

NiN Kar lay N g guides Nr4 TERRESTRIAL



Description of mapping units on a scale of 1:5000

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by NiN (2.2.0)

Description of
mapping units on a

scale of 1:5000 according to

NiN version 2.2.0

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NiN (Nature in Norway) system documentation

NiN is based on extensive scientific work carried out by a number of experts. In the system documentation you will find all professional documentation, including theory and principles on which the system is based, how the system is structured, changes that have been made etc.

NiN (Nature in Norway) mapping guides

These are the Artdatabanken's guides for practical mapping of natural variation according to the NiN system. Among the publications here are descriptions of mapping units, species tables etc. which should be of help in practical mapping and other uses of NiN.

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NiN (Nature in Norway) R&D

reports The R&D reports contain results of research and development work financed through the Artsdatabank, with the aim of improving the NiN system.

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Contents

Introduction	10
Explanation of the descriptions	11
DESCRIPTIONS	21
M8-C-1 Helophyte saltwater swamp	22
M9-C-1 Littoral Basin	23
L4-C-1 Calcareous helophyte swamp	24
L4-C-2 Slightly calcareous to intermediate helophyte swamp	25
L4-C-3 Calcareous helophyte swamp	26
T1-C-1 Slightly drought-prone, very and fairly calcareous bare rocks	27
T1-C-2 Drought-exposed very and rather low-calc rocks, rock walls and crags	28
T1-C-3 Slightly drought-prone slightly calcareous and slightly intermediate bare rocks	29
T1-C-4 Drought-prone slightly calcareous and slightly intermediate rocks, rock walls and crags	30
T1-C-5 Mild drought-prone strongly intermediate and slightly calcareous bare rock	31
T1-C-6 Drought-prone intermediate and slightly calcareous rocks, rock walls and crags	32
T1-C-7 Slightly drought-prone fairly to extremely calcareous bare rock	33
T1-C-8 Drought-prone rather to extremely calcareous rocks, rock walls and knolls	34
T1-C-9 Lime-poor and slightly intermediate weathered rock	35
T1-C-10 Strong intermediate to extremely calcareous weathered rock	36
T1-C-11 Calcareous and weakly intermediate snow-bearing rock	37
T1-C-12 Strong intermediate to extremely calcareous snow bedrock	38
T2-C-1 Open calcareous shallow heathland	39
T2-C-2 Open calcareous shallow lowland	40
T2-C-3 Open intermediate shallow heathland	41
T2-C-4 Open intermediate shallow lowland	42
T2-C-5 Open slightly calcareous shallow heathland	43
T2-C-6 Open slightly calcareous shallow lowland	44
T2-C-7 Open highly calcareous shallow heathland	45
T2-C-8 Open highly calcareous shallow lowland	46
T3-C-1 Lime-poor lee side	47
T3-C-2 Calcareous mountain heather	48
T3-C-3 Calcareous mountain-lowland	49
T3-C-4 Intermediate reading page	50
T3-C-5 Intermediate mountain heather	51
T3-C-6 Intermediate mountain-lowland	52
T3-C-7 Weak calcareous lees side	53
T3-C-8 Slightly calcareous mountain heather	54
T3-C-9 Slightly calcareous mountain-lowland	55
T3-C-10 Strong calcareous loess side	56
T3-C-11 Strong calcareous mountain heather	57
T3-C-12 Strongly calcareous mountain-lowland	58

T3-C-13 Intermediate source affected reading page	59
T3-C-14 Calcareous source-influenced lees site	60
T4-C-1 Blueberry forest	61
T4-C-2 Weak low herbaceous forest	62
T4-C-3 Lågurtskog	63
T4-C-4 Kalklågurt forest	64
T4-C-5 Bærlyn forest	65
T4-C-6 Weak heather-low herbaceous forest	66
T4-C-7 Bærlyng-lågurt forest	67
T4-C-8 Bærlyng-limestone forest	68
T4-C-9 Heather forest	69
T4-C-10 Weak heather-lowgrass forest	70
T4-C-11 Heather-low gur forest	71
T4-C-12 Heather-limestone forest	72
T4-C-13 Lichen forest	73
T4-C-14 Weak lichen-low herbaceous forest	74
T4-C-15 Low-low herbaceous forest	75
T4-C-16 Lichen-calcareous bog forest	76
T4-C-17 Large Fern Forest	77
T4-C-18 Høgstaedeskog	78
T4-C-19 Slightly drought-prone tall perennial forest	79
T4-C-20 Drought-prone tall perennial forest	80
T5-C-1 Lime-poor to slightly lime-rich caves and overhangs not exposed to drought	81
T5-C-2 Highly calcareous caves and overhangs not exposed to drought	82
T5-C-3 Less calcareous cave depth	83
T5-C-4 Inner part of deep karst cave	84
T5-C-5 Dry low-calcareous overhang	85
T5-C-6 Dry intermediate and slightly calcareous overhang	86
T5-C-7 Dry strongly calcareous overhang	87
T6-C-1 Calcareous beach rocks	88
T6-C-2 Calcareous boulder in the wave splash zone	89
T7-C-1 Very calcareous moderate snow bed	90
T7-C-2 Slightly calcareous moderate snow bed	91
T7-C-3 Intermediate moderate snow bed	92
T7-C-4 Weak calcareous and intermediate late snow bed	93
T7-C-5 Weak calcareous and intermediate extreme snow bed	94
T7-C-6 Slightly calcareous moderate snow bed	95
T7-C-7 Weak calcareous late snow bed	96
T7-C-8 Strong calcareous moderate snow bed	97
T7-C-9 Strong calcareous late snow bed	98
T7-C-10 Calcareous extreme snow bed	99
T7-C-11 Vegetation-free snow bed	100
T7-C-12 Source-influenced intermediate snow bed	101
T7-C-13 Source-influenced weak calcareous snow bed	102
T7-C-14 Source-influenced calcareous snow bed	103

T8-C-1 Fuglefjell meadows	104
T8-C-2 Fuglefjell-Högstaudeen meadow	105
T8-C-3 Bird peak	106
T9-C-1 Poor-intermediate moss tundra	107
T9-C-2 Calcareous moss tundra	108
T10-C-1 Arctic steppes	109
T11-C-1 Salt enrichment fields in geolittoral	110
T11-C-2 Upper salt enrichment field on gravel	111
T12-C-1 Beach meadows in the lower and middle geolittoral	112
T12-C-2 Beach meadows in the upper geolittoral and supralittoral	113
T13-C-1 Lime-poor rough watch	114
T13-C-2 Lime-poor clock	115
T13-C-3 Lime-poor gravel and sand-dominated wasteland	116
T13-C-4 Intermediate and slightly calcareous coarse chert	117
T13-C-5 Intermediate and slightly calcareous chert	118
T13-C-6 Intermediate and slightly calcareous gravel- and sand-dominated alluvial soil	119
T13-C-7 Strongly calcareous coarse urn	120
T13-C-8 Highly calcareous urn	121
T13-C-9 Strongly calcareous gravel and sand-dominated alluvial soil	122
T13-C-10 Lime-poor damp coarse clock	123
T13-C-11 Lime-poor humid clock	124
T13-C-12 Intermediate and slightly calcareous moist coarse chert	125
T13-C-13 Intermediate and slightly calcareous moist chert	126
T13-C-14 Strongly calcareous moist coarse urn	127
T13-C-15 Strongly calcareous moist urn	128
T14-C-1 Lime-poor and intermediate rabbe	129
T14-C-2 Calcareous gravel	130
T15-C-1 Calcareous and intermediate fosse-meadow	131
T15-C-2 Calcareous waterfall meadow	132
T16-C-1 Calcareous racemeadow and heathland	133
T16-C-2 Intermediate race meadow and heath	134
T16-C-3 Weakly calcareous heath meadow and heath	135
T16-C-4 Strongly calcareous heath meadow and heath	136
T16-C-5 Source-influenced intermediate racemeadow and heath	137
T16-C-6 Spring-affected calcareous racemeadow and heath	138
T16-C-7 Strongly marked race meadow and heath	139
T17-C-1 Landslide	140
T17-C-2 Gravel and sand landslides	141
T17-C-3 Silt and clay landslides	142
T18-C-1 Open flood-resistant fields on sand, gravel and stone	143
T18-C-2 Open flood resistant soil on silt and clay	144
T18-C-3 Open flood-resistant ground on calcareous gravel and stone	145
T18-C-4 Open flood-proof land on sand with clear signs of erosion	146
T19-C-1 Lime-poor fine soil patches	147
T19-C-2 Calcareous fine soil patches	148

T20-C-1 Lime-poor and intermediate ice-freezing ground	149
T20-C-2 Calcareous ice-freezing soil	150
T21-C-1 Foreshore and primary dunes	151
T21-C-2 White and gray duvets	152
T21-C-3 Brown quilts and quilt heather	153
T21-C-4 Quilt trough	154
T22-C-1 Calcareous and intermediate mountain grass heath	155
T22-C-2 Lime-poor and intermediate grass snow bed	156
T22-C-3 Calcareous mountain grass heath	157
T22-C-4 Calcareous grass snow bed	158
T23-C-1 Freshwater impoundment	159
T24-C-1 Protected and moderately exposed drift embankments	160
T25-C-1 Historic landslide	161
T25-C-2 Historic gravel and sand slides	162
T25-C-3 Historic silt and clay landslides	163
T26-C-1 Fjellhei initials	164
T26-C-2 Snow bed initials	165
T26-C-3 Gravel and stone-dominated glacier foreland in the pioneer phase	166
T26-C-4 Glacier foreland and snowmelt areas in pioneer phase, dominated by fine gravel, sand, silt to clay	167
T27-C-1 Calcareous and intermediate block soil	168
T27-C-2 Lime-poor and intermediate snow bed block land	169
T27-C-3 Calcareous block soil	170
T27-C-4 Calcareous snow bed block land	171
T27-C-5 Block land in vegetation-free snow bed	172
T27-C-6 Lime-poor and intermediate blocky soil characterized by rabies	173
T27-C-7 Calcareous craggy block ground	174
T28-C-1 Calcareous polar desert	175
T28-C-2 Intermediate and slightly calcareous polar desert	176
T28-C-3 Highly calcareous polar desert	177
T29-C-1 Stone and gravel beaches and shorelines in the pioneer phase on epilitoral land	178
T29-C-2 Stone and gravel beaches and shorelines in the establishment and consolidation phase on epilitoral land	179
T29-C-3 Upper shell sand beach with pioneer vegetation	180
T29-C-4 Upper shell sand beach in the establishment and consolidation phase	181
T29-C-5 Stone and gravel beaches and shorelines in the pioneer phase in the supralitoral	182
T29-C-6 Lower shell sand beach with pioneer vegetation	183
T30-C-1 Floodplain forest fields on gravel and stone	184
T30-C-2 Floodplains on fine material	185
T30-C-3 Source-influenced floodplain forests on fine material	186
T30-C-4 Erosion-prone floodplain forest land	187
T31-C-1 Calcareous boreal fresh heath	188
T31-C-2 Calcareous boreal heather	189
T31-C-3 Calcareous boreal lowland	190
T31-C-4 Intermediate boreal fresh hi	191
T31-C-5 Intermediate boreal heath	192
T31-C-6 Intermediate boreal lowland	193

T31-C-7 Weak calcareous boreal fresh heath	194
T31-C-8 Weak calcareous boreal heather	195
T31-C-9 Weak calcareous boreal lowland	196
T31-C-10 Highly calcareous boreal fresh heath	197
T31-C-11 Highly calcareous boreal heather	198
T31-C-12 Highly calcareous boreal lowland	199
T31-C-13 Intermediate source-influenced boreal fresh heath	200
T31-C-14 Calcareous source-influenced boreal fresh heath	201
T32-C-1 Lime-poor meadow with less heather	202
T32-C-2 Lime-poor meadow with clear heather	203
T32-C-3 Intermediate meadow with less heath	204
T32-C-4 Intermediate meadow with clear heather	205
T32-C-5 Weak calcareous meadow with less heather	206
T32-C-6 Intermediate meadow with a slight hint of fertilization	207
T32-C-7 Strongly calcareous meadow with less heather	208
T32-C-8 Strongly calcareous meadow with clear heather	209
T32-C-9 Calcareous tall perennial meadow with less heather	210
T32-C-10 Calcareous tall perennial meadow with a clear hint of heather or a weak hint of fertilization	211
T32-C-11 Lime-poor dry rain with less heaviness	212
T32-C-12 Lime-poor dry reng with a clear heaving character	213
T32-C-13 Intermediate dry with less heaviness	214
T32-C-14 Intermediate dry rain with a clear hint of heaviness or a weak hint of fertilization	215
T32-C-15 Weakly calcareous dry soil with less heaviness	216
T32-C-16 Weak calcareous dryland with a clear hint of heaving or a faint hint of fertilization	217
T32-C-17 Strong calcareous dry soil with less heaviness	218
T32-C-18 Strong calcareous dry soil with a clear heaving character	219
T32-C-19 Dune-meadow with a clear sign of heaving or a weak sign of fertilisation	220
T32-C-20 Weakly calcareous meadow with clear heather	221
T32-C-21 Weak calcareous meadow with a faint hint of fertilisation	222
T33-C-1 Lower semi-natural salt marsh	223
T33-C-2 Upper semi-natural salt marsh	224
T34-C-1 Lime-poor bakli heather	225
T34-C-2 Calcareous coastal heaths	226
T34-C-3 Intermediate bakli-hi	227
T34-C-4 Intermediate coastal moors	228
T34-C-5 Slightly calcareous coastal heath moors	229
T34-C-6 Highly calcareous coastal heaths	230
T35-C-1 Strongly altered solid land with soil cover	231
T35-C-2 Strongly altered permanent soils with a cover of sand or gravel	232
T35-C-3 Strongly altered firm ground with a cover of silt and clay	233
T36-C-1 Strongly altered former wetland	234
T36-C-2 Dried river bed	235
T36-C-3 Dried lake bed	236
T37-C-1 Slag heaps and landfills for solid chemical waste	237
T37-C-2 Asphalt, loose concrete and the like	238

T37-C-3 Waste landfill and similar	239
T38-C-1 Tree Plantation	240
T39-C-1 Block dumps	241
T39-C-2 Exposed solid rock	242
T39-C-3 Solid rock exposed by dry laying or draining	243
T39-C-4 Heavily modified or synthetic, predominantly inorganic solid substrates	244
T40-C-1 Meadow-like strongly altered solid ground	245
T41-C-1 Meadow-like cultivated field	246
T42-C-1 Flower beds and similar	247
T43-C-1 Lawns, parks and the like	248
T44-C-1 Arable	249
T45-C-1 Cultivated permanent meadows with little intensive heath	250
T45-C-2 Cultivated intensive mowed meadow	251
T45-C-3 Cultivated very intensive hay meadow	252
V1-C-1 Very and fairly calcareous bog surfaces	253
V1-C-2 Slightly calcareous and slightly intermediate bog surfaces	254
V1-C-3 Strongly intermediate and slightly calcareous bog surfaces	255
V1-C-4 Fairly to extremely calcareous bog surfaces	256
V1-C-5 Very and fairly calcareous bog edges	257
V1-C-6 Slightly calcareous and slightly intermediate bog edges	258
V1-C-7 Strongly intermediate and slightly calcareous bog edges	259
V1-C-8 Fairly to extremely calcareous bog edges	260
V1-C-9 Salt-affected marsh edge	261
V2-C-1 Lime-poor and slightly intermediate marsh and swamp forest lands	262
V2-C-2 Strongly intermediate and slightly calcareous bog and swamp forest fields	263
V2-C-3 Fair to extremely calcareous bog and swamp woodlands	264
V3-C-1 Ombrotrophic peatlands	265
V3-C-2 Ombrotrophic bog edge	266
V4-C-1 Slightly calcareous and slightly intermediate weak source	267
V4-C-2 Strongly intermediate and slightly calcareous springs	268
V4-C-3 Fair to extremely calcareous springs	269
V4-C-4 Strongly intermediate and slightly calcareous peatland sources	270
V4-C-5 Fair to extremely calcareous peatland sources	271
V5-C-1 Weak heat source	272
V5-C-2 Clear heat source	273
V6-C-1 Lime-poor and intermediate moderate wet snow bed	274
V6-C-2 Calcareous moderate wet snow bed	275
V6-C-3 Lime-poor and intermediate late wet snow bed	276
V6-C-4 Calcareous late wet snow bed	277
V6-C-5 Lime-poor and intermediate extreme wet snow bed	278
V6-C-6 Calcareous extreme wet snow bed	279
V6-C-7 Calcareous and intermediate late source snow bed	280
V6-C-8 Calcareous late spring snow bed	281
V6-C-9 Extreme source snow bed	282
V7-C-1 Lime-poor and intermediate permafrost wetland	283

V7-C-2 Calcareous permafrost wetland	284
V8-C-1 Lime-poor and intermediate beach and swamp forest land	285
V8-C-2 Calcareous beach and swamp forest land	286
V8-C-3 Salt-affected coastal and swamp forest land	287
V9-C-1 Lime-poor semi-natural bog	288
V9-C-2 Intermediate semi-natural bog	289
V9-C-3 Calcareous semi-natural bog	290
V10-C-1 Intermediate wet meadow	291
V10-C-2 Calcareous wet meadow	292
V10-C-3 Wet meadow affected by spring water	293
V11-C-1 Lime-poor peat roof	294
V11-C-2 Calcareous peat roof	295
V12-C-1 Ditched low-calcareous peat bog	296
V12-C-2 Ditched calcareous groundwater bog	297
V12-C-3 Ditched rainfall marsh	298
V13-C-1 New wetlands originating in strongly altered terrestrial systems	299
V13-C-2 New wetlands originating in agricultural land on solid land	300
V13-C-3 New wetlands originating in dammed woodland	301
V13-C-4 New wetlands originating in freshwater bottoms	302
I1-C-1 Snow- and ice-covered solid ground	303
OTHER PROVIDED INFORMATION	305
Key to, and brief description of, strongly altered land types (T35–T45)	305

Introduction

The present document contains descriptions of all units for terrestrial nature mapping according to NiN version 2.2 adapted to the scale 1: 5,000. In addition, two marine units (M) and three limnic units (L) are included. The descriptions are cut across a common template, and each description is limited to one page so that the collection of descriptions should be easy to find, e.g. in field. The descriptions are arranged consecutively by main type number (e.g. main types in solid land systems, indicated by T; or main types in wetland systems, indicated by V), then by number of mapping unit (C-1, C-2 etc. within each main type; see the main guide) Table C2). To make the best possible use of the limited space, standard abbreviations are used extensively. These are explained in the sections below; one paragraph for each of the main headings in the description template that needs explanation. A prerequisite for being able to use the descriptions is a certain familiarity with the principles and criteria that underlie the type classification at the natural system level in NiN. These are described in the document "NiN's System Core", but also very briefly reproduced below in the section "NiN characteristics".

As an addition to this document, sorted lists of the distribution of species along important local complex environmental variables (LKM) have been prepared in selected, area-wise or otherwise particularly important main types of wood. These lists are published in the document "Species tables and other prepared documentation for the variation along important LKM" and in an associated excel file. These species lists have been compiled on the basis of the principles for generalized species list datasets (see the document »NiN's system core" and the document "Basis for type classification of the natural system level"; the most important of these are explained in the chapter "Species lists" below.

Explanation of the descriptions

NiN characteristic

Under this heading, the mapping units are placed in the type system for the natural system level in NiN version 2.2. At the natural system level, the species composition is the **characterizing natural property** (the nature characteristic that is primarily used to characterize the natural variation at this natural diversity level), while local complex environmental variation is the **characterizing source of variation** (that is, the basic nature characteristic used to explain the variation in the species composition). Local complex environmental variation means variation in environmental conditions that give rise to patterns on a relatively fine spatial scale (typically less than 1 km) and which are stable over a relatively long time (typically more than 100(–200) years). The local complex environmental variation is described by defining **local complex environmental variables** (LKM), variables that consist of several individual environmental variables that co-vary to a greater or lesser extent, and which give rise to variation in species composition on a relatively fine spatial scale and which have an effect that persists over a relatively long time (typically more than 100(–200) years). The LKM concept is one of the most central concepts in NiN.

The type system is hierarchical with three levels; main type group, main type and base type. Three of the seven main type groups contain 'terrestrial nature'; there are solid ground systems (T), wetland systems (V) and snow and ice systems (I). Within each of the main type groups, the main types are defined using a verifiable procedure that first identifies the **normal range of variation within each main type group**, i.e. the area-wise dominant range of variation in species composition and environmental conditions within the main type group (that is, also within a dominant ecosystem component), which can be described by using a limited set of main complex variables (important LKMs), and then defines **special variation within the main type group**, i.e. all other variation. The basis for distinguishing something as special variation is the identification of at least one **special local complex environmental variable** (= sLKM), i.e. a local complex environmental variable that explains more variation in species composition than 2 ecological distance units (\varnothing AE) between centers of gravity for a nature type within normal range of variation within a natural system main type group and a comparable natural type that does not lie within the normal range of variation. This criteria-based method for identifying main types assumes that it is possible to calculate an ecological "distance" between candidates for habitat types along any LKM. In NiN version 2, a methodology has been developed to calculate such "distances" on the basis of standardized, so-called generalized, species lists. An **ecological distance unit** (1 \varnothing AE) corresponds to a difference in the species composition between two systems being compared, each represented by a generalized species list, where a quarter of the species composition is replaced. In addition, the division into main types takes into account important ecological structuring processes (see NiN's system core Article 1, chapter B3), so that one and the same main type should only contain variation that is conditioned by the same important ecological structuring processes. In total, 18 different categories of natural variation have been identified on the basis of ecologically important structuring processes. In total, NiN version 2.2 identified 45 main types in solid land systems, 13 in wetland systems and 1 terrestrial main type in snow and ice systems.

Each main type is divided into basic types based on the identification of the LKM that are most important for explaining the variation in species composition within the main type. To be considered important, there must be at least 2 \varnothing AE between the endpoints along an LKM within a main type. The number of basic types that are distinguished along an LKM must be in proportion to how much variation in species composition there is along this LKM in this main type - the rules state that there must be one basic type per started \varnothing AE beyond the first. This means that if there are 2.7 \varnothing AE between the end points along an LKM within a main type, 2 basic types must be distinguished along this. If there are several important LKMs, the divisions of these are combined into a network of basic types. The variation in species composition along a given LKM is not the same within each main type. As an example, we can take lime content (KA), which is a _____

important LKM to explain variation in species composition in the majority of the main terrestrial types. In open soil water bog (V1) the variation along KA is > 5 ØAE, while on rabbe (T14), where the environmental conditions are much more extreme, it is only between 2 and 3 ØAE. Thus, the same step division of the LKMs cannot be used for basic type division across the main types - a step division adapted to the main type is required, so that KA is divided into 5 steps in V1 and 2 steps in T14. It is strongly desirable that we should be able to use the same terminology to describe the variation along one and the same LKM, e.g.

CA. To achieve this, while adapting the division to the variation within each main type for use in defining basic types, each LKM is first divided into a number of small **base steps**. The base steps are the smallest steps (intervals), each with an extent of 0.5–1.0 ØAE, along a complex environmental gradient, measured in the main type and in the geographical and ecological context where it is assumed that the variation in species composition within the relevant interval along the environmental gradient is greatest. By using the basic level division as a starting point for the conceptual apparatus that describes the variation along the LKMs and as a starting point for the main type-adapted step division of the complex environmental variables, we achieve at the same time a common conceptual apparatus and a division into basic types that are adapted to the main type.

Lime content (KA), with as many as nine basic steps, is a good example of this. In T14, KA is divided into one stage adapted to the main type, KAÿ1, for low-calcium and intermediate rabbits and one stage, KAÿ2, for calcium-rich rabbits. KAÿ1 is made up of the five lowest base steps, KAÿ2 of the top four. Main type-matched steps are indicated by numbers (or for the few naturally class-divided LKMs, a capital letter), while the base steps are indicated by the number 0, lower case letters or the symbols + or □. The main type-matched steps are therefore defined on the basis of the base step division. In T14, KAÿ1 defined as KAÿabcde, while KAÿ2 is KAÿfghi.

For some LKMs, there are incorporated combinations of main type-matched step divisions that extend across several main types. This applies, for example, to heaving intensity (HI) from permanent forest land (T4) to cultivated permanent meadow (T45), and sand stabilization (SS) from dune land (T21) to T4. In such cases, it is appropriate to combine the main type-matched step divisions for the relevant main types into a **background step division**. The 'technical' definition of this term is 'tiering of complex environmental variables that simplifies the basic tiering and which does not satisfy the definitions of dataset-specific, main type-specific or main-type-adapted tiering', but in the context of species lists the term is used of main-type-adapted tiering that is linked across main types. Each step in a background step classification is usually one standard step, but in some cases exceptions have been made to capture variation along the ULKM within main types. Background step divisions are also used in special cases where what in NiN is perceived as several LKMs due to the fact that the most important ecological structuring process changes along the way, in nature is combined into one long vegetation gradient, preferably connected to a topographic gradient. The classic example of this is the three LKMs wind exposure (VI), desiccation risk (UF) and snow cover-related growing season reduction (SV), which together form the classic 'rabbe-snow bed gradient' in the mountains.

The steps of the background step divisions are denoted by large Roman numerals; I, II, III etc.

The basic type division of the main natural system types does not take into account the spatial scale on which the important LKMs vary. Some LKMs, e.g. drying duration (TV), which explains the variation from soft mats to tufts in bogs, varies on very fine spatial scales. In order for the NiN system to be used for practical nature mapping at scales coarser than 1:500, where the ground types can be used directly as mapping units with a minimum area for delineating polygons of 1 m² , the ground types are aggregated into scale-adjusted mapping units on the basis of which spatial variation is found along the relevant LKMs (see the main guide. While the 59 main terrestrial types comprise 443 ground types, the number of mapping units adapted to mapping in 1:5000 with a minimum area of 250 m² is only 281.

The NiN characteristic in the descriptions contains information about the mapping unit's affiliation to main type group and main type, how many basic types it consists of, and which step combinations along important LKMs that define the mapping unit. "Defined by LKM" defines the mapping unit using the main type-matched step division, while 'LKM base step' indicates

the base step combination that defines is the unit. Note that 'KAÿabc' means all basis steps along KA from and including KAÿa to and including KAÿc.

In Table 1 below, all the 43 LKMs that are relevant for the main terrestrial types are listed, with an indication of the number of base steps. This is an edited version of the document NiN type division and description system for the natural system level: Table B1–1. An overview of the basic level division of these LKMs, and the names of the basic levels, can be found in NiN type classification and description system for the natural system level Table B1–2. In Table 2, the 59 main terrestrial types at the natural system level are listed, with information on which LKMs are so important that they are used for basic type division of the main types, as well as the number of mapping units in 1: 5000. This table is an edited version of the one that can be found in the document NiN type classification and description system for the natural system level: Table C1–2, added information from the Main Supervisor, Table C2. Main types for which there are descriptions of the mapping units in the present edition of this document are highlighted. These, and all other main types, are described in the document "NiN type classification and description system for the natural system level": Appendix 2. The basis for the basic type division is also thoroughly described, and there are "basic type diagrams" for each main type.

Table 1. Overview of local complex environmental variables (LKM) that are used in type classification (such as nLKM, sLKM, dLKM, hLKM or tLKM) or in the description system (such as uLKM) in terrestrial main types at the natural system level in NiN 2.0. VM = category of variation pattern that characterizes the LKM in question [f = factor, g = gradient (ga = gradient ending in a species thinning interval; gs = successional gradient; starting with accumulation of species); t = transition type (actually a gradient, but with a clear threshold interval where a rapid replacement of the species composition occurs so that it is appropriate (and often natural) to treat it as a factor)]. ØSP = category of ecological structuring process that best characterizes the relevant LKM [S = environmental stress (marked with light blue color); R = regulatory disturbance (violet color); D = destabilizing disturbance (red color); L = (slow) succession (green color)]. bK/bT = base class/basic step division, with any zero steps (0), intermediate steps (designation a,b,c etc. for the last intermediate step is indicated), any natural end steps (¤) and transition steps (+) [the indication '0d¤' means that the environmental gradient has a zero step, is divided into 4 intermediate steps and ends in a natural final step]. RS = characteristic spatial scale for variation along the environmental variable (expressed on a 2-log scale, rounded down to the nearest whole number; that is, the value 6 indicates RS in the range between 26 and 27 (64–128) m. –1: 0.5–1 m; 0: 1–2 m; 1: 2–4 m; 2: 4–8 m; 3: 8–16 m; 4: 16–32 m; 5: 32–64 m; 6: 64–128 m; 7: 128–256 m; 8: 256–512 m; 9: 512–1024 m; 10: > 1024 m. KG = knowledge base, generally about relationships between variation along the environmental variable and variation in species composition, including processes and mechanisms, the importance of the variable for the species composition and descriptive knowledge of the (co)variation patterns. KS = knowledge base, especially about the basis for dividing the environmental variable into stages (whether the stage division in NiN 2 is based on empirical material and analyses, or not). Knowledge status is indicated on the five-step scale explained in the document NiNsystemkjerne ch. A2d and Table A2–3 and Fig. A2–4 (0 = none; 1 = very weak; 2 = weak; 3 = acceptable; 4 = good; 5 = certain).

Code Name		WC ØSP		bK/ bT RS		KG	KS
AS	Arid terrestrial salinity	t	S	0a	5	3	2
BK	Bedrock with a different chemical composition	f	S	0d	4	3	2
IS	Vulnerability to erosion	go	D	0b¤	8	3	2
FR	Flood regime	f	R	0a	10	3	4
GS	Cave-related shielding	go	S	0d¤	3	3	1
HF	Slope-dependent disturbance intensity	g	R	0b+	1	2	2
HI	Claim intensity	g	D	0j	6	4	5
HR	Semi-natural hedging regime	f	D	0a	7	5	5
HS	Main type-specific division						
IF	Glacial disturbance	go	D	0b¤	2	2	1
IO	Content of organic matter	g	D	0b¤	3	2	2
JF	Earth flow	g	D	0b	3	2	4
JV	Geothermal influence	go	S	0e¤	6	3	2

Code Name		WC	ØSP	bK/ bT	RS	KG	KS
CA	Lime content	g	S	-	7	4	5
AI	Source water impact	g	S	0f¤	1	3	5
KT	Source type	f	S	f	7	3	2
LET	Slow primary succession	g.s	L	0f+	6	3	2
MB	Tillage	f	D	0+	6	4	3
MF	Marsh surface features	g	S	0 f	5	2	3
MX	Semi-natural land/bottom with no character, characterized by human-induced disturbance	f	D	0a	7	3	2
NG	Natural fertilization	go	S	0d¤	1	3	2
OF	Freezing	g	D	0b	2	2	2
OR	Sprinkling	g	S	0c	0	2	2
PF	Permafrost	f	S	0a	7	3	2
RU	Racial vulnerability	go	R	0e¤	5	2	3
SO	Marine salinity	g	S	0f+	4	4	4
SF	Salt enrichment of soil in the spring belt	go	S	0b¤	2	4	3
SH	Special land/bottom characterized by historical environmental stress or disturbance	f	R	0e	8	3	2
SP	Mowed field character	t	R	0a	6	3	4
SS	Sand stabilization	g.s	D	0k+	3	4	2
SU	Landslide vulnerability	go	D	0c¤	4	2	3
SV	Snow cover-related growing season reduction	go	S	0f¤	4	4	5
SX	Strongly changed land/bottom without a strong character, characterized by human-induced disturbance	f	D	0o	7	3	2
S1	Dominant grain size class	f	R	0 in			
TEA	Peat-producing ability	g	R	¤0	-1	5	5
Television	Drying duration	g	S	0l+	0	5	5
EU	Desiccation exposure	g	D	0g	2	3	2
UF	Danger of drying out	g	D	h	4	4	5
VF	Water impact intensity	go	D	0h¤	3	3	2
WE	Wind exposure	go	D	0c¤	3	3	4
WC	Water saturation	g	S	0b+	1	4	5
Vs	Water splash intensity	g	R	0e+	3	2	1
VT	Water supply	f	S	0c	8	3	3

Table 2. NiN version 2: Main type division at the natural system level. HTK = Main type code, PrK = procedural category, i.e. assignment to group (category) from 1 to 14b according to the procedure for criteria-based main type classification.

The main types are arranged in the order given by the procedure category. Within each category, the major types are arranged so that major types representing early stages in frozen successions (e.g., bare rock) come first and systems with well-developed soils and well-established communities of perennial species (e.g., meadows) come last. GrL = the basis for defining the main type, indicated as follows: 0 – normal main type; D – main type conditioned by destabilizing disturbance; R – main type conditioned by regulatory disturbance; M and N – conditioned by anthropogenic disturbance, respectively semi-natural and highly altered land (+ H = natural, + J = agricultural land); A – main type conditioned by structuring species groups; S – environmental stress-related main type; X – main type separated for special land/bottom on the basis of historical disruptive environmental stress (XS) or destabilizing disturbance (XD). L indicates main type in slow succession, i.e. without ground cover.

LKM (local complex environment variables) = column containing the main type's complex environment variable group. For (special) main types conditioned by environmental stress or disturbance, in the defining LKM (dLKM), i.e. the sLKM that distinguishes the main type from the corresponding normal main type is indicated first and in **dark red** font in brackets, hLKM is indicated in **red font** in order explained by assumed decreasing variation in species composition, followed by any additional complex environmental variables (tLKM) in **orange text** and subordinate environmental variables that are part of the description system in **gray text**. Main types that follow directly from the definition of the procedure category are indicated with P for defining LKM. GT# and KE# respectively indicate the number of basic types and the number of mapping units adapted to the scale 1: 5000 into which the main type is divided.

HTK	PrK	GrL	Name	LKM	GT#	KE#
Mainland systems						
T1	1	0L	Bare rock	KA UE OR HF VF VS LA NG VI SV IF BK	85	12
T2	1	0	Open shallow land	KA UF VM BK HI	8	8
T3	1	0	Mountain heath, lee side and tundra	KA UF KI BK HI RU WC	14	14
T4	2	A	Permanent forest land	UF KA KI BK HI SU RU SS S1 VM VS UE	20	20
T5	3	SL	Cave and overhang	(GSÿa+) GS KA UE BK LA	10	7
T6	3	SL	Strandberg	(TVÿk– SAÿa+) TV KA VF HF IF	7	2
T7	3	S	Snow rent	(SVÿa+) KA SV KI VM HI S1	14	14
T8	3	S	Fuglefjell meadow and bird peak	(NGÿa+) NG KI UF KA HI	5	3
T9	3	S	Moss tundra	(NGÿab PFÿa IOÿb) KA WC	2	2
T10	3	S	Arctic steppe	(ASÿa) VI	2	1
T11	3	S	Salt enrichment land in the spring belt	(TVÿk– SFÿb+) TV S1	3	2
T12	3	S	Beach meadow	(TVÿk– SAÿa+) TV SA HI S1 VM KA	4	2
T13	4	FL	Rasmark	(RUÿb+) KA S1 UE RU BK VI	18	15
T14	4	R	Rabb	(Viÿa+) VI KA	3	2
T15	4	R	Fosse meadow	(VSÿbcd) KA VS HI KI	2	2
T16	4	R	Rasmarkhei and meadows	(RUÿb+) KA RU KI UF HI BK VI WC	7	7
T17	5	DL	Active landslide	(SUÿbc) S1 SU KA KI	4	3
T18	5	DL	Open flood-resistant land	(VFÿf+) S1 VF KA FR IF KI HI	6	4
T19	5	D	Freezing ground	(PFÿa OFÿa) S1 KA	3	2
T20	5	D	Ice freezing ground	(IFÿb) KA	2	2
T21	5	D	Sand dune field	(SSÿi–) SS VI VM HI	8	4
T22	5	D	Mountain grassland and grass tundra	(JFÿab) KA SV WC	4	4
T23	5	D	Freshwater drift embankment	(TVÿk– IOÿe)	1	1

HTK	PrK	GrL	Name	LKM	GT#	KE#
T24	5	D	Drift full	(TVýk– IOý¤ SAýa+) VF WC	3	2
T25	6a	XD	Historical landslide field	(SHýa) S1 KA KI	4	3
T26	6b	XSL	Glacier foreland and snow melting area	(SHýb) SV VM LA S1 KA KI	7	4
T27	6b	XRL	Blockmark	(SHýc) SV KA VI LA BK S1 UE	8	7
T28	6b	XRL	Polar desert	(SHýd PFýa) KA	3	3
T29	6b	XRL	Gravel and stone-dominated beach and shoreline	(SHýe) S1 LET WE TV HI	10	6
T30	9	AD	Flomskogsmark	(VFýbcde) S1 VF KI ER KA HI SA	7	4
T31	10	M	Boreal hi	(MXýa) KA UF KI BK HI WC	14	14
T32	11b	MHJ	Semi-natural meadow	(HIýbcde) KA HI KI UF SS SP WC	21	21
T33	11b	MHJ	Semi-natural salt marsh	(HIýbcde TVýk– SAýa+) TV SA SP WC S1 HI KA	2	2
T34	11b	MHJ	Kystlynghei	(HIýbcde HRýa) KA UF VM BK	12	6
T35	12a	N	Strongly changed solid land with loose soil cover [Fix heavily altered landmass]	(SXýe) S1 KA	4	3
T36	12a	N	New solid land on former wetland and fresh water bed [Dried wetland and fresh water systems]	(SXýf) HS* KA	3	3
T37	12a	N	New permanent soil on highly modified and synthetic substrates, in rapid succession [New loose permanent soil]	(SXýg) HS*	3	3
T38	12a	N	Tree plantation	(SXýe) UF KA	1	1
T39	12b	NL	Hard strongly changed and new firm ground in slow succession [Hard strongly changed firm ground]	(SXýh) HS* LA	8	4
T40	13a	NH	Strongly altered solid land with semi-natural meadow characteristics [Road edges, lawns, parks and the like with semi-natural meadow characteristics]	(SXýi MBý0) KA UF SP VM SS SA	1	1
T41	13b	NHJ	Cultivated land with semi-natural meadow character [Cultivated land with semi-natural meadow character]	(SXýj MBý+) KA HI SP WC	1	1
T42	14a	NH	Heavily modified, frequently cultivated firm ground with an intensive hedging character [Flower beds and other frequently cultivated land]	(SXýk MBý0) O	1	1
T43	14a	NH	Strongly modified, permanent permanent land with an intensively cultivated character [Lawns, parks and the like without a semi-natural meadow character]	(SXýk MBý+)	1	1
T44	14b	NHJ	Arable	(SXýl MBý0) KA S1 WC	1	1
T45	14b	NHJ	Cultivated permanent meadow	(SXýl MBý+) HI SP KA S1 WC	4	3
Wetland systems						
V1	1	0	Open groundwater bog	KA TV MF KI SA VT TE	32	9
V2	2	A	Marsh and swamp forest land	KA TV KI	8	3
V3	3	S	Precipitation marsh	(VTýc) TV MF VI TE	7	2

HTK	PrK	GrL	Name	LKM	GT#	KE#
V4	3	S	Cold spring	(Klýd+) KA KI KT	9	5
V5	3	S	Hot spring	(Klýd+ JVýa+) JV	2	2
V6	3	S	Wet snow bed and snow bed source	(SVýa+ IOý0a) SV KA KI	9	9
V7	3	S	Arctic permafrost wetland	(PFýa) KA TV	2	2
V8	7 AS	Strandsumpskogsmark		(VTýa) KA SA	3	3
V9	11b	MHJ	Semi-natural bog	(Hlýbcde) KA TV KI SP	3	3
V10	11b	MHJ	Semi-natural wet meadow	(Hlýbcde IOý0a) KA KI SP	3	3
V11	12a	N	Sod roof	(SXým) KA	2	2
V12	12a	N	Ditched peat land	(SXýn) VT KA	3	3
V13	12a	N	New wetland	(SXýo) HS* IO KA	8	4
Snow and ice systems						
IN 1	1	0	Snow- and ice-covered solid ground	0	1	1

Terrain and aerial photography characteristics

Under this heading, systematized knowledge will eventually be collected to help advance digitization of the mapping units using aerial photographs. In the present edition of the document, this information is incomplete. The abbreviations FF and IR refer respectively to aerial photography (preferably in color) and infrared images. The term "consistent" is used for mapping units that appear on aerial images in the same way over larger areas (regions, parts of the country, the whole country), and which are therefore well suited for aerial image interpretation.

Mapping rules, map technical specifications and scale adjustments

In addition to special, relevant information, this section contains a table which, for the 1:500 scale, defines the relevant basic types the mapping unit consists of with reference to the main type-matched step division, and for other scales the designation of mapping units included in (1: 2500) indicates the relevant mapping unit for 1: 5000 (grey colored cells) or which the latter is included in (1: 10,000 and 1: 20,000).

Diagnostic species

The term **diagnostic species** is used in NiN as a collective term for all species that can be of help in identifying a natural type. A distinction is made between four categories; quantity type, common type, center of gravity type and distinguishing type'. Most habitat types have far too large a range of species for all diagnostic species to be listed in a table that should fit in a 1-page description. The tables of diagnostic species therefore contain a subjective selection of species which are believed to be particularly useful when the types are to be identified and delimited in the field. For more complete species lists, refer to the generalized species list datasets and adapted tables at the back of this document (more will be included in due course).

The four categories of diagnostic species, with subcategories, are defined as follows:

quantity species (m) = "species with an average coverage or biomass proportion greater than 1/8 in a selection of individual observation units". The term "mass species" is incorporated in all documentation for NiN version 2 (articles, theory and practice related to generalized species list data). In connection with generalized

species list data, the 'sampling of individual observation units' is specified to be a representative sample of 100 m² - route in the relevant area the species list data set must cover. In the descriptions of mapping units, which must be valid for the relevant unit in the entire NiN area (unless otherwise stated, this means the whole of Norway) or other geographical areas, the same specification is used as when used in generalized species lists, but adapted to the relevant geographical area. Species that are only found within a limited part of this area are considered a mass species when it satisfies the 1/8 criterion within a representative selection of observation units within the species' range. As a subcategory of quantitative type, defined:

dominant quantity species (m*) = 'species with average coverage or biomass share greater than 1/4 in a selection of individual observation units'. The term 'dominant mass species' is useful when species that particularly characterize types, e.g. physiognomically, must be specified (e.g. spruce as dominant tree species in blueberry forest). In order to be listed as dominant population species in the NiN documentation, species must have an occurrence frequency of 4/5 in the total area where the habitat type occurs (or the area being addressed), i.e. dominant population species are also constant species (see below).

common species (v) = 'species with frequency greater than 1/8 in a selection of individual observation units'. The selection of observation units is defined as above (see "quantity"). The term 'common species' has been chosen because it is the simplest and most intuitive term that can be thought of for 'frequent species'. In order for a species to be 'common', it must satisfy this requirement of frequency > 1/8 throughout the natural type's distribution area, not just within the species' distribution area. As a subcategory of quantitative type, defined:

constant species (v*) = 'species with frequency greater than 4/5 in a sample of 'single observation units'. This is the classic definition of 'constant' used in vegetation ecology, and which is used to define the top step on the 6-step scale for standardized species abundance (see Table B2-1).

center of gravity species (t) = 'species with higher frequency and coverage in a relevant nature type (main type or basic type) than in a comparable selection of types (e.g. other main types belonging to the same main type group or other basic types belonging to the same main type)'. The term 'gravity' is reused from Fremstad (1997), but with a different meaning than in Fremstad. The term is used because it gives a precise characterization of this species' relationship to a type – the point in the ecological space where the species has its center of gravity. The term 'gravity point type' is preferred over the alternative term 'optimal type'. Note that a center of gravity species normally also occurs in other habitat types or groups of habitat types than where it has its center of gravity. It is possible to arrange species along a gradient from indifferent species via center of gravity species with an increasing degree of connection to a habitat type or group of habitat types, to a characteristic species. If necessary, the term 'fidelity' can be used to describe a species' degree of attachment to a natural type. The following are defined as subcategories of center of gravity:

characteristic focal point species (t*) = 'focal point species that occurs exclusively or almost exclusively in a habitat type or group of habitat types at some level of generalization (main type group, main type or basic type)'. The term 'character species', which is a central term in classical plant sociology following the Central European tradition (Braun-Blanquet school), is not used in NiN because it has a strongly incorporated, specific meaning.

gradient centroid species (t₀) = 'species with higher frequency and coverage at a given step along a local complex environmental gradient (LKMg) than at any other step along the same LKMg (given that the variation along all other local complex environmental variables is held constant)'. For gradient-center-of-gravity species, the LKM and which base step(s) the species has its center of gravity are indicated in square brackets.

distinguishing species (s) = 'species with higher frequency and/or coverage in one of two or more habitat types being compared'.

Distinguishing species are characterized by combining two criteria; (1) occurrence or non-occurrence or relative

quantity of the species has diagnostic significance, and (2) the degree of difference in quantity of the species between habitat types that are compared. Based on the first criterion, a distinction is made between:

absolute distinguishing species (s*) = 'species that normally only occur in one of two or more nature types being compared'

relative distinguishing species = 'species with higher frequency and/or coverage in one of two or more habitat types being compared (but occurring in both/all); the difference amounts to at least one step on the standard 7-step scale M7 for specifying species quantities in NiN'

Based on other criteria, a distinction is made between:

weak distinguishing species = 'species with a slightly higher frequency and/or coverage in one of two or more habitat types being compared; the difference amounts to one step on the standard 7-step scale M7 for specifying species amounts in NiN'

strong distinguishing species = 'species with significantly higher frequency and/or coverage in one of two or more habitat types being compared; the difference amounts to two steps on the standard 7-step scale M7 for specifying species quantities in NiN'

very strong distinguishing species = 'species with such a much higher frequency and/or coverage in one of two or more habitat types being compared that the difference amounts to three or more steps on the standard 7-step scale M7 for specifying species amounts in NiN'

The terms for the two criteria are freely combined to e.g. **weak relative distinction (s-)** and **strong relative distinction (s+)**.

These two combined terms are marked in particular in the species lists of the descriptions of each individual mapping unit.

Note that characteristic center-of-gravity species and gradient-center-of-gravity species are automatically also distinguishing species from 'neighboring types' along an LKM. These are therefore not listed with a distinguishing species code. For distinguishing species, the basic steps along which LKMs they are distinguishing species are indicated in a standardized way. E.g. means s*[UFyflg] that the species is an absolute distinguishing species for danger of desiccation (UF) basic step f against basic step g. In some cases, a species can be set up as a distinguishing species between steps included in the mapping unit, to mark that the species changes frequency or amount within the mapping unit. An example is wood violet in weak low-herb forest (T4-C-2, defined by KA-de), which becomes more common in the richest part of weak low-herb forest and is therefore indicated as a distinguishing species between stages d and e. Some species have diagnostic value only in a part of the country or in certain bioclimatic regions. The following abbreviations are used to indicate this (always in brackets after category of diagnostic nature):

Counties: Øf = Østfold; Ak = Akershus; Os = Oslo; He = Hedland; Op = Upland; Bu = Buskerud; Vf = Vestfold; Te = Telemark; AA = Aust-Agder; VA = Vest-Agder; Ro = Rogaland; Ho = Hordaland; SF = Parish and Fjordane; MR = Møre and Romsdal; ST = South Trøndelag; NT = Nord-Trøndelag; No = Northland; Tr = Troms; Fi = Finnmark.

Country parts: Ø = Eastern Norway (Øf–Te); S = Southern Norway (AA, VA; possibly also adjacent parts of Te og Ro); V = Western Norway (Ro – MR: Sunnmøre), M = Central Norway (MR: Romsdal – NO: Helgeland), N = Northern Norway (No: Salten – Fi); Sb = Svalbard.

Location along regional LKM: Along bioclimatic sections (variable 6SE): O3, O2, O1, OC, C1, C2; along bioclimatic zones (variable 6SO): BN, SB, MB, NB, LA, MA, HA.

The naming of the species follows the Species Data Bank's species name database per 05/04/2019. In some cases closely related species that may be difficult to determine in the field have been grouped together, for example weed dandelions *Taraxacum officinale* agg., or only indicated to genus, for example ladybugs *Alchemilla* spp.

Ranunculus acris may contain taiga sole *Ranunculus subborealis*.

Distribution and regional distribution

Brief information on variation in the distribution of the mapping unit in Norway is described, primarily using the terms bioclimatic sections (6SE) and bioclimatic zones (6SO).

Most important confusion types, red list status (2018) and references and type parallels

Various types of relevant information are collected under these headings. "Conversion types" contains a list of mapping units that are ecologically close, i.e. take neighboring steps along important LKM. These can be units of the same or a different main type. "Red list status" refers to the Species Data Bank's Red List for nature types 2018. Under the heading "References and type parallels" corresponding types are indicated in NiN version 1, Vegetation types in Norway (VN; Fremstad 1997) or the Directorate for Nature Management's mapping handbook 13, 2007 edition. The information under these headings has not yet been systematised and harmonised.

Red list status 2018

Names of the assessment units and category follow the red list for habitat types from 2018. Relationship between mapping unit and red list unit is indicated with four different symbols. In those cases where the assessment unit corresponds to the mapping unit, this is indicated with "=" . If the mapping unit is fully included in the red list unit, this is indicated with "<" . If the mapping unit includes more than the red list unit, this is indicated with ">" . This includes cases where the mapping unit comprises more basic types than the red list unit, or where the red list unit is delimited by variables from the description system, typically regional variation or tree species composition. If the mapping unit is part of several red list units or the red list unit includes basic types from several mapping units, possibly also in combination with variables from the description system, this is indicated with "ÿ" .

For example, for V9-C-3 Calcareous semi-natural bog, the phrase "Semi-natural bog (EN;<) and southern mowed bog (CR;ÿ)" means that the mapping unit is part of the red list unit Semi-natural bog, which is assessed as ONE. Furthermore, the mapping unit is included in southern mowed mire, which is assessed as CR, but since this red list unit only includes mowed land designs in the boreonemoral and southern boreal zone, not the entire mapping unit, and the red list unit also includes the two other mapping units in V9 semi natural mire, the symbol ÿ is used.

Photo

Photographs of most of the mapping units have been inserted and the county, municipality and locality where the photograph was taken is also indicated. Photographer is indicated by initials, where GA is Geir Arnesen, HB is Harald Bratli, GG is Geir Gaarder, RH is Rune Halvorsen, JBJ is John Bjarne Jordal, AL is Arild Lindgaard, ES is Ellen Svalheim and PAA is Per Arild Arrestad.

DESCRIPTIONS

M8-C-1 Helophyte saltwater swamp

NiN characteristics: Saltwater bottom systems: Helophyte saltwater swamp (M8), one ground type (1).

Physiognomy: Tall, dense vegetation with helophytes (swamp plants: herbs and graminids adapted to life in water with air channels in root, stem and leaves).

Often a pure population with one species or a mixed population with a few species.

Ecological characteristic: Occurs in and along the edge of the sea beach in shallow water in wedges, coves and in other protected places. Typically associated with brackish water, preferably in places with an influx of fresh water from the land side, at river estuaries and deltas. Occurs on fine sediments, which is partly caused by the dense vegetation acting as a "sediment trap". Distinguished from halophyte swamps in freshwater by the presence of halophytes (salt-tolerant species). Usually humus-poor soil, but can have a high organic content, especially in northern Norway. Has previously often been grazed or mowed, but is rarely used today.



Helophyte saltwater swamp. NT: Inderøy: Hjulstadholmen.
Photo: HB.

Terrain and aerial photo characteristics: In the transition between open water and dryland vegetation on the seashore.

Mostly relatively smooth structure. Can be difficult to distinguish from other open land vegetation or wetland vegetation.

Mapping rules, map technical specifications and scale adjustments: Contiguous helophyte belts, i.e. vegetation dominated by helophytes, must be collectively assigned to the type, which thus also includes the parts of the helophyte populations that extend onto what is, according to the definition, solid land (bottom/land that is covered by water < 50% of the time).

Codes and scale adaptations have not yet been prepared for the type.

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Bolboschoenus maritimus</i> sea sivaks m;t*	<i>Filipendula ulmaria</i> meadowsweet v	<i>Lythrum salicaria</i> cat's tail v
<i>Carex xhalophila</i> spriglestellarr	<i>Glyceria fluitans</i> manna sweetgrass v	<i>Phalaris arundinacea</i> beach reed v
<i>Carex xsalina</i> spring starr v	<i>Glyceria maxima</i> giant sweetgrass v	<i>Phragmites australis</i> roof pipes m*v
<i>Carex xvacillans</i> saltmarsh m	<i>Iris pseudacorus</i> sword lily v	<i>Schoenoplectus lacustris</i> seasivaks v
<i>Carex mackenziei</i> pool sedge v	<i>Lysimachia thyrsiflora</i> golden tassel v	<i>Schoenoplectus tabernaemontani</i> pollusive axis t*
<i>Carex paleacea</i> sea sedge t*	<i>Lysimachia vulgaris</i> outlaw v	<i>Thalictrum flavum</i> yellow seed star v

Distribution and regional distribution: BN-NB, O3-OC. Along the coast throughout the country.

Most important types of confusion: Helophyte swamp (L4), salt marsh (T12).

Red list status (2018): Helophyte saltwater catfish (LC;=)

References and type parallels: U7, U8, U9 (VN). Partially G05, G07 (DNHB13).

M9-C-1 Littoral basin NiN characteristics:

Saltwater bottom systems: Littoral basin bottom (M9), nine basic types.

Physiognomy: Small bodies of water near the sea that are regularly supplied with salt water. Algae and other species adapted to salty water occur. Wetland vegetation and salt meadow plants often along the edge.

Ecological characteristics: Littoral basins are bodies of water on solid rock in the spring belt that are physically demarcated from the sea, and which therefore do not have a permanent inlet from the sea. They are regularly, but not permanently, supplied with seawater and belong to the main type group saltwater bottom, but since they occur in connection with the main terrestrial types, they should be mapped together with these. Littoral basins are characterized by great environmental variation, primarily in temperature and salinity. The smaller the volume of water the pool contains and the less often the pool is supplied with new seawater, the greater the environmental variability. The salinity decreases when a lot of fresh water is supplied, e.g. during snowmelt or after heavy rainfall, and increases during prolonged summer drought. The tendency to ice in winter is stronger than in the sea outside, and the bottom can therefore be exposed to ice scouring. During hot periods in the summer, the water in small littoral basins can become strongly heated. The species composition gradually changes from a dominance of kelp species in large, deep littoral basins with water exchange at each tidal change to a dominance of intestinal green algae (*Ulva intestinalis*) and green tuft species (*Cladophora species*) in smaller littoral basins with less frequent water exchange. In temporary littoral basins, few species live on the bottom. Preferably with elements of beach plants along the edge. Wetland vegetation can also occur along the edge of littoral basins with salinity close to the lower limit, which is salinity > 0.5 per thousand, while peat mats are small patches with salt-affected marsh edges (V1-C-9).

Littoral basins are usually < 2500 m² and shallower than < 3 m, but the limit is not absolute. The essential thing is that the species composition in littoral basin bottoms is significantly different from the species composition on normal solid saltwater bottoms. Differs from pollards in that littoral basins do not have a permanent outlet to the sea.

Supply of salt water differs from freshwater bodies near the sea.

Terrain and aerial photo characteristics: Small bodies of water on rocks near the sea. Open body of water, often wetland vegetation along the edge.

Mapping rules, map technical specifications and scale adjustments:

Codes and scale adaptations have not yet been prepared for the type.

Distribution and regional distribution: BN-NB and ASHTZ, O3-OC. Found along the entire coast.

Main types of confusion:

Red list status (2018): Littoral basin bottom (LC;=)

References and type parallels: –



Littoral pool. Ve: Tjøme: Høftøya. Photo: HB

L4-C-1 Calcareous helophyte swamp

NiN characteristics: Freshwater benthic systems: Helophyte-freshwater swamp (L4), one ground type (1). Defined by LKM: KAÿ1. LKM basic step: KAÿab.

Physiognomy: Tall, dense vegetation with helophytes (swamp plants: herbs and graminids adapted to life in water with air channels in root, stem and leaves). Often a pure population with one species or a mixed population with a few species.



Calcareous helophyte swamp. Op: Spruce: Kvernsjøen. Photo: HB.

Ecological characteristics: Occurs in and along the edge of lakes and rivers, in floodplains, canals and rivulets adjacent to slow-flowing rivers, from the river's edge up to approx. 1(–2) m deep and in inland deltas. Occurs on various sediment types, but often on relatively fine-grained substrate (gravel, sand, silt and clay) with a low content of organic material, on a low-calcium bottom. Distinguished from more calcareous helophyte swamps by the lack of calcareous species. Was formerly often used for grazing or mowing, but is rarely used today.

Terrain and aerial photo characteristics: In the transition between open water and solid land vegetation on the river or lake shore. Mostly relatively smooth structure. Can be difficult to distinguish from other open land vegetation or wetland vegetation.

Mapping rules, map technical specifications and scale adjustments: Contiguous helophyte belts (i.e. vegetation dominated by helophytes) must be collectively assigned to the type, which thus also includes the parts of the helophyte populations that extend onto what is, according to the definition, solid land (bottom/land that is covered by water < 50% of the time).

Codes and scale adaptations have not yet been prepared for the type.

Diagnostic species

m = type of quantity (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Equisetum fluviatile</i> watercress v	<i>Carex rostrata</i> bottle gourd v*	<i>Menyanthes trifoliata</i> buckleaf v
<i>Calamagrostis canescens</i> water pipe sedge v	<i>Comarum palustre</i> marsh hatt v	<i>Phragmites australis</i> roof pipe etc
<i>Carex lasiocarpa</i> thread sedge v		<i>Schoenoplectus lacustris</i> seasivaks v

Distribution and regional distribution: BN-LA, O3-C1. The whole country.

Most important types of alteration: Weak calcareous to intermediate and calcareous helophyte swamp (E4-C-2-3), open floodplain on silt and clay (T18-C-2), semi-natural wet meadow (V10).

Red list status (2018): Helophyte freshwater swamp (LC;<)

References and type parallels: Partially O3, O5 (VN). Parts of E01, E03, (DNHB13).

L4-C-2 Slightly calcareous to intermediate helophyte swamp

NiN characteristics: Freshwater benthic systems: Helophyte-freshwater swamp (L4), one ground type (2).
Defined by LKM: KAy2. LKM base step: KAycde.

Physiognomy: Tall, dense vegetation with helophytes (swamp plants: herbs and graminids adapted to life in water with air channels in root, stem and leaves). Often a pure population with one species or a mixed population with a few species.



Slightly calcareous to intermediate helophyte swamp. Ak: Oppegård: Skjerløkka. Photo: HB.

Ecological characteristics: Occurs in and along the edge of lakes and rivers, in floodplains, canals and rivulets adjacent to slow-flowing rivers, from the river's edge up to approx. 1(–2) m deep and in inland deltas. Occurs on various sediment types, but often on relatively fine-grained substrate (gravel, sand, silt and clay) with a relatively low content of organic material, on slightly low-calcium and intermediate bottoms. Distinguished from lime-poor helophyte swamps by the presence of somewhat lime-requiring species and from lime-rich helophyte swamps by the lack of clearly lime-requiring species. Was formerly often used for grazing or mowing, but is rarely used today.

Terrain and aerial photo characteristics: In the transition between open water and solid land vegetation on the river or lake shore. Mostly relatively smooth structure. Can be difficult to distinguish from other open land vegetation or wetland vegetation.

Mapping rules, map technical specifications and scale adjustments: Contiguous helophyte belts (i.e. vegetation dominated by helophytes) must be collectively assigned to the type, which thus also includes the parts of the helophyte populations that extend onto what is, according to the definition, solid land (bottom/land that is covered by water < 50% of the time).

Codes and scale adaptations have not yet been prepared for the type.

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Equisetum fluviatile</i> watercress v	<i>Carex rostrata</i> bottle sedge v	<i>Schoenoplectus lacustris</i> seasivaks v
<i>Alisma plantago-aquatica</i> vassgro v	<i>Carex vesicaria</i> sedge grass s*[KA-clb]	<i>Sparganium emersum</i> tendril bud v
<i>Calamagrostis canescens</i> water pipe sedge v	<i>Comarum palustre</i> marsh hatt v	<i>Sparganium natans</i> small spike bud v
<i>Caltha palustris</i> brook flower v	<i>Iris pseudacorus</i> sword lily v	<i>Typha angustifolia</i> narrow rolling pin v
<i>Carex aquatilis</i> nordlandsstarr v	<i>Phragmites australis</i> roof pipe etc	<i>Typha latifolia</i> brei dunkjevle v
<i>Carex disticha</i> duskstarr s+[KA-clb]		

Distribution and regional distribution: BN-LA, O3-C1. The whole country.

Most important types of confusion: Calcareous and calcareous helophyte swamp (E4-C-1,3), open floodplain on silt and clay (T18-C-2), semi-natural wet meadow (V10).

Red list status (2018): Helophyte freshwater swamp (LC;<)

References and type parallels: Partially O3, O5 (VN). Parts of E01, E03, (DNHB13).

L4-C-3 Calcareous helophyte swamp

NiN characteristics: Freshwater benthic systems:

Helophyte-freshwater swamp (L4), one ground type (3).

Defined by LKM: KAÿ3. LKM base step: KAÿfghi.

Physiognomy: Tall, dense vegetation with helophytes

(swamp plants: herbs and graminids adapted to life in water with air channels in root, stem and leaves).

Often a pure population with one species or a mixed population with a few species, but can also be quite rich in species.



Calcareous helophyte swamp. Ak: Oppgård: Kurud. Photo: HB.

Ecological characteristics: Occurs in and along the edge of lakes and rivers, in floodplains, canals and rivulets adjacent to slow-flowing rivers, from the river's edge up to approx. 1(–2) m deep and in inland deltas.

Occurs on various sediment types, but often on relatively fine-grained substrate (gravel, sand, silt and clay), with varying content of organic material, on calcareous bottoms, sometimes on spawning grounds. Distinguished from lime-poor and intermediate helophyte swamps by the presence of clearly lime-demanding species. Was formerly often used for grazing or mowing, but is rarely used today.

Terrain and aerial photo characteristics: In the transition between open water and solid land vegetation on the river or lake shore. Mostly relatively smooth structure. Can be difficult to distinguish from other open land vegetation or wetland vegetation.

Mapping rules, map technical specifications and scale adjustments: Contiguous helophyte belts (i.e. vegetation dominated by helophytes) must be collectively assigned to the type, which thus also includes the parts of helophyte populations that extend onto what is, according to the definition, solid land (bottom/land that is covered by water < 50% of the time).

Codes and scale adaptations have not yet been prepared for the type.

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Dryopteris cristata</i> reed t*;s*[KA·hlg]	<i>Carex elata</i> sedge t*;s*[KA·hlg]	<i>Lysimachia thyrsiflora</i> golden tassel v
<i>Equisetum fluviatile</i> watercress v	<i>Carex paniculata</i> top starr t*;s*[KA·glf]	<i>Lythrum salicaria</i> cat's tail v
<i>Alisma plantago-aquatica</i> vassgro v	<i>Carex pseudocyperus</i> queen 's sedge t*;s*[KA·glf]	<i>Phragmites australis</i> roof pipe etc
<i>Calamagrostis canescens</i> water pipe sedge v	<i>Carex rhynchospora</i> bladderwort	<i>Schoenoplectus lacustris</i> seasivaks v
<i>Caltha palustris</i> brook flower v	t*;s*[KA·glf]	<i>Sparganium emersum</i> tendril bud v
<i>Carex acuta</i> kvass-starr t*	<i>Carex riparia</i> giant sedge t*;s*[KA·hlg]	<i>Sparganium erectum</i> giant spike bud t*;s*[KA·fle]
<i>Carex acutiformis</i> rowan t*;s*[KA·hlg]	<i>Carex vesicaria</i> sedge grass v*	<i>Stellaria palustris</i> marsh star flower s-[KA·fle]
<i>Carex diandra</i> sedge s*[KA·fle]	<i>Cicuta virosa</i> sealskin t*;s*[KA·fle]	<i>Typha angustifolia</i> narrow rolling pin t*
	<i>Glyceria maxima</i> giant sweetgrass	<i>Typha latifolia</i> wide rolling pin t*
	<i>Iris pseudacorus</i> sword lily v	

Distribution and regional distribution: BN-SB, O2-C1. Mostly in low-lying areas, close to the coast.

Most important types of disturbance: Calcareous, slightly calcareous and intermediate helophyte swamp (E4-C-1,2), open floodplain on silt and clay (T18-C-2), semi-natural wet meadow (V10).

Red list status (2018): Calcareous helophyte swamp (VU;=)

References and type parallels: O4 (VN). Parts of E01, E03, (DNHB13).

T1-C-1 Slightly drought-prone, very and rather low-**calc bare rock NiN characteristics:** Solid ground

systems: Bare rock (T1), ten basic types

(1,2,21,33,41,42,61,62,69,70). Defined by LKM: ORy1-3 & HFy1,2 & KAy1 & UEy1,2 & VFy2 & VSy2. LKM base step ORy0abc & HFy0ab+ & KAyb & UEy0abc & VFybcdef & VSye.



Slightly calcareous to intermediate helophyte swamp. Ak: Oppgård: Skjerløkka. Photo: HB.

Physiognomy: Solid rock either without vegetation or dominated by mosses and/or lichens.**Ecological characteristics:** Bare rock includes solid rock without soil cover on flat rock, crags or rock walls on very acidic rocks in protected, often shady places, such as in canyons, on north-facing slopes or under tree layers where the humidity is stably high. Distinguished from other mapping units within bare rock by the dominance of mosses and moisture-demanding lichens. Species adapted to slightly calcareous or richer bedrock are missing. Vascular plants can be found in crevices and on small shelves. Such microhabitats and small overhangs often occur in bare rock and are included in the mapping unit when they are completely enclosed by bare rock. Considerable variation in species composition as a result of variation in over-irrigation, flood exposure on rocks along rivers, waterfall spray, natural fertilization on bird stones and deviant chemical composition (copper- or iron-rich rock).**Terrain and aerial photo characteristics:** Often small occurrences. Vertical rock walls are difficult to see in aerial photographs. Knauser and flatberg can be light gray to dark in colour.**Mapping rules, map technical specifications and scale adjustments:**

Scale 1:500		1:2,500	1:5,000	1:10,000	1:20,000
Code		T1-B-1,9,13	T1-C-1	T1-D-1	T1-E-1
Basic types	T1-1,2,21,33,41, 42,61,62,69,70	T1-1,2,21,33,41, 42,61,62,69,70	T1-1,2,21,33,41, 42,61,62,69,70	T1-1,2,21,33,41, 42,61,62,69,70	T1-1-8,21-26,33- 36,41-48,61-64,69- 72,77,78,83,84

Diagnostic species m =abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta**- gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Anastrepta orcadensis</i> heimose s*[UE:cld] <i>Dicranum fuscescens</i> bergsigd v <i>Dicranum scoparium</i> rib sickle v <i>Dicranodontium denudatum</i> fleinljåmose s*[UE:cld] <i>Diplophyllum albicans</i> striped moss t* <i>Hypnum cupressiforme</i> mat flette v	<i>Isothecium myosuroides</i> mousetail moss v * <i>Kurzia trichoclados</i> coastal finger moss v <i>Mylia taylorii</i> red mussel/moss s*[UE:cld] <i>Rhytidiodelphus loreus</i> coastal wreath moss v;s+[UE:cld]	<i>Sanionia uncinata</i> claw white moss v <i>Cladonia squamosa</i> fnaslav v <i>Cladonia subcervicornis</i> coastal cushion v <i>Hypogymnia vittata</i> s *[UE:cld] <i>Lepraria</i> spp. v
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Distribution and regional distribution: BN-HA and ASHTZ, O3-C1.**Most important types of confusion:** Strandberg (T6), open shallow ground (T2).**Red list status (2018):** Overrisslingsberg in eastern high mountain areas (EN; y), fosseberg (VU; y)**References and type parallels:** Parts of F2, F3 and F6 (VN), B01 in part (DNHB13).

T1-C-2 Drought-exposed very and rather low-**calc rocks, rock walls and knolls NiN characteristics:**

Solid ground systems: Bare rock (T1), seven basic types (3,4,22,23,34,43,44).

Defined by LKM: ORy1-3 & HFy1,2 & KAy1 & UEy3,4.
LKM base step ORy0abc & HFy0ab+ & KAyb & UEydefg.



Physiognomy: Solid rock either without vegetation or dominated by lichens and/or mosses.

Drought-exposed very and fairly low-calcareous rocks, rock walls and knolls. Bu: Hurum: Tofte. Photo: HB.

Ecological characteristic: Bare rock includes solid rock without soil cover. The mapping unit includes flat rock, crags or rock walls on very acidic rocks in exposed places, often with direct sunlight, such as on south or southwest facing slopes, and in open ground without bushes and trees where the humidity is low. Distinguished from other mapping units within bare rock by the dominance of drought-tolerant lichens and mosses. Species adapted to slightly calcareous or richer bedrock are missing. Vascular plants can be found in crevices and on small shelves. Such microhabitats and small overhangs often occur in bare rock and are included in the mapping unit when they are completely enclosed by bare rock. Considerable variation in species composition as a result of variation in sprinkling, natural fertilization on bird stones and deviant chemical composition (copper- or iron-rich rock).

Terrain and aerial photo characteristics: Often small occurrences. Vertical rock walls are difficult to see in aerial photographs. Knauser and flatberg can be light gray to dark in colour.

Mapping rules, map technical specifications and scale adjustments:

Scale 1:500		1:2,500	1:5,000	1:10,000	1:20,000
Code		T1-B-2	T1-C-2	T1-D-2	T1-E-1
Basic types	T1-3,4,22,23,34, 43,44		T1-3,4,22,23,34, 43,44 T1-3,4,22,23,34, 43,44 T1-3,4,22,23,34, 43,44 T1-1-8 ,21-26,33-36,41-48,61-64,69-72,77,78,83,84		

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta**- gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Asplenium septentrionale</i> olive beard v;s-[UE-dlc]	<i>Pohlia nutans</i> vegnikke v <i>Racomitrium lanuginosum</i> heath gray moss v;s-[UE-dlc]	<i>Parmelia saxatilis</i> gray lichen v <i>Rhizocarpon geographicum</i> common map lichen v <i>Stereocaulon saxatile</i> gray salt lichen v <i>Stereocaulon vesuvianum</i> shield salt lichen v <i>Umbilicaria cylindrica</i> fringe shield v;s+[UE-dlc]
<i>Ptilidium ciliare</i> ground fringe v <i>Andreaea rothii</i> nervous sotmosis v	<i>Racomitrium microcarpon</i> tufted gray moss <i>Sanionia uncinata</i> claw white moss v	<i>Umbilicaria deusta</i> v ;s+[UE-dlc] <i>Umbilicaria hyperborea</i> common navel lichen v;s+[UE-dlc]
<i>Andreaea rupestris</i> bergsotmoss v <i>Dicranum fuscescens</i> bergsigd v	<i>Arctoparmelia centrifuga</i> large yellow chrysanthemum v;s*[UE-dlc]	<i>Umbilicaria polypylla</i> smooth navel lichen v;s+[UE-dlc]
<i>Dicranum scoparium</i> rib sickle v <i>Hedwigia ciliata</i> gray stone moss ta[UF-gj];s*[UE-dlc]	<i>Arctoparmelia incurva</i> small yellow chrysanthemum v;s*[UE-dlc]	<i>Umbilicaria vellea</i> light navel lichen v;s+[UE-dlc]
<i>Hypnum cupressiforme</i> mat flette v <i>Paraleucobryum longifolium</i> sickle moss v	<i>Cladonia strepsilis</i> cushion lichen v;s*[UE-dlc] <i>Lecidea lapicida</i> v <i>Parmelia omphalodes</i> brown lichen v;s+[UE-dlc]	

Distribution and regional distribution: BN-HA and ASHTZ, O3-C1.

Most important types of confusion: Strandberg (T6), open shallow ground (T2).

Red list status (2018): Overrisslingsberg in eastern high mountain areas (EN;ü)

References and type parallels: Parts of F2, F3 and F6 (VN), B01 in part (DNHB13).

T1-C-3 Slightly drought-prone, slightly**calcareous and slightly intermediate bare****rock NiN characteristics:** Solid ground

systems: Bare rock (T1), 10 basic types

(5,6,24,35,45,46,63,64,71,72). Defined by LKM:

OR \ddot{y} 1-3 & HF \ddot{y} 1,2 & KA \ddot{y} 2 & UE \ddot{y} 1,2 & VF \ddot{y} 2 & VS \ddot{y} 2. LKM:
base step OR \ddot{y} 0abc & HF \ddot{y} 0ab+ & KA \ddot{y} cd & UE \ddot{y} 0abc &
VF \ddot{y} bcd & VS \ddot{y} e.

Slightly drought-prone, slightly calcareous and slightly intermediate bare rocks. Op: Gausdal: Hell. Photo: RH.

Physiognomy: Solid rock either without vegetation or dominated by mosses and/or lichens.**Ecological characteristic:** Bare rock includes solid rock without soil cover. The mapping unit includes flat rocks, crags or rock walls on slightly calcareous to slightly intermediate rocks in protected, often shady places, such as in canyons, on north-facing slopes or under tree layers where the humidity is stably high. Distinguished from other mapping units within bare rock by the dominance of mosses and moisture-demanding lichens. Species adapted to strongly intermediate or richer bedrock are lacking. Vascular plants can be found in crevices and on small shelves. Such microhabitats and small overhangs often occur in bare rock and are included in the mapping unit when they are completely enclosed by bare rock. Considerable variation in species composition as a result of variation in over-sprinkling, flood exposure on rocks along rivers, waterfall spray, natural fertilization on bird stones and deviating chemical composition (copper- or iron-rich rock).**Terrain and aerial photo characteristics:** Often small occurrences. Vertical rock walls are difficult to see in aerial photographs. Knauser and flatberg can be light gray to dark in colour.**Mapping rules, map technical specifications and scale adjustments:**

Scale 1:500		1:2,500	1:5,000	1:10,000	1:20,000
Code		T1-B-3,10,14	T1-C-3	T1-D-3	T1-E-1
Basic types	T1-5,6,24,35,45,46, 63,64,71,72	T1-5,6,24,35,45,46, 63,64,71,72	T1-5,6,24,35,45,46, 63,64,71,72	T1-5,6,24,35,45,46, 63,64,71,72	T1-1-8,21-26,33- 36,41-48,61-64,69- 72,77,78,83,84

Diagnostic species m =abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Amphidium mougeotii</i> bergpolstermose s-[KA-clb] b]	<i>Grimmia hartmanii</i> sickle knousing v <i>Hookeria lucens</i> queen moss s-[KA-clb] [UE-cld]	<i>Rhytidadelphus loreus</i> coastal wreath moss v;s+[UE-cld] <i>Cladonia squamosa</i> fraslav v <i>Cladonia subcervicornis</i> coastal cushion v <i>Hypogymnia vittata</i> s *[UE-cld] <i>Nephroma parile</i> gritty vrenge s-[KA-clb] <i>Peltigera praetextata</i> shell fists s-[KA-clb] <i>Sphaerophorus globosus</i> brown coral v
<i>Anastrepta orcadensis</i> heimose s*[UE-cld]	<i>Hylocomiastrum umbratum</i> shade house moss se s-[KA-clb][UE-cld]	
<i>Breutelia chrysocoma</i> s *[UE-cld]	<i>Hypnum cupressiforme</i> carpet braid v*	
<i>Dicranella heteromalla</i> emerald ditch moss v	<i>Isothecium myosuroides</i> mousetail moss v *;s+ [UE-cld]	
<i>Dicranodontium denudatum</i> fleinljåmose s*[UE-cld] d]	<i>Mylia taylorii</i> red mussel moss s*[UE-cld]	
<i>Diplophyllum albicans</i> striped moss v		

Distribution and regional distribution: BN-HA and ASHTZ, O3-C1.**Most important types of confusion:** Strandberg (T6), open shallow ground (T2).**Red list status (2018):** Overrislingsberg in eastern high mountain areas (EN;ÿ), fosseberg (VU;ÿ)**References and type parallels:** Parts of F2, F3 and F6 (VN), B01 in part (DNHB13).

T1-C-4 Drought-exposed slightly calcareous and slightly intermediate rocks, rock walls and crags NiN characteristics:

Solid ground systems: Bare rock (T1), seven basic types (7,8,25,26,36,47,48).

Defined by LKM: ORy1-3 & HFy1,2 & KAy2 & UEy3,4. LKM base step ORy0abc & HFy0ab+ & KAycd & UEydefg.



Physiognomy: Solid rock either without vegetation or dominated by lichens and/or mosses.

Ecological characteristic: Bare rock includes solid rock without soil cover. The mapping unit includes flat rocks, crags or rock walls on slightly calcareous to weakly intermediate rocks in exposed locations, often with direct sunlight, such as on south- or southwest-facing slopes, in open ground without bushes and trees where the humidity is low.

Distinguished from other mapping units within bare rock by the dominance of drought-tolerant lichens and mosses. Species adapted to strongly intermediate or richer bedrock are lacking. Vascular plants can be found in crevices and on small shelves. Such microhabitats and small overhangs often occur in bare rock and are included in the mapping unit when they are completely enclosed by bare rock. Considerable variation in species composition as a result of variation in over-sprinkling, flood exposure on rocks along rivers, waterfall spray, natural fertilization on bird stones and deviating chemical composition (copper- or iron-rich rock).

Drought-prone slightly calcareous and slightly intermediate rocks, rock walls and crags.
MR: Volda: The Helsetnakken.

Photo: RH.

Terrain and aerial photo characteristics: Often small occurrences. Vertical rock walls are difficult to see in aerial photographs. Knauser and flatberg can be light gray to dark in colour.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T1-B-4	T1-C-4	T1-D-4	T1-E-1
Basic types	T1-7,8,25,26,36,47, 48	T1-7,8,25,26,36,47, 48	T1-7,8,25,26,36,47, 48	T1-7,8,25,26,36,47, 48	T1-1-8,21-26,33- 36,41-48,61-64,69- 72,77,78,83,84

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Andreaea rupestris</i> bergsotmoss v <i>Hedwigia ciliata</i> gray stone moss v;s*[UE-dlc] ta[UF-fg];s*[UE-dlc]	<i>Arctoparmelia centrifuga</i> large yellow sedge <i>Lecanora muralis</i> wall lichen s+[UE-dlc] <i>Lecanora rupicola</i> s+[UE-dlc] <i>Lecidea fuscoatra</i> v;s-[UE-dlc] <i>Lecidea lapicida</i> v <i>Parmelia fraudans</i> knauslav v;s*[UE-dlc] <i>Parmelia saxatilis</i> gray lichen v <i>Phaeophyscia sciastra</i> pin rosette lichen v;s*[UE-dlc]	<i>Physcia caesia</i> head rosette lichen v;s*[UE-dlc] <i>Physcia dubia</i> lichen v;s*[UE-dlc] <i>Rhizocarpon geographicum</i> common map lichen v <i>Stereocaulon saxatile</i> gray salt lichen v <i>Umbilicaria</i> spp. navel lichen v;s*[UE-dlc] <i>Xanthoparmelia conspersa</i> stone lichen v;s+[UE-dlc] <i>Xanthoparmelia pulla</i> _
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Distribution and regional distribution: BN-HA and ASHTZ, O3-C1.

Most important types of confusion: Strandberg (T6), open shallow ground (T2).

Red list status (2018): Overrisslingsberg in eastern high mountain areas (EN;ÿ)

References and type parallels: Parts of F2, F3 and F6 (VN), B01 in part (DNHB13).

T1-C-5 Slightly drought-prone, highly intermediate

and slightly calcareous bare rock NiN characteristics: Solid

ground systems: Bare rock (T1), ten basic types

(9,10,27,37,49,50,65,66,73,74). Defined by LKM: ORy1-3 & HFy1,2 & KAy3 & UEy1,2 & VFy2 & VSy2. LKM base step ORy0abc & HFy0ab+ & KAyef & UEy0abc & VFybcdef & VSye.



Physiognomy: Solid rock either without vegetation or dominated by mosses and/or lichens.

Ecological characteristic: Bare rock includes solid rock without soil cover. The mapping unit includes flat rocks, crags or rock walls on strongly intermediate or slightly calcareous rocks in protected, often shady places, such as in canyons, on north-facing slopes or under tree layers where the humidity is stably high. Distinguished from other mapping units within bare rock by the dominance of mosses and moisture-demanding lichens. Species adapted to fairly or extremely calcareous bedrock are lacking. Vascular plants can be found in crevices and on small shelves. Such microhabitats and small overhangs often occur in bare rock and are included in the mapping unit when they are completely enclosed by bare rock. Considerable variation in species composition as a result of variation in over-sprinkling, flood exposure on rocks along rivers, waterfall spray, natural fertilization on bird stones and deviating chemical composition (copper- or iron-rich rock).

Mildly drought-prone, strongly intermediate and slightly calcareous bare rocks. SF: Aurland: Bakka, Styvi. Photo: RH.

Terrain and aerial photo characteristics: Often small occurrences. Vertical rock walls are difficult to see in aerial photographs. Knauser and flatberg can be light gray to dark in colour.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T1-B-5,11,15	T1-C-5	T1-D-5	T1-E-2
Basic types	T1- 9,10,27,37,49,50, 65,66,73,74	T1- 9,10,27,37,49,50, 65,66,73,74	T1 -9,10,27,37,49,50, 65,66,73,74	T1- 9,10,27,37,49,50, 65,66,73,74	T1-9,20,27-32,37- 40,49-60,65-68,73- 76,79-82,85

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Amphidium mougeotii</i> bergpolstermoss t* <i>Anomodon attenuatus</i> whip moss see s+[UE:cld] s+[KA:cld] <i>Anomodon viticulosus</i> calcareous moss s+ [KA:cld] <i>Apometzgeria pubescens</i> scarf moss s-[KA:fle] s+[KA:cld] <i>Cirriphyllum piliferum</i> lundveikmose v <i>Distichium capillaceum</i> cushion plan moss s+ [KA:cld] <i>Homalia trichomanoides</i> gloss moss <i>Schistostega pennata</i> gloss moss t* s+[KA:fle] <i>Hookeria lucens</i> queen moss s+[KA:cld] t*[s*[UE:cld]]	<i>Hylocomiastrum umbratum</i> shade housemoss <i>Cetrelia olivetorum</i> magnificent lichen s*[UE:cld] <i>Isothecium alopecuroides</i> rat tail moss <i>Leptogium cyanescens</i> lead lichen s-[KA:cld] s*[UE:cld] <i>Lejeunea cavifolia</i> pearl moss <i>Metzgeria furcata</i> yellow band s+[KA:cld] <i>Myurella julacea</i> bowl step moss s+[KA:fle] <i>Neckera complanata</i> flatfellmoss s+[KA:cld] <i>Racomitrium aciculare</i> butt gray moss t* <i>Thamnobryum alopecurum</i> bush fox moss	<i>Collema flaccidum</i> skjelglye s*[UE:cld] s*[UE:cld] <i>Menegazzia terebrata</i> schoddelav s*[UE:cld] <i>Nephroma parile</i> gritty vrenge s-[UE:cld] <i>Peltigera collina</i> coastal vein s+[UE:cld] <i>Peltigera praetextata</i> shell fists v;s-[UE:cld] <i>Sticta</i> spp. pore lichen s-[KA:cld] <i>Vahlia leucophaea</i> small felt lichen s-[KA:cld]
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Distribution and regional distribution: BN-HA and ASHTZ, O3-C1.

Most important types of confusion: Strandberg (T6), open shallow ground (T2).

Red list status (2018): Overrislingsberg in eastern high mountain areas (EN;ÿ), fosseberg (VU;ÿ)

References and type parallels: Parts of F2, F3 and F6 (VN), B01 in part (DNHB13).

T1-C-6 Drought-exposed intermediate and**slightly calcareous rocks, rock walls and knolls**

NiN characteristics: Solid ground systems: Bare rock (T1), seven basic types (11,12,28,29,38,51,52).

Defined by LKM: ORy1-3 & HFy1,2 & KAy3 & UEy3,4.
LKM base step ORy0abc & HFy0ab+ & KAyef & UEydefg.

Physiognomy: Solid rock either without vegetation or dominated by lichens and/or mosses.

Ecological characteristics: Bare rock includes solid rock without soil cover on flat rock. The mapping unit includes crags or rock walls on strongly intermediate or slightly calcareous rocks in exposed locations, often with direct sunlight, such as on south- or southwest-facing slopes, in open ground without bushes and trees where the humidity is periodically low. Distinguished from other mapping units within bare rock by the dominance of drought-tolerant lichens and mosses. Species adapted to fairly or extremely calcareous bedrock are lacking. Vascular plants can be found in crevices and on small shelves. Such microhabitats and small overhangs often occur in bare rock and are included in the mapping unit when they are completely enclosed by bare rock. Considerable variation in species composition as a result of variation in over-sprinkling, flood exposure on rocks along rivers, waterfall spray, natural fertilization on bird stones and deviating chemical composition (copper- or iron-rich rock).

Terrain and aerial photo characteristics: Often small occurrences. Vertical rock walls are difficult to see in aerial photographs. Knauser and flatberg can be light gray to dark in colour.

Mapping rules, map technical specifications and scale adjustments:

Scale 1:500		1:2,500	1:5,000	1:10,000	1:20,000
Code		T1-B-6	T1-C-6	T1-D-6	T1-E-2
Basic types	T1- 11,12,28,29,38,51,52	T1- 11,12,28,29,38,51,52	T1- 11,12,28,29,38,51,52	T1- 11,12,28,29,38,51,52	T1-9-20,27-32,37- 40.49-60.65-68.73- 76.79-82.85

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Abietinella abietina</i> granmose v;s*[KA-eld]	<i>Pseudoleskeella nervosa</i> stinging nettle see v;s-[KA-eld]	<i>Parmelia fraudans</i> knauslav v;s*[UE-dlc]
<i>Antitrichia curtipendula</i> ryemose v;s+[KA-eld]	<i>Syntrichia ruralis</i> pillow hair star v;s+[KA-eld]	<i>Phaeophyscia sciastra</i> pin rosette lichen v;s*[UE-dlc]
<i>Encalypta rhaftocarpa</i> red bell moss v;s+[KA-el d]	<i>Dermatocarpon miniatum</i> smooth leather lichen v;s-[KA-eld]	<i>Physcia caesia</i> head rosette lichen v;s*[UE-dlc]
<i>Homalothecium sericeum</i> creeping silk moss v;s+[KA-eld]	<i>Diploschistes gypsaceus</i> v;s-[KA-eld]	<i>Physcia dubia</i> lichen v;s*[UE-dlc]
<i>Myurella julacea</i> cup step moss s*[KA-fle]	<i>Lathagrium fuscovirens</i> wave gleye v;s-[KA-eld]	<i>Scyphinium gelatinosum</i> _ [UE-dlc]
	<i>Lecanora muralis</i> wall lichen t*	<i>Xanthoparmelia stenophylla</i> yellow stone lichen v;s*[UE-dlc]

Distribution and regional distribution: BN-HA and ASHTZ, O3-C1.

Most important types of confusion: Strandberg (T6), open shallow ground (T2).

Red list status (2018): Overripe rock in eastern high mountain areas (EN;y), dry calcareous rock in continental areas (VU;y)

References and type parallels: Parts of F2, F3 and F6 (VN), B01 in part (DNHB13).



Highly drought-prone intermediate and slightly calcareous rocks, rock walls and crags. Øf: Moss: Bile. Photo: RH.

T1-C-7 Slightly drought-prone fairly to extremely calcareous bare rock NiN characteristics:

Solid ground systems: Bare rock (T1), 14 basic types (13,14,17,18,30,39,53,54, 57,67,68, 75,76). Defined by LKM: ORy1-3 & HFy1,2 & KAy4,5 & UEy1,2 & VFy2 & VSy2.

LKM base step ORy0abc & HFy0ab+ & KAyghi & UEy0abc & VFybcdef & VSye.

Physiognomy: Solid rock either without vegetation or dominated by mosses and/or lichens.

Ecological characteristic: Bare rock includes solid rock without soil cover. The mapping unit includes flat rocks, crags or rock walls on rather to extremely calcareous rocks in protected, often shady places, such as in canyons, on north-facing slopes or under tree layers where the humidity is stably high. Distinguished from other mapping units within bare rock by the dominance of mosses and moisture-demanding lichens. Species adapted to fairly or extremely calcareous bedrock are included. Vascular plants can be found in crevices and on small shelves. Such microhabitats and small overhangs often occur in bare rock and are included in the mapping unit when they are completely enclosed by bare rock. Considerable variation in species composition also as a result of variation in over-sprinkling, flood exposure on rocks along rivers, waterfall spray and natural fertilization on bird stones.



Slightly drought-prone rather to extremely calcareous bare rock. Oslo: Mærradalen. Photo: HB.

Terrain and aerial photo characteristics: Often small occurrences. Vertical rock walls are difficult to see in aerial photographs. Knauser and flatberg can be light gray to dark in colour.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T1-B-7,12,16	C1-C-7	C1-D-7	T1-E-2
Basic types	T1-13,14,17,18, 30,39,53, 54,57, 67,68,75,76	T1-	T1-	T1-	T1-9-20,27-32,37- 40.49-60.65-68.73-

13,14,17,18,30,39,53,54,57,67,68,75,76
13,14,17,18,30,39,53,54,57,67,68,75,76
13,14,17,18,30,39,53,54,57,67,68,75,76
13,14,17,18,30,39,53,54,57,67,68,75,76

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Anomodon attenuatus</i> whiplash moss t*;s*[UE:cld]	<i>Ditrichum flexicaule</i> storburst v <i>Distichium capillaceum</i> cushion plan moss v* <i>Encalypta streptocarpa</i> large bell moss s+[KA:g] f]	<i>Neckera complanata</i> flatfellmose v <i>Neckera crispa</i> krusfellmoss v <i>Preissia quadrata</i> s *[UE:cld],s-[KA:g] f]
<i>Anomodon longifolius</i> carpet moss t*;s*[UE:cld]	<i>Homalia trichomanoides</i> gloss moss t*;s*[UE:cld]	<i>Gyalecta jenensis</i> s+[KA:g] f] <i>Heterodermia speciosa</i> ivory s+[KA:g] f]
<i>Anomodon viticulosus</i> calcareous moss t*;s*[UE:cld]	<i>Isothecium alopecuroides</i> rattail moss v ;s*[UE:cld]	<i>Lathagrium auriforme</i> moseglye s-[KA:g] f] <i>Solorina saccata</i> common scale lichen v;s+[KA:g]
<i>Apometzgeria pubescens</i> scarf moss t*;s*[UE:cld]	<i>Myurella julacea</i> bowl step moss t*	

Distribution and regional distribution: BN-HA and ASHTZ, O2-C1.

Most important types of confusion: Strandberg (T6), open shallow ground (T2).

Red list status (2018): Overrislingsberg in eastern high mountain areas (EN;ÿ), fosseberg (VU;ÿ)

References and type parallels: Parts of F2, F3 and F6 (VN), B01 in part (DNHB13).

T1-C-8 Drought-prone to extremely calcareous rock,**rock walls and knolls NiN characteristics:** Solid

ground systems: Bare rock (T1), 11 basic types (15,16,19,20,31,32,40,55, 56,59, 60). Defined by LKM: ORy1-3 & HFy1,2 & KAy4,5 & UEy3,4. LKM base step ORy0abc & HFy0ab+ & KAyghi & UEydefg.



Physiognomy: Solid rock either without vegetation or dominated by lichens and/or mosses.

Drought-prone rather to extremely calcareous rocks, rock walls and knolls. Ak: Bærum: Ostøya, Hesthagabukta. Photo: HB.

Ecological characteristic: Bare rock includes solid rock without soil cover. The mapping unit includes flat rocks, crags or rock walls on rather to extremely calcareous rocks in exposed places, often with direct sunlight, such as on south or south-west facing slopes, in open ground without bushes and trees where the humidity is low. Distinguished from other mapping units within bare rock by the dominance of drought-tolerant lichens and mosses. Species adapted to fairly or extremely calcareous bedrock are included. Vascular plants can be found in crevices and on small shelves. Such microhabitats and small overhangs often occur in bare rock and are included in the mapping unit when they are completely enclosed by bare rock.

Considerable variation in species composition also as a result of variation in over-sprinkling, flood exposure on rocks along rivers, waterfall spray and natural fertilization on bird stones.

Terrain and aerial photo characteristics: Often small occurrences. Vertical rock walls are difficult to see in aerial photographs. Knauser and flatberg can be light gray to dark in colour.

Mapping rules, map technical specifications and scale adjustments:

Scale 1:500		1:2,500	1:5,000	1:10,000	1:20,000
Code		T1-B-8	T1-C-8	T1-D-8	T1-E-2
Basic types	T1-15,16,19,20,31, 32,40,55, 56,59,60	T1-15,16,19,20, 31,32,40,55, 56,59,60	T1-15,16,19,20,31, 32,40,55, 56,59,60	T1-15,16,19,20,31, 32,40,55, 56,59,60	T1-9-20,27-32,37- 40,49-60,65-68,73- 76,79-82,85

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Abietinella abietina</i> granmose v	<i>Callome multipartita</i> fan gleye v;s*[KA:glt]	<i>Psora globifera</i> s*[KA:glt]
<i>Ditrichum flexicaule</i> storburst v;s-[KA:glt]	<i>Glypholecia scabra</i> lime shield v;s*[KA:glt]	<i>Rusavskia elegans</i> raudberglav v;s+[KA:glt]
<i>Encalypta vulgaris</i> bell moss s-[KA:glt]	<i>Lathagrium fuscovirens</i> wave gleye v;s+[KA:glt]	<i>Squamaria cartilaginea</i> cartilaginous calcareous scales s*[KA:glt]
<i>Grimmia pulvinata</i> Kvitknausing v	<i>Phaeophyscia constipata</i> calrosette lichen v;s*[KA:glt]	<i>Xanthoparmelia stenophylla</i> yellow stone lichen v;s*[UE:dlc]
<i>Rhytidium rugosum</i> paw moss v;s-[KA:glt]	<i>Physconia muscigena</i> calkdogglav v;s*[KA:glt]	<i>Rusavskia sorediata</i> lime brass lichen s-[KA:glt]
<i>Syntrichia ruralis</i> pillow hair star v		
<i>Weissia controversa</i> toothwort v;s+[KA:glt]		

Distribution and regional distribution: BN-HA and ASHTZ, O2-C1.

Most important types of confusion: Strandberg (T6), open shallow ground (T2).

Red list status (2018): Overripple rock in eastern high mountain areas (EN;ÿ), dry calcareous rock in continental areas (VU;ÿ), very drought-prone southern calcareous rock (NT;>)

References and type parallels: Parts of F2, F3 and F6 (VN), B01 in part (DNHB13).

T1-C-9 Lime-poor and slightly intermediate weathered rock

NiN characteristics: Solid ground systems: Bare rock (T1), one base type (83). Defined by LKM: KA \ddot{y} 1,2 & UE \ddot{y} 1-4 & VI \ddot{y} 2. LKM base steps: KA \ddot{y} abcd & UE \ddot{y} 0abcdefg & VI \ddot{y} bc.

Physiognomy: Solid rock either without vegetation or dominated by lichens, mosses occur.

Ecological characteristic: Bare rock includes solid rock without soil cover. occurs on flat rocks, crags or rock walls on very calcareous to slightly intermediate rocks in very exposed places in open ground with direct sunlight where the humidity is low. The mapping unit is The mapping unit is most widespread in the high mountains, but probably also occurs along the coast. Characterized by lichens in particular that can withstand strong wind exposure. Species adapted to strongly intermediate or richer bedrock are lacking. Dominance of drought-tolerant lichens and mosses. Such microhabitats and small overhangs often occur in bare rock and are included in the mapping unit when they are completely enclosed by bare rock. Often elements of slightly nitrophilous species due to natural fertilization on bird stones and bird rocks.

Terrain and aerial photo characteristics: Often small occurrences. Vertical rock walls are difficult to see in aerial photographs. Knauser and flatberg can be light gray to dark in colour.

Mapping rules, map technical specifications and scale adjustments:

Scale 1:500		1:2,500	1:5,000	1:10,000	1:20,000
Code		T1-B-21	T1-C-9	T1-D-9	T1-E-1
Basic types	T1-83	T1-83	T1-83	T1-83	T1-1-8,21-26,33-36,41-48,61-64,69-72,77,78,83,84

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Polytrichum piliferum</i> raccoon moss v <i>Gymnomitrion apiculatum</i> prickly pear moss v <i>Gymnomitrion coralliooides</i> club moss v <i>Alectoria nigricans</i> wolverine v <i>Allantoparmelia alpicola</i> fjælttoplav v	<i>Brodoa atrofusca</i> alperabbelav v <i>Brodoa intestiniformis</i> common rabbitlav v <i>Brodoa oroarctica</i> mountain rat lichen v <i>Bryocaulon divergens</i> mountain thorn v <i>Cornicularia normoerica</i> nordmørslav v <i>Lecidea confluens</i> v <i>Lecidea lapicida</i> v <i>Melanelia hepaticoz</i> svartberglav v	<i>Montanelia disjuncta</i> black lichen v <i>Ophioparma ventosa</i> common sealskin t* <i>Pseudephebe minuscula</i> smallbeard v <i>Pseudephebe pubescens</i> common stone beard v <i>Rhizocarpon</i> spp. v <i>Sporastatia testudinea</i> v <i>Umbilicaria</i> spp. navel lichen v
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Distribution and regional distribution: NB-HA and ASHTZ, O3-C1.

Most important types of confusion: Open shallow ground (T2).

Red list status (2018): Naked mountain (LC;<)

References and type parallels: Parts of F2, F3 and F6 (VN), B01 in part (DNHB13).



Lime-poor and weakly intermediate weathered rock. Op: Vang: Tyinosen. Photo: HB.

T1-C-10 Strong intermediate to extremely calcareous weathered rock

NiN characteristics: Solid ground systems: Bare rock (T1), one base type (84). Defined by LKM: KAյ3-5 & UEյ1-4 & Vlý2. LKM base steps: KAյefghi & UEў0abcdefg & Vlýbc.

Physiognomy: Solid rock either without vegetation or dominated by lichens, mosses occur.

Ecological characteristic: Bare rock includes solid rock without soil cover. The mapping unit occurs on flat rock, crags or rock walls on strongly intermediate to extremely calcareous rocks in highly exposed locations in open ground with direct sunlight where the humidity is low. The mapping unit is most widespread in the high mountains, but probably also occurs along the coast.

Characterized by lichens in particular that can withstand strong wind exposure. Dominance of drought-tolerant lichens with elements of mosses. Characterized by species adapted to strongly intermediate or richer bedrock. Vascular plants can be found in crevices and on small shelves. Such microhabitats and small overhangs often occur in bare rock and are included in the mapping unit when they are completely enclosed by bare rock. Often elements of slightly nitrophilous species due to natural fertilization on bird stones and bird rocks.

Terrain and aerial photo characteristics: Often small occurrences. Vertical rock walls are difficult to see in aerial photographs. Knauser and flatberg can be light gray to dark in colour.

Mapping rules, map technical specifications and scale adjustments:

Scale 1:500		1:2,500	1:5,000	1:10,000	1:20,000
Code		T1-B-22	T1-C-10	T1-D-10	T1-E-1
Basic types	T1-84	T1-84	T1-84	T1-84	T1-1-8,21-26,33-36,41-48,61-64,69-72,77,78,83,84

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **tx**- gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.).

<i>Gymnomitrion apiculatum</i> prickly pear moss v	<i>Dimelaena oreina</i> v	<i>Pseudephebe minuscula</i> smallbeard v
<i>Gymnomitrion coralliooides</i> club moss v	<i>Hypogymnia austrodes</i> seterlav v	<i>Pseudephebe pubescens</i> common stone
<i>Brodoa atrofusca</i> alperabbelav v	<i>Lecidea lapicida</i> v	beard v
<i>Brodoa intestiniformis</i> common rabblelav v	<i>Melanelia hepatizon</i> svartberglav v	<i>Physcia caesia</i> head rosette lichen v
<i>Brodoa orarctica</i> mountain rat lichen v	<i>Melanohalea infumata</i> rimkrinslav v	<i>Physcia dubia</i> bird lichen v
	<i>Montanelia disjuncta</i> black lichen v	<i>Sporastatia testudinea</i> v
	<i>Montanelia tornii</i> lichen v	<i>Umbilicaria</i> spp. navel lichen v
	<i>Ophioparma ventosa</i> common sealskin t*	<i>Rusavskia elegans</i> raudberglav v

Distribution and regional distribution: NB-HA and ASHTZ, O2-C1.

Most important types of confusion: Open shallow ground (T2).

Red list status (2018): Naked mountain (LC;<)

References and type parallels: Parts of F2, F3 and F6 (VN), B01 in part (DNHB13).

T1-C-11 Lime-poor and slightly intermediate snow

-bearing rock NiN characteristics: Solid ground systems: Bare rock (T1), one basic type (81). Defined by LKM: KA \ddot{y} 1,2 & UE \ddot{y} 1-4 & SV \ddot{y} 2. LKM basis steps: KA \ddot{y} abcd & UE \ddot{y} 0abcdefg & SV \ddot{y} abcd.

Physiognomy: Solid rock without vegetation or with mosses and scattered lichens.

Ecological characteristic: Bare rock includes solid rock without soil cover. The mapping unit covers flat rocks and rock crags, sometimes smaller rock walls on slightly calcareous to weakly intermediate rocks in places with long-term snow cover in the mountains, which melts out late. It is therefore characterized by species that can withstand a short growing season. Relatively humid conditions due to slow melting, oversprinkling and low evaporation. Distinguished from other mapping units within bare rock by occurrence in the high mountains in places that melt out late. Species composition poorly known. The species list is provisional and will be changed. Probably species-poor and with elements of snow bed species, especially mosses and species that are linked to solid riverbeds. Species adapted to strongly intermediate or richer bedrock are lacking. Variation in species composition probably as a result of variation from normal to abnormal chemical composition.



Calcareous and weakly intermediate snow-bearing rock. Op: Vang: Tyinosen. Photo: HB.

Terrain and aerial photo characteristics: Often small occurrences. Knauser and flatberg can be light gray to dark in colour.

Mapping rules, map technical specifications and scale adjustments:

Scale 1:500		1:2,500	1:5,000	1:10,000	1:20,000
Code	T1-81	TB-23	TC-11	TD-11	T1-E-2
Basic types		T1-81	T1-81	T1-81	T1-9-20,27-32,37-40,49-60,65-68.73-76.79-82.85

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Andreaea nivalis</i> snow moss v <i>Andreaea obovata</i> felesotmose v <i>Anthelia julacea</i> creeping snow moss v <i>Cephalozia ambigua</i> snow glefmosis v	<i>Gymnomitrion apiculatum</i> prickly pear moss v <i>Marsupella brevissima</i> snowhutremose v <i>Marsupella sparsifolia</i> døkkhutremose v	<i>Racomitrium sudeticum</i> gray moss t*
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Distribution and regional distribution: (NB-)LA-HA and ASHTZ, O3-C1.

Main types of confusion: –

Red list status (2018): Snøleieberg (NT;<)

References and type parallels: Parts of F2, F3 and F6 (VN), B01 in part (DNHB13).

T1-C-12 Strong intermediate to extremely calcareous snow bed rock NiN characteristics: Solid ground

systems: Bare rock (T1), one basic type (82). Defined by LKM: KAյ3-5 & UEў1-4 & SVў2. LKM basis steps: KAўefghi & UEў0abcdefg & SVўabcd.

Physiognomy: Solid rock without vegetation or with some moss and scattered lichens.

Ecological characteristic: Bare rock includes solid rock without soil cover. The mapping unit covers flat rocks and rock crags, sometimes smaller rock walls on strongly intermediate or richer rocks in places with long-term snow cover in the mountains, which melts out late. It is therefore characterized by species that can withstand a short growing season.

Relatively humid conditions due to late melting with sprinkling and low evaporation. Distinguished from other mapping units within bare rock by occurrence in the high mountains in places that melt out late.

Species composition poorly known. The species list is provisional and will be changed. Probably species-poor and with elements of snow-bed species, especially mosses. Variation in species composition probably as a result of variation from normal to abnormal chemical composition.

Terrain and aerial photo characteristics: Often small occurrences. Knauser and flatberg can be light gray to dark in colour.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T1-B-24	T1-C-1	T1-D-1	T1-E-2
Basic types	T1-82	T1-82	T1-82	T1-82	T1-9-20,27-32,37-40,49-60,65-68.73-76.79-82.85

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Andreaea nivalis</i> snow moss v	<i>Cephalozia ambigua</i> snow glefmoss v	<i>Marsupella brevissima</i> snowhutremose v
<i>Andreaea obovata</i> felesotmose v	<i>Distichium capillaceum</i> cushion plan moss	<i>Marsupella sparsifolia</i> døkkhutremose v
<i>Anthelia julacea</i> creeping snow moss v	<i>Gymnomitrion apiculatum</i> prickly pear moss v	

Distribution and regional distribution: (NB-)LA-HA and ASHTZ, O2-C1.

Main types of confusion: –

Red list status (2018): Snøleieberg (NT;<)

References and type parallels: Parts of F2, F3 and F6 (VN), B01 in part (DNHB13).

T2-C-1 Open calcareous low -lying**heather soil NiN characteristics:**

Permanent soil systems: Open low-lying soil (T2), one soil type (1). Defined by LKM: KAÿ1 & UFÿ1. LKM base steps: KAÿabc & UFÿdef.



Physiognomy: Open vegetation on shallow ground.

Dominated by low-growing herbs and grasses, sometimes with scattered bushes and small trees. Elements of

heather may occur. Most often silty field layer with some bare soil and rock today. Bottom layer varying, most often Bekkensten. Photo: HB.
with drought-tolerant mosses and some scrub.

Ecological characteristics: Soil-covered natural land below the forest border on acidic rocks, in the transition between bare rock and forest land, where shallow soil, exposure to drought, strong wind exposure etc. prevent tree growth. Found on shelves in rock walls and on earth-covered areas, e.g. in cracks in crags in a transition zone between bare rock and forest. Also formed along the coast by primary succession after land uplift in places where soil development on rocks takes place slowly. Species composition with fairly drought-tolerant, light-loving acid soil species. Less prone to drought than shallow lowlands, which are dominated by drought-tolerant lichens and where mosses play a subordinate role. Occurrence of soil-dwelling vascular plant species differs from bare rock, which is dominated by stone-dwelling lichens and mosses.

Terrain and aerial photo characteristics: Typically small areas, narrow transitions between forest and rock during the day. Often mosaic with bare rock. Aerial photo: Often brown and smooth texture, more reddish-brown color with touches of heather. Texture and color consistent within regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T2-1	T2-B-1	T2-C-1	T2-D-1	T2-E-1
Basic types		T2-1	T2-1	T2-1,2	T2-1,2

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Calluna vulgaris</i> heather v* <i>Carex panicea</i> sorghum v [BN,O2-O3] <i>Carex pilulifera</i> bråtstarr v <i>Empetrum nigrum</i> krekling v <i>Huperzia selago</i> louse grass v <i>Juniperus communis</i> juniper v <i>Luzula pilosa</i> hairy frill s-[UFÿflg] <i>Polypodium vulgare</i> sisselrot v	<i>Rumex acetosella</i> small acid v <i>Vaccinium vitis-idaea</i> cranberry v <i>Dicranum fuscescens</i> bergsigd v <i>Dicranum scoparium</i> rib sickle v <i>Dicranum polysetum</i> sickle s-[UFÿflg] <i>Hylocomium splendens</i> floor moss v; s* [UFÿflg] <i>Hypnum cupressiforme</i> carpet braid v[O2-O3]	<i>Pleurozium schreberi</i> furumose v <i>Pohlia nutans</i> vegnikke v <i>Ptilidium ciliare</i> ground fringe s-[UFÿflg] <i>Racomitrium lanuginosum</i> heath gray moss m*; v* [O3,MR-Tr] <i>Cladonia</i> spp. lichen v <i>Cetraria islandica</i> islandslav v
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Distribution and regional distribution: BN-NB, O3-C1. The whole country below the forest line, primarily along the coast in exposed places.

Main types of confusion: Open calcareous shallow lowland (T2-C-2), open intermediate shallow heather (T2-C-3), open intermediate shallow lowland (T2-C-4), calcareous meadow with less heather (T32-C-1), low-calcareous meadow with clear heath (T32-C-2), low-calcareous dry heath with less heath (T32-C-11), low-lime dry heath with clear heath (T32-C-12).

Red list status (2018): Open ground land (LC;<)

References and type parallels: F3 in part (VN).

T2-C-2 Open calcareous low -lying**lowland NiN characteristics:** Fixed soil

systems: Open low-lying land (T2), one type of soil (2).

Defined by LKM: KAÿ1 & UFÿ2. LKM basic steps: KAÿabc & UFÿgh.



Physiognomy: Open mounded vegetation on shallow ground. Dominated by drought-tolerant lichens, with scattered heather species and drought-tolerant herbs and grasses. Creeping juniper may occur. Most often, open limestone-poor shallow lowland. Øf: Halden: slippery field layer with a lot of bare soil and rock during the day.

Enningdal, Skogen. Photo: RH.

Ecological characteristics: Soil-covered natural land

below the forest border on acidic rocks, in the transition between bare rock and forest land, where shallow soil, exposure to drought, strong wind exposure etc. prevent tree growth. Typically on drought-prone cols in rift valley landscapes (Østfold, the southern coast). Found on shelves in rock walls and on earth-covered areas, e.g. in crevices in crags in a transition zone between bare rock and forest, both in openings in forest and along the coast in places where also primary succession after uplift means that soil development is slow.

Species composition with drought-tolerant, light-loving acid soil species. More prone to drought than low-lying heathland, and dominated by lichen in the bottom layer. Drought-tolerant vascular plants, glistening vegetation. Occurrence of soil-dwelling vascular plant species differs from bare rock, which is dominated by rock-dwelling lichens and mosses.

Terrain and aerial photo characteristics: Typically small areas, preferably on knolls, wind-exposed ridges, or narrow transitions between forest and rock during the day. Often mosaic with bare rock. FF: Gray to white color with dominance of lichen, and then very even texture. With increasing heather coverage, the color becomes more brownish.

Texture and color consistent within and between regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T2-B-2	T2-C-2	T2-D-1	T2-E-1
Basic types	T2-2	T2-2	T2-2	T2-1,2	T2-1,2

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Agrostis vinealis</i> bergkvein v <i>Aira praecox</i> pygmy owl t*[S] <i>Arctostaphylos uva-ursi</i> honeydew s-[UFÿglf] <i>Atocion rupestre</i> småsmelle v <i>Calluna vulgaris</i> heather v* <i>Carex panicea</i> corn sedge v [BN-SB,O2-O3] <i>Carex pilulifera</i> bråstarr v <i>Hylotelephium maximum</i> butterbuck s-[UFÿglf] <i>Juniperus communis</i> juniper v	<i>Polypodium vulgare</i> sisselroot v <i>Rumex acetosella</i> small acid v <i>Spergula morisonii</i> spring bentel t*;s-[UFÿglf] <i>Vaccinium vitis-idaea</i> cranberry v <i>Dicranum fuscescens</i> bergsigd v <i>Dicranum spurium</i> rabbesigd t* <i>Pohlia nutans</i> vegnikke v* <i>Polytrichum juniperinum</i> juniper moss v* <i>Polytrichum piliferum</i> raccoon moss v*;t*	<i>Racomitrium lanuginosum</i> heath gray moss m[O2-O3,SF-Tr] <i>Cladonia arbuscula</i> light lichen s-[UFÿglf] <i>Cladonia rangiferina</i> gray lichen s-[UFÿglf] <i>Cladonia stellaris</i> white curl s-[UFÿglf] <i>Cladonia uncialis</i> prickly pear s-[UFÿglf] <i>Cetraria ericetorum</i> narrow Iceland slave s-[UFÿglf] <i>Cetraria islandica</i> islandslav v
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Distribution and regional distribution: BN-NB, O3-C1. The whole country, usually along the coast and larger lakes.

Most important types of confusion: Other calcareous (T2-C-1) and intermediate (T2-C-3,4) mapping units within open shallow land; as well as a semi-natural meadow with a similar location along KA and/or UF (T32-C-1,2,11,12).

Red list status (2018): Open ground land (LC;<)**References and type parallels:** F3 in part (VN).

T2-C-3 Open intermediate shallow heath land**NiN characteristics:** Permanent soil systems:

Open shallow ground (T2), one soil type (3). Defined by LKM: KAy2 & UFy1. LKM basic steps: KAyde & UFydef.

**Physiognomy:** Open vegetation on shallow ground.

Dominated by low-growing herbs and grasses, not infrequently with scattered bushes, scrub and small trees. Elements of heather may occur. Mostly slippery field layer with some bare soil and rock during the day. Bottom layer variable, often with drought-tolerant mosses and lichens.

Ecological characteristic: Soil-covered natural land below the forest line on intermediate rocks, in the transition between bare rock and forest land, where shallow soil, drought, strong wind exposure etc. prevent tree growth. Typically in sloping terrain in sun-exposed locations along the coast. Found on shelves in rock walls and on earth-covered areas, e.g. in cracks in crags in a transition zone between bare rock and forest. Also formed along the coast by primary succession after land uplift in places where soil development on rocks takes place slowly. Species from poor heather and somewhat more lime-demanding species are included. Less prone to drought than shallow lowlands, which are dominated by drought-tolerant lichens and where mosses play a subordinate role. Occurrence of soil-dwelling vascular plant species differs from bare rock, which is dominated by stone-dwelling lichens and mosses.

Open intermediate shallow heathland, partly overgrown with scrub. Ex: Moss: Jeløy, Rødsåsen. Photo: RH.

Terrain and aerial photo characteristics: As a rule, small areas, narrow transitions between forest and rock during the day. Often mosaic with bare rock. FF: Often green in the case of bushes, otherwise light to dark brown in the case of heather. Uneven texture with elements of bushes, thickets and small trees. Texture and color vary within and between regions.**Mapping rules, map technical specifications and scale adjustments:**

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T2-B-3	T2-C-3	T2-D-2	T2-E-2
Basic types	T2-3	T2-3	T2-3	T2-3,4	T2-3,4

Diagnostic species m =abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Calluna vulgaris</i> heather v <i>Campanula rotundifolia</i> bluebell s-[KAydlc] <i>Carex pilulifera</i> bråttstarr v <i>Convallaria majalis</i> lily of the valley s-[KAydlc] <i>Epilobium collinum</i> mountain milk s-[KAyeld] <i>Festuca ovina</i> sheep fescue v	<i>Geranium lucidum</i> white stork's beak t*[S] <i>Hieracium umbellatum</i> screen hover v <i>Huperzia selago</i> louse grass v <i>Juniperus communis</i> juniper v <i>Lathyrus linifolius</i> s*[KAydlc] <i>Pilosella officinarum</i> s-[KAydlc] <i>Plantago lanceolata</i> s-[KAydlc]	<i>Trifolium arvense</i> hare clover v;s-[KAydlc] <i>Dicranum polysetum</i> sickle s-[UFyflg] <i>Dicranum scoparium</i> rib sickle v <i>Hylocomium splendens</i> floor moss v;s*[Ufylflg] <i>Pleurozium schreberi</i> furmose v <i>Cladonia spp.</i> lichen v <i>Cetraria islandica</i> islandslav v
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Distribution and regional distribution: BN-NB, O3-C1. Primarily along the coast in exposed places.**Most important types of confusion:** Lime-poor (T2-C-1,2) and slightly lime-rich (T2-C-5,6) open shallow ground, open intermediate shallow lowland (T2-C-4), as well as semi-natural meadow with similar location along KA and/or UF (T32-C-3,4,13).**Red list status (2018):** Open ground land (LC;<)**References and type parallels:** F3 in part (VN).

T2-C-4 Open intermediate shallow lowland

NiN characteristics: Firm soil systems: Open shallow ground (T2), one soil type (4).

Defined by LKM: KAÿ2 & UFÿ2.

LKM basic steps: KAÿde & UFÿgh.

Physiognomy: Open mounded vegetation on shallow ground. Dominated by drought-tolerant lichens, and interspersed with drought-tolerant herbs and grasses. Sometimes deposits with juniper and heather vegetation. Mostly slippery field layer with some bare soil and rock during the day.



Open intermediate shallow lowland. Ex: Whales: Søndre Sandøy.
Photo: RH.

Ecological characteristics: Soil-covered natural land below the forest line on intermediate rocks, in the transition between bare rock and forest land, where the shallow soil and drought, in some places also strong wind exposure etc. prevent tree growth. Found on shelves in rock walls and on earth-covered areas, e.g. in cracks in crags in a transition zone between bare rock and forest. Also along the coast where primary succession after land uplift produces slow soil development on rocks. More prone to drought than low-lying heathland, and dominated by lichen in the bottom layer. Drought-tolerant vascular plants, often glistening vegetation. Distinguished from fairly rich lowland by the lack of weak low-grass indicators. Occurrence of soil-dwelling vascular plant species differs from bare rock, which is dominated by rock-dwelling lichens and mosses.

Terrain and aerial photo characteristics: Most often cover small areas, preferably on hills, wind-exposed ridges, or narrow transitions between forest and rock during the day, often in mosaic with bare rock. FF: Gray to white color when lichen dominates, and then most often with uniform texture and color, which is consistent within and between regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T2-4	T2-B-4	T2-C-4	T2-D-2	T2-E-2
Basic types		T2-4	T2-4	T2-3,4	T2-3,4

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity species (t* = characteristic t., tÿ- gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.)

Antennaria dioica cat's foot v Arabidopsis thaliana spring flower s-[UFÿglf] Arctostaphylos uva-ursi honeydew s-[UFÿglf] Arenaria serpyllifolia sanderve s-[UFÿglf] Atocion rupestre small s-[UFÿglf] Bromus hordeaceus lodnefaks v Calluna vulgaris heather v Carex pilulifera bråttstarr v Epilobium collinum mountain milk s-[KAÿeld] Festuca ovina sheep fescue v	Geranium robertianum stink stork v Hylotelephium maximum butterbuck s-[UFÿglf] Myosurus minimus mouse butt t* Pilosella officinarum s-[KAÿd lc] Potentilla argentea silver wall v Rumex acetosella small acid v Saxifraga granulata kidney herring v Scleranthus perennis perennial s+[UFÿglf] Sedum acre bitterbergknapp s+[UFÿglf] Sedum annuum small rock button v;s+[UFÿglf]	Sedum rupestre prickly pear s-[UFÿglf] Spergula morisonii spring bentel s-[UFÿglf] Teesdalia nudicaulis sand cress t* Viola tricolor motherwort s-[KAÿdlc] Viscaria vulgaris meadow tar flower s-[KAÿdlc] Cladonia spp. lichen v Cladonia arbuscula light lichen s-[UFÿglf] Cladonia rangiferina gray lichen s-[UFÿglf] Cladonia stellaris white curl s-[UFÿglf] Cetraria islandica islandslav v
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Distribution and regional distribution: BN-NB, O3-C1. The whole country, most commonly along the coast and larger lakes.

Most important types of confusion: Open calcareous, intermediate and slightly calcareous shallow heathland (T2-C-1, T2-C-3, T2-C-5), open calcareous and slightly calcareous shallow lowland (T2-C-2, T2-C-6), intermediate dry heath with less heat (T32-C-13), intermediate meadow with a less raised impression (T32-C-3), intermediate meadow with clear raised impression (T32-C-4).

Red list status (2018): Open ground land (LC;<)

References and type parallels: F3 in part (VN).

T2-C-5 Open slightly calcareous shallow**heather soil NiN characteristics:** Permanent

soil systems: Open shallow soil (T2), one soil type (5).

Defined by LKM: KA3 & UFy1. LKM base step: KAyfg & UFydef.

Physiognomy: Open vegetation on shallow ground.

Dominated by low-growing herbs and grasses, sometimes with scattered shrubs and small trees that are unlikely to grow old. Mostly slippery field layer with some bare soil and rock during the day. Can have bottom layer with drought-tolerant mosses.



Open slightly calcareous shallow heathland. Ak: Oppegård: Bekkensten. Photo: HB.

Ecological characteristics: Includes soil-covered natural land below the forest line on moderately calcareous rocks. Found in the transition between bare rock and woodland, where shallow soil, drought, in some places also strong wind exposure, etc. prevent tree growth. Includes soil-covered areas, i.a. in crevices in crags and in a transition zone between bare rock and forest and on shelves in rock walls.

Also formed along the coast by primary succession after land uplift in places where soil development on rocks takes place slowly. Less prone to drought than shallow lowlands, which are dominated by drought-tolerant lichens and where mosses play a subordinate role. Distinguished from strongly calcareous heather (T2-C-7) by the lack of calcareous gout indicators. T2-C-5 is dominated by soil-dwelling vascular plant species, while bare rock only contains stone-dwelling lichens and mosses.

Terrain and aerial photo characteristics: Mostly small areas, narrow transitions between forest and rock during the day and mosaic with bare rock. FF: Often green in colour, but darkens when undergrowth is present. Texture in aerial photo smooth when shrub layer is missing. Texture and color consistent within regions.**Mapping rules, map technical specifications and scale adjustments:**

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T2-5	T2-B-5	T2-C-5	T2-D-3	T2-E-3
Basic types		T2-5	T2-5	T2-5,6	T2-5,6

Diagnostic species m =abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

Anthyllis vulneraria round pod s-[KAyglf] Astragalus glycyphyllos licorice milk v ;s-[KAyglf] Barbara vulgaris winter cress v Carex pilulifera bråtstarr v Festuca ovina sheep fescue v Fragaria vesca field strawberry s-[KAyfle] Galium boreale white ants s-[KAyfle]	Geranium sanguineum s*[KAyglf] Helictotrichon pubescens down oat s-[KAyfle] Hypericum perforatum St. John's wort s-[KAyfle] Lathyrus linifolius s-[UFyf le] Lotus corniculatus tiriltongue v;s-[UFyfle]	Plantago lanceolata slimy giant v Plantago media down giant v;s*[KAyglf] Poa alpina mountain thrush s*[KAyglf] Polygala vulgaris Great Blue Feather v;s-[KAyfle] Rubus saxatilis teaberry s-[KAyfle] Trifolium arvense hare clover v
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Distribution and regional distribution: BN-NB, O3-C1. The whole country on moderately calcareous rocks first and foremost in exposed places.**Most important types of confusion:** Open intermediate and strongly calcareous shallow heath land (T2-C-3, T2-C-7), open intermediate, weakly calcareous and strongly calcareous shallow lowland (T2-C-4, T2-C-6, T2-C 8), weakly calcareous dry heath with less heat (T32-C-15), weakly calcareous meadow with a slight uplift (T32-C-5), slightly calcareous meadow with a clear uplift (T32-C-20).**Red list status (2018):** Open ground land (LC;<)**References and type parallels:** Partially F3, F4 and F5 (VN). Partially B02 (DNHB13).

T2-C-6 Open slightly calcareous shallow**lowland NiN characteristics:** Solid ground

systems: Open shallow ground (T2), one soil type

(6). Defined by LKM: KA3 & UFy2. LKM base steps: KAyfg & UFygh.

Physiognomy: Open, dry-rain vegetation on shallow ground. Dominated by low-growing herbs and grasses, sometimes with scattered shrubs and small trees that are expected to die at a young age. Mostly slippery field layer with some bare soil and rock during the day. Bottom layer with drought-tolerant mosses and lichens.



Open weakly calcareous shallow lowland. Tea: Bamble: NE in Rognsfjorden. Photo: RH.

Ecological characteristics: Soil-covered natural land below the forest line on moderately calcareous rocks.

Includes the transition between bare rock and woodland, where shallow soil, drought, in some places also strong wind exposure, etc. prevent tree growth. Typical of uplifted areas along the coast with slow soil development and primary succession on rock. Species composition with very drought-tolerant, light-loving species. More drought-prone than low-lying heathland. Distinguished from strongly calcareous lowland by the lack of calcareous low-gurt indicators. Occurrence of soil-dwelling vascular plant species differs from bare rock, which is dominated by rock-dwelling lichens and mosses.

Terrain and aerial photo characteristics: Most often small areas, preferably on hills, wind-exposed ridges, or narrow transitions between forest and rock during the day and mosaics of bare rock. FF: Gray to white color with dominance of lichen, and then usually smooth texture in aerial photographs. Darkens and more brownish with elements of heather, green when there are a lot of bushes. Texture and color consistent within and between regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T2-6	T2-B-6	T2-C-6	T2-D-3	T2-E-3
Basic types		T2-6	T2-6	T2-5,6	T2-5,6

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

Allium oleraceum wild onion v Allium vineale beach onion v Antennaria dioica cat 's foot v;s-[UFyglf] Anthyllis vulneraria round pod s-[KAyglf] Arabidopsis thaliana spring box flower v Arenaria serpyllifolia sandarve v Ceratium semidecandrum spring heirloom v Draba verna vårrubblom s-[UFyglf;KAyflf] Festuca ovina sheep fescue v Geranium sanguineum _	Hylotelephium maximum butterbuck v Hypochaeris maculata spotted pig's ear s-[KA-fle] Myosotis stricta dwarf forget-me-not t* Pilosella officinarum hair fly v Polygonatum odoratum lily of the valley v;s-[KAyglf] Potentilla argentea silver wall v Saxifraga granulata kidney herring v Scleranthus perennis perennial s+[UFyglf] Sedum acre bitterbergknapp s+[UFyglf]	Sedum album whitbergknapp s+[UFyglf] Veronica arvensis bakkeveronika v;s-[KAyflf] Viola tricolor motherwort m;s-[UFyglf] Viscaria vulgaris meadow tar flower v;s-[UFyglf] Cetraria islandica islandslav v Cladonia arbuscula light lichen s-[UFyglf] Cladonia rangiferina gray lichen s-[UFyglf]
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Distribution and regional distribution: BN-NB, O3-C1. The whole country on moderately calcareous rocks, most commonly along the coast.

Most important types of confusion: Open intermediate, weakly calcareous and strongly calcareous shallow heathland (T2-C-3, T2-C-5, T2-C-7), open intermediate and strongly calcareous shallow lowland (T2-C-4, T2-C 8), weakly calcareous dry meadow with less heather (T32-C-15), slightly calcareous meadow with less heather (T32-C-5), slightly calcareous meadow with clear heather (T32-C-20).

Red list status (2018): Open ground land (LC;<)

References and type parallels: Partially F3, F4 and F5 (VN). Partial B02 (DNHB13)

T2-C-7 Open highly calcareous low -lying heather

land NiN characteristics: Fixed land system: Open low-lying land (T2), one type of soil (7). Defined by LKM: KAý4 & UFý1. LKM base step: KAýhi & UFýdef.



Physiognomy: Open vegetation on shallow ground.

May have elements of heather species, but most often with a predominance of low-growing herbs and grasses, sometimes with scattered bushes and small trees that are unlikely to grow old.

Varying field layer coverage, often bare soil and rock during the day. Can have bottom layer with drought-tolerant mosses.

Open strongly calcareous shallow heathland. Ak: Bærum: Sarbuollen west. Photo: HB.

Ecological characteristics: Soil-covered natural land below the forest line on very calcareous rocks. Includes transitions between bare rock and woodland, where shallow soil, drought, and in some places also strong wind exposure prevent tree growth. Found on shelves in rock walls and on earth-covered areas, e.g. in cracks in crags in a transition zone between bare rock and forest. Also formed along the coast by primary succession after land uplift in places where soil development on rocks takes place slowly.

Less prone to drought than shallow lowlands, which are dominated by drought-tolerant lichens and where mosses play a subordinate role. Often rich in species, distinguished from poorer types by the presence of calcareous gourd indicators. Dominance of soil-dwelling vascular plant species, while bare rock only has stone-dwelling lichens and mosses.

Terrain and aerial photo characteristics: Mostly small areas, narrow transitions between forest and rock during the day.

Mosaic with bare rock plain. FF: Often light green to green in colour, darker and more brownish with hints of heather.

The presence of a shrub layer gives a darker green tone. Texture in aerial photo smooth if bush layer is missing. Texture and color consistent within regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T2-7	T2-B-7	T2-C-7	T2-D-4	T2-E-4
Basic types		T2-7	T2-7	T2-7,8	T2-7,8

Diagnostic species

m = abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity species (t* = characteristic t., t#- gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.)

Acinos arvensis groundmint v;s+[KAýhl]	Galium verum yellow ant s-[KAýh lg]	Plantago media down giant v;s-[UFýhl]
Anthyllis vulneraria round pod v	Geranium sanguineum bloodsucker beak v	Poa alpina fjellrapp v
Astragalus glycyphyllos licorice meal v	Helicotrichon pratense meadow oats v;s*[KAýhl]	Polygala vulgaris large blue feather v
Briza media heart grass v;s+[KAýh lg]	Hypericum perforatum St. John's wort v	Potentilla crantzii spotted wall s+[KAýhl]
Carex caryophyllea spring sedge v;s*[KAýhl]	Hypochaeris maculata spotted pig's ear s-[KAýhl]	Rubus saxatilis teaberry v
Centaurea scabiosa s-[KAýh lg]	[KAýhl]	Silene nutan 's nod s+[KAýhl]
Dracocephalum ruyschiana dragon 's head t*;s*[KAýhl]	Linum catharticum wild-lin s+[KAýhl]	Viola rupestris gravel violet v;s+[KAýhl]
Filipendula vulgaris s*[KAýh lg]	Origanum vulgare rock mint v;s-[KAýhl]	Rhytidium rugosum paw moss v;s+[KAýhl]
	Pimpinella saxifraga _ hlg]	Abietinella abietina granmose v;s-[KAýhl]

Distribution and regional distribution: BN-NB, 03-C1. Primarily along the coast on very calcareous rocks in the Oslofjord area and on Helgeland and in Salten (No).

Most important types of confusion: Other weakly calcareous and strongly calcareous types of open, shallow land (T2-C-5,6,8), as well as semi-natural meadow with a similar location along KA and/or UF (T32-C-7,17,18).

Red list status (2018): Open shallow calcareous ground in the boreal zone (EN;ý), open shallow calcareous ground in the southern boreal zone (VU;ý)

References and type parallels: Partially F3, F4 and F5 (VN). Partially B01 and B02 (DNHB13)

T2-C-8 Open highly calcareous low -lying ground

NiN characteristics: Permanent soil systems: Open low-lying ground (T2), one soil type (8).

Defined by LKM: KAÿ4 & UFÿ2. LKM base step: KAÿhi & UFÿgh.

Physiognomy: Open, dry-rain vegetation on shallow ground. Dominated by low-growing herbs and grasses, sometimes with scattered shrubs and small trees that are expected to die at a young age. Most often a slippery field layer with some bare calcareous gravel and rock during the day. Bottom layer with elements of drought-tolerant mosses and lichens.



Open, strongly calcareous lowland. Bu: Hurum: Delsvik.
Photo: HB.

Ecological characteristics: Soil-covered natural land below the forest line on very calcareous rocks. Includes the transition between bare rock and woodland, where shallow soil, drought, sometimes also strong wind exposure, etc. prevent tree growth. Found on shelves in rock walls and on earth-covered areas, e.g. in cracks in crags in a transition zone between bare rock and forest. Along the coast also in places where primary succession after uplift results in slow soil development on rocks. Species composition with highly drought-tolerant, light-loving vascular plant species; more prone to drought than low-lying heathland. Rich in species, distinguished from types on more calcareous land by the presence of calcareous gout indicators. Occurrence of soil-dwelling vascular plant species differs from bare rock, which is dominated by rock-dwelling lichens and mosses.

Terrain and aerial photo characteristics: Most often small areas, preferably on hills, wind-exposed ridges, or narrow transitions between forest and rock during the day and mosaics of bare rock. FF: Most often a light green-brown colour, but turns gray when the light lichen element increases. Mostly smooth texture in aerial photos; texture and color consistent within and between regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T2-8	T2-B-8	T2-C-8	T2-D-4	T2-E-4
Basic types		T2-8	T2-8	T2-7,8	T2-7,8

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity species (t* = characteristic t., t¤- gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.)

Acinos arvensis groundmint v;s+[KAÿhlg] Allium oleraceum wild onion v;t* Allium vineale beach onion v;t* Androsace septentrionalis minor key s*[KAÿhlg] Anthyllis vulneraria round pod v Arabis hirsuta bergschrinneblom v;s+[KAÿhlg] Artemisia campestris field wormwood v;s+[KAÿhlg] Draba verna vårrubblom t*;s-[UFÿglf] Festuca ovina sheep fescue v Galium verum yellow ant v	Geranium sanguineum bloodsucker beak v Hypochaeris maculata spotted pig's ear v Myosotis ramosissima ground forget-me-not s-[UFÿglf] Myosotis stricta dwarf forget-me-not s-[UFÿglf] Poa alpina fjellrapp v Poa compressa flatrapp t*;s-[KAÿhlg] Polygonatum odoratum lily of the valley m;v* Potentilla argentea silver wall v Potentilla crantzii spotted wall s*[KAÿhlg] Saxifraga tridactylites s-[KAÿhlg]	Sedum album whitbergknapp s+[UFÿglf] Seseli libanotis deerroot t*;s*[KAÿhlg] Silene nutan 's nod s+[KAÿhlg] Veronica spicata aksveronika t*;s*[KAÿhlg] Viola rupestris gravel violet v;s-[KAÿhlg] Viola tricolor stepmother v Abietinella abietina granmose v;s-[KAÿhlg] Rhytidium rugosum paw moss v;s+[KAÿhlg] Cladonia spp. lichen s-[UFÿglf]
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Distribution and regional distribution: BN-NB, O3-C1. Associated with very calcareous rocks and shelly sandbanks, most commonly along the coast in the Oslofjord area and on Helgeland and in Salten (No).

Most important types of confusion: Other weakly calcareous and strongly calcareous types of open, shallow land (T2-C-5,6,7), as well as semi-natural meadow with a similar location along KA and/or UF (T32-C-7,17,18).

Red list status (2018): Open shallow calcareous ground in the boreal zone (EN;ÿ), open shallow calcareous ground in the southern boreal zone (VU;ÿ)

References and type parallels: Partially F3, F4 and F5 (VN). Partially B01 and B02 (DNHB13)

T3-C-1 Lime-poor loess NiN characteristic:

Solid ground systems: Mountain heath, loess and tundra (T3), one basic type (1). Defined by LKM: KAý1 & UFý1 & Klý1. LKM base steps: KAýabc & UFýbc & Klý0a.

Physiognomy: Species-poor, heather-dominated vegetation with scattered bushes and with a slippery field layer of herbs and grasses that do not require lime. Moss-dominated bottom layer, usually with elements of lichen. Lichens dominate in continental areas.

Ecological characteristics: On very low-lime, soil-covered solid land in sloping terrain with a podsol profile and with stable and thick snow cover. Occurs in LA retrended in the middle of the Rabb snow layer gradient. Borders downwards towards snow beds and upwards towards heather or low heath. The snow cover provides good protection against wind wear and low temperatures, and the soil is rarely frozen and normally not exposed to soil flow (solifluction). The snow melts relatively early in June/July and provides good soil moisture and a fairly long growing season. Shrub layer of frugal species such as juniper and dwarf birch. Mouse ears and scrub berries are important in oceanic areas.

Terrain and aerial photo characteristics: Inclined terrain, slopes.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T3-B-1	T3-C-1	T3-D-1	T3-E-1
Basic types	T3-1	T3-1	T3-1	T3-1	T3-1

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Alchemilla alpina</i> mountain ladybug <i>Anthoxanthum nipponicum</i> mountain gulaks <i>v*</i> ;s-[UF-cld] <i>Avenella flexuosa</i> smyle m; <i>v*</i> ;s-[UF-cld] <i>Betula nana</i> ssp. <i>nana</i> dwarf birch m ; <i>v*</i> ;s-[KA-cld],[UF-cld] <i>Calluna vulgaris</i> heather <i>v</i> ;s-[KA-cld] <i>Carex bigelowii</i> _ [iKA-cld],[UF-cld] <i>Carex brunescens</i> ssp. <i>brunescens</i> brown cataract <i>v</i> ;s+[UF-cld] <i>Carex vaginata</i> slirestarr v <i>Diphasiastrum alpinum</i> fjelljamne s-[UF-cld] <i>Empetrum nigrum</i> cricket m ; <i>v*</i> ;s-[KA-cld] <i>Festuca ovina</i> sheep fescue v <i>Gymnocarpium dryopteris</i> bird tail s+[UF-cld] <i>Hieracium alpinum</i> agg. mountain hoverer <i>v</i> ;s-[UF-cld] <i>Juncus trifidus</i> rabbesiv v <i>Juniperus communis</i> einer <i>v</i> ;s+[KA-cld],s-[UF-cld]	<i>Luzula pilosa</i> hair frill s+[UF-cld] <i>Lysimachia europaea</i> forest star <i>v</i> ;s*[UF-cld] <i>Omalotheca norvegica</i> seder graywort <i>v</i> ;s*[UF-cld] <i>Pedicularis lapponica</i> Bleikmyrklegg v <i>Phyllodoce caerulea</i> blue heather <i>v</i> ;s-[KA-cld],[UF-cld] <i>Ranunculus acris</i> ground soleie <i>v</i> ;s*[UF-cld] <i>Rubus chamaemorus</i> molte <i>v</i> ;s-[KA-cld] <i>Rumex acetosa</i> meadow sorrel <i>v</i> ;s*[UF-cld] <i>Salix glauca</i> ssp. <i>glauca</i> silver willow v <i>Salix herbacea</i> mouse ear <i>v</i> ;s-[KA-cld],[s+][UF-cld] <i>Solidago virgaurea</i> golden rice <i>v</i> ;s+[UF-cld] <i>Taraxacum crocea</i> agg. mountain lion teeth <i>v</i> ;s-[UF-cld] <i>Vaccinium myrtillus</i> blueberries m ; <i>v*</i> ;s-[KA-cld],s+[UF-cld] <i>Vaccinium vitis-idaea</i> cranberry <i>v</i> *;s-[KA-cld] <i>Veronica alpina</i> snow veronika <i>v</i> ;s*[UF-cld]	<i>Barbilophozia lycopodioides</i> goosefoot beard moss <i>v*</i> ;s-[UF-cld] <i>Dicranum scoparium</i> rib sickle <i>v</i> ;s-[KA-cld] <i>Hylocomium splendens</i> floor moss <i>v</i> ;s+[UF-cld] <i>Pleurozium schreberi</i> furmose <i>v</i> ;s+[KA-cld] <i>Polytrichastrum alpinum</i> mountain binnemoss <i>v</i> ;s-[UF-cld] <i>Polytrichum commune</i> large bear moss <i>v</i> ;s-[KA-cld],s-[UF-cld] <i>Polytrichum juniperinum</i> juniper moss v <i>Ptilidium ciliare</i> ground fringe v <i>Cetraria islandica</i> islandslav <i>v*</i> <i>Cladonia arbuscula</i> light lichen v <i>Cladonia rangiferina</i> gray lichen <i>v</i> ;s-[KA-cld] <i>Cladonia stellaris</i> white curl <i>v</i> ;s+[KA-cld] <i>Cladonia uncialis</i> spikelav <i>v</i> ;s-[KA-cld] <i>Cladonia</i> spp. cup lichen <i>Nephroma arcticum</i> storvrenge v <i>Peltigera aphthosa</i> green liver v
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Lime-poor leeside. Op: Vang: Tyinosen. Photo: HB.

Distribution and regional distribution: LA, O3-C1. Throughout the country, but mostly in snowy mountains.

Most important types of confusion: Calcareous mountain heather (T3-C-2), intermediate leeside (T3-C-4), intermediate mountain heather (T3-C-5), calcareous and intermediate rabbble (T14-C-1), calcareous boreal fresh hi (T31-C-1).

Red list status (2018): Mountain heath, leeside and tundra (NT mainland, LC Svalbard;<)

References and type parallels: S1, S3 (VN).

T3-C-2 Calcareous mountain heather

NiN characteristics: Mainland systems: Mountain heath, lee side and tundra (T3), one ground type (2). Defined by LKM: KAý1 & UFý2 & Klý1. LKM base steps: KAýabc & UFýde & Klýoa.

Physiognomy: Species-poor 0.5-1 m thick thickets of bushes, and with a field layer dominated by heather, with few and undemanding grasses and herbs. Moss-dominated bottom layer, with elements of lichen. More dense and homogeneous shrub layer than low heather.



Calcareous mountain heather. Fi: Måsøy: Havøy gable. Photo: RH

Ecological characteristics: On very low-lime, soil-covered firm ground with a podsol profile and a thick raw humus layer, often on large, gently sloping surfaces with a stable and thick snow cover. Occurs in LA in the upper and partly middle parts of the Rabb snow bed gradient. Borders downwards towards the leeside or snow bed and upwards towards the low heath or rabb. The snow cover provides good protection against wind wear and low temperatures. The soil is rarely frozen and normally not exposed to soil flow (solifluction). The snow melts earlier than in T3-C-1 (in May/June), and provides relatively good soil moisture and a long growing season. Somewhat drought-prone, with elements of drought-tolerant species. Thickets of juniper, dwarf birch and some willows. The height of the scrub reflects the depth of the snow, as shoots emerging from the snow are dried out and worn away by strong winds. In central parts of Eastern Norway dominated by juniper and dwarf birch. In oceanic areas, more grebes, gray wagtails, and buzzards. Field layer of thrifty species such as cricket and berry heather species. Distinguished from richer types by lacking lime-demanding species.

Terrain and aerial photo characteristics: Gently sloping surfaces.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T3-B-2	T3-C-2	T3-D-4	T3-E-4
Basic types	T3-2	T3-2	T3-2	T3-2,3	T3-2,3

Diagnostic species m = abundance

species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity species (t* = characteristic t., tð- gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.)

<i>Anthoxanthum nipponicum</i> mountain gulaks v;s*[UF-elf] <i>Avenella flexuosa</i> smyle v*;s-[UF-elf] <i>Betula nana</i> ssp. <i>nana</i> dwarf birch v;s- [KA-cld] <i>Calluna vulgaris</i> heather v;s-[UF-elf] <i>Carex bigelovii</i> stivstarr v <i>Diphasiastrum alpinum</i> fjelljamne s- [UF-elf] <i>Empetrum nigrum</i> cricket m;v*s- [KA-cld] <i>Festuca ovina</i> sheep fescue v;s+[UF-dlc] <i>Hieracium alpinum</i> agg. mountain hoverer v;s- [UF-dlc] <i>Juncus trifidus</i> rabbesiv v;s-[UF-dlc] <i>Juniperus communis</i> einer v;s+[KA-cld],s- [UF-elf] <i>Kalmia procumbens</i> greplyng s-[UF-dlb]	<i>Pedicularis lapponica</i> white anthill v;s- [UF-elf] <i>Phyllodoce caerulea</i> blue heather v;s- [KA-cld],s+[UF-elf] <i>Solidago virgaurea</i> golden rice v;s+[UF-elf] <i>Vaccinium myrtillus</i> blueberry v;s- [KA-cld],s+[UF-elf] <i>Vaccinium uliginosum</i> blockberry v;s+ [UF-dlc] <i>Vaccinium vitis-idaea</i> cranberry v*s- [KA-cld] <i>Barbilophozia florekei</i> v*s+[KA-cld],s*[UF-elf] <i>Barbilophozia lycopodioides</i> goosefoot egg moss v;s+[UF-elf] <i>Dicranum fuscescens</i> bergsigd v;s- [KA-cld] <i>Hylocomium splendens</i> floor moss v;s- [UF-elf]	<i>Pleurozium schreberi</i> furumose v;s+ [KA-cld],s-[UF-elf] <i>Polytrichum juniperinum</i> juniper moss v <i>Ptilidium ciliare</i> ground fringe v;s-[UF-elf] <i>Cetraria islandica</i> islandslav v* <i>Cladonia arbuscula</i> light lichen v*s-[UF-dlc] <i>Cladonia rangiferina</i> gray lichen v*s- [KA-cld],s-[UF-dlc] <i>Cladonia stellaris</i> white curl v*s+[KA-cld],s+[UF-dlc] <i>Cladonia uncialis</i> spikelav v;s-[KA-cld],s- [UF-elf] <i>Cladonia</i> spp. cup lichen <i>Flavocetraria nivalis</i> yellow skin v;s+[UF-dlc]
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Distribution and regional distribution: LA, O3-C1. Throughout the country, but mostly in snowy mountains.

Most important types of confusion: Calcareous lee side (T3-C-1), calcareous mountain-low heath (T3-C-3), intermediate mountain heather (T3-C-5), calcareous boreal heather (T31-C-2).

Red list status (2018): Mountain heath, leeside and tundra (NT mainland, LC Svalbard;<)

References and type parallels: S2, S3 (VN).

T3-C-3 Calcareous mountain-lowland

NiN characteristics: Mainland systems: Mountain heath, lee side and tundra (T3), one ground type (3). Defined by LKM: KAÿ1 & UFÿ3 & Klÿ1. LKM base steps: KAÿabc & UFÿfg & Klÿ0a.



Physiognomy: Fairly sparse in species, often with a scattered shrub layer. Slippery field layer with berry heather species, drought-tolerant heather species and small willows. Relatively few herbs and grasses. Dense bottom layer of lichen and drought-adapted mosses. Photo: RH.

Ecological characteristics: On limestone-poor, soil-covered solid ground, often on large blown-off surfaces with unstable snow cover. Particularly widespread in the upper part of LA and in MA with somewhat less shrub layer (dwarf birch, willow, juniper). The soil is podsol with elements of sandy mineral soil in the humus layer. Occurs in the upper parts of the Rabb snow bed gradient. Borders downwards towards lynghei or leeside, and upwards towards rabb. Thin snow cover provides little protection against wind and low temperatures. Early snowmelt and good drainage, combined with strong winds, result in low soil moisture and a long growing season. Shrub layer of undemanding species such as dwarf birch, juniper and silver willow. Common heather most commonly in O2. In oceanic regions, dwarf birch is replaced by willows. Differentiated from richer low-lying types by lacking lime indicators and slightly moisture-demanding species.

Terrain and aerial photo characteristics: Flat to gently sloping terrain. Light color due to high low coverage.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T3-3	T3-B-3	T3-C-3	T3-D-4	T3-E-4
Basic types		T3-3	T3-3	T3-2,3	T3-2,3

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinguishing species (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.), Distinguishing species against T3-C-12.

<i>Arctous alpina</i> grouse berry v;s*[UF:fle] <i>Avenella flexuosa</i> smyle v <i>Betula nana</i> ssp. <i>nana</i> dwarf birch v;s-[KA:cld] <i>Calluna vulgaris</i> heather v[LA;O1-O2] <i>Carex bigelowii</i> stivstarr v <i>Empetrum nigrum</i> cricket v;s-[KA:cld] <i>Festuca ovina</i> sheep's fescue v;s-[UF:fle] <i>Juncus trifidus</i> rabbesiv v <i>Kalmia procumbens</i> greplyng v;s+[UF:fle] <i>Luzula spicata</i> <i>Salix glauca</i> ssp. <i>glauca</i> silver willow v <i>Vaccinium uliginosum</i> blockberry v <i>Vaccinium vitis-idaea</i> cranberry v*s-[KA:cld]	<i>Dicranum fuscescens</i> bergsigd v;s-[KA:cld] <i>Lophozia sudetica</i> red tab v <i>Lophozia ventricosa</i> buckwheat patch v <i>Pleurozium schreberi</i> furumose v;s+[KA:cld] <i>Pohlia nutans</i> vegnukke v;s-[KA:cld],s-[UF:fle] <i>Polytrichum juniperinum</i> juniper moss v <i>Ptilidium ciliare</i> ground fringe v;s-[UF:fle] <i>Cetraria aculeata</i> pit tag v <i>Cetraria ericetorum</i> narrow island slave v;s-[UF:fle]	<i>Cetraria islandica</i> islandslav v* <i>Cladonia arbuscula</i> light lichen m;v*s-[UF:fle] <i>Cladonia gracilis</i> syllabary <i>Cladonia rangiferina</i> gray lichen v*s-[KA:cld] <i>Cladonia stellaris</i> white curl m;v*s+[KA:cld],s+[UF:fle] <i>Cladonia uncialis</i> spikelav v;s-[KA:cld] <i>Cladonia</i> spp. cup lichen <i>Flavocetraria cucullata</i> yellow sedge v;s-[UF:fle] <i>Flavocetraria nivalis</i> yellow skin v*s-[UF:fle] <i>Stereocaulon paschale</i> common salt lichen v
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Distribution and regional distribution: LA-MA, O2-C1.

Most important types of confusion: Calcareous mountain-heath heath (T3-C-2), intermediate mountain-low heath (T3-C-6), calcareous and intermediate heather (T14-C-1), calcareous boreal low heath (T31-C-3).

Red list status (2018): Mountain heath, leeside and tundra (NT mainland, LC Svalbard;<)

References and type parallels: R1, R2, R5, R6a (VN).

T3-C-4 Intermediate leesside NiN characteristic:

Mainland systems: Mountain heath, leesside and tundra (T3 one basic type (4). Defined by LKM: KAy2 & UFy1 & Klj1. LKM base step: KAyde & UFybc & Klj0a.

Physiognomy: Sparse shrub layer and moderately species-rich field layer with berry heather and small to moderately demanding small ferns, herbs and graminids. Moss-dominated bottom layer with high coverage. A little low.



Intermediate reading page. SF: Årdal: V for Torolmen. Photo: HB.

Ecological characteristics: On low to medium nutrient-rich, soil-covered firm ground in sloping terrain with stable snow cover. Occurs in LA in middle parts of the Rabb snow bed gradient. It borders downwards towards the snow bed and upwards towards heather or low heath. The snow cover provides good protection against wind wear and low temperatures, and the soil is rarely frozen and normally not exposed to soil flow (solifluction). The snow melts relatively early and provides good soil moisture and a long growing season. Distinguished from low-lime leeside by the inclusion of somewhat more lime-demanding species.

Terrain and aerial photo characteristics: Inclined terrain, slopes. Green color on the terrain.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T3-4	T3-B-4	T3-C-4	T3-D-2	T3-E-2
Basic types		T3-4	T3-4	T3-4	T3-4

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **tb-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Anthoxanthum nipponicum</i> mountain gulaks v*s-[UF:cld]	<i>Hieracium alpinum</i> agg. mountain hoverer v;s-[UF:cld]	<i>Silene acaulis</i> fjellsmelle v;s*[KA:dlc] <i>Solidago virgaurea</i> golden rice v*s+[UF:cld]
<i>Avenella flexuosa</i> smyle m;v*s-[KA:elf],s-[UF:cld]	<i>Luzula pilosa</i> hair frill s+[UF:cld] <i>Luzula spicata</i> aksfrytle v;s-[KA:dlc]	<i>Taraxacum croceum</i> agg. mountain lion teeth v:s+[UF:cld];s+[KA:dlc]
<i>Bartsia alpina</i> blacktop v;s-[UF:cld];s+[KA:dlc]	<i>Lysimachia europaea</i> forest star v*s+[UF:cld]	<i>Vaccinium myrtillus</i> blueberry v*s*[KA:elf],s+[UF:cld]
<i>Betula nana</i> ssp. <i>nana</i> dwarf birch v;s-[UF:cld]	<i>Omalotheca norwegica</i> v ;s+[UF:cld];s-[KA:dlc]	<i>Vaccinium vitis-idaea</i> cranberry v
<i>Bistorta vivipara</i> harerug v;s+[KA:dlc]	<i>Oxyria digyna</i> mountain acid v;s+[UF:cld];s+[KA:dlc]	<i>Veronica alpina</i> snow veronica v;s*[UF:cld];s-[KA:dlc]
<i>Campanula rotundifolia</i> bluebell v;s*[KA:dlc]	<i>Pedicularis lapponica</i> Bleikmyrklegg v	<i>Viola biflora</i> mountain violet v;s*[UF:cld];s+[KA:dlc]
c]	<i>Phyllodoce caerulea</i> blue heather v;s-[UF:cld]	<i>Barbilophozia lycopodioides</i> goosefoot egg moss v;s-[UF:cld]
<i>Carex bigelowii</i> stilt v;s+[KA:elf],s-[UF:cld]	<i>Poa alpina</i> mountain thrush v;s*[UF:cld];s*[KA:dlc]	<i>Dicranum scoparium</i> rib sickle v;s+[KA:elf]
<i>Carex brunnescens</i> ssp. <i>brunnescens</i> brown cataract v;s+[UF:cld]	<i>Pyrola minor</i> pearl winter green v;s+[UF:cld];s-[KA:dlc]	<i>Hylocomium splendens</i> floor moss v*s-[UF:cld]
<i>Carex vaginata</i> scabbard v;s-[KA:dlc]	<i>Ranunculus acris</i> ground sunbed v;s*[UF:cld];s-[KA:dlc]	<i>Polytrichastrum alpinum</i> mountain binnemoss v;s-[UF:cld]
<i>Empetrum nigrum</i> cricket v*s+[KA:elf]	<i>Rhodiola rosea</i> rose root v;s+[UF:cld];s-[KA:dlc]	<i>Cetraria islandica</i> islandslav v*
<i>Euphrasia wettsteinii</i> small-eyed thrush v;s-[UF:cld];s*[KA:dlc]	<i>Rumex acetosa</i> meadow sorrel v*s*[UF:cld];s*[KA:dlc]	<i>Cladonia arbuscula</i> light lichen v;s-[KA:elf]
<i>Galium boreale</i> white ants s*[KA:dlc]	<i>Saussurea alpina</i> mountain thistle v*s+[UF:cld];s-[KA:dlc]	<i>Peltigera aphthosa</i> green liver v
<i>Geranium sylvaticum</i> v ;s*[UF:cld];s*[KA:dlc]		
<i>Gymnocarpium dryopteris</i> bird tail v;s+[UF:cld]		

Distribution and regional distribution: LA, O3-C1. Throughout the country, but mostly in snowy mountains.

Most important types of confusion: Calcareous leeside (T3-C-1), slightly calcareous leeside (T3-C-7), intermediate mountain heather (T3-C-5), calcareous and intermediate mountain grassland (T22-C-1), intermediate boreal fresh hell (T31-C-4).

Red list status (2018): Mountain heath, leeside and tundra (NT mainland, LC Svalbard;<)

References and type parallels: S3, elements of S4 (VN).

T3-C-5 Intermediate mountain heather

NiN characteristics: Mainland systems: Mountain heath, lee side and tundra (T3), one ground type (5). Defined by LKM: KAý2 & UFý2 & Klý1. LKM base steps: KAýde & UFýde & Klý0a.

Physiognomy: Slightly species-rich 0.5-1 m thick thickets of shrubs. The field layer consists of heather species and low- to medium-nutrient-demanding herbs and grasses. Moss-dominated bottom layer with elements of lichen.

Ecological characteristics: On moderately calcareous, soil-covered firm ground with a podsol profile, often on large, gently sloping surfaces with stable and thick snow cover. Occurs in LA in the upper and partly middle parts of the Rabb snow bed gradient. It borders downwards towards the leeside or snow bed, and upwards towards the low heath or rabble. The snow cover provides good protection against wind wear and low temperatures. The soil is rarely frozen and normally not exposed to soil flow (solifluction). The snow melts earlier than T3-C-4 (May/June) and provides relatively good soil moisture and a long growing season. The type is more drought-prone than T3-C-4, with elements of drought-tolerant species. Juniper, dwarf birch and silver willow are common in the shrub layer. In central parts of Eastern Norway dominated by dwarf birch, which in Western Norway is replaced by willows. In oceanic regions, dwarf birch is replaced by willows. Distinguished from low-lime mountain heather by the inclusion of somewhat more lime-demanding species.

Terrain and aerial photo characteristics: Gently sloping terrain. The height of the scrub reflects the depth of the snow, as shoots emerging from the snow are dried out and cut off by strong winds.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T3-5	T3-B-5	T3-C-5	T3-D-5	T3-E-5
Basic types		T3-5	T3-5	T3-5,6	T3-5,6

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Antennaria dioica</i> cat's foot v;t*[KA-de],s+[UF-dlc] <i>Anthoxanthum nipponicum</i> mountain gulaks s+[UF-elf] <i>Bartsia alpina</i> blacktop v;s+[KA-dlc],s+[UF-elf] <i>Betula nana</i> ssp. <i>nana</i> dwarf birch v;s+[KA-elf] <i>Bistorta vivipara</i> harerug v;s+[KA-dlc] <i>Campanula rotundifolia</i> bluebell v;s+[KA-dlc],t*[UF-de] <i>Carex bigelowii</i> sorghum v;s+[KA-elf] <i>Carex vaginata</i> scabbard v;s-[KA-dlc],s-[UF-elf] <i>Cerastium alpinum</i> mountain sage v;s+[KA-dlc],s-[UF-elf] <i>Empetrum nigrum</i> cricket v*t*[KA-elf],s+[UF-elf] <i>Euphrasia wettsteinii</i> small-eyed thrush v;s+[KA-dlc],s-[UF-elf]	<i>Festuca ovina</i> sheep's fescue v;s-[KA-dlc],s-[UF-elf] <i>Hieracium alpinum</i> agg. mountain hoverer v;s-[KA-elf],s-[UF-elf] <i>Huperzia appressa</i> mountain louse grass v;s-[KA-dlc],s-[UF-dlc] <i>Juncus trifidus</i> rabbesiv v;s-[KA-elf],s-[UF-dlc] <i>Kalmia procumbens</i> greplyng s-[UF-dlc] <i>Luzula spicata</i> aksfrytle v;t*[KA-de] <i>Pedicularis lapponica</i> _ [KA-elf],s-[UF-elf] <i>Phyllodoce caerulea</i> blue heather v;s-[KA-elf],s+[UF-elf] <i>Pulsatilla vernalis</i> mogop s-[UF-dlc] <i>Rhodiola rosea</i> rose root s-[KA-dlc] <i>Salix glauca</i> ssp. <i>glauca</i> silver willow v <i>Saussurea alpina</i> mountain thistle v;s-[KA-dlc],s-[UF-elf] <i>Silene acaulis</i> fjellsmelle v;s*[KA-dlc]	<i>Solidago virgaurea</i> golden rice v;t*[KA-de],s+[UF-elf] <i>Vaccinium myrtillus</i> blueberry v;s*[KA-elf],s-[UF-elf] <i>Vaccinium uliginosum</i> blockberry v;s-[UF-dlc] <i>Vaccinium vitis-idaea</i> lingonberry v;s+[KA-elf] <i>Viola biflora</i> mountain violet v;s+[KA-dlc],s+[UF-elf] <i>Dicranum fuscescens</i> bergsigd v;s-[KA-elf] <i>Polytrichum juniperinum</i> juniper moss v;s-[KA-elf] <i>Cetraria islandica</i> islandslav v* <i>Cladonia arbuscula</i> light lichen v*s*[KA-elf],s-[UF-dlc] <i>Cladonia stellaris</i> white curl v;s+[KA-elf],s+[UF-dlc] <i>Flavocetraria nivalis</i> yellow skin v;s+[UF-dlc]
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Intermediate mountain heath. He: Foldal: Råtåsjøen. Photo: RH.

Distribution and regional distribution: LA, O3-C1. Throughout the country.

Most important types of confusion: Lime-poor mountain heather (T3-C-2), slightly calcareous mountain heather (T3-C-8), intermediate lake side (T3-C-4), intermediate mountain low heath (T3-C-6), intermediate boreal heath (T31-C-5)

Red list status (2018): Mountain heath, leeside and tundra (NT mainland, LC Svalbard;<)

References and type parallels: S2b (VN).

T3-C-6 Intermediate mountain-lowland

NiN characteristics: Mainland systems: Mountain heath, lee side and tundra (T3), one ground type (6). Defined by LKM: KAy2 & UFy3 & Klj1. LKM base steps: KAyde & UFyfg & Klj0a.

Physiognomy: Scattered shrubbery of juniper and dwarf birch. Relatively species-poor field layer consisting of drought-tolerant dwarf shrubs such as cricket. Scattered occurrences of small to medium lime-requiring grasses and herbs. Dense bottom layer of lichen with elements of drought-adapted mosses.

Ecological characteristics: On fairly dry, calcareous, soil-covered firm ground with a podsol profile, often on flats or in gently sloping terrain. Particularly widespread in the upper part of LA and MA in the upper parts of the rabb-snowbed gradient, then with somewhat smaller shrubs (dwarf birch, willow and juniper). Common heather most commonly in O2. Borders downwards towards lynghei or leeside and upwards towards rabb. The snow cover is thin and relatively unstable and offers less protection against wind wear and low temperatures. The snow melts early, and good drainage combined with strong winds results in low soil moisture, a high risk of drying out and a long growing season. Differs from T3-C-3 in the inclusion of slightly lime-requiring species and somewhat less lichen cover. Blueberries are almost absent.

Terrain and aerial photo characteristics: Flat to gently sloping terrain. Light color due to high low coverage.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T3-6	T3-B-6	T3-C-6	T3-D-5	T3-E-5
Basic types		T3-6	T3-6	T3-5,6	T3-5,6

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **tx-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Antennaria alpina</i> mountain cat 's foot s-[UF-fle] <i>Antennaria dioica</i> cat 's foot v;ta[KA-elf] <i>Arctous alpina</i> grouse berry v <i>Avenella flexuosa</i> smyle v;s-[KA-elf] <i>Betula nana</i> ssp. <i>nana</i> dwarf birch v;s+[KA-elf] <i>Bistorta vivipara</i> harerug v;s+[KA-dlc] <i>Campanula rotundifolia</i> bluebell v;s*[KA-dl c] <i>Carex bigelowii</i> sorghum v;s-[KA-elf] <i>Carex vaginata</i> scabbard v;s-[KA-dlc] <i>Cerastium alpinum</i> mountain sage v;s+[KA-dlc] <i>Diapensia lapponica</i> mountain ornament v;s-[KA-dlc],s*[UF-fle] <i>Empetrum nigrum</i> cricket v;s-[KA-dlf] <i>Euphrasia wettsteinii</i> small-eyed thrush v;s+[KA-dlc]	<i>Festuca ovina</i> sheep's fescue v;s-[KA-dlc],ta[UF-fg] <i>Huperzia appressa</i> mountain louse grass v;s-[KA-dlc] <i>Juncus trifidus</i> rabbesv v;s-[KA-elf] <i>Kalmia procumbens</i> greplyng v;s+[UF-fle] <i>Luzula spicata</i> aksfrytle v;ta[KA-de] <i>Pinguicula vulgaris</i> sedge v;s+[KA-dlc] <i>Salix glauca</i> ssp. <i>glauca</i> silver willow v <i>Saussurea alpina</i> mountain thistle v;s-[KA-dlc] <i>Silene acaulis</i> fjellsmelle v;s*[KA-dlc] <i>Vaccinium uliginosum</i> blackberry v <i>Vaccinium vitis-idaea</i> lingonberry v;s+[KA-elf] <i>Dicranum fuscescens</i> bergsigd v;s-[KA-elf]	<i>Polytrichum juniperinum</i> juniper moss v;s-[KA-elf] <i>Ptilidium ciliare</i> ground fringe v;s-[KA-elf] <i>Cetraria aculeata</i> pit thorn v;s*[UF-fle] <i>Cetraria ericetorum</i> narrow island slave v;s-[UF-fle] <i>Cetraria islandica</i> islandslav v* <i>Cladonia arbuscula</i> light lichen v*;s-[KA-elf],ta[UF-fg] <i>Cladonia rangiferina</i> gray lichen v;s-[KA-elf] <i>Cladonia stellaris</i> white curl v*;s+[KA-elf],ta[UF-fg] <i>Cladonia spp.</i> lichen v <i>Flavocetraria cucullata</i> yellow skerpe v <i>Flavocetraria nivalis</i> yellow skin v*;ta[UF-fg]
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Distribution and regional distribution: LA-MA, O2-C1.

Most important types of confusion: Calcareous mountain-low heath (T3-C-3), intermediate mountain-heath heath (T3-C-5), slightly calcareous mountain-low heath (T3-C-9), calcareous and intermediate rabble (T14-C-1), intermediate boreal lowland (T31-C-6).

Red list status (2018): Mountain heath, leeside and tundra (NT mainland, LC Svalbard;<)

References and type parallels: R5 (VN).



Intermediate mountain-lowland with mogop. He: Folldal: Grimsmoen. Photo: RH.

T3-C-7 Weakly calcareous loess side NiN

characteristic: Mainland systems: Mountain heath, loess side and tundra (T3), one basic type (7). Defined by LKM: KAÿ3 & UFÿ1 & Klÿ1. LKM base steps: KAÿfg & UFÿbc & Klÿ0a.

Physiognomy: Species-rich and lush nature type characterized by demanding low herbs, tall perennials and graminids with elements of shrubs and low creeping willows, where sedges dominate. Moss-dominated bottom layer.



Slightly calcareous lees side. ST: Oppdal: S Knutshø. Photo: RH.

Ecological characteristics: On calcareous, soil-covered solid ground in sloping terrain with stable snow cover. Fore occurs in LA in middle parts of the rabb snowbed gradient. Borders downwards towards snow beds and upwards towards heather or low heath. Thick snow cover provides good protection against wind wear and low temperatures. The soil is rarely frozen and normally not exposed to soil flow (solifluction). The snow melts relatively early and provides good soil moisture and a long growing season. Distinguished from poorer types by inclusions of more lime-demanding species and very little lichen.

Terrain and aerial photo characteristics: Inclined terrain, slopes. Weakly calcareous lakeside often has a brown tinge, never strong green.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T3-7	T3-B-7	T3-C-7	T3-D-3	T3-E-3
Basic types		T3-7	T3-7	T3-7,10,13,14	T3-7,10,13,14

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **t¤** - gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Anthoxanthum nipponicum</i> mountain gulaks <i>v;s+;KA·glh,s-[UF·cld]</i> <i>Astragalus alpinus</i> milkweed <i>v;s*[KA·fle],t¤[UF·bc]</i> <i>Avenella flexuosa</i> smyle <i>v*s*[KA·glh],t¤[UF·bc]</i> <i>Bartsia alpina</i> blacktop <i>v*t¤[KA·fg],s-[UF·cld]</i> <i>Bistorta vivipara</i> harerug <i>v*s*[KA·fle]</i> <i>Carex atrata</i> black starr <i>v*s*[KA·fle]</i> <i>Cerastium alpinum</i> mountain sage <i>v*s+[KA·fle],t¤[UF·bc]</i> <i>Coeloglossum viride</i> green curlew <i>v;s-[KA·fle]</i> <i>Erigeron uniflorus</i> snow star <i>v;s*[KA·fle],t¤[UF·bc]</i> <i>Euphrasia wettsteinii</i> small-eyed thrush <i>v*t¤[KA·fg],t¤[UF·bc]</i> <i>Galium boreale</i> white ant <i>v;t¤[KA·fg],t¤[UF·bc]</i> <i>Gentiana nivalis</i> snow sweet <i>v;s+[KA·fle],t¤[UF·bc]</i> <i>Geranium sylvaticum</i> v*; <i>t¤ [UF·bc]</i> <i>Hieracium alpinum</i> agg. mountain hoverer <i>v;s-[KA·glh],t¤[UF·bc]</i>	<i>Minuartia biflora</i> tuerve <i>s-[KA·fle]</i> <i>Oxyria digyna</i> mountain acid <i>v;s+[UF·cld]</i> <i>Parnassia palustris</i> jablom <i>s+[KA·fle]</i> <i>Pedicularis oederi</i> s * [KA·fle] <i>Poa alpina</i> mountain thrush <i>v;s-[KA·fle],s*[UF·cld]</i> <i>Potentilla crantzii</i> spotted wall <i>v*s*[KA·fle]</i> <i>Pyrola minor</i> pearl wintergreen <i>v;s-[KA·glh],s+[UF·cld]</i> <i>Ranunculus acris</i> ground soleie <i>v;s-[KA·fle],s*[UF·cld]</i> <i>Rhodiola rosea</i> rose root <i>v;s-[KA·fle],t¤[UF·bc]</i> <i>Salix herbacea</i> mouse ear <i>v;s-[KA·glh],s+[UF·cld]</i> <i>Salix reticulata</i> Wrinkled nettle <i>v*s*[KA·fle]</i> <i>Saussurea alpina</i> mountain thistle <i>v*t¤[KA·fg],t¤[UF·bc]</i> <i>Saxifraga oppositifolia</i> red herring <i>v;s+[KA·fle]</i> <i>Selaginella selaginoides</i> dwarf dwarf <i>v*t¤[KA·fg]</i> <i>Silene acaulis</i> fjellsnelle <i>v*s+[KA·fle]</i> <i>Hieracium alpinum</i> agg. mountain hoverer <i>v;s-[KA·glh],t¤[UF·bc]</i>	<i>Solidago virgaurea</i> golden rice v; <i>s+[KA·glh],t¤[UF·bc]</i> <i>Taraxacum crocea</i> agg. mountain lion teeth <i>v;s-[KA·glh],s+[UF·cld]</i> <i>Thalictrum alpinum</i> mountain seed star <i>v*s*[KA·fle]</i> <i>Tofieldia pusilla</i> bear sting <i>v;s*[KA·fle]</i> <i>Veronica alpina</i> snow veronica <i>v;s+[KA·glh],s*[UF·cld]</i> <i>Viola biflora</i> mountain violet <i>v*t¤[KA·fg],t¤[UF·bc]</i> <i>Brachythecium salebrosum</i> lilundmoss <i>v;s-[KA·fle],t¤[UF·bc]</i> <i>Distichium capillaceum</i> cushion plane moss <i>v;s*[KA·fle]</i> <i>Hylocomiastrum pyrenaicum</i> seat house moss <i>v;t¤[KA·fg],t¤[UF·bc]</i> <i>Hylocomium splendens</i> floor moss <i>v;s-[KA·glh],t¤[UF·bc]</i> <i>Cetraria islandica</i> islandslav <i>v;s*[KA·glh]</i> <i>Cladonia rangiferina</i> gray lichen <i>v;s+[KA·glh]</i> <i>Peltigera rufescens</i> fountain <i>v;t¤[KA·fg],t¤[UF·bc]</i>
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Distribution and regional distribution: LA, O3-C1. Throughout the country, but mostly in snowy mountains.

Most important types of confusion: Intermediate loess side (T3-C-4), highly calcareous loess side (T3-C-10), intermediate spring-influenced mountain heath (T3-C-13) and calcareous spring-influenced mountain heath (T3-C-14).

Red list status (2018): Mountain heath, leeside and tundra (NT mainland, LC Svalbard;<)

References and type parallels: S4 (VN).

T3-C-8 Slightly calcareous

mountain heather

NiN characteristics: Mainland systems: Mountain heath, lee side and tundra (T3), one ground type (8). Defined by LKM: KAy3 & UFy2 & Klý1. LKM base steps: KAýfg & UFýde & Klý0a.

Physiognomy: Species-rich, glabrous scrub with some bushes. Field layer of dwarf shrubs, graminids and herbs. Moss-dominated bottom layer with elements of lichen.

Ecological characteristics: On limestone-rich, soil-covered solid ground, often blown-off surfaces in gently sloping terrain with relatively stable and thick snow cover. Occurs in LA in the upper and partly middle parts of the Rabb snow bed gradient. Borders downwards towards the lee side or snow bed and upwards towards the low heath or ridge. The snow cover provides good protection against wind wear and low temperatures, and the soil is rarely frozen and is not normally exposed to soil flow (solifluction). In central parts of Eastern Norway with elements of dwarf birch, which in Western Norway is replaced by willows. The snow melts earlier than T3-C-6 (May/June), and provides relatively good soil moisture and a long growing season. Characterized by demanding species such as cycads and reindeer roses. Distinguished from poorer types by the inclusion of lime-requiring species.

Terrain and aerial photo characteristics: Gently sloping terrain. Slightly calcareous mountain heather often has a brown tinge, never strong green.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T3-B-8	T3-C-8	T3-D-6	T3-E-6
Basic types	T3-8	T3-8	T3-8	T3-8,9	T3-8,9

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity species (t* = characteristic t., t¤- gradient-t.);

s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.)

<i>Anthoxanthum nipponicum</i> mountain gulaks v;s+[KA·glh],s*[UF·elf] <i>Astragalus alpinus</i> milkweed v;s*[KA·fle],s-[UF·elf] <i>Bartsia alpina</i> blacktop v;t¤ [KA·fg],s+[UF·elf] <i>Campanula rotundifolia</i> bluebell v*;t¤ [UF·de] <i>Carex atrata</i> black sedge v*;s*[KA·fle],s+[UF·elf] <i>Carex vaginata</i> scabbard v;s+[KA·glh],s-[UF·elf] <i>Cerastium alpinum</i> mountain sage v;s+[KA·fle],s-[UF·elf] <i>Coeloglossum viride</i> green curlew v;- [KA·fle],s+[UF·elf] <i>Dryas octopetala</i> reinrose v*;s*[KA·fle] <i>Erigeron borealis</i> mountain star s-[KA·glh] <i>Euphrasia wettsteinii</i> small-eyed thrush v;t¤ [KA·fg],s-[UF·elf] <i>Festuca ovina</i> sheep's fescue v;s-[KA·fle],s-[UF·dlc]	<i>Hieracium alpinum</i> agg. mountain hoverer v;s-[KA·glh],s-[UF·elf] <i>Juncus trifidus</i> rabbesv v;s-[UF·dlc] <i>Minuartia biflora</i> tuerve v;t¤[KA·f g],s-[UF·el f] <i>Parnassia palustris</i> jåblom v;s*[KA·fle],t¤[UF·de] <i>Pedicularis oederi</i> golden mullet v;s*[KA·fle],s-[UF·elf] <i>Potentilla crantzii</i> spotted wall v*;s*[KA·fle],s-[UF·elf] <i>Pulsatilla vernalis</i> mogop s-[UF·dlc] <i>Salix reticulata</i> Wrinkled nettle v*;s*[KA·fle] <i>Saussurea alpina</i> mountain thistle v;t¤[KA·f g],s-[UF·elf] <i>Saxifraga oppositifolia</i> red herring v;s+ [KA·fle] <i>Selaginella selaginoides</i> dwarf dwarf v;t¤ [KA·fg],s+[UF·elf] <i>Silene acaulis</i> fjellsnelle v*;s*[KA·fle] <i>Solidago virgaurea</i> golden rice v;s+[KA·glh],s+[UF·elf]	<i>Thalictrum alpinum</i> mountain seed star v*s*[KA·fle] <i>Tofieldia pusilla</i> bear sting v;s*[KA·f e],s-[UF·dlc] <i>Vaccinium uliginosum</i> blockberry v;s-[KA·glh],s-[UF·dlc] <i>Viola biflora</i> mountain violet v; t¤ [KA·fg],s+[UF·elf] <i>Abietinella abietina</i> granmose v;s*[KA·fle],t¤[UF·de] <i>Aulacomnium turgidum</i> mountain felt moss <i>Ditrichum flexicaule</i> storburst v;s*[KA·fle],t¤[UF·de] <i>Rhytidium rugosum</i> paw moss v;s*[KA·fle],s*[UF·dlc] <i>Tomentypnum nitens</i> golden moss v;s*[KA·fle],t¤[UF·de] <i>Tortella tortuosa</i> cushion v;s*[KA·f e],t¤[UF·de] <i>Cetraria islandica</i> islandslav v;s*[KA·glh] <i>Flavocetraria nivalis</i> yellow skin v;s-[KA·glh],s+[UF·dlc]
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Slightly calcareous mountain heather. No: Fauske: N for Ny-Sulitjelma mountain lodge. Photo: RH.

Distribution and regional distribution: LA, O3-C1.

Most important types of confusion: Intermediate mountain heather (T3-C-5), slightly calcareous lee side (T3-C-7), slightly calcareous mountain low heath (T3-C-9), strongly calcareous mountain heather (T3-C-11), slightly calcareous boreal heath (T31-C-8),

Red list status (2018): Mountain heath, leeside and tundra (NT mainland, LC Svalbard;<)

References and type parallels: R4 (VN). C01 rabb (DNHB13).

T3-C-9 Slightly calcareous mountain-lowland

NiN characteristics: Mainland systems: Mountain heath, lee side and tundra (T3), one ground type (9). Defined by LKM: KAy3 & UFy3 & Klj1. LKM base steps: KAyfg & UFyfg & Klj0a.



Slightly calcareous mountain-lowland. Fi: Måsøy: Ingøyfjellet. Photo: RH.

Physiognomy: Very species-rich vegetation with scattered shrubs and a low field layer of dwarf shrubs, herbs and graminids. Well-developed bottom layer of lichen with elements of drought-adapted mosses.

Ecological characteristics: The type occurs on calcareous, soil-covered solid ground immediately below the scarp or on large blown-off surfaces in gently sloping terrain. Particularly widespread in the upper part of LA and MA in upper parts of the Rabb snow bed gradient. The snow cover is thin and unstable and offers less protection against wind wear and low temperatures. The snow melts early, and good drainage combined with strong wind results in low soil moisture and a long growing season. Somewhat moister than T3-C-6. Distinguished from poorer types by some element of lime-demanding herbs and mosses, and less lichen cover. Gooseberry replaces dwarf birch in O2.

Terrain and aerial photo characteristics: Flat to gently sloping terrain. Light color due to high low coverage.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T3-9	T3-B-9	T3-C-9	T3-D-6	T3-E-6
Basic types		T3-9	T3-9	T3-8,9	T3-8,9

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Antennaria alpina</i> mountain cat's foot v;t [KA-fg],s-[UF-fle] <i>Arctous alpina</i> grouse berry v;s-[KA-gh] <i>Astragalus alpinus</i> milkweed v;s*[KA-fle] <i>Avenella flexuosa</i> smyle v;s*[KA-gh] <i>Bistorta vivipara</i> harerug v*;s-[KA-fle] <i>Campanula rotundifolia</i> bluebell v* <i>Carex atrata</i> black starr v;s*[KA-fle] <i>Carex bigelowii</i> sorghum v;s-[KA-gh] <i>Carex vaginata</i> scabbard v;s+[KA-gh] <i>Cerastium alpinum</i> mountain sage v*;s+[KA-fle] <i>Dryas octopetala</i> reinrose v*;s*[KA-fle] <i>Empetrum nigrum</i> cricket v;s+[KA-gh] <i>Erigeron borealis</i> mountain star s-[KA-gh] <i>Euphrasia wettsteinii</i> small-eyed thrush v;t [KA-fg] <i>Festuca ovina</i> sheep's fescue v;s-[KA-fle],t [UF-fg]	<i>Huperzia appressa</i> mountain louse grass v;t [KA-fg] <i>Juncus trifidus</i> rabbesiv v <i>Kalmia procumbens</i> greplyng v;s-[KA-gh],s+[UF-fle] <i>Oxytropis lapponica</i> reindeer meal s*[KA-fle] <i>Parnassia palustris</i> jáblom v;s*[KA-fle] <i>Pinguicula vulgaris</i> sedge grass v;s-[KA-gh] <i>Poa glauca</i> bluebell <i>Potentilla crantzii</i> spotted wall v;s*[KA-fle] <i>Primula scandinavica</i> mountain key flower s-[KA-fle] <i>Salix reticulata</i> Wrinkled nettle v*;s*[KA-fle] <i>Saussurea alpina</i> mountain thistle v;t [KA-fg] <i>Saxifraga oppositifolia</i> red herring v;s+[KA-fle] <i>Selaginella selaginoides</i> dwarf jamne v;t [KA-fg] <i>Silene acaulis</i> fjellsmelle v*;s+[KA-fle] <i>Thlaspi alpinum</i> mountain seed star v*;s*[KA-fle] <i>Tofieldia pusilla</i> bear sting v;s*[KA-fle]	<i>Vaccinium uliginosum</i> blackberry v;s-[KA-gh] <i>Abietinella abietina</i> spruce moss <i>Aulacomnium turgidum</i> mountain felt moss <i>Distichium capillaceum</i> cushion plane moss v;s*[KA-fle] <i>Ditrichum flexicaule</i> storburst v;s*[KA-fle] <i>Rhytidium rugosum</i> paw moss v;s*[KA-fle] <i>Tortella tortuosa</i> cushion v;s*[KA-fle] <i>Cetraria aculeata</i> pit thorn v;s-[KA-fle],s*[UF-fle] <i>Cetraria islandica</i> islandslav v;s*[KA-gh] <i>Cladonia arbuscula</i> light lichen v*;s-[KA-gh],t [UF-fg] <i>Cladonia rangiferina</i> gray lichen v;s+[KA-gh] <i>Flavocetraria cucullata</i> yellow sedge v;s-[KA-gh],s+[UF-fle] <i>Flavocetraria nivalis</i> yellow skin v*;s-[KA-gh],t [UF-fg]
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Distribution and regional distribution: LA-MA, O2-C1.

Most important types of confusion: Intermediate mountain-low heath (T3-C-6), slightly calcareous mountain-heath heath (T3-C-8), strong calcareous mountain-low heath (T3-C-12), calcareous heather (T14-C-2), slightly calcareous boreal low heath (T31-C-9).

Red list status (2018): Mountain heath, leeside and tundra (NT mainland, LC Svalbard;<)

References and type parallels: S2b, R3c, R5 (VN).

T3-C-10 Highly calcareous loess side NiN characteristics:

Solid ground systems: Mountain heath, loess side and tundra (T3), one basic type (10). Defined by LKM: KAÿ4 & UFÿ1 & Klÿ1. LKM base steps: KAÿhi & UFÿbc & Klÿ0a.



Physiognomy: Very species-rich vegetation dominated by low herbs and graminids. Lacks heather species, but has low-growing willows. Bottom layer of mosses. A little low.

Ecological characteristics: The type occurs on very calcareous, soil-covered solid ground in sloping terrain with stable and thick snow cover. Occurs in LA in middle parts of the Rabb snow bed gradient.

Borders downwards towards snow beds and upwards towards heather or low heath. The snow cover provides good protection against wind wear and low temperatures, and the soil is rarely frozen and is not normally exposed to soil flow (solifluction). The snow melts relatively early in June/July and provides good soil moisture and a fairly long growing season.

A large proportion of lime-requiring species in the field layer, where kelp dominates and several slightly nutrient-requiring species from poorer floodplains are missing.

Strong calcareous leesside. No: Saltdal: S Solvågvatnet SE.
Photo: RH.

Terrain and aerial photo characteristics: Inclined terrain, slopes. The strongly calcareous vegetation almost always has a brown tinge, never strongly green.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T3-10	T3-B-10	T3-C-10	T3-D-3	T3-E-3
Basic types		T3-10	T3-10	T3-7,10,13,14	T3-7,10,13,14

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **tn-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Astragalus alpinus</i> milkweed v*;s-[UF:cld] <i>Astragalus frigidus</i> yellow spleen s-[KA:hlg] <i>Astragalus norvegicus</i> blue spleen <i>Bartsia alpina</i> blacktop v;s-[UF:cld] <i>Bistorta vivipara</i> harerug v* <i>Campanula rotundifolia</i> bluebell v <i>Carex atrata</i> black star v* <i>Cerastium alpinum</i> mountain sage v*;s-[UF:cld] <i>Chamerion angustifolium</i> geitrams v;s-[UF:cld] <i>Coeloglossum viride</i> green curlew v <i>Deschampsia cespitosa</i> ssp. <i>cespitosa</i> silver pile v;s+[UF:cld] <i>Draba alpina</i> gold rub flower <i>Equisetum variegatum</i> s-[KA:hlg] <i>Erigeron uniflorus</i> snow star v;s+[UF:cld]	<i>Euphrasia wettsteinii</i> small-eyed thrush v;s-[UF:cld] <i>Festuca ovina</i> sheep fescue v <i>Gentiana nivalis</i> snow sweet v;s-[UF:cld] <i>Geranium sylvaticum</i> v *;s*[UF:cld] <i>Juncus trifidus</i> rabbesis v <i>Oxyria digyna</i> mountain acid v;s+[UF:cld] <i>Parnassia palustris</i> jáblom v <i>Pedicularis oederi</i> golden mullet v;s-[KA:hlg] <i>Poa alpina</i> mountain thrush v;s*[UF:cld] <i>Poa arctica</i> jerboa s-[KA:fle] <i>Potentilla crantzii</i> spotted wall v* <i>Pseudorchis straminea</i> mountain white curlew v;s-[KA:hlg] <i>Ranunculus acris</i> ground soleie v;s-[UF:cld] <i>Rhodiola rosea</i> rose root v;s+[UF:cld] <i>Rumex acetosa</i> meadow sorrel v;s*[UF:cld] <i>Salix glauca</i> ssp. <i>glauca</i> silver willow v	<i>Salix reticulata</i> nettles m;v* <i>Saussurea alpina</i> mountain thistle v;s+[UF:cld] <i>Saxifraga oppositifolia</i> red herring v;s-[KA:hlg] <i>Selaginella selaginoides</i> dvergjamne v <i>Silene acaulis</i> fjellsmelle v* <i>Silene dioica</i> red jonsock flower v;s*[UF:cld] <i>Taraxacum crocea</i> agg. mountain lion teeth v;s+[UF:cld] <i>Thalictrum alpinum</i> mountain seed star v* <i>Toftelia pusilla</i> bear bite v <i>Veronica fruticans</i> bergveronica v;s-[KA:hlg],s+[UF:cld] <i>Viola biflora</i> mountain violet v*;s+[UF:cld] <i>Brachythecium salebrosum</i> lilundmoss v;s+[UF:cld] <i>Bryum capillare</i> screw moss v;s+[UF:cld] <i>Distichium capillaceum</i> cushion plane moss v;s-[KA:hlg]
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Distribution and regional distribution: LA, O3-C1. Throughout the country, but mostly in snowy mountains.

Most important types of confusion: Weakly calcareous loess side (T3-C-7), strongly calcareous mountain heather (T3-C-11), calcareous source-influenced mountain heath (T3-C-14), strongly calcareous moderate snow bed (T7-C-8).

Red list status (2018): Mountain heath, leeside and tundra (NT mainland, LC Svalbard;<)

References and type parallels: S4 (VN), C01 leeside (DNHB13).

T3-C-11 Strong calcareous

mountain heather

NiN characteristics: Mainland systems: Mountain heath, lee side and tundra (T3), one ground type (11). Defined by LKM: KAÿ4 & UFÿ2 & Klÿ1. LKM base step: KAÿhi &UFÿde & Klÿ0a.

Physiognomy: Very species-rich, wispy thicket of shrubs. Field layer with dwarf shrubs, graminids and herbs. Moss-dominated bottom layer with elements of some lichen.

Ecological characteristics: The natural type occurs on very calcareous, soil-covered solid ground, often on large areas in gently sloping terrain with stable and thick snow cover. Occurs in LA in the upper and partly middle parts of the Rabb snow bed gradient. It borders downwards towards the leeside or snow bed, and upwards towards the low heath or rabb. The snow cover provides good protection against wind wear and low temperatures. The soil is rarely frozen and is not normally exposed to soil flow (solifluction). The snow melts relatively early in May/June and provides good soil moisture and a long growing season. Very demanding, small and woody plants such as sedums and rhododendrons dominate. In Western Norway, dwarf birch is replaced by willows. Distinguished from poorer types by greater coverage of graminids and several herbs that require a lot of lime.

Terrain and aerial photo characteristics: Gently sloping terrain. The calcareous vegetation often has a brown tinge, never strong green.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T3-11	T3-B-11	T3-C-11	T3-D-7	T3-E-7
Basic types		T3-11	T3-11	T3-11,12	T3-11,12

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-**gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Astragalus alpinus</i> milkweed v;s-[UF-elf] <i>Astragalus frigidus</i> yellow spleen s-[KA-hlg] <i>Astragalus norvegicus</i> blue spleen <i>Bartsia alpina</i> blacktop v;s+[UF-elf] <i>Bistorta vivipara</i> harerug v* <i>Campanula rotundifolia</i> bluebell v*,t ^a [UF-de] <i>Carex atrata</i> black starr v*,s+[UF-elf] <i>Carex capillaris</i> s- [KA-hlg] <i>Carex rupestris</i> sedge s*[KA-hlg] <i>Ceratium alpinum</i> mountain heather v;s-[UF-elf] <i>Coeloglossum viride</i> green curlew v;s+[UF-elf] <i>Dryas octopetala</i> reinrose m;v*s-[KA-hlg],s*[UF-dlc] <i>Equisetum variegatum</i> s- [KA-hlg] <i>Erigeron uniflorus</i> snow star v;s-[UF-elf] <i>Euphrasia wettsteinii</i> small-eyed thrush v;s-[UF-elf]	<i>Festuca ovina</i> sheep's fescue v;s-[UF-dlc] <i>Gentiana nivalis</i> snow sweet v;s-[UF-dle] <i>Huperzia appressa</i> mountain louse grass v;s+[UF-dlc] <i>Juncus trifidus</i> rabbesiv v;s-[UF-dlc] <i>Oxytropis lapponica</i> reindeer meal v;s-[KA-hlg],s-[UF-dlc] <i>Parnassia palustris</i> jåblom v;t ^a [UF-de] <i>Pedicularis oederi</i> _ [iKA-hlg],s-[UF-elf] <i>Pinguicula vulgaris</i> sedge v;s+[UF-dlc] <i>Potentilla crantzii</i> spotted wall v*;s-[UF-elf] <i>Primula scandinavica</i> mountain key flower <i>Pseudorchis straminea</i> mountain white curlew s-[KA-hlg] <i>Salix glauca</i> ssp. <i>glauca</i> silver willow v <i>Salix reticulata</i> nettle v* <i>Saussurea alpina</i> mountain thistle v;s-[UF-elf] <i>Saxifraga oppositifolia</i> red herring v;s-[KA-hlg]	<i>Selaginella selaginoides</i> dwarf dwarf v;s-[UF-elf] <i>Silene acaulis</i> fjellsnelle v* <i>Thalictrum alpinum</i> mountain seed star v* <i>Tofieldia pusilla</i> bear sting v;s-[UF-dlc] <i>Viola biflora</i> mountain violet v;s+[UF-elf] <i>Abietinella abietina</i> grammae v;s-[KA-hlg],t ^a [UF-de] <i>Distichium capillaceum</i> cushion plane moss v;s-[KA-hlg] <i>Ditrichum flexicaule</i> storburst v;s-[KA-hlg],t ^a [UF-de] <i>Rhytidium rugosum</i> paw moss v*;s-[KA-hlg],s+[UF-dlc] <i>Tomentypnum nitens</i> golden moss v;s-[KA-hlg],t ^a [UF-de] <i>Tortella tortuosa</i> cushion v*;s-[KA-hlg],t ^a [UF-de] <i>Cladonia arbuscula</i> light lichen v;s-[UF-dlc] <i>Flavocetraria nivalis</i> yellow skin v;s+[UF-dlc]
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Strong calcareous mountain heather. ST: Oppdal: M. Knutshø.

Photo: RH.

Distribution and regional distribution: LA, O3-C1.

Most important types of confusion: Weakly calcareous mountain heather (T3-C-8), highly calcareous leeside (T3-C-10), highly calcareous mountain-low heath (T3-C-12), calcareous and intermediate rabble (T14-C-1), highly calcareous boreal heath (T31-C-11).

Red list status (2018): Mountain heath, leeside and tundra (NT mainland, LC Svalbard;<)

References and type parallels: R4 (VN), C01 rabb (DNHB13).

T3-C-12 Strongly calcareous mountain low heath

NiN characteristics: Solid ground systems: Mountain

heath, leesside and tundra (T3), one basic type (12). Defined by LKM: KAÿ4 & UFÿ3 & Klÿ1. LKM base steps: KAÿhi & UFÿfg & Klÿ0a.

Physiognomy: Very species-rich vegetation with scattered drought-tolerant shrubs and a low field layer of dwarf shrubs, herbs and graminids. Well-developed bottom layer with somewhat less low than in T3-C-3 and T3-C-6.



Strongly calcareous mountain-lowland. Op: Lom: Dumdal. Photo: HB.

Ecological characteristics: The type occurs on very calcareous, soil-covered solid ground, often on large areas in gently sloping terrain. Particularly widespread in the upper part of LA and MA in upper parts of the Rabb snow bed gradient. The snow cover is thin and less stable and provides less protection against wind wear and low temperatures than in mountain heather. The snow melts early, and good drainage combined with strong wind results in low to medium soil moisture and a long growing season. Great risk of drying out. Borders downwards towards mountain heath or leeside and upwards towards rabb. Common heather most commonly in O2, replaces dwarf birch. Many lime-requiring species. Distinguished from poorer low heaths by the dominance of reindeer rose and several herbs that require a lot of lime.

Terrain and aerial photo characteristics: Flat to gently sloping terrain. Calcareous vegetation often has a brown tinge, never strong green. Light color due to high low coverage.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T3-B-12	T3-C-12	T3-D-7	T3-E-7
Basic types	T3-12	T3-12	T3-12	T3-11,12	T3-11,12

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Astragalus alpinus</i> setermelt v <i>Astragalus norvegicus</i> blue spleen <i>Bistorta vivipara</i> harerug v* <i>Campanula rotundifolia</i> bluebell v <i>Carex atrata</i> black starr v <i>Carex capillaris</i> s- [KA:hlg] <i>Carex rupestris</i> rock sedge v*;s*[KA:hlg],s*[UF:fle] <i>Cerastium alpinum</i> mountain heirloom v <i>Diapensia lapponica</i> mountain ornamental v;s*[UF:fle] <i>Draba fladnizensis</i> alpine flower <i>Draba nivalis</i> snowdrop flower <i>Draba norvegica</i> rock flower <i>Dryas octopetala</i> reindeer m*;v*s- [KA:hlg] <i>Euphrasia wettsteinii</i> small- eyed thrush v <i>Festuca ovina</i> sheep's fescue v*s-[UF:fle]	<i>Huperzia appressa</i> mountain louse grass v <i>Juncus trifidus</i> rabbesiv v <i>Kobresia myosuroides</i> rabbitst. s+[KA-hlg] <i>Minuartia biflora</i> tuhe heirloom <i>Minuartia rubella</i> needle inheritance <i>Oxytropis lapponica</i> reindeer meal v;s-[KA:hlg] <i>Parnassia palustris</i> jåblom v <i>Pinguicula vulgaris</i> sedge grass v <i>Potentilla crantzii</i> spotted wall v <i>Primula scandinavica</i> mountain key flower <i>Salix glauca</i> ssp. <i>glauca</i> silver willow v <i>Salix reticulata</i> nettle v* <i>Saussurea alpina</i> mountain thistle v <i>Saxifraga oppositifolia</i> red herring v;s-[KA:hlg] <i>Selaginella selaginoides</i> dvergjamne v <i>Silene acaulis</i> fjellsmelle v*	<i>Silene wahlbergella</i> blindwort <i>Thalictrum alpinum</i> mountain seed star v* <i>Tofieldia pusilla</i> bear bite v <i>Distichium capillaceum</i> cushion plane moss v;s-[KA:hlg] <i>Ditrichum flexicaule</i> storburst v;s+[KA:hlg] <i>Myurella julacea</i> bowl step moss v;s-[KA:hlg],s+[UF:fle] <i>Rhytidium rugosum</i> paw moss v*;s-[KA:hlg] <i>Tortella tortuosa</i> cushion v;s-[KA:hlg] <i>Cetraria aculeata</i> pit thorn v;s*[UF:fle] <i>Cladonia arbuscula</i> light lichen v;s-[UF:fle] <i>Flavocetraria cucullata</i> yellow sedge v;s+[UF:fle] <i>Flavocetraria nivalis</i> yellow skin v;s*[UF:fle]
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Distribution and regional distribution: LA-MA, O2-C1.

Most important types of confusion: slightly calcareous mountain-low heath (T3-C-9), strong calcareous mountain-heath heath (T3-C-11), calcareous rabbble (T14-C-2), highly calcareous boreal low heath (T31-C-12).

Red list status (2018): Mountain heath, leeside and tundra (NT mainland, LC Svalbard;<)

References and type parallels: R3, R4, S2b (VN), C01 leeside (DNHB13).

T3-C-13 Intermediate

source affected reading page

NiN characteristics: Mainland systems: Mountain heath, lee side and tundra (T3), one ground type (13). Defined by LKM: KAy2 & UFy1 & Kljy2. LKM base steps: KAyde & UFybc & Kljbc.

Physiognomy: Lush vegetation with or without a shrub layer of willows. The field layer is often dominated by large ferns and tall grasses (large fern type), but both medium lime-demanding low herbs and tall perennials are included. Bottom layer of pleurocarp mosses.

Ecological characteristics: In sloping terrain on poor to medium calcareous moraines with leachate.

Constantly moist soil with a supply of fresh, oxygen- and lime-rich groundwater where the water movement is parallel to the ground surface (spring water influence). Common in stream valleys, along streams and below springs on relatively coarse substrate. Stable snow cover that melts relatively early. Distinguished from fern snow beds (T13 Rasmek) by a high proportion of graminids and herbs.

Terrain and aerial photo characteristics: Sloping terrain.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T3-B-13	T3-C-13	T3-D-3	T3-E-3
Basic types	T3-13	T3-13	T3-13	T3-7,10,13,14	T3-7,10,13,14

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

Aconitum septentrionale bull helmet s-[KA-dlc],s-[Kl-bla]	Epilobium hornemannii milkweed v Equisetum arvense s+[KA-dlc]	Pyrola minor pearl winter green v;s-[KA-dlc]
Alchemilla glabra marigold v;s+[KA-dlc],s-[Kl-bla]	Filipendula ulmaria meadowsweet s-[KA-dlc],s-[Kl-bla]	Ranunculus acris ground sunbed v;s+[KA-dlc]
Alchemilla glomerulans source ladybug v;t ^a [KA-de],s-[Kl-bla]	Geranium sylvaticum v ;s*[KA-dlc],s-[Kl-bla]	Ranunculus platanifolius white sunbed s-[KA-dlc],s-[Kl-bla]
Angelica sylvestris sloe s+[KA-dlc],s-[Kl-bla]	Geum rivale meadowsweet flower s+[KA-dlc],s-[Kl-bla]	Rhodiola rosea rose root v;s-[KA-dlc]
Athyrium distentifolium fjellburkne v;t ^a [KA-de],s-[Kl-bla]	Gymnocarpium dryopteris bird tail v Lysimachia europaea forest star v	Rumex acetosa meadow sorrel v*s*[KA-dlc]
Bartsia alpina blacktop v;s+[KA-dlc]	Melampyrum sylvaticum small marimjelle v;s-[KA-dlc]	Salix glauca ssp. glauca silver willow v
Bistorta vivipara harerug v;s+[KA-dlc]	Milium effusum musk grass s-[KA-dlc],s-[Kl-bla]	Salix lapporum lappvier v;s+[KA-dlc]
Calamagrostis phragmitoides forest sorrel vein v;t ^a [KA-de],s-[Kl-bla]	Myosotis decumbens mountain forget-me-not s-[KA-dlc],s-[Kl-bla]	Salix phylicifolia green willow v
Carex vaginata scabbard v;s-[KA-dlc]	Omalotheca norvegica _ [KA-dlc]	Saussurea alpina mountain thistle v*s-[KA-dlc]
Chamerion angustifolium geitramsl v;s+[KA-dlc],s-[Kl-bla]	Phegopteris connectilis hanging wing s-[KA-dlc],s-[Kl-bla]	Silene dioica red jonsock flower v;s*[KA-dlc],s-[Kl-bla]
Cicerbita alpina turt s-[KA-dlc],s-[Kl-bla]	Poa alpigena seatrapp v;s-[KA-dlc]	Solidago virgaurea golden rice v;s-[KA-dlc]
Cirsium heterophyllum white-leaved thistle v;s-[KA-dlc],s-[Kl-bla]	Polygonatum verticillatum lily of the valley s-[KA-dlc],s-[Kl-bla]	Stellaria borealis mountain star flower v;s+[KA-dlc],s-[Kl-bla]
Deschampsia cespitosa ssp. cespitosa silver pile v	Trollius europaeus ball flower s-[KA-dlc],s-[Kl-bla]	Taraxacum crocea agg. mountain lion teeth v;s+[KA-dlc]
Dryopteris expansa agg. sheep 's milk v;t ^a [KA-de],s-[Kl-bla]	Valeriana sambucifolia root s+[KA-dlc],s-[Kl-bla]	Trollius europaeus ball flower s-[KA-dlc],s-[Kl-bla]
		Viola biflora mountain violet v;s+[KA-dlc]



Intermediate source-influenced reading page. Op: Vågå: Storhø SW.
Photo: RH.

Distribution and regional distribution: LA, O3-C1. Largest distribution in oceanic mountains.

Most important types of confusion: intermediate lake side (T3-C-4), calcareous source-influenced mountain heath (T3-C 14), strongly intermediate and slightly calcareous springs (V4-C-2, intermediate source-influenced boreal fresh heath (T31-C-13).

Red list status (2018): Mountain heath, leeside and tundra (NT mainland, LC Svalbard;<)

References and type parallels: S5c, S6 (VN).

T3-C-14 Calcareous source-influenced loess NiN

characteristics: Solid ground systems: Mountain

heath, loess and tundra (T3), one base type (14). Defined by LKM: KAy3,4 & UFy1 & Klj2. LKM base steps: KAyfghi & UFybc & Kljbc.

Physiognomy: Very luxuriant vegetation with or without a shrub layer of willows. The field layer is dominated by tall perennials and tall grasses (tall perennial type), with elements of lime-demanding low herbs. Often also elements of heat-loving species. Bottom layer of pleurocarp mosses.



Calcareous source-influenced loes site. Op: Øystre Slidre: Øvre Heimdalsvatnet, N of Osbue. Photo: RH.

Ecological characteristics: The type most often occurs in favorably exposed and sloping terrain on calcareous moraines with leachate influence. Characterized by the supply of fresh, oxygen-rich and calcareous groundwater where the water movement is parallel to the ground surface (spring water influence). Humus-mixed moist mineral soil with a brown soil character. Common in stream valleys, along streams and below springs. The snow cover is stable and melts relatively early. Distinguished from intermediate source-influenced mountain heath (T3-C-13) by more elements of lime-requiring species.

Terrain and aerial photo characteristics: Sloping terrain.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T3-14	T3-B-14	T3-C-14	T3-D-3	T3-E-3
Basic types		T3-14	T3-14	T3-7,10,13,14	T3-7,10,13,14

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Aconitum septentrionale</i> bull helmet v*;s*[KA:fle],s-[KI:bla]	<i>Epilobium hornemannii</i> milkweed v <i>Equisetum arvense</i> horsetail s-[KA:fle] <i>Filipendula ulmaria</i> meadowsweet s-[KA:fle], s-[KI:bla]	<i>Ranunculus acris</i> ground sunflower v;s-[KA:fle] <i>Ranunculus platanifolius</i> white sunbed s-[KA:fle],s-[KI:bla]
<i>Alchemilla glomerulans</i> spring ladybug v <i>Angelica archangelica</i> ssp. <i>archangelica</i> mountain water s+[KA:fle],s-[KI:bla]	<i>Geranium sylvaticum</i> wood stork's bill v*; s-[KI:bla] <i>Geum rivale</i> meadow bumblebee v;s+[KA:fle], s-[KI:bla]	<i>Rodiola rosea</i> rose root v;s-[KA:fle] <i>Rumex acetosa</i> meadow sorrel v <i>Salix hastata</i> bleached hemlock s-[KA:fle]
<i>Angelica sylvestris</i> gorse v;s-[KA:fle], s-[KI:bla]	<i>Lysimachia europaea</i> forest star v <i>Melica nutans</i> hanging ax s-[KA:fle] <i>Milium effusum</i> musk grass v;s+[KA:fle], s-[KI:bla]	<i>Salix lanata</i> woolly willow v;s-[KA:fle] <i>Saussurea alpina</i> mountain thistle v <i>Silene dioica</i> red jonsock flower v;s-[KA:fle], s-[KI:bla]
<i>Athyrium distentifolium</i> fjellburkne v <i>Avenella flexuosa</i> smyle v <i>Bartsia alpina</i> black top v <i>Bistorta vivipara</i> harerug v;s-[KA:fle]	<i>Myosotis decumbens</i> mountain forget-me-not v;s+[KA:fle],s-[KI:bla] <i>Omalotheca norvegica</i> seder graywort v <i>Phegopteris connectilis</i> hanging wing s-[KI:bla] a]	<i>Solidago virgaurea</i> golden rice v <i>Stellaria borealis</i> mountain star flower v;s-[KI:bla] <i>Stellaria nemorum</i> forest star flower s-[KA:fle],s-[KI:bla]
<i>Calamagrostis phragmitoides</i> forest roe vein v <i>Carex atrata</i> black starr v*;s*[KA:fle] <i>Carex vaginata</i> slirestarr v <i>Cicerbita alpina</i> turt v :s+[KA:fle],s-[KI:bla]	<i>Poa alpigena</i> seatrapp s-[KA:fle] <i>Polemonium caeruleum</i> mountain flock <i>Polygonatum verticillatum</i> lily of the valley v;s+[KA:fle],s-[KI:bla]	<i>Trollius europaeus</i> ball flower s-[KA:fle], s-[KI:bla] <i>Valeriana sambucifolia</i> root v ;s-[KA:fle],s-[KI:bla] <i>Viola biflora</i> mountain violet v*;s+[KA:fle]
<i>Cirsium heterophyllum</i> white-leaved thistle v;s-[KA:fle],s-[KI:bla] <i>Coeloglossum viride</i> green curlew v;s-[KA:fle] <i>Dryopteris expansa</i> agg. sheep telg v	<i>Pyrola minor</i> pearl wintergreen v	

Distribution and regional distribution: LA, O2-C1. Mostly in continental and northern mountains.

Most important types of confusion: Weakly calcareous loess (T3-C-7), strongly calcareous loess (T3-C-10), intermediate source-influenced heath (T3-C-13), fairly to extremely calcareous springs (V4-C-3), calcareous source affected boreal heath fresh heath (T31-C-14).

Red list status (2018): Mountain heath, leeside and tundra (NT mainland, LC Svalbard;<)

References and type parallels: S7 (VN), C01 (DNHB13).

T4-C-1 Blueberry forest

NiN characteristics: Solid land systems: Solid land woodland (T4), one ground type (1). Defined by LKM: UFÿ1 & KAÿ1 & Klÿ1. LKM base steps: UFÿab & KAÿabc & Klÿ0a.

Physiognomy: Most often shady forests strongly characterized by blueberry dominance and on slightly more nutritious ground and in more oceanic and mountainous areas also small ferns. Typical is a continuous moss cover at the bottom, on wetlands completely dominated by peat mosses. In terms of area, the most important is spruce forest with a sparse element of boreal deciduous trees. In BN also represented by oak forest and beech forest, while birch forest dominates large areas in NB and parts of the country outside the spruce distribution area. Pine can also be dominant there.



Blueberry forest. Op: Gjøvik: Brattåsen. Photo: HB.

Ecological characteristics: The field layer includes a limited number of species with a dominance of blueberries, and with lingonberries, smyle and a few other frugal species. Occurs on limestone-poor bedrock, different exposure and slope conditions and a soil that is characterized by a well-developed podsol profile with a raw humus layer at the top and which maintains a relatively stable moisture.

Terrain and aerial photo characteristics: All terrain positions, but more frequent in flat, evenly sloping or concave terrain positions than in open, more shallow parts. FF: Dominant tree species and tree layer density are governing for recognition in aerial photographs, texture varying. Color dark green in spruce forest, light green in deciduous forest, green-grey in pine forest. Texture and color often consistent within regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T4-B-1	T4-C-1	T4-D-1	T4-E-1
Basic types	T4-1	T4-1	T4-1	T4-1.5	T4-1.5.

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Avenella flexuosa</i> smile v* <i>Betula pubescens</i> birch etc <i>Blechnum spicant</i> bear 's comb v[O3-O2] <i>Chamaepericlymenum suecicum</i> scruberry m[O3-O2];v[O3-O1] <i>Gymnocarpium dryopteris</i> birdtail v;s+ [UFÿblc];m[O3-O2,NB] <i>Linnaea borealis</i> linnea v;s-[UF-blc] <i>Luzula pilosa</i> hair frill v;s-[UFÿblc] <i>Lycopodium annotinum</i> stri crow's foot v;s- [UF-blc] <i>Lysimachia europaea</i> forest star v*s+ [UFÿblc] <i>Maianthemum bifolium</i> Mayflower v*s+;s-[UFÿblc] <i>Melampyrum pratense</i> stormarmjmelle v*s-[UFÿblc] <i>Picea abies</i> fir m*v* <i>Sorbus aucuparia</i> roe v <i>Vaccinium myrtillus</i> blueberry m*v*	<i>Vaccinium vitis-idaea</i> cranberry v* <i>Barbilophozia attenuata</i> whip beard moss v <i>Barbilophozia floerkei</i> v[O3-O2] <i>Barbilophozia lycopodioides</i> goosefoot beard moss m[O3-OC,SB-NB] <i>Calypogeia muelleriana</i> swamp flake v <i>Dicranum fuscescens</i> bergsigd v <i>Dicranum majus</i> blunt sickle m*v* <i>Dicranum scoparium</i> rib sickle v* <i>Hylocomiastrum umbratum</i> shade house moss v <i>Hylocomium splendens</i> floor moss m*v* <i>Lophocolea heterophylla</i> stump lace v <i>Lophozia obtusa</i> butt tab v <i>Plagiochila asplenoides</i> prakthinnemose v	<i>Plagiothecium laetum</i> agg. gloss jammemose v* <i>Plagiothecium undulatum</i> coastal jammemose v[O3-O1] <i>Pleurozium schreberi</i> pine moss v* <i>Polytrichastrum formosum</i> littoral moss v <i>Ptilidium ciliare</i> ground fringe v <i>Ptilium crista-castrensis</i> feather moss v* <i>Rhytidadelphus loreus</i> m[O3-O2];v[O3-O1] <i>Sphagnum girgensohnii</i> spruce peat moss etc <i>Sphagnum quinquefarium</i> heather peat moss v <i>Sphagnum russowii</i> tvaretormose v <i>Tritomaria quinquedentata</i> large fang v
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Distribution and regional distribution: BN–NB. Occurs all over the country; probably the ground type that covers the largest area of forest in Norway.

Most important types of confusion: heather forest (T4-C-5), weak low herb forest (T4-C-2).

Red list status (2018): Woodland (LC;<), pasture forest (LC;ÿ), boreal rainforest (VU;ÿ) and boreonemoral rainforest (VU;ÿ).

References and type parallels: T23-1,2,6,7 (NiN v1).

T4-C-2 Weak low herbaceous forest

NiN characteristics: Solid land systems: Solid land woodland (T4), one ground type (2). Defined by LKM: UFy1 & KAy2 & Klj1. LKM base steps: UFyb & KAyde & Klj0a.



Physiognomy: Most often shady forests characterized by blueberry dominance as well as the presence of small ferns and some herbs, grasses and mosses that do not find enough nourishment in the blueberry forest. Typical is a weak low moss cover at the bottom, on wetland for Gjendebu. Photo: RH. herbaceous forest with a grazing feel. Op: Vang: Svartdal, SE continuous dominance of peat bogs. In terms of area, the most important is spruce forest with a sparse element of boreal deciduous trees. In BN also represented by oak forest and beech forest, while birch forest dominates large areas in NB and parts of the country outside the spruce distribution area. Pine can also be dominant there.

Ecological characteristics: The field layer includes a limited number of species with blueberry and its related species from the blueberry forest (including the small fern design) as well as scattered occurrences of somewhat more lime-demanding species such as forest weed and medicinal veronica. Occurs on slightly more calcareous bedrock, different exposure and slope conditions and a soil that is usually characterized by a podsol profile, at the top with a humus layer of the mother type and which maintains a relatively stable moisture.

Terrain and aerial photo characteristics: All terrain positions, but more frequent in flat, evenly sloping or concave terrain positions than in open, shallow parts. Dominant tree species and tree layer density are controlling for recognition in aerial photographs, texture varying. Color dark green in spruce forest, light green in deciduous forest, green-grey in pine forest. Texture and color often consistent within regions

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T4-2	T4-B-2	T4-C-2	T4-D-2	T4 E-2
Basic types		T4-2	T4-2	T4-2,6,17	T4-2,6,17

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity species (t* = characteristic t., txa- gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.)

<i>Anemone nemorosa</i> whitves v;s-[KAydlc] <i>Avenella flexuosa</i> smile v* <i>Betula pubescens</i> birch etc <i>Calamagrostis arundinacea</i> v[O] <i>Gymnocarpium dryopteris</i> bird tail v;m[O3-O2,NB] <i>Hieracium</i> spp. hover v;s+[KAydlc] <i>Lathyrus linifolius</i> tuberous button s+[KAAdlc] <i>Linnaea borealis</i> linnea v <i>Luzula pilosa</i> hair fritter v <i>Lysimachia europaea</i> forest star v* <i>Maianthemum bifolium</i> Mayflower v*;s-[UFyblc]	<i>Melampyrum sylvaticum</i> small marmjelle v <i>Orthilia secunda</i> nodding wintergreen v <i>Oxalis acetosella</i> cuckoo acid v;s+[KAydlc] <i>Picea abies</i> fir m*;v* <i>Pyrola minor</i> pearl wintergreen s*[KAydlc] <i>Rubus saxatilis</i> teaberry s*[KAydlc] <i>Solidago virgaurea</i> golden rice v <i>Sorbus aucuparia</i> roe v <i>Vaccinium myrtillus</i> blueberry m*;v* <i>Vaccinium vitis-idaea</i> cranberry v* <i>Viola riviniana</i> forest violet s+[KAyeld] <i>Barbilophozia floerkei</i> heather beard moss v <i>Barbilophozia lycopodioides</i> goosefoot egg moss v;m[O3-OC,SB-NB]	<i>Dicranum majus</i> blunt sickle m*;v* <i>Dicranum scoparium</i> rib sickle v* <i>Hylocomium splendens</i> floor moss m*;v* <i>Lophozia obtusa</i> butt tab v <i>Plagiochila asplenoides</i> prakthinnemose v <i>Pleurozium schreberi</i> pine moss v* <i>Ptilium crista-castrensis</i> spring moss v <i>Rhytidiodelphus subpinnatus</i> plume moss v <i>Rhytidiodelphus triquetrus</i> s+[KAydlc] <i>Sciuro-hypnum reflexum</i> sprikelundmose v <i>Sphagnum girgensohnii</i> spruce peat moss v
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Distribution and regional distribution: BN–NB. Occurs all over the country.

Most important types of confusion: Weak berry heather-low heather forest (T4-C-6), low heather forest (T4-C-3).

Red list status (2018): Woodland (LC;<), pasture forest (LC;ÿ), boreal rainforest (VU;ÿ) and boreonemoral rainforest (VU;ÿ).

References and type parallels: T23-3 (NiN v1)

T4-C-3 Lågurtskog

NiN characteristics: Solid land systems: Solid land woodland (T4), one ground type (3). Defined by LKM: UFy1 & KAy3 & Klý1. LKM base steps: UFyb & KAýfg & Klýoa.

Physiognomy: Mostly shady forests characterized by herbs and grasses. The forest floor has varying moss coverage of partly more demanding species, and good quality with a dense layer of wood and low light can often limit the undergrowth, so that parts of the forest floor are pure pine needles or covered with leaf litter. In terms of area, the most important is spruce forest, with a sparse element of boreal deciduous trees. In BN also represented by broadleaf forest, while birch forest dominates large areas in NB and parts of the country outside the spruce distribution area. Pine can also be dominant there.



Lågurtskog. Us: Lutdalens. Photo: HB.

Ecological characteristics: The type can be relatively species-rich, and a classic distinguishing species from poorer types is blue-veined. Occurs on calcareous bedrock, different exposure and slope conditions. The soil is characterized by a brown soil profile that maintains a relatively stable moisture content.

Terrain and aerial photo characteristics: Occurs in all terrain positions, but more frequently in flat, evenly sloping or concave terrain positions than upland, often low-lying parts. Dominant tree species and tree layer density governing recognition in aerial photographs, texture varying. Dark green in spruce forest, light green in deciduous forest, green-grey in pine forest. Lighter green color in forest glades (not in shadow) in aerial photo. Texture and color often consistent within regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T4-3	T4-B-3	T4-C-3	T4-D-3	T4 E-3
Basic types		T4-3	T4-3	T4-3,4,7,8,18,19	T4-3,4,7,8,18,19

Diagnostic species m =

abundance species (**m*** = dominant m.); v = common species (**v*** = constant v.); t = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); s = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Anemone nemorosa</i> whitew m* ;v*	<i>Maianthemum bifolium</i> Maiblom v *	<i>Cirriphyllum piliferum</i> lundveikmose v
<i>Avenella flexuosa</i> smile v*	<i>Melampyrum sylvaticum</i> small marimjelle v	<i>Dicranum majus</i> sickle m; v*
<i>Betula pubescens</i> birch etc	<i>Melica nutans</i> hangax v;s+[KAýfle]	<i>Eurhynchium angustirete</i> hazel mold moss
<i>Calamagrostis</i> arundinaceae v[Ø]	<i>Oxalis acetosella</i> cuckoo acid v*	s+[KAýfle]
<i>Carex digitata</i> finger sedge v*;s+[KAýfle]	<i>Poa nemoralis</i> lundrapp v	<i>Hylocomium splendens</i> floor moss v*
<i>Convallaria majalis</i> lily of the valley v	<i>Picea abies</i> fir m* ;v*	<i>Mnium spinosum</i> bramble s-[KAýfle]
<i>Corylus avellana</i> hazel v;s+[KAýfle]	<i>Pyrola minor</i> pearl wintergreen v	<i>Plagiomnium affine</i> skogfagermose v
<i>Fragaria vesca</i> field strawberry v;s+[KAfle]	<i>Rubus saxatilis</i> teaberry v	<i>Ptilium crista-castrensis</i> spring moss v
<i>Geranium sylvaticum</i> wood stork beak v	<i>Sanicula europaea</i> sanikel s+[KA·glf]	<i>Rhodobryum roseum</i> rosette moss v
<i>Gymnocarpium dryopteris</i> bird tail v*	<i>Solidago virgaurea</i> golden rice v	<i>Rhytidadelphus triquetrus</i> large crown moss
<i>Hepatica nobilis</i> blauveis v;s*[KAýfle]	<i>Vaccinium myrtillus</i> blueberry v*	m* ;v*
<i>Hieracium</i> spp. hover v	<i>Veronica officinalis</i> legeveronika v	<i>Sciuro-hypnum reflexum</i> sprikelund moss
<i>Lathyrus linifolius</i> tuberous teaknapp v	<i>Viola riviniana</i> forest violet v*	v*
<i>Luzula pilosa</i> hairy fly v*	<i>Barbilophozia lycopodioides</i> goosefoot beard moss v	

Distribution and regional distribution: BN–NB throughout the country. Widespread type

Most important types of confusion: Weak low-growth forest (T4-C-2), berry heather-low-growth forest (T4-C-7), calcareous low-growth forest (T4-C-4).

Red list status (2018): Woodland (LC;<), grazing forest (LC;ÿ), boreonemoral rainforest (VU;ÿ) and fresh rich deciduous forest (NT;ÿ).

References and type parallels: T23-4 (NiN v1)

T4-C-4 Kalklågurt forest

NiN characteristics: Fixed land systems: Fixed land woodland (T4), one ground type (4). Defined by LKM: UFy1 & KAy4 & Klj1. LKM base step: UFyb & KAyh & Klj0a.

Physiognomy: Mostly shady forests on more or less shallow ground. Lime spruce forest probably covers the largest area in BN, where there are all transitions to pure deciduous forest in the most climatically favorable localities. Frequent as birch forest in NB and elsewhere in all parts of the country outside the spruce's distribution area, where the prerequisites for kalklågurt forest are present.



Kalklågurt forest. Ak: Bærum: Hamang. Photo: HB.

Ecological characteristics: Often a small and trivial element of low herbs that do not differ much from more ordinary low herb forests, but with a few decisive plant species. The type can be strongly moss-dominated (preferably floor moss). Best characterized by a number of demanding chalk conifer forest fungi. Prominent calcareous rock knolls with moss flora typical of calcareous rocks also indicate calcareous lowland forest. Occurs on calcareous bedrock, different exposure and slope conditions and a soil characterized by a brown soil profile and which maintains a relatively stable moisture. On calcareous soil with a thick humus layer, the calcareous peat forest is replaced by woodland types with a lower realized KA level.

Terrain and aerial photo characteristics: Occurs in all terrain positions, but often in open areas.

Dominant tree species and tree layer density governing recognition in aerial photographs, as in T4-C-3. Dark green in spruce forest, light green in deciduous forest, green-grey in pine forest. Texture varying, but often uneven. Texture and color often consistent within regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T4-4	T4-B-4	T4-C-4	T4-D-4	T4 E-4
Basic types		T4-4	T4-4	T4-3,4,7,8,18,19	T4-3,4,7,8,18,19

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **tx**- gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Acer platanoides</i> maple v <i>Actaea spicata</i> witch hazel v;s-[KAyhlg] <i>Anemone nemorosa</i> whittes m* ;v* <i>Calamagrostis arundinacea</i> _ <i>Calamagrostis epigejos</i> rock reed v[Ø] <i>Campanula trachelium</i> nettle bell v;s-[KAyhlg] <i>Carex digitata</i> finger sedge v* <i>Convallaria majalis</i> lily of the valley v <i>Corylus avellana</i> hazel v <i>Galium odoratum</i> musk v;s+[KAyhlg] <i>Geranium sylvaticum</i> wood stork beak v <i>Gymnocarpium dryopteris</i> bird tail v <i>Hepatica nobilis</i> blauveis v	<i>Hieracium</i> spp. hover v <i>Lathyrus vernus</i> spring pea button s-[KAyhlg] <i>Lonicera xylosteum</i> jointed wood v ;s-[KAyhlg] <i>Maianthemum bifolium</i> Maiblom v <i>Melampyrum sylvaticum</i> small marimjelle v <i>Melica nutans</i> hangax v <i>Poa nemoralis</i> lundrapp v <i>Picea abies</i> fir m* ;v* <i>Pyrola minor</i> pearl wintergreen v <i>Rubus saxatilis</i> teaberry v* <i>Sanicula europaea</i> sanikel s+[KA:gfl] <i>Solidago virgaurea</i> golden rice v <i>Veronica officinalis</i> legeveronika v <i>Viola collina</i> ground violet v;s+[KAyhlg] <i>Viola mirabilis</i> scrub violet v;s-[KAyhlg] <i>Viola riviniana</i> forest violet v*	<i>Barbilophozia lycopodioides</i> goosefoot beard moss v <i>Cirriphyllum piliferum</i> lundveikmose v <i>Dicranum majus</i> blunt sickle v <i>Eurhynchium angustirete</i> hazel moldmo see v <i>Hylocomium splendens</i> floor moss m* ;v <i>Plagiomnium affine</i> skogfagermose v <i>Pleurozium schreberi</i> furumose v <i>Rhytidiodelphus triquetrus</i> large crown moss m* <i>Gomphus clavatus</i> violet s+[KAyhlg] <i>Cortinarius cupreorufus</i> copper red blurs up s+[KAyhlg] <i>Clitopaxillus alexandri</i> plug funnel fungus s+[KAyhlg]
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Distribution and regional distribution: BN–NB. Distribution limited to the very most limestone-rich areas, especially the geological Oslo field and Nord-Trøndelag-Nordland.

Most important types of confusion: low heath forest (T4-3), berry heather-lime heath forest (T4-8).

Red list status (2018): Woodland (LC;<), pasture forest (LC;ÿ), fresh rich deciduous forest (NT;ÿ) and lime spruce forest (VU;ÿ).

References and type parallels: T23-5 (NiN v1)

T4-C-5 Bærlyn forest

NiN characteristics: Fixed land systems: Fixed land woodland (T4), one ground type (5). Defined by LKM: UFy2 & KAy1 & Klý1. LKM base step: UFycd & KAyabc & Klý0a.

Physiognomy: Most often shady to semi-open forests with heather and partly moss dominance, but with an increasing amount of lichen towards more continental areas. Within the spruce's distribution area, bare mixed forest, which varies from spruce dominance with a constant element of pine to a more equal mixture of the two. With elements or dominance of oak in BN in Sørlandet.

Developed as pine and/or birch forest outside the spruce distribution area, as pure birch forest up towards the mountain.



Bærlyn forest. Op: Vågå Tolstadmoan. Photo: HB.

Ecological characteristics: Berry heather dominance with a more or less strong element of heather, and with few other species in the field layer. Pine mosses and sickle mosses, in places also storey mosses or reindeer lichens, are characteristic in the bottom layer. Spruce, heather and sedge peat moss dominate on wetlands. Occurs on limestone-poor bedrock. The soil forms a podsol profile and is usually thinner and more prone to drought than in the blueberry forest.

Terrain and aerial photo characteristics: Occurs under various exposure and slope conditions, but especially on ridges and slightly convex terrain forms. Can cover large areas of river and glacial deposits (pine bogs). Dominant tree species and tree layer density are controlling for recognition in aerial photographs, texture varying. Dark green in spruce forest, light green in deciduous forest, green-grey in pine forest; in aerial photographs, open areas most often appear as green to greenish-brown. Texture and color consistent within and between regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T4-5	T4-B-5	T4-C-5	T4-D-1	T4-E1
Basic types		T4-5	T4-5	T4-1.5	T4-1.5

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity species (t* = characteristic t., t̄ - gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.)

<i>Avenella flexuosa</i> smile v* <i>Betula pubescens</i> birch etc <i>Calluna vulgaris</i> heather v*;s*[UFyclb] <i>Chamaepericlymenum suecicum</i> scrub berry v[O3-O1] <i>Empetrum nigrum</i> kreling v <i>Lycopodium annotinum</i> stri crow's foot v <i>Melampyrum pratense</i> stormarimjelle v* <i>Picea abies</i> fir m*;v* <i>Pinus sylvestris</i> pine m*;v <i>Vaccinium myrtillus</i> blueberry m*;v* <i>Vaccinium vitis-idaea</i> lingonberry m;v*	<i>Barbilophozia floerkei</i> heather beard moss m;v*[O3-O1,SB-NB] <i>Barbilophozia lycopodioides</i> goosefoot beard moss v*[O3-O1,SB-NB] <i>Dicranum fuscescens</i> bergsigd v* <i>Dicranum majus</i> white sickle etc <i>Dicranum polysetum</i> krugjigd v;v*[UF-clb] <i>Dicranum scoparium</i> ribbed sickle m;v* <i>Hylocomium splendens</i> floor moss m;v* <i>Plagiothecium undulatum</i> coastal jammemose v[O3-O1] <i>Pleurozium schreberi</i> pine moss m;v*	<i>Ptilidium ciliare</i> ground fringe v <i>Ptilium crista-castrensis</i> spring moss v <i>Rhytidiodelphus loreus</i> coastal wreath moss v[O3-O1] <i>Sphagnum girgensohnii</i> spruce peat moss v <i>Sphagnum quinquefarium</i> heather peat moss v <i>Sphagnum russowii</i> tvaretormose v <i>Cladonia arbuscula</i> light lichen v <i>Cladonia rangiferina</i> gray lichen v <i>Cladonia</i> spp. lichen v
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Distribution and regional distribution: BN–NB. Over the whole country; heather forest is one of the most widespread ground types in forests.

Most important types of confusion: heather forest (T4-C-9), blueberry forest (T4-C-1).

Red list status (2018): Woodland (LC;<), pasture forest (LC;ÿ) and olive forest (EN;ÿ).

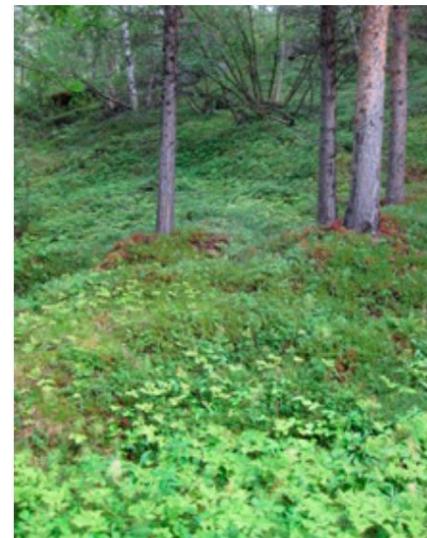
References and type parallels: T23-11,16 pp and T23-1,2,6,7 pp (NiN v1).

T4-C-6 Weak heather-low herbaceous forest

NiN characteristics: Fixed land systems: Fixed land woodland (T4), one ground type (6). Defined by LKM: UFÿ2 & KAÿ2 & Klÿ1. LKM base steps: UFÿcd & KAÿde & Klÿ0a.

Physiognomy: Mostly shady to semi-open forests with heather and partly moss dominance, but increasing amounts of lichen towards more continental areas. Within the spruce's distribution area, bare mixed forest, which varies from spruce dominance with a constant element of pine to a more equal mixture of the two. With elements of oak in BN. Developed as pine and/or birch forest outside the spruce distribution area, as pure birch forest up towards the mountain.

Ecological characteristics: Berry heather dominance with a more or less strong element of heather, and with few other species in the field layer. Pine mosses and sickle mosses, in places also storey mosses or reindeer lichens, are characteristic in the bottom layer. Occurs on bedrock that is poor in lime, but with a slightly better calcareous content than berry heather forest, T4-C-5. This results in a few, scattered, slightly more lime-demanding species being included compared to this mapping unit. The soil is typically a weak podsol profile which is usually thinner and more prone to drought than in weak low herbaceous forest on fresh land.



Weak berry heather-lagert forest. Tree:
Storfjord: Luledalen. Photo: RH.

Terrain and aerial photo characteristics: Occurs under various exposure and slope conditions, but especially on ridges and slightly convex terrain forms. Forest glades often with a green to greenish-brownish color in color photos. Otherwise, color and texture vary with the dominant wood species and wood layer density. Dark green in spruce forest, light green in deciduous forest, green-grey in pine forest. Uneven texture. Texture and color consistent within regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T4-6	T4-B-6	T4-C-6	T4-D-2	T4-E-2
Basic types		T4-6	T4-6	T4-2,6,17	T4-2,6,17

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity species (t* = characteristic t., tå- gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.)

<i>Anemone nemorosa</i> whitveis v;s*[UF-dle] <i>Avenella flexuosa</i> smile v* <i>Betula pubescens</i> birch etc <i>Calamagrostis arundinacea</i> snarl pipe w[Ø]	<i>Orthilia secunda</i> nodding wintergreen v <i>Oxalis acetosella</i> cuckoo acid v;s+[KA-dlc] <i>Picea abies</i> fir m*;v* <i>Pinus sylvestris</i> pine m;v* <i>Pulsatilla vernalis</i> mogop s*[UF-clb] <i>Pyrola minor</i> pearl wintergreen s*[KAÿdlc] <i>Vaccinium myrtillus</i> blueberry m*;v* <i>Vaccinium vitis-idaea</i> lingonberry m;v* <i>Barbilophozia florkei</i> heather beard moss m;v*[O3-O1,SB-NB] <i>Barbilophozia lycopodioides</i> goosefoot egg moss v*[O3-O1,SB-NB]	<i>Dicranum majus</i> white sickle etc <i>Dicranum fuscescens</i> bergsigd v <i>Dicranum polysetum</i> krugigg v;s*[UFÿclb] <i>Dicranum scoparium</i> rib sickle v* <i>Hylocomium splendens</i> floor moss m;v* <i>Pleurozium schreberi</i> pine moss m;v* <i>Ptilidium ciliare</i> ground fringe v <i>Ptilidium crista-castrensis</i> spring moss v <i>Rhytidadelphus triquetrus</i> large crown moss v;s-[KAÿdlc] <i>Cladonia arbuscula</i> light lichen v <i>Cladonia rangiferina</i> gray lichen v
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Distribution and regional distribution: BN–NB. All over the country, but far less frequent than (T4-C-5).

Most important types of confusion: Weak heather-low herbaceous forest (T4-C-10), weak low herbaceous forest (T4-C-2).

Red list status (2018): Woodland (LC;<), pasture forest (LC;ÿ), olive forest (EN;ÿ), low-growth deciduous forest (VU;ÿ) and lime and low-growth pine forest (VU;ÿ).

References and type parallels: T23-11,16 pp and T23-1,2,6,7 pp (NiN v1).

T4-C-7 Bærlyng-lågurt forest

NiN characteristics: Fixed land systems: Fixed land woodland (T4), one ground type (7). Defined by LKM: UFy2 & KAy3 & Klj1. LKM base step: UFycd & KAyfg & Klj0a.

Physiognomy: Mostly shady to semi-open forests with herbs and moss dominance: the amount of lichen increases towards more continental areas. Within the spruce's distribution area, bare mixed forest, which varies from spruce dominance with a constant element of pine to a more equal mixture of the two. With elements of oak in BN. Developed as pine and/or birch forest outside the spruce distribution area, as pure birch forest up towards the mountain.



Bærlyng lowland forest. Op: Dovre: Grimsdalen, N for the meeting between Buåi and Grimsa. Photo: RH.

Ecological characteristics: Includes the freshest and least calcareous part of what is traditionally called lime pine forest; i.e. a medium-rich pine forest with elements of slightly drought-tolerant low herbs such as violets, lavender, field strawberries, tuber pea, teaberry, lily of the valley, etc. Presence of strong lime indicators, typically orchids, is lacking. Often found on easily weathered rocks such as amphibolite, larvikite, gabbro, basalt, room porphyry, preferably in warm places. Occurrences of berry heather-low fir forest outside the limestone areas are often conditioned by weak leachate influence (seasonally wet). Few plant species distinguish this type from the more calcareous berry heather-lågurt forest. The soil is a brown soil profile.

Terrain and aerial photo characteristics: Occurs under various exposure and slope conditions, but especially on ridges and other convex terrain forms. Color in aerial photos varies depending on the dominant tree species and tree layer density. Spruce forests give a dark green color that brightens with an increasing proportion of deciduous trees; the green color is lighter in forest glades. Texture often variable. Texture and color often consistent within regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T4-7	T4-B-7	T4-C-7	T4-D-3	T4-E-3
Basic types		T4-7	T4-7	T4-3,4,7,8,18,19	T4-3,4,7,8,18,19

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Anemone nemorosa</i> whitveis v <i>Betula</i> spp. birch species v <i>Calamagrostis arundinacea</i> snarl pipe w[Ø] <i>Carex digitata</i> finger sedge v <i>Convallaria majalis</i> lily of the valley v* <i>Corylus avellana</i> hazel v*; s-[UFyde],s-[KAyelf] <i>Fragaria vesca</i> field strawberry v;s+[KAfle] <i>Geranium sylvaticum</i> wood stork beak v <i>Hepatica nobilis</i> blauveis s*[KA-fle] <i>Hieracium</i> spp. hover v	<i>Lathyrus linifolius</i> tuberous teaknapp v <i>Melampyrum sylvaticum</i> small marimjelle v <i>Melica nutans</i> hangax v;s+[KAyfle] <i>Picea abies</i> fir m*;v* <i>Pinus sylvestris</i> pine m*;v* <i>Pyrola minor</i> pearl wintergreen v <i>Rubus saxatilis</i> teaberry v <i>Solidago virgaurea</i> golden rice v <i>Vaccinium vitis-idaea</i> cranberry v* <i>Vaccinium myrtillus</i> blueberry v*	<i>Viola riviniana</i> forest violet v <i>Dicranum polysetum</i> krugigd v;s*[UFyclb] <i>Dicranum scoparium</i> rib sickle v* <i>Hylocomium splendens</i> floor moss v* <i>Dicranum fuscescens</i> bergsigd v <i>Dicranum majus</i> blunt sickle v <i>Pleurozium schreberi</i> pine moss m;v* <i>Ptilium crista-castrensis</i> spring moss v <i>Rhytidiodelphus triquetrus</i> large crown moss v
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Distribution and regional distribution: BN–NB throughout the country, but far less frequent than the heather forest (T4-C-5). Part of the rich fjordside pine forests in Møre and Romsdal and inner Parish falls here.

Most important types of confusion: heather-limestone forest (T4-C-8), heather-lågurt forest (T4-C-11).

Red list status (2018): Woodland (LC;<), pasture forest (LC;ÿ), olive forest (EN;ÿ), low-growth deciduous forest (VU;ÿ) and lime and low-growth pine forest (VU;ÿ).

References and type parallels: T23-11,16 pp and T23-1,2,6,7 pp (NiN v1).

T4-C-8 Bærlyng-limestone forest

NiN characteristics: Solid land systems: Solid land woodland (T4), one ground type (8). Defined by LKM: UFy2 & KAy4 & Klj1. LKM base step: UFycd & KAyhi & Klj0a.



Physiognomy: Meadow-like, lush, herbaceous and grass-rich forest, most often a fairly open pine forest with a forest edge against open limestone ground and rock walls.

Ecological characteristics: Comprises the freshest and most calcareous part of what is traditionally termed herb-rich lime pine forest; with elements of slightly drought-tolerant low herbs such as violets, lavender, field strawberries, tuberous peas, tea berries, lily of the valley, etc. Also designs where the "limestone effect" is due to inputs of leachate combined with periodic drying out and then preferably as a mosaic between a well-drained design and a wetland design. Presence of strong lime indicators, i.a. orchids, which are lacking in berry heather-low-grass forest, separate T4-C-8 from this. In BN, heat-loving deciduous trees and shrubs can form an important part of the tree and shrub layer and sometimes be dominant (e.g. drought-prone lime forest). The soil is a typical brown soil profile, but is usually thinner than in calcareous peat forest on fresh land. It is also distinguished from types poorer in lime by the presence of several lime-requiring mushroom species.

Bærlyng-kalklågurt forest. Bu: Øvre Eiker: Hamrefjell.
Photo: HB.

Terrain and aerial photo characteristics: Occurs under various exposure and slope conditions, but especially on ridges and other convex terrain forms. Color in aerial photos varies with dominant tree species and tree layer density. Spruce forests give a dark green color that brightens with an increasing proportion of deciduous trees; the green color is lighter in forest glades. Texture often variable. Texture and color often consistent within regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T4-8	T4-B-8	T4-C-8	T4-D-3	T4-E-3
Basic types		T4-8	T4-8	T4-3,4,7,8,18,19	T4-3,4,7,8,18,19

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **tr-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Anemone nemorosa</i> white vein v*	<i>Geranium sylvaticum</i> wood stork beak v <i>Hepatica nobilis</i> blauveis v <i>Hieracium</i> spp. hovers v*	<i>Abietinella abietina</i> granmose v;s*[UFy-hlg] <i>Ctenidium molluscum</i> kammose v;s*[UFy-hlg] <i>Dicranum polysetum</i> mug sickle v <i>Dicranum scoparium</i> rib sickle v*
<i>Betula pendula</i> hanging birch v <i>Calamagrostis arundinacea</i> snarl pipe w[Ø]	<i>Juniperus communis</i> juniper v <i>Lathyrus linifolius</i> tuberous teaknapp v <i>Melica nutans</i> hangax v <i>Picea abies</i> fir m;v*	<i>Hylocomium splendens</i> floor moss m;v* <i>Pleurozium schreberi</i> pine moss m;v* <i>Ptilium crista-castrensis</i> spring moss v <i>Rhytidiodelphus triquetrus</i> large crown moss etc
<i>Carex digitata</i> finger sedge v*	<i>Pinus sylvestris</i> pine m*v*	
<i>Convallaria majalis</i> lily of the valley m;v*	<i>Rubus saxatilis</i> teaberry v*	
<i>Corylus avellana</i> hazel v <i>Epipactis atrorubens</i> red flanger s*[UFyih] <i>Fragaria vesca</i> field strawberry v <i>Galium boreale</i> white ant v	<i>Solidago virgaurea</i> golden rice v <i>Vaccinium vitis-idaea</i> cranberry v* <i>Viola riviniana</i> forest violet v	

Distribution and regional distribution: BN–NB. Widespread and found in all parts of the country, but everywhere rare.

Core areas are the Cambrosilurian areas in the Oslo field, Sunnhordland, Steinkjer-Snåsa and Salten.

Most important types of confusion: heather-calcareous sedge forest (T4-C-12), berry heather-low sedge forest (T4-C-7).

Red list status (2018): Woodland (LC;<), pasture forest (LC;ÿ), olive forest (EN;ÿ), calcareous deciduous forest (EN;ÿ) and lime and low-stemmed pine forest (VU;ÿ).

References and type parallels: T23-13,18 pp and T23-4,5,9,10 pp (NiN v1).

T4-C-9 Heather forest

NiN characteristics: Permanent land systems:

Permanent field forest land (T4), one ground type (9).
Defined by LKM: UFy3 & KAy1 & Klj1. LKM base steps:
UFyef & KAyabc & Klj0a.

Physiognomy: Mostly semi-open forests where heather often plays a very important role. The bottom layer is dominated by reindeer lichen in the most continental areas; the proportion of mosses increases towards more oceanic areas. Pine is the dominant tree species in most of the country. In BN, particularly in Southern Norway, oak can also be an important element. Within the spruce's distribution area, bare mixed forest, which varies from spruce dominance with a constant element of pine to a more equal mixture of the two. Developed as pine and/or birch forest outside the spruce distribution area, as pure birch forest up towards the mountain.



Heather forest. Bu: Øvre Eiker: Hamrefjell. Photo: HB.

Ecological characteristics: The field layer typically dominated by thrifty and drought-tolerant species, in addition to heather also berry heather species. Pine moss is often the most important moss species and can dominate on well-drained land, while pine peat moss is the most important dominant on moist land. Heiggray moss plays a major role and is the dominant species in oceanic areas. Light and gray lichen are characteristic features of the bottom layer. The mapping unit is linked to low-lime and drought-prone soil. The soil profile is a podsol profile, but on land with thin soil no characteristic soil profile develops. Can cover large areas of river and glacial deposits ("pine bogs").

Terrain and aerial photo characteristics: Occurs under various exposure and slope conditions, but especially on well-drained surfaces, ridges and summit areas. Can cover large areas of river and glacial deposits ("pine bogs"). Color varies depending on the dominant wood species and wood layer density. Pine dominance in the wood layer gives an olive-green colour, most often with a brown to darker greenish-brown color in forest glades. If there is a higher percentage of moor gray moss (O2-O3) or light lichens, then the unit has a more greyish colour. Texture often variable. Texture and color often consistent within and between regions given comparable dominance conditions in wood and ground layers.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T4-B-9	T4-C-9	T4-D-4	T4-E-4
Basic types	T4-9	T4-9	T4-9	T4-9,13	T-9,13

Diagnostic species

m = type of quantity (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **tr-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.).

Antennaria dioica cat 's foot s+	Vaccinium vitis-idaea lingonberry m;v*	Polytrichum juniperinum juniper moss v
[KAydlc],[UF-eld]	Barbilophozia floerkei heather beard moss v	Ptilidium ciliare ground fringe v
Avenella flexuosa smyle s*[UF-flg]	Dicranum drummondii giant sickle t*	Racomitrium lanuginosum heath gray moss
Betula pubescens birch m	Dicranum fuscescens bergsigd v*	m[O3-O2];v[O2-O3]
Calluna vulgaris heather m*v*	Dicranum polysetum mug sickle m;v*	Sphagnum capillifolium pine peat moss etc
Empetrum nigrum cricket m;v*	Dicranum scoparium ribbed sickle m;v*	Cetraria islandica island slave m;v
Picea abies fir v	Hylocomium splendens floor moss v	Cladonia arbuscula light lichen etc
Pinus sylvestris pine m*;v*	Leucobryum glaucum blue moss v(BN)	Cladonia rangiferina gray reindeer lichen etc
Vaccinium myrtillus blueberry v*;s+[UFyflg]	Pleurozium schreberi pine moss m*;v*	Cladonia stellaris white curl etc
Vaccinium uliginosum blackberry v	Polytrichum commune large bear moss v	

Distribution and regional distribution: BN–NB. Over the whole country; heather forest is one of the most widespread ground types in forests.

Most important types of confusion: Bær heather forest (T4-C-5), lichen forest (T4-C-13).

Red list status (2018): Woodland (LC;<), pasture forest (LC;ÿ) and olive forest (EN;ÿ).

References and type parallels: T23-11,16 pp and T23-21,24 (NiN v1).

T4-C-10 Weak heather-lowgrass forest

NiN characteristics: Fixed land systems: Fixed land woodland (T4), one ground type (10). Defined by LKM: UFy3 & KAy2 & Klj1. LKM base step: UFyef & KAyde & Klj0a.

Physiognomy: Mostly semi-open forests where heather usually plays a very important role. The bottom layer is dominated by reindeer lichen in the most continental areas, the proportion of moss increases towards more oceanic areas. Pine is the dominant tree species in most of the country. In BN, especially in Southern Norway, oak can be an important element. Mostly pure birch forest up towards the mountain.

Small and slow-growing spruce individuals can be found in this mapping unit.

Ecological characteristics: Species-poor field layer, typically dominated by drought-tolerant species, in addition to heather also berry heather species. Pine moss is the most important moss species and often dominates on well-drained land, while pine peat moss is the most important dominant on moist land. Heiggray moss plays a major role and is the dominant species in oceanic areas. Light and gray lichen are characteristic features of the bottom layer. The mapping unit is linked to relatively low-lime and drought-prone ground, but the lime content is higher than in heather forest. This results in a few, scattered, slightly more lime-demanding species being included compared to this mapping unit. The soil is a podsol profile, but this is not well developed on wet, thin soils.



Weak heather-lågurt forest. Op: Nord-Fron: Skåbu, Åkremoen.
Photo: RH.

Terrain and aerial photo characteristics: Occurs under various exposure and slope conditions, but particularly well-drained surfaces, ridges and summit areas. Can cover larger contiguous areas of glacial river and river deposits. The color varies depending on the dominant tree species and tree layer density, but most often with a green-brown color in forest glades. The color grays with higher elements of light lichen or heather gray moss. Texture often variable. Texture and color often consistent within regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T4-10	T4-B-10	T4-C-10	T4-D-5	T4-E-5
Basic types		T4-10	T4-10	T4-10,14	T4-10,14

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta**-gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

Antennaria dioica cat's foot v;s+[UF-eld]	Pinus sylvestris pine m* ;v*	Pleurozium schreberi pine moss m* ;v*
Betula pubescens birch m	Pulsatilla vernalis mogop s+[KAyeld]	Polytrichum juniperinum juniper moss v
Calluna vulgaris heather m* ;v*	Pyrola minor pearl wintergreen v	Racomitrium lanuginosum heath gray moss m [O3–O2];v*[O3–O2]
Campanula rotundifolia bluebell v	Solidago virgaurea golden rice v	Rhytidiodelphus triquetrus large crown moss v;s+[KAydlc]
Empetrum nigrum cricket m ;v*	Vaccinium myrtillus blueberry v*	Cetraria islandica islandslav v*
Festuca ovina sheep fescue v	Vaccinium vitis-idaea lingonberry m ;v*	Cladonia arbuscula light lichen v*
Hieracium spp. hover v	Dicranum fuscescens bergsigd v*	Cladonia rangiferina gray lichen m ;v*
Lathyrus linifolius s+[KAyld]	Dicranum polysetum mug sickle m ;v*	Cladonia stellaris white curl v
Picea abies fir v	Dicranum scoparium rib sickle v*	
Pilosella officinarum v[KAyld]	Hylocomium splendens floor moss v*	

Distribution and regional distribution: BN–NB throughout the country and constitutes one of the most widespread soil types in forests.

Most important types of confusion: heather forest (T4-C-9), weak berry heather-low heather forest (T4-C-6), weak lichen-low heather forest (T4-C-14).

Red list status (2018): Woodland (LC;<), pasture forest (LC;ÿ), rich sand pine forest (NT;ÿ), olive forest (EN;ÿ), low-growth deciduous forest (VU;ÿ), and lime and low-growth pine forest (VU;ÿ)).

References and type parallels: T23-12.17 pp and T22-21.25 (NiN v1).

T4-C-11 Heather-low gur forest

NiN characteristics: Solid land systems: Solid land woodland (T4), one ground type (11). Defined by LKM: UFy3 & KAy3 & Klj1. LKM base step: UFyef & KAyfg & Klj0a.

Physiognomy: Most often semi-open forests where the heather character from more lime-poor forests with a similar susceptibility to drying out has been replaced by a more luxuriant character with herbs and grass. The bottom layer is dominated by reindeer lichen in the most continental areas; the proportion of moss increases towards more oceanic areas. Pine is the dominant tree species in most of the country.

In BN, particularly in Southern Norway, oak can also be an important feature. Mostly pure birch forest up towards the mountain.

Ecological characteristics: Includes the drier and least calcareous part of what is traditionally called lime pine forest; i.e. medium-calcareous pine forest with elements of drought-tolerant low herbs. Occurrence of strong lime indicators, preferably orchids, is lacking in the heather-lågurt forest. Often found on easily weathered rocks such as amphibolite, larvikite, gabbro, basalt, room porphyry, preferably in warm places. Occurrences of low-growth pine forest outside the limestone areas are often conditioned by weak leachate influence (seasonally wet).

Terrain and aerial photo characteristics: Occurs under various exposure and slope conditions, but especially on ridges and summit areas. Color in aerial photos varies depending on the dominant tree species and tree layer density, but often with a light green to green-brown color in open areas. Dominance of mosses and heather gives a darker colour.

The color grays with higher elements of light lichen or heather gray moss. Texture often variable. Texture and color consistent within regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T4-11	T4-B-11	T4-C-11	T4-D-6	T4-E-6
Basic types		T4-11	T4-11	T4-11,12,15,16,20	T4-11,12,15,16,20

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity type (t* = characteristic t., t- gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.)

Berberis vulgaris	barberis s*[KAyfle]	Fragaria vesca	field strawberry v;s+[KA-fle]	Dicranum polysetum	mugwort etc
Betula spp.	birch species v	Galium boreale	white ants s+[KAyfle]	Dicranum scoparium	rib sickle etc
Calamagrostis arundinacea	snarl pipe w[Ø]	Hieracium spp.	hovers v;s-[KAyfle]	Hylocomium splendens	floor moss v*
Calamagrostis epigejos	s *[KAyfle]	Hypericum perforatum	St. John's wort s*[KAyfle]	Pleurozium schreberi	pine moss m;v*
Calluna vulgaris	heather v	Lotus corniculatus	tilrltongue s-[KAyfle]	Polytrichum juniperinum	juniper moss v
Campanula persicifolia	fagerbell s+[KAyfle]	Pinus sylvestris	pine m*;v*	Rhytidadelphus triquetrus	large crown moss v
Convallaria majalis	lily of the valley etc	Rosa majalis	cinnamon rose s*[KAyfle]	Cetraria islandica	islandslav v
Empetrum nigrum	krekling v	Solidago virgaurea	golden rice v	Cladonia arbuscula	light lichen v
Festuca ovina	sheep fescue v	Sorbus hybrida	rognsal s*[KAyfle]	Cladonia rangiferina	gray lichen v
		Vaccinium vitis-idaea	lingonberry m;v*		

Distribution and regional distribution: BN–NB. All over the country, but everywhere rarely. Most frequent in the Cambrian Silurian in the Oslo field, in Sunnhordland, the Steinkjer-Snåsa area and in Salten. Part of the rich fjordside pine forests in Møre and Romsdal and inner Sogn belong to this nature type.

Most important types of confusion: Bær heather-lågurt forest (T4-C-7), heather-calcareous lågurt forest (T4-C-12), low lågurt forest (T4-C-15).

Red list status (2018): Woodland (LC;<), pasture forest (LC;ÿ), rich sand pine forest (NT;ÿ), olive forest (EN;ÿ), low-growth deciduous forest (VU;ÿ) and lime and low-growth pine forest (VU;ÿ) .

References and type parallels: T23-12.17 pp and T23-22.25 pp (NiN v1).



Heather-lågurt forest. Tea: Bamble: Jyplevik. Photo: RH.

T4-C-12 Heather-limestone forest

NiN characteristics: Permanent land systems:

Permanent field forest land (T4), one ground type (12).
Defined by LKM: UFy3 & KAy4 & Klj1. LKM base steps:
UFyef & KAyhi & Kljoa.

Physiognomy: Meadow-like, relatively open, lush, herbaceous and grassy forest. Most often dominated by pine, with forest edges against open limestone.

Ecological characteristics: Includes the drier and most calcareous part of what is traditionally termed a herb-rich lime pine forest, and also includes designs where the "lime effect" is due to inputs of leachate combined with periodic drying, and then often as a mosaic between a well-drained and a wetland design. Presence of strong lime indicators, i.a. orchids lacking in heather-low-grass forest separate T4-C-12 from this. Many fungi strongly associated with calcareous forests can occur in the habitat. In BN, heat-loving deciduous trees and shrubs can form an important part of the tree and shrub layer. The soil is most often a thin brown soil profile, which can contain a lot of stone and gravel, e.g. calcareous gravel and shale.

Terrain and aerial photo characteristics: Occurs under various exposure and slope conditions, but especially in convex lysids with favorable exposure. Color in aerial photos varies with dominant tree species and tree layer density. The color is often brown to greenish-brown in open areas, light green with grass or herb dominance, darker green with shrub layer. Dominance of calcareous gravel gives a greyish to grey-black colour. Texture often variable. Texture and color consistent within regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T4-12	T4-B-12	T4-C-12	T4-D-6	T4-E-6
Basic types		T4-12	T4-12	T4-11,12,15,16,20	T4-11,12,15,16,20

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

Acinos arvensis groundmint s*[KAyhl]	Filipendula vulgaris s *[KAyhl]	Abietinella abietina granmose v*s*[KAyhl]
Antennaria dioica cat's foot v	Galium verum yellow ants v;s+[KAyhl]	Ctenidium molluscum comb moss v*s*[KAyhl]
Berberis vulgaris berberis v	Hieracium spp. hovers v*	Dicranum polysetum mug sickle v
Briza media heart grass v;s*[KAyhl]	Melica nutans hangax v	Hylocomium splendens floor moss v*
Calamagrostis epigejos rock reed vein v;s+[KAyhl]	Pinus sylvestris pine m*v*	Pleurozium schreberi pine moss m;v*
Campanula rotundifolia bluebell v*	Plantago media down giant v;s+[KAyhl]	Rhytidadelphus triquetrus large crown moss v
Convallaria majalis lily of the valley m*v	Polygala vulgaris large blue feather v	Rhytidium rugosum paw moss v;s+[KAyhl]
Cotoneaster integrifolius dwarf medlar s*[KAyhl]	Potentilla crantzii spotted wall v;s+[KAyhl]	Cladonia arbuscula light lichen v
Epipactis atrorubens red flanger v;s*[KAyhl],s+[UF-eld]	Rhamnus cathartica goatwood v;s*[KAyhl]	Cladonia rangiferina gray lichen v
Festuca ovina sheep fescue v	Vaccinium vitis-idaea lingonberry m;v*	

Distribution and regional distribution: BN–NB throughout the country, but everywhere rare. Core areas are the Cambrian Silurian in the Oslo field, Sunnhordland, Steinkjer-Snåsa and Salten.

Most important types of confusion: heather-lågurt forest (T4-C-11), berry heather-lime-lågurt forest (T4-C-8), lichen-låkllågurt forest (T4-C-16).

Red list status (2018): Woodland (LC;<), pasture forest (LC;ÿ) and olive forest (EN;ÿ), chalk and low-stemmed pine forest (VU;ÿ) and calkedella deciduous forest (EN;ÿ).

References and type parallels: T23-13.18 pp and T23-23.26 pp (NiN v1).



Heather-calcareous bog forest. NT: Steinkjer: Nygård. Photo: HB.

T4-C-13 Lichen forest

NiN characteristics: Permanent land systems:

Permanent field forest land (T4), one ground type (13).
Defined by LKM: UFÿ4 & KAÿ1 & Klÿ1. LKM base steps:

UFÿgh & KAÿabc & Klÿ0a.

Physiognomy: Semi-open or mostly open forests dominated by heather and lichen; towards the mountains often forest or thicket of stunted trees. The bottom layer is often completely dominated by reindeer lichens. Pine is the dominant tree species in most of the country, but birch dominates in the mountain forest in most places.



Ecological characteristics: The field layer contains few, thrifty and very desiccation-tolerant species; primarily gorse, cricket and lingonberry. Pine peat moss occurs on wetland patches, e.g. in slight depressions on flat ground. White curlew, light lichen and gray lichen are the most important species in the bottom layer, but heather gray moss may be common and/or dominant in oceanic areas. T4-C-13 occurs primarily on limestone-poor, dry and barren land with thin soil over rock (hällmarkstallskog), but can also cover large, flat moraine deposits in continental areas. Where the soil is deeper, a podsol profile develops.

Lichen forest. He: Folldal: Grimsmoen. Photo: HB.

Terrain and aerial photo characteristics: Occurs under various exposure and slope conditions, but particularly on ridges, summit areas and flat moraine deposits in continental parts of the country. Color varies depending on dominant tree species and tree layer density, but often a mosaic between grey-white (low dominance) and green (wood and possibly shrub layer). Touches of heather give a darker colour. Pine dominance (olive green) is easily distinguished from birch dominance (purer green). Texture and color consistent within and between regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T4-13	T4-B-13	T4-C-13	T4-D-4	T4-E-4
Basic types		T4-13	T4-13	T4-E-9,13	T4 E-9,13

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Arctostaphylos uva-ursi</i> honeydew s*[UF-glf] <i>Betula pubescens</i> birch m*[NB];v <i>Calluna vulgaris</i> heather m;v* <i>Empetrum nigrum</i> krekling v <i>Pinus sylvestris</i> pine m*,v* <i>Vaccinium vitis-idaea</i> lingonberry m;v* <i>Dicranum fuscescens</i> bergsigid v <i>Dicranum scoparium</i> rib sickle v	<i>Dicranum spurium</i> rabbesigid t* <i>Leucobryum glaucum</i> blue moss m;v[BN] <i>Pleurozium schreberi</i> pine moss v* <i>Polytrichum juniperinum</i> juniper moss v* <i>Polytrichum piliferum</i> raccoon moss s*[UFÿhl] g] <i>Ptilidium ciliare</i> ground fringe v	<i>Racomitrium lanuginosum</i> heath gray moss m[O3–O2];v*[O3–O2] <i>Sphagnum capillifolium</i> pine peat moss v <i>Cetraria islandica</i> island slave m;v <i>Cladonia arbuscula</i> light lichen m;v* <i>Cladonia rangiferina</i> gray lichen m;v* <i>Cladonia stellaris</i> white curl m*,v* <i>Stereocaulon</i> spp. salt lichen v
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Distribution and regional distribution: BN–NB: Found throughout the country, but the area share increases towards continental areas.

Most important types of confusion: heather forest (T4-C-9), weak low-low-grass forest (T4-C-14).

Red list status (2018): Woodland (LC;<) and pasture forest (LC;ÿ)

References and type parallels: T23-21,24, T23-11,16 pp (NiN v1).

T4-C-14 Weak lichen-low herbaceous forest

NiN characteristics: Fixed land systems: Fixed land woodland (T4), one ground type (14). Defined by LKM: UFy4 & KAy2 & Klj1. LKM base step: UFygh & KAyde & Klj0a.

Physiognomy: Semi-open or mostly open forests dominated by heather and lichen; towards the mountains often forest or thicket of stunted trees. The bottom layer is often completely dominated by reindeer lichens. Pine is the dominant tree species in most of the country, but birch dominates in the mountain forest in most places.

Ecological characteristics: The field layer contains few, relatively thrifty and very drying-tolerant species, primarily heather, cricket and lingonberry. Pine peat moss occurs on wetland patches. White curlew, light lichen and gray lichen are the most important species in the bottom layer, but heather gray moss may be common and/or dominant in oceanic areas. T4-C-14 occurs primarily on relatively low-calcium, dry and dry land with thin soil above rock ("hällmarkstallskog"), but is also found on flat moraine deposits in continental areas. Where the soil is deeper, a podsol profile develops. Occurrence of a few, slightly less thrifty species separates T4-C-14 from lowland forest (T4-C-13).



Weak low-low grass forest. Op: Sel: Uladalen near Kvitskriuprestin.
Photo: RH.

Terrain and aerial photo characteristics: Occurs under various exposure and slope conditions, but especially on ridges and summit areas. FF: Color in aerial photographs varies depending on the dominant tree species and tree layer density, but often a mosaic between grey-white (low dominance) and green (tree and shrub layer). Touches of heather give a darker colour. Pine dominance (olive green) is easily distinguished from birch dominance (purer green). Texture and color consistent within and between regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T4-14	T4-B-14	T4-C-14	T4-D-5	T4 E-5
Basic types		T4-14	T4-14	T4-10,14	T4-10,14

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Arctostaphylos uva-ursi</i> honeydew v*;s*[UF-glf]	<i>Rumex acetosella</i> small acid s-[KAydlc];s+[UF-glf]	<i>Polytrichum piliferum</i> raccoon moss s*[UFyhl g]
<i>Betula pubescens</i> birch m*[NB];v	<i>Vaccinium vitis-idaea</i> cranberry v*	<i>Racomitrium lanuginosum</i> heath gray moss m[O3-O2];v*[O3-O2]
<i>Calluna vulgaris</i> heather etc	<i>Dicranum fuscescens</i> bergsigd v	<i>Cetraria islandica</i> island slave m;v
<i>Campanula rotundifolia</i> bluebell s*[KAy dlc]	<i>Dicranum scoparium</i> rib sickle v	<i>Cladonia arbuscula</i> light lichen m;v*
<i>Empetrum nigrum</i> kreling v	<i>Dicranum spurium</i> rabbesigd s-[UFyglf]	<i>Cladonia rangiferina</i> gray lichen m;v*
<i>Festuca ovina</i> sheep fescue s+[KAydlc]	<i>Leucobryum glaucum</i> blue moss v[BN]	<i>Cladonia stellaris</i> white curl m*;v*
<i>Pinus sylvestris</i> pine m*;v*	<i>Pleurozium schreberi</i> pine moss v*;m	<i>Stereocaulon</i> spp. salt lichen v
<i>Pulsatilla vernalis</i> mogop s+[KAyeld]	<i>Polytrichum juniperinum</i> juniper moss v	

Distribution and regional distribution: BN–NB throughout the country, but clearly most widespread in continental areas. Seems clearly rarer than the lowland forest (T4-C-13).

Most important types of confusion: Lichen forest (T4-C-13), weak heather-lågurt forest (T4-C-10).

Red list status (2018): Woodland (LC;<), pasture forest (LC;ÿ), rich sand pine forest (NT;ÿ) and chalk and low-stem pine forest (VU;ÿ).

References and type parallels: T23-22.25 (pp), T23-12.17 pp (NiN v1).

T4-C-15 Low-low herbaceous forest

NiN characteristics: Fixed land systems: Fixed land woodland (T4), one ground type (15). Defined by LKM: UFy4 & KAy3 & Klj1. LKM base step: UFygh & KAyfg & Klj0a.

Physiognomy: Open forest dominated by pine and with a slippery field layer characterized by heather, herbs and lichen. In NB, T4-C-15 is most often a shallow mountain birch forest.

Ecological characteristics: The field layer has elements of relatively lime-demanding and drought-tolerant vascular plants. The mapping unit often occurs in alternation with heather-lowgurt forest (T4-C-11), heather-limegurt forest (T4-C-12) and/or lichen-limegurt forest (T4-C-16), often as marginal zones against, or in mosaic with bare rock (T1) and open shallow ground (T2). Floristically, T4-C-15 is characterized by the presence of extremely drought-tolerant, moderately lime-requiring species that are also typical of open, low-lying land (T2), such as white bergknop, bluebell, bitter bergknob, hairsaver, butterbuck and silver wall. Most often a low-dominated bottom layer, but can also have a sparsely developed bottom layer with a lot of litter.



Low-low herbaceous forest. Op: Vägå: Ø for Åsvang. Photo: RH.

Terrain and aerial photo characteristics: Occurs under various exposure and slope conditions, but especially on ridges and summit areas. FF: Color in aerial photographs varies depending on the dominant tree species and tree layer density, but often a mosaic between grey-white (low dominance) and green (tree and shrub layer). Touches of heather give a darker colour. Pine dominance (olive green) is easily distinguished from birch dominance (purer green). Texture and color consistent within and between regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T4-15	T4-B-15	T4-C-15	T4-D-6	T4-E-6
Basic types		T4-15	T4-15	T4-11,12,15,16,20	T4-11,12,15,16,20

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Antennaria dioica</i> cat's foot v <i>Arabidopsis thaliana</i> spring flower s*[KAyglf]	<i>Festuca ovina</i> sheep fescue v <i>Lotus corniculatus</i> tillitongue s*[KAyglf] <i>Pinus sylvestris</i> pine m*;v*	<i>Dicranum fuscescens</i> bergsigd v <i>Dicranum scoparium</i> rib sickle v <i>Pleurozium schreberi</i> furumose v <i>Polytrichum juniperinum</i> juniper moss v <i>Polytrichum piliferum</i> raccoon moss s*[UF-glf]
<i>Arctostaphylos uva-ursi</i> honeydew v <i>Artemisia campestris</i> field wormwood s*[KAyglf]	<i>Polygonatum odoratum</i> lily of the valley s+ [KAyglf] <i>Salix starkeana</i> blue willow s*[KAyhlg]	<i>Cetraria islandica</i> island slave m;v <i>Cladonia arbuscula</i> light lichen etc <i>Cladonia rangiferina</i> gray reindeer lichen etc <i>Cladonia stellaris</i> white curl etc
<i>Convallaria majalis</i> lily of the valley v <i>Crepis tectorum</i> s*[KAyglf]	<i>Sedum acre</i> bitterbergknapp v <i>Sedum album</i> whitbergknapp s*[KAyglf] <i>Vaccinium vitis-idaea</i> cranberry v*	
<i>Empetrum nigrum</i> krekling v		

Distribution and regional distribution: Distribution and occurrence poorly known, but probably approximately as low-calcareous lowland forest with a core area in continental areas.

Most important types of confusion: Low-calcareous low-gurt forest (T4-C-16), heather-low-gurt forest (T4-C-11).

Red list status (2018): Woodland (LC;<), pasture forest (LC;ÿ), rich sand pine forest (NT;ÿ) and chalk and low-stem pine forest (VU;ÿ).

References and type parallels: T23-22.25 pp, T23-12.17 pp (NiN v1).

T4-C-16 Lichen-calcareous bog forest

NiN characteristics: Fixed land systems: Fixed land woodland (T4), one ground type (16). Defined by LKM: UFy4 & KAy4 & Klj1. LKM base step: UFygh & KAyhi & Klj0a.

Physiognomy: Open forest, most often dominated by pine and with a slippery field layer characterized by herbs and lichens. In NB, T4-C-16 is most often a shallow mountain birch forest.

Ecological characteristics: The field layer has elements of very lime-demanding and drought-tolerant vascular plants. The mapping unit often occurs in alternation with heather-lågurt forest (T4-C-11), heather-lime-lågurt forest (T4-C-12) and lichen-lågurt forest (T4-C-15), often as marginal zones against, or in mosaic with, bare rock (T1) and open shallow land (T2). Occurs most often on shallow ground on calcareous rocks.

Most often a low-dominated bottom layer, but can also have a sparsely developed bottom layer with a lot of litter.

Terrain and aerial photo characteristics: Occurs under various exposure and slope conditions, but especially on limestone ridges, preferably in karst landscapes. The color varies depending on the dominant tree species and tree layer density, but is often a mosaic between grey-white (low dominance) and green (tree and shrub layer). Touches of heather give a darker colour, in mosaics with bare rock often a more greyish colour. Pine dominance (olive green) is easily distinguished from birch dominance (purer green). Texture and color consistent within regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T4-B-16	T4-C-16	T4-D-6	T4-E-6
Basic types	T4-16	T4-16	T4-16	T4-11,12,15,16,20	T4-11,12,15,16,20

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.).

<i>Acinos arvensis</i> groundmint s*[KAyhl]	<i>Filipendula vulgaris</i> s+[KAyhl]	<i>Abietinella abietina</i> granmose v;s*[KAyhl]
<i>Antennaria dioica</i> cat's foot v		
<i>Arctostaphylos uva-ursi</i> honeydew s*[UFyglf]	<i>Geranium sanguineum</i> bloodsucker beak v	<i>Ctenidium molluscum</i> comb moss v;s*[KAyhl]
<i>Artemisia campestris</i> field wormwood v;s*[UFyglf]	<i>Galium verum</i> yellow ants v;s+[KAyhl]	<i>Ditrichum flexicaule</i> big bristle s*[KAyhl]
<i>Calamagrostis epigejos</i> rock reed vein v;s+[KAyhl]	<i>Origanum vulgare</i> rock mint s+[KAyhl]	<i>Polytrichum juniperinum</i> juniper moss v
<i>Campanula rotundifolia</i> bluebell v	<i>Pinus sylvestris</i> pine m*;v*	<i>Rhytidium rugosum</i> paw moss v;s+[KAyhl]
<i>Convallaria majalis</i> lily of the valley v*	<i>Polygonatum odoratum</i> lily of the valley v*	<i>Pleurozium schreberi</i> furumose v
<i>Epipactis atrorubens</i> red flanger s*[KAyhl]	<i>Sedum acre</i> bitterbergknapp v	<i>Cladonia arbuscula</i> light lichen v
<i>Festuca ovina</i> sheep fescue v*	<i>Thymus pulegioides</i> ground thyme s*[KAyhl]	<i>Cladonia rangiferina</i> gray lichen v
	<i>Vaccinium vitis-idaea</i> lingonberry m;v*	



Low-calcareous lowland forest. Bu: Ringerike: Ulltveitvatnet. Photo: RH

Distribution and regional distribution: Rare type with a clear center of gravity in continental areas.

Most important types of confusion: Lichen-lågurt forest (T4-C-15), heather-calcareous lågurt forest (T4-C-12).

Red list status (2018): Woodland (LC;<), pasture forest (LC;ÿ) and lime and low-stemmed pine forest (VU;ÿ).

References and type parallels: T23-23.26 (pp), T23-13.18 pp(NiN v1).

T4-C-17 Large Fern Forest

NiN characteristics: Solid land systems: Solid land woodland (T4), one ground type (17). Defined by LKM: UFy1 & KAy2 & Klÿ2. LKM basic steps: UFyab & KAyde & Klÿbc.

Physiognomy: Open or shaded, lush forests with high production. Field layer with large ferns and, in the densest designs, with a bottom that is almost completely covered by a thick layer of fern litter. Found as large fern-spruce forest in the spruce's distribution area and as large fern-birch forest in Western Norway, in northern Norway and in the mountain forest. Large fern-oak or beech forest covers very small areas. Elements of gray alder in younger felling classes, willow in N, are common.



Open fern-birch forest. MR: Stranda: Between Homlongsetra and Homlong. Photo: RH.

Ecological characteristic: Permanent supply of oxygen-rich leachate; water movement parallel to the ground surface (spring water influence). Large ferns dominate, sometimes almost like reindeer populations of forest burkne or mountain burkne (mostly in NB) or buttercup (O2–O3). Species from blueberry forest (T4-C-1) and weak low herbaceous forest (T4-C-2) are included together with species that benefit from or require spring water influence. Occurs on limestone-poor bedrock, in continental areas mostly as narrow belts in depressions, along streambeds etc., in oceanic areas sometimes covering larger areas. The soil is most often a podsol profile with a light fern-strewn humus.

Terrain and aerial photo characteristics: In depressions and gentle slopes, especially on shady north slopes; to a lesser extent limited to clear depressions in oceanic areas. Color varies with dominant wood species and wood layer density. Large fern dominance gives an emerald green or most often dark green colour. Granddominance (dark green) is easily distinguished from birch dominance (purer green). Consistent texture and color.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T4-17	T4-B-17	T4-C-17	T4-D-2	T4-E-2
Basic types		T4-17	T4-17	T4-2,6,17	T4-2,6,17

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Alnus incana</i> alder v <i>Anemone nemorosa</i> white wheat m;v* <i>Athyrium filix-femina</i> forest burkne m*;v* <i>Athyrium distentifolium</i> mountain buckthorn m;v[NB] <i>Avenella flexuosa</i> smile v* <i>Betula pubescens</i> birch etc <i>Blechnum spicant</i> bear 's comb v[O3-O2] <i>Chamaepericlymenum suecicum</i> scrub berry m[O3-O2];v[O3-O1] <i>Calamagrostis phragmitoides</i> forest sorrel vein v;s+[KA-dlc] <i>Equisetum sylvaticum</i> sedge v <i>Geranium sylvaticum</i> wood stork beak v	<i>Gymnocarpium dryopteris</i> bird 's tail m;v* <i>Luzula pilosa</i> hair fritter v <i>Lysimachia europaea</i> forest star v* <i>Maianthemum bifolium</i> Maiblom v * <i>Oreopteris limbosperma</i> buttercup m[O3-O2] <i>Oxalis acetosella</i> cuckoo acid v* <i>Phegopteris connectilis</i> hanging wing m;v* <i>Picea abies</i> fir m*;v* <i>Solidago virgaurea</i> golden rice v <i>Vaccinium myrtillus</i> blueberries m;v* <i>Barbilophozia lycopodioides</i> goosefoot beard moss v <i>Calypogeia azurea</i> blue flake t*	<i>Calypogeia muelleriana</i> swamp flake v <i>Dicranum majus</i> blunt sickle v* <i>Hylocomiastrium umbratum</i> shade house moss v <i>Hylocomium splendens</i> floor moss v* <i>Plagiochila asplenoides</i> prakthinnemose v* <i>Ptilium crista-castrensis</i> spring moss v <i>Rhytidiodelphus subpinnatus</i> plume moss v <i>Sciuro-hypnum reflexum</i> sprikelundmose v <i>Sciuro-hypnum starkei</i> strølendmose s+[KA-dlc] <i>Sphagnum girgensohnii</i> spruce peat moss v
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Distribution and regional distribution: BN–NB throughout the country; strong increase in area towards oceanic areas.

Most important types of confusion: Høgstadeskog (T4-C-18)

Red list status (2018): Woodland (LC;<), pasture forest (LC;ÿ), boreal rainforest (VU;ÿ) and boreonemoral rainforest (VU;ÿ).

References and type parallels: T23-8 (NiN v1).

T4-C-18 Høgstaudeskog NiN characteristics:

Permanent land systems: Permanent forest land (T4), one base type (18). Defined by LKM: UFy1 & KAy3,4 & Klÿ2. LKM base steps: UFyab & KAÿfghi & Klÿbc.

Physiognomy: Open or shaded, very lush and highly productive forests. Field layer with herbs, grasses and ferns up to a man's height. Found as tall fir forest in the spruce forest region and otherwise as tall fir birch forest in Western Norway, in northern Norway and in the mountain forest. T4-C-18 also includes calcareous, moist deciduous forests dominated by ash, elm or gray alder in BN and SB. Younger successional stages in SB and MB may have abundant gray alder. Significant element of willow in No and Tr.

Ecological characteristic: Characterized by a permanent supply of oxygen- and lime-rich leachate and water movement parallel to the ground surface (spring water influence). The species selection, including the dominance conditions, varies widely without it being possible to demonstrate ecological differences, but the regional variation is large. In continental areas mostly as narrow belts in depressions, along streambeds etc., in oceanic areas sometimes covering larger areas, typically in lysids. Occurs on calcareous bedrock and has a brown soil profile.

Terrain and aerial photo characteristics: Widespread in depressions or gentle parts, especially on shady north slopes; the more oceanic the climate, the less degree limited to clear depressions. Color varies depending on the dominant tree species and tree layer density, but is often emerald green or most often dark green with a high concentration of tall perennials in the field layer. Granddominance (dark green) is easily distinguished from birch dominance (purer green). Texture and color consistent within and between regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T4-18	T4-B-18	T4-C-18	T4-D-3	T4-E-3
Basic types		T4-18	T4-18	T4-3,4,7,8,18,19	T4-3,4,7,8,18,19

Diagnostic species m =

abundance species (m^* = dominant m.); v = common species (v^* = constant v.); t = center of gravity species (t^* = characteristic t., ta - gradient-t.); s = distinction (s^* = absolute s., $s+$ = strong relative s., $s-$ = weak relative s.)

<i>Aconitum septentrionale</i> bull helmet <i>m;v;s+[KAÿfle]</i> <i>Alchemilla</i> spp. ladybug <i>v;s+[KAÿfle]</i> <i>Alnus incana</i> alder <i>v;s-[KAÿfle]</i> <i>Anemone nemorosa</i> white vein <i>v*</i> <i>Angelica sylvestris</i> gorse <i>s+[KAÿfle]</i> <i>Athyrium filix-femina</i> forest burke <i>m;v*</i> <i>Betula pubescens</i> birch <i>m</i> <i>Campanula latifolia</i> bigbell <i>v[B N];s*[KAÿgl f]</i> <i>Carex sylvatica</i> sedge <i>s*[KAÿhl]</i> <i>Cicerbita alpina</i> turt s * [KAÿfle] <i>Cirsium heterophyllum</i> white-leaved thistle <i>v;s+[KAÿfle]</i> <i>Crepis paludosa</i> Marshhawk <i>v;s+[KAÿfle]</i>	<i>Cypripedium calceolus</i> marisko <i>s*[KAÿhl]</i> <i>Elymus caninus</i> dog croak <i>s *[KAÿglf]</i> <i>Filipendula ulmaria</i> meadowsweet <i>v;s+[KAÿfle]</i> <i>Fraxinus excelsior</i> ash <i>m[BN]</i> <i>Geranium sylvaticum</i> stork 's beak <i>m;v;s+[KAÿfle]</i> <i>Geum rivale</i> meadow bumblebee <i>v;s*[KAÿfle]</i> <i>Gymnocarpium dryopteris</i> bird 's tail <i>m;v*</i> <i>Matteuccia struthiopteris</i> ostrich feather <i>s-[KAÿglf];t*[Kl-bc]</i> <i>Milium effusum</i> musk grass <i>v</i> <i>Paris quadrifolia</i> four leaf <i>v;s+[KAÿglf]</i> <i>Picea abies</i> fir <i>m*</i> <i>Phegopteris connectilis</i> hanging wing etc	<i>Ranunculus acris</i> ground soleie <i>v;s-[KAÿfle]</i> <i>Solidago virgaurea</i> golden rice <i>v</i> <i>Stachys sylvatica</i> wood vine root <i>s*[KAÿglf]</i> <i>Trollius europaeus</i> ball flower <i>m[N]</i> <i>Valeriana sambucifolia</i> root <i>v ;s+[KAÿfl e]</i> <i>Brachythecium salebrosum</i> lilundmose <i>v</i> <i>Cirriphyllum piliferum</i> lundveikmose <i>v</i> <i>Plagiomnium affine</i> skogfagermose <i>v</i> <i>Rhodobryum roseum</i> rosette moss <i>v</i> <i>Rhytidiodelphus subpinnatus</i> feather wreath moss <i>v*</i> <i>Rhytidiodelphus triquetrus</i> large crown moss <i>m;v;s-[KAÿfle]</i> <i>Sciuro-hypnum reflexum</i> sprikelundmose <i>v*</i>
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Distribution and regional distribution: BN–NB. All over the country, particularly large area coverage in oceanic areas with calcareous bedrock (especially in central and northern Norway)

Most important types of confusion: Large fern forest (T4-C-17), slightly drought-prone tall perennial forest (T4-C-19)

Red list status (2018): Woodland (LC;<), pasture forest (LC;ÿ), boreal rainforest (VU;ÿ), tall fir forest (NT;ÿ) and tall evergreen hardwood forest (VU;ÿ).

References and type parallels: T23-9,10 (NiN v1).



Norway spruce forest. Op: Lillehammer: Flokåa. Photo: HB.

T4-C-19 Slightly drought-prone tall**perennial forest NiN characteristics:**

Permanent land systems: Permanent forest land (T4), one basic type (19). Defined by LKM: UFy2 & KAy3,4 & Klj2. LKM base steps: UFycd & KAyfghi & Kljbc.

Physiognomy: Most often relatively dense to semi-open forest dominated by spruce with a mixture of pine, but other tree species composition (e.g. dominance of deciduous trees) also occurs. The field layer is more slippery and less productive than in the tall evergreen forest (T4-C-18). Characterized by a large species diversity of herbs and grasses.



Slightly drought-prone tall perennial forest. Bu: Ø. Eiker: Fiskum: N for Tørbekk. Photo: RH.

Ecological characteristics: Characterized by the periodic supply of oxygen- and lime-rich leachate (seasonally moist), but also periodically exposed to drying out. The species selection is a mixture of typical "lime pine forest species" and species with a focus in tall perennial forests. Occurs on calcareous bedrock and on more calcareous rocks that are supplied with leachate from more calcareous rocks - then in clear contrast to surrounding calcareous woodland on convex landforms without clear influence from calcareous leachate.

Terrain and aerial photo characteristics: Widespread in depressions and relatively gentle parts, especially in south-facing terrain positions with good turnover and reduced humus formation. FF: Varies depending on the dominant tree species and tree layer density, but often bright green with a high proportion of grass and herbs in the field layer. Granddominance (dark green) is easily distinguished from pine dominance (olive green). Texture and color consistent within and between regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T4-B-19	T4-C-19	T4-D-3	T4-E-3
Basic types	T4-19	T4-19	T4-19	T4-3,4,7,8,18,19	T4-3,4,7,8,18,19

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

Aconitum septentrionale bull helmet v Alnus incana alder v Anemone nemorosa whitveis v Calluna vulgaris heather v;s*[UFyclb] Cirsium heterophyllum white-leaved thistle v Convallaria majalis lily of the valley v Crepis paludosa swamp hawk v Fragaria vesca field strawberry v Galium boreale white ants s+[UFyclb]	Geranium sylvaticum wood stork beak v Gymnocarpium dryopteris bird tail v Molinia caerulea bluetop m;v;s+[UFyclb] Parnassia palustris jablom s+[UF-clb] Picea abies fir m*,v* Pinus sylvestris pine m;v* Potentilla erecta carpet root v Solidago virgaurea golden rice v Vaccinium vitis-idaea cranberry v	Plagiomnium affine skogfagermose v Rhytidadelphus triquetrus large wreath moss m*;v* Campylium stellatum s *[UFyclb] Hylocomium splendens floor moss v* Pleurozium schreberi furmose v
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Distribution and regional distribution: Rare type found in BN–NB in all parts of the country. The most calcareous formation (KAyhi) has a clear center of gravity on the most calcareous rocks in the Oslo field and in central Norway.

Less calcareous formations are more widespread and frequent and also occur in bedrock areas.

Most important types of confusion: Tall perennial forest (T4-C-18), drought-prone tall perennial forest (T4-C-20), berry heather-lågurt forest (T4-7), berry heather-limegrass forest (T4-8)

Red list status (2018): Woodland (LC;<), pasture forest (LC;ÿ), tall perennial deciduous forest (VU;ÿ), olive forest (EN;ÿ) and lime and low-stemmed pine forest (VU;ÿ).

References and type parallels: T23-17.18 pp, T23-9.10 pp (NiN v1).

T4-C-20 Drought-prone tall perennial forest NiN characteristics:

Permanent land systems: Permanent forest land (T4), one basic type (20). Defined by LKM: UFy3 & KAy3,4 & Klj2. LKM base steps: UFyef & KAyfghi & Kljbc.

Physiognomy: Semi-open, pine-dominated forest. Characterized by a large species diversity of herbs and grasses, often also desiccation-tolerant shrubs such as e.g. juniper. Often alternates with more calcareous and/or non-spring water-affected nature types.

Ecological characteristic: Characterized by the periodic supply of oxygen-rich and calcareous leachate, but seasonally moist and subject to repeated and sometimes strong drying. The species selection consists of typical "lime pine forest species", with elements of some species from the tall perennial forests. Occurs on calcareous bedrock and sometimes on more calcareous rocks that are supplied with leachate that has been in contact with more calcareous rocks.

Terrain and aerial photo characteristics: Widespread in lysides, often relatively gentle, especially in south-facing terrain positions with good turnover and reduced humus formation. FF: Color varies depending on the dominant wood species and wood layer density, but the wood layer is often olivine green (pine dominance). Dark green with a high proportion of juniper and heather species, otherwise usually green. Texture and color consistent within and between regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T4-20	T4-B-20	T4-C-20	T4-D-6	T4 E-6
Basic types		T4-20	T4-20	T4-11,12,15,16,20	T4-11,12,15,16,20

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Agrostis canina</i> dog's kneiv v <i>Anemone nemorosa</i> whitveis v <i>Briza media</i> heart grass <i>Calluna vulgaris</i> heather v* <i>Carex flacca</i> s*[UFyeld] <i>Carex flava</i> s*[UFyeld] <i>Carex panicea</i> sedge s *[UFyfile] <i>Festuca ovina</i> sheep fescue s*[UFyeld] <i>Fragaria vesca</i> field strawberry v <i>Geranium sylvaticum</i> wood stork beak v	<i>Gymnadenia conopsea</i> bridal spore s*[UFyeld] <i>Juniperus communis</i> juniper v <i>Molinia caerulea</i> blue top m;v* <i>Picea abies</i> fir v <i>Pinus sylvestris</i> pine m*;v* <i>Polygala vulgaris</i> Great blue feather s+[UFyeld] <i>Potentilla erecta</i> carpet root v* <i>Solidago virgaurea</i> golden rice v <i>Succisa pratensis</i> blue button v;s+[UF-yeld]	<i>Vaccinium vitis-idaea</i> cranberry v <i>Campylium stellatum</i> s *[UFyeld] <i>Fissidens adianthoides</i> saw pocket moss v <i>Hylocomium splendens</i> floor moss v* <i>Plagiomnium affine</i> skogfagermose v <i>Pleurozium schreberi</i> furumose v <i>Rhytidadelphus triquetrus</i> large crown moss v*
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Distribution and regional distribution: Rare type found in BN–NB in all parts of the country. The most calcareous formation (KAyhi) has a clear center of gravity on the most calcareous rocks in the Oslo field and in central Norway.

Less calcareous formations are more widespread and frequent and also occur in bedrock areas.

Most important types of confusion: Slightly drought-prone tall perennial forest (T4-C-19) heather-lowgurt forest (T4-C-11), heather-limegrass forest (T4-C-13)

Red list status (2018): Woodland (LC;<), pasture forest (LC;ÿ), olive forest (EN;ÿ) and lime and low-stemmed pine forest (VU;ÿ).

References and type parallels: T23-17,18 pp (NiN v1).



Drought-prone evergreen forest. Tea: Bamble: NE in Rognsfjorden. Photo: RH.

T5-C-1 Lime-poor to slightly lime-rich not drought-prone caves and overhangs NiN characteristics:

Solid ground systems: Cave and overhang (T5), three basic types (1,2,4). Defined by LKM: GSy1,2 & KAy1,2. LKM basis steps: GSyabcd & KAyabcdefg.



Physiognomy: Bare rock surfaces or with crustal lichens and scattered mosses under overhangs and in cave openings. Without vegetation further into caves.

Lime-poor to slightly lime-rich, not drought-prone caves and overhangs. SF: Årdal: Utladalen by Avdalsfossen. Photo: HB.

Ecological characteristics: The mapping unit includes overhangs and the outer and middle parts of caves, i.e. natural cavities in rocks below the earth's surface, in limestone-poor rocks. Overhangs are rock walls with more than a 90° slope and cavities that extend 0-5 meters inwards. The overhang is strongly influenced by the environment outside the cave, but not directly influenced by rainfall and other fallout from above. The influence from the outside environment diminishes inwards and the boundary towards deep caves is drawn where the influence from outside is gone, in practice where there is no longer sufficient light for mosses to grow. The mapping unit comprises limestone-poor to slightly limestone-rich caves and overhangs that are not drought-prone and are distinguished from limestone-rich types on the basis of bedrock and the lack of lime-requiring species. Variation related to desiccation exposure is important in overhangs. With desiccation exposure is meant the humidity of the air close to the ground and in T5-C-1 the humidity is relatively high and stable (not exposed to desiccation or very or rather slightly exposed to desiccation). Desiccation exposure depends, among other things, on sun exposure, which decreases on overhangs and cave openings behind a closed tree layer, in narrow valleys or in N-NE-facing lisides. The species composition also varies with the rock's chemical composition, with special species associated with copper-rich or iron-rich rocks.

Terrain and aerial photo characteristics: Overhangs are found adjacent to steep rock walls. Cannot be identified on aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T5-B-1,2,4	T5-C-1	T5-D-1	T5-E-1
Basic types	T5-1,2,4	T5-1,2,4	T5-1,2,4	T5-1,2,4	T5-1,2,4,8,9

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

Examples of species	<i>Enterographa zonata</i> belt lichen <i>Gyrographa gyrocarpa</i>	<i>Lecanographa abscondita</i> <i>Schismatomma umbrinum</i> brown tussock lichen
<i>Chaenotheca furfuracea</i> golden needle v <i>Chrysothrix chlorina</i> rock powder lichen v*	<i>Haematoma ochroleucum</i> blood eye lichen	

Distribution and regional distribution: BN-LA, O3-C1. Spread across the country.

Most important types of confusion: Little desiccation-exposed poor to slightly calcareous rock, rock walls and crags (T1-C-1, T1-C-3, T1-C-5).

Red list status (2018): Cave and overhang (LC;<).

References and type parallels: B05 (DNHB13)

T5-C-2 Highly calcareous not drought-prone

caves and overhangs NiN characteristics: Solid ground

systems: Cave and overhang (T5), two basic types (3.5). Defined by LKM: GSÿ1,2 & KAÿ3.
LKM base steps: GSÿabcd & KAÿhi.

Physiognomy: Bare rock surfaces or with crustal lichens and scattered mosses under overhangs and in cave openings. Without vegetation further into caves.

Ecological characteristics: The mapping unit includes overhangs and the outer and middle parts of caves, i.e. natural cavities in rocks below the soil surface in calcareous rocks. Overhangs are rock walls with more than a 90° slope and cavities that extend 0-5 meters inwards. The overhang is strongly influenced by the environment outside the cave, but not directly influenced by rainfall and other fallout from above. The influence from the outside environment diminishes inwards and the boundary towards deep caves is drawn where the influence from outside is gone, in practice where there is no longer sufficient light for mosses to grow. The mapping unit includes calcareous caves and overhangs that are not drought-prone and are distinguished from calcareous types on the basis of bedrock and the presence of calcareous species. Variation related to desiccation exposure is important in overhangs. With desiccation exposure is meant the humidity of the air close to the ground and in T5-C-1 the humidity is relatively high and stable (not exposed to desiccation or very or rather slightly exposed to desiccation). Desiccation exposure depends, among other things, on sun exposure, which decreases on overhangs and cave openings behind a closed tree layer, in narrow valleys or in N-NE-facing lisides.



Highly calcareous caves and overhangs not exposed to drought. Op: Lom: Dumdalen. Photo: RH.

Terrain and aerial photo characteristics: Overhangs are found adjacent to steep rock walls. Cannot be identified on aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T5-3.5	T5-B-3.5	T5-C-2	T5-D-2	T5-E-2
Basic types		T5-3.5	T5-3.5	T5-3.5	T5-3.5,10

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **tr-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

Examples of species Chaenotheca furfuracea golden needle v Chaenotheca gracilenta white-headed needle v	<i>Enterographa zonata</i> belt lichen <i>Gyrophora gyrocarpa</i> v <i>Haematoma ochroleucum</i> blood eye lichen v <i>Lecanactis abietina</i> old spruce lichen v	<i>Lecanographa abscondita</i> <i>Schismatomma umbrinum</i> brown tussels lichen v
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Distribution and regional distribution: BN-LA, O3-C1. Spread across the country on calcareous rocks.

Most important types of confusion: Little desiccation-exposed to extremely calcareous rock, rock walls and knolls (T1-C-7).

Red list status (2018): Cave and overhang (LC;<).

References and type parallels: B05 (DNHB13)

T5-C-3 Less calcareous cave depth

NiN Characteristics: Solid ground systems: Cave and overhang (T5), one basic type (6). Defined by LKM: GSÿ3 & KAÿ1,2.

LKM base step: GSÿ¤ & KAÿabcdefg.

Physiognomy: Bare rock surfaces without vegetation in deep caves.

Ecological characteristics: The nature type includes the inner part of deep caves, i.e. natural cavities in rocks below the earth's surface in limestone-poor rocks. The boundary towards the middle part of the cave is drawn where the influence from the outside environment is gone, in practice where there is no longer sufficient light for mosses to grow. Distinguished from the inner part of a deep karst cave on the basis of the rock's lime content.

Terrain and aerial photo characteristics: Cannot be identified on aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T5-B-6	T5-C-3	T5-D-3	T5-E-3
Basic types	T5-6	T5-6	T5-6	T5-6	T5-6

Distribution and regional distribution: BN-LA, O3-C1. Spread across the country.

Main types of confusion:

Red list status (2018): Cave and overhang (LC;<).

References and type parallels: B05 (DNHB13).



Less calcareous cave depth. NT: Leka: Steinstdalen. Photo: RH.

T5-C-4 Inner part of deep karst cave

NiN Characteristics: Solid ground systems: Cave and overhang (T5), one basic type (7). Defined by LKM: GSÿ3 & KAÿ3. LKM base step: GSÿ¤ & KAÿhi.

Physiognomy: Bare rock surfaces without vegetation in deep caves.

Ecological characteristics: The nature type includes the inner part of deep caves, i.e. natural cavities in rocks below the earth's surface in calcareous rocks. The boundary towards the middle part of the cave is drawn where the influence from the outside environment is gone, in practice where there is no longer sufficient light for mosses to grow. Distinguished from less calcareous cave depths on the basis of the rock's lime content.

Terrain and aerial photo characteristics: Cannot be identified on aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T5-7	T5-B-7	T5-C-4	T5-D-4	T5-E-4
Basic types		T5-7	T5-7	T5-7	T5-7

Distribution and regional distribution: BN-LA, O3-C1. Spread across the country on calcareous rocks.

Main types of confusion:

Red list status (2018): Cave and overhang (LC;<).

References and type parallels: B05 (DNHB13).

T5-C-5 Dry low-calcareous overhang

NiN Characteristics: Solid ground systems: Cave and overhang (T5), one basic type (8). Defined by LKM: GSÿ1 & KAÿ1 & UEÿ2. LKM base steps: GSÿa & KAÿabc & UEÿdefg.



Dry low-calcareous overhang. SF: Aurland: Undredal. Photo: HB.

Physiognomy: Bare rock surfaces or most often with crustal lichens and scattered mosses under overhangs.

Ecological characteristics: The natural type includes overhangs and the outermost part of caves, i.e. natural cavities in rocks below the earth's surface, in limestone-poor rocks. Overhangs are rock walls with more than a 90° slope and cavities that extend 0-5 meters into the cave. The overhang is strongly influenced by the environment outside the cave, but not directly influenced by rainfall and other fallout from above. The influence from the outside environment gradually decreases inwards and the boundary towards outer parts of deep caves is drawn where the influence from outside has decreased from strong to significant, that is, where the environment is fairly strongly shielded. The natural type includes low-calc overhangs that are drought-prone and are distinguished from high-calc types based on bedrock and a lack of lime-demanding species. Variation related to desiccation exposure is important in overhangs. With desiccation exposure is meant the humidity of the air close to the ground and in T5-C-5 the humidity is low (fairly to very exposed to desiccation). Desiccation exposure depends, among other things, on sun exposure, and dry overhangs are exposed to light and are typically located in open terrain, not covered by a dense layer of wood, and in S-SW facing lysides. The species composition also varies with the rock's chemical composition, with special species associated with copper-rich or iron-rich rocks.

Terrain and aerial photo characteristics: Overhangs are found adjacent to steep rock walls. Cannot be identified on aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T5-B-8	T5-C-5	T5-D-5	T5-E-1
Basic types	T5-8	T5-8	T5-8	T5-8	T5-1,2,4,8,9

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

Examples of species Chaenotheca furfuracea golden needle v Chrysotrichia chlorina rock powder lichen v	<i>Fuscidea gothoburgensis</i> v <i>Haematoma ochroleucum</i> blood eye lichen	<i>Lecanora lojkaeana</i> <i>Psilolechia lucida</i> light slave
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Distribution and regional distribution: BN-HA, O3-C1. Spread across the country.

Most important types of confusion: Dry intermediate and slightly calcareous overhang (T5-C-6), dry strongly calcareous overhang (T5-C-7), desiccation-exposed very and rather low-calc rocks, rock walls and crags (T1-C-2).

Red list status (2018): Cave and overhang (LC;<).

References and type parallels: –

T5-C-6 Dry intermediate and slightly calcareous overhang

NiN Characteristics: Solid Ground Systems: Cave and Overhang (T5), one base type (9). Defined by LKM: GSÿ1 & KAÿ2 & UEÿ2. LKM base step: GSÿa & KAÿdefg & UEÿdefg.

Physiognomy: Bare rock surfaces or most often with crustal lichens and scattered mosses under overhangs.

Ecological characteristics: The nature type includes overhangs and the outermost part of caves, i.e. natural cavities in rocks below the earth's surface, in intermediate to slightly calcareous rocks.

Overhangs are rock walls with more than a 90° slope and Stranda: Between Homlongsetra and Homlong. Photo: RH.

cavity that extends 0-5 meters into the cave.

The overhang is strongly influenced by the environment outside the cave, but not directly influenced by rainfall and other fallout from above. The influence from the outside environment gradually decreases inwards and the boundary towards outer parts of deep caves is drawn where the influence from outside has decreased from strong to significant, that is, where the environment is fairly strongly shielded. The nature type includes intermediate to slightly lime-poor overhangs that are drought-prone and are distinguished from lime-poor and lime-rich overhangs from the bedrock, presence of slightly lime-requiring species, but lacking the most lime-requiring species. Variation related to desiccation exposure is important in overhangs. With desiccation exposure is meant the humidity of the air close to the ground and in T5-C-6 the humidity is low (fairly to very exposed to desiccation). Desiccation exposure depends, among other things, on sun exposure, and dry overhangs are exposed to light and are typically located in open terrain, not covered by a dense layer of wood, and in S-SW facing lysides. The species composition also varies with the rock's chemical composition, with special species associated with copper-rich or iron-rich rocks.

Terrain and aerial photo characteristics: Overhangs are found adjacent to steep rock walls. Cannot be identified on aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T5-B-9	T5-C-6	T5-D-6	T5-E-1
Basic types	T5-9	T5-9	T5-9	T5-9	T5-1,2,4,8,9

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

Examples of species Chaenotheca furfuracea golden needle v Chrysotrichia chlorina rock powder lichen v Fuscidea gothoburgensis v	Haematoma ochroleucum blood eye lichen Lecanora lojkaeana v	Pleopsidium chlorophanum cushion chlorophyll v Psilolechia lucida lylslav v
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Distribution and regional distribution: BN-HA, O3-C1. Spread across the country.

Most important types of confusion: Dry low-calcareous overhang (T5-C-5), dry highly calcareous overhang (T5-C-7), desiccation-exposed strongly intermediate and slightly calcareous rocks, rock walls and crags (T1-C-6).

Red list status (2018): Cave and overhang (LC;<).

References and type parallels: –



Dry intermediate and slightly calcareous overhang. MR:

T5-C-7 Dry strongly calcareous overhang

NiN Characteristics: Solid Ground Systems: Cave and Overhang (T5), one base type (10). Defined by LKM: GSÿ1 & KAÿ3 & UEÿ2. LKM base step: GSÿa & KAÿhi & UEÿdefg.

Physiognomy: Bare rock surfaces or most often with crustal lichens and scattered mosses under overhangs.

Ecological characteristics: The nature type includes overhangs and the outermost part of caves, i.e. natural cavities in rocks below the earth's surface, in calcareous rocks. Overhangs are rock walls with more than a 90° slope and cavities that extend 0-5 meters into the cave. The overhang is strongly influenced by the environment outside the cave, but not directly influenced by rainfall and other fallout from above. The influence from the outside environment gradually decreases inwards and the boundary towards outer parts of deep caves is drawn where the influence from outside has decreased from strong to significant, that is, where the environment is fairly strongly shielded. The nature type includes limestone-rich and overhangs that are drought-prone and are distinguished from limestone-poor types based on bedrock and a lack of strongly lime-demanding species. Variation related to desiccation exposure is important in overhangs. With desiccation exposure is meant the humidity of the air close to the ground and in T5-C-7 the humidity is low (fairly to very exposed to desiccation). Desiccation exposure depends, among other things, on sun exposure, and dry overhangs are exposed to light and are typically located in open terrain, not covered by a dense layer of wood, and in S-SW facing lysides.



Dry strong calcareous overhang. Op: Vågå: south of Sande.
Photo: HB.

Terrain and aerial photo characteristics: Overhangs are found adjacent to steep rock walls. Cannot be identified on aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T5-10	T5-B-10	T5-C-7	T5-D-7	T5-E-2
Basic types		T5-10	T5-10	T5-10	T5-3,5,10

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

Examples of species <i>Leproplaca chrysodeta</i> t* <i>Leproplaca cirochroa</i> t*		
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Distribution and regional distribution: BN-HA, O3-C1. Spread across the country on calcareous rocks.

Most important alteration types: Dry intermediate and weakly calcareous overhang (T5-C-6), desiccation-exposed to extremely calcareous rocks, rock walls and knolls (T1-C-8).

Red list status (2018): Cave and overhang (LC;<).

References and type parallels: –

T6-C-1 Calcareous beach rocks

NiN characteristics: Solid ground systems: Strandberg (T6), six basic types (1-3,5-7). Defined by LKM: ў TVÿ1-3 & KAÿ1 & VFÿ1,2 & HFÿ1,2 & IFÿ1,2. LKM base steps: TVÿijk & KAÿbcde & VFÿ0abcdefgha & HFÿ0ab+ & IFÿ0ab¤.

Physiognomy: Consists of bare rock or lichen- and moss-dominated vegetation on rock in the geolittoral and supralittoral zone.

Ecological characteristics: Lime-poor beach rocks include rocks and large boulders in the upper geolittoral and supralittoral zone. These are bare rocks without soil cover and the vegetation is dominated by salt-tolerant lichens and mosses. Vascular plant cover missing, but small patches of salt meadow vegetation are often found in cracks in the rock. The type occurs most frequently and with the greatest coverage on exposed rocks on the outer coast that are exposed to regular wave spray, and in areas with a large tidal difference. In fjord areas only as narrow zones near the sea. Against saltwater systems, the limit is drawn at the upper limit for rut and shore snails and at the lower limit for the low marebek, which is seen as a black belt. Above the marebek there is often an orange brass low belt. Upwards, the beach rocks extend as far as there is a distinct element of salt-tolerant or salt-prefering species. Occurrence of salt meadow fragments and salt meadow plants in rock crevices can be of help when delineating. Distinguished from bare rock by the presence of salt-tolerant species. Open shallow land has thin soil cover and the presence of species that cannot tolerate strong salt exposure, including heather species.

In the lower part, salt content is more important than lime content, so that the species composition is relatively similar in lime-rich and lime-poor rocks. In the wave splash zone, lime-poor beach rocks are defined by the lack of clearly lime-demanding species and the rock's lime content.

Terrain and aerial photo characteristics: Found on rocky outcrops, knolls or steep rocks along exposed sea beaches. Most often clearly defined as bare rock on aerial photographs towards the sea, but the border with other open vegetation on the landward side is difficult to determine in aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T6-1-3,5-7	T6-B-1,3	T6-C-1	T6-C-1	T6-E-1
Basic types		T6-1-3,5-7	T6-1-3,5-7	T6-1-3,5-7	T6-1-3,5-7

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Bryum alpinum</i> koppervrangmose v	<i>Athallia scopularis</i> t*	<i>Lichina confinis</i> dwarf kelp t*
<i>Bryum salinum</i> feather bramble t*	<i>Calogaya lobulata</i> t*	<i>Lichina pygmaea</i> sea kelp t*
<i>Schistidium maritimum</i> salt marsh t*	<i>Hydropunctaria maura</i> marebek m*;v*	<i>Xanthoria aureola</i> coastal brass lava t*
<i>Anaptychia runcinata</i> svaberglav v	<i>Lecanora helicopis</i> t*	<i>Xanthoria parietina</i> common brass lichen m*
	<i>Lecanora actophila</i> t*	

Distribution and regional distribution: BN-NB and ASHTZ, O3-OC. Found along the entire coast.

Most important types of confusion: Bare rock (T1), open shallow ground (T2).

Red list status (2018): Strandberg (LC;<).

References and type parallels: X1a (VN).



Calcareous beach rock. AA: Arendal: Tromøya, Øyna.
Photo: HB.

T6-C-2 Calcareous boulder in the wave splash zone

NiN characteristics: Solid ground systems: Strandberg (T6), one basic type (4). Defined by LKM: TVý3 & KAý2 & VFý1 & HFý1 & IFý1. LKM base steps: TVýk & KAýfghi & VFý0abcde & HFý0ab & IFý0ab.

Physiognomy: Consists of bare rock or lichen- and moss-dominated vegetation on rock in the supralittoral zone.

Ecological characteristics: Lime-poor beach rocks include rocks and large boulders in the supralittoral zone. These are bare rocks without soil cover and the vegetation is dominated by salt-tolerant lichens and mosses. Lack of vascular plant cover, but small patches of salt meadow vegetation are often found in cracks in the rock. The type occurs most frequently and with the greatest coverage on exposed rocks on the outer coast that are exposed to regular wave spray, and in areas with a large tidal difference. In fjord areas only as narrow zones near the sea. Against saltwater systems, the limit is drawn at the upper limit for rut and shore snails and at the lower limit for the low marebek, which is seen as a black belt. Upwards, the beach rocks extend as far as there is a distinct element of salt-tolerant or salt-preferring species. Occurrence of salt meadow fragments and salt meadow plants in rock crevices can be of help when delineating. Distinguished from bare rock by the presence of salt-tolerant species. Open shallow land has thin soil cover and the presence of species that cannot tolerate strong salt exposure, including heather species. In the wave splash zone, calcareous beach rocks are distinguished from the calcareous rocks by the presence of clearly lime-demanding species and the rock's lime content.



Calcareous boulder in the wave splash zone. Woe: Larvik: Ugly Goose.

Terrain and aerial photo characteristics: Found on knolls and rocky outcrops along exposed sea beaches. Most often clearly defined as bare rock on aerial photographs towards the sea, but the border with other open vegetation on the landward side is difficult to determine in aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T6-4	T6-B-2	T6-C-2	T6-D-2	T6-E-2
Basic types		T6-4	T6-4	T6-4	T6-4

Diagnostic species m =

abundance species (m^* = dominant m.); v = common species (v^* = constant v.); t = center of gravity species (t^* = characteristic t., $t\alpha$ - gradient-t.); s = distinction (s^* = absolute s., $s+$ = strong relative s., $s-$ = weak relative s.)

<i>Bryum alpinum</i> koppervrangmose v	<i>Athallia scopularis</i> t*	<i>Lichina confinis</i> dwarf kelp t*
<i>Bryum salinum</i> feather bramble t*	<i>Calogaya lobulata</i> t*	<i>Lichina pygmaea</i> sea kelp t*
<i>Schistidium maritimum</i> salt marsh t*	<i>Hydropunctaria maura</i> marebek m;v*	<i>Ramalina siliquosa</i> klippragg v
<i>Anaptychia runcinata</i> svaberglav t*	<i>Lecanora helicopis</i> t*	<i>Xanthoria aureola</i> coastal brass lava t*
	<i>Lecanora actophila</i> t*	<i>Xanthoria parietina</i> common brass lichen m*

Distribution and regional distribution: BN-NB and ASHTZ, O3-OC. Found along the entire coast.

Most important types of confusion: Bare rock (T1), open shallow ground (T2).

Red list status (2018): Strandberg (LC;<).

References and type parallels: X1b (VN).

T7-C-1 Very calcareous moderate snow bed

NiN characteristics: Firm ground systems: Snow bed (T7), one base type (1). Defined by LKM: KAÿ1 & SV 1 & Klÿ1. LKM base steps: KAÿa & SVÿab & Klÿ0a.

Physiognomy: Lacks shrub layer. Very species-poor field layer of graminids with scattered elements of a few low-nutrient herbs, rarely some heather.

Bottom layer mainly dominated by mosses and some lichen.

Ecological characteristics: Moderate snow beds are characterized by a medium-long snow cover that protects the vegetation from low temperatures in winter. The snow usually melts in June/July. T7-C-1 is found on slopes on very low-lime, well-drained soils that can dry out at times. Occurs in LA and MA in lower parts of the Rabb snow bed gradient. It borders downwards towards the late snow beds and upwards towards the leeside or mountain heath. Mouse ears are common. Finnbeard can dominate in oceanic mountains. Distinguished from richer snow beds by the lack of lime-requiring species.

Terrain and aerial photo characteristics: Sloping terrain.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T7-B-1	T7-C-1	T7-D1-	T7-E-1
Basic types	T7-1	T7-1	T7-1	T7-1	T7-1

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **tx** - gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Alchemilla alpina</i> mountain marigold v;s+[SV·blc]	<i>Barbilophozia floerkei</i> heather beard moss v;s*[SV·blc]	<i>Polytrichum commune</i> large bear moss v;s+[SV·blc]
<i>Anthoxanthum nipponicum</i> mountain gulaks v;s+[SV·blc]	<i>Barbilophozia lycopodioides</i> goosefoot beard moss v;s+[SV·blc]	<i>Cetraria islandica</i> islandslav v;s-[SV·blc]
<i>Avenella flexuosa</i> smyle m;v*s+[SV·blc]	<i>Dicranum fuscescens</i> bergsigd v;s*[SV·blc]	<i>Cetrariella delisei</i> snow sedge v;s-[SV·blc]
<i>Carex bigelowii</i> sorghum v;s-[SV·blc]	<i>Hylocomium splendens</i> floor moss v;s*[SV·blc]	<i>Cladonia arbuscula</i> light lichen v;s-[SV·blc]
<i>Harrimanella hypnoides</i> heather	<i>Kiaeria starkei</i> snow frost moss v	<i>Cladonia bellidiflora</i> flower lichen v;s-[SV·blc]
<i>Luzula spicata</i>	<i>Lophozia sudetica</i> red tab v	<i>Cladonia coccifera</i> agg. goat red beaker v
<i>Lysimachia europaea</i> forest star v;s*[SV·blc]	<i>Polytrichastrum alpinum</i> mountain binnemoss v	<i>Cladonia crispata</i> funnel lichen v;s-[SV·blc]
<i>Nardus stricta</i> fin beard v;s+[SV·blc]	<i>Polytrichastrum sexangulare</i> snowdrop moss v	<i>Cladonia ecmocyna</i> snow awl v
<i>Omalotheca supina</i> dwarf graywort v		<i>Cladonia gracilis</i> syllav v;s-[SV·blc]
<i>Pedicularis lapponica</i> bleach myrklegg v		<i>Cladonia uncialis</i> spikelav v
<i>Salix herbacea</i> mouse ear v		<i>Stereocaulon paschale</i> common salt lichen v

Distribution and regional distribution: LA-MA, O3-C1. Most common in LA.

Most important types of confusion: Weak calcareous moderate snow bed (T7-C-2).

Red list status (2018): Snøleie (VU mainland, LC Svalbard;<).

References and type parallels: T1 (VN).



Very low calcareous moderate snow bed. Ro: Sirdal: Light road by Børsteinsvatnet. Photo: RH.

T7-C-2 Slightly calcareous moderate snow bed

NiN characteristics: Firm ground systems: Snow bed (T7), one base type (2). Defined by LKM: KA^y2 & SV 1 & Kl^y1. LKM base steps: KA^ybc & SV^yab & Kl^y0a.



Physiognomy: Lacks shrub layer. Relatively species-poor field layer of graminids and herbs, rarely some heather. Bottom layer mainly of mosses, somewhat low.

Slightly calcareous moderate snow bed. Op: Vågå: Blåhøveien at Tverrhø. Photo: HB.

Ecological characteristics: Moderate snow beds are characterized by a medium-long snow cover that protects the vegetation from low temperatures in winter. The snow usually melts in June/July. T7-C 2 is found on slopes on relatively low-lime and well-drained soil that can dry out at times. Occurs in LA and MA in lower parts of the Rabb snow bed gradient. Mouse ear common. It borders downwards towards the late snow beds and upwards towards the leeside or mountain heath. Distinguished from poorer snow beds with elements of medium lime-demanding graminids and herbs and from richer types due to a lack of lime-demanding species.

Terrain and aerial photo characteristics: Sloping terrain. Somewhat greenish in color due to nodding mosses.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T7-2	T7-B-2	T7-C-2	T7-D-2	T7-E-2
Basic types		T7-2	T7-2	T7-2-4,12	T7-2-4,12

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Agrostis mertensii</i> mountain sedge v; s+[SV-blc],s+[KA·bla] <i>Alchemilla alpina</i> mountain marigold v; s+[SV-blc],s-[KA·bla] <i>Anthoxanthum nipponicum</i> mountain gulaks v; s-[SV-blc],s*[KA·bla] <i>Avenella flexuosa</i> smyle m; v*s+[SV-blc] <i>Bistorta vivipara</i> harerug v; s+[KA·bla] <i>Carex bigelowii</i> stilt m; v*s-[SV-blc],t*[KA·bc] <i>Carex brunescens</i> ssp. <i>brunescens</i> brown cataract v; s+[SV-blc],s-[KA·bla] <i>Carex lachenalii</i> ryegrass v; t*[KA·bc] <i>Cerastium cerastoides</i> glacial heritage v; s+[KA·bla] <i>Harrimanella hypnoides</i> heather <i>Hieracium alpinum</i> agg. mountain hoverer v; s+[SV-blc],s+[KA·bla] <i>Luzula spicata</i> <i>Lysimachia europaea</i> forest star v; s*[SV-blc],s+[KA·bla] <i>Nardus stricta</i> fin beard v; s+[SV-blc],s-[KA·cld]	<i>Omalotheca norvegica</i> v; s+[SV-blc],s*[KA·bla] <i>Omalotheca supina</i> dwarf graywort v; t*[KA·bc] <i>Phleum alpinum</i> mountain timotei v; s*[SV-blc],s*[KA·bla] <i>Pyrola minor</i> pearl wintergreen v; s+[KA·bla] <i>Ranunculus acris</i> ground soleie v; s-[SV-blc],s*[KA·bla] <i>Rumex acetosa</i> meadow sorrel v; s-[SV-blc],s+[KA·bla] <i>Salix herbacea</i> mouse ear m; v*t*[KA·bc] <i>Saussurea alpina</i> mountain thistle v; s*[SV-blc],s*[KA·bla] <i>Sibbaldia procumbens</i> three-finger herb v; s-[SV-blc],s*[KA·bla] <i>Solidago virgaurea</i> golden rice v; s-[SV-blc],s+[KA·bla] <i>Taraxacum crocea</i> agg. mountain lion teeth v; s*[KA·bla] <i>Veronica alpina</i> snow veronika v; s-[SV-blc],s*[KA·bla]	<i>Barbilophozia floerkei</i> v; s*[SV-blc],s+[KA·cld] <i>Barbilophozia lycopodioides</i> goosefoot v; s-[SV-blc],s-[KA·bla] <i>Dicranum fuscescens</i> bergsigd v; t*[SV·a b],s-[KA·cld] <i>Hylocomium splendens</i> floor moss v; s*[SV-blc] <i>Kiaeria starkei</i> snow frost moss v; t*[KA·bc] <i>Pohlia drummondii</i> red-bud nock v; s*[KA·blaj] <i>Polytrichastrum alpinum</i> mountain moss v; s-[KA·bla] <i>Polytrichastrum sexangulare</i> snow binnemo see v; t*[KA·bc] <i>Polytrichum commune</i> large bear moss v; s-[SV-blc],s+[KA·cld] <i>Cetraria islandica</i> islandslav v; s-[SV-blc] <i>Cetrariella delisei</i> snow sharp v; s-[SV-blc],s-[KA·cld]
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Distribution and regional distribution: LA-MA, O2-C1. Most common in LA.

Most important types of confusion: Very calcareous moderate snow bed (T7-C-1), intermediate moderate snow bed (T7-C-3), weakly calcareous and intermediate late snow bed (T7-C-4).

Red list status (2018): Snøleie (VU mainland, LC Svalbard;<).

References and type parallels: T2 (VN).

T7-C-3 Intermediate moderate

snow rent

NiN characteristics: Firm ground systems: Snow bed (T7), one base type (3). Defined by LKM: KAÿ3 & SV 1 & Klÿ1. LKM base step: KAÿde & SVÿab & Klÿ0a.

Physiognomy: Lacks shrub layer. Meadow vegetation with a relatively species-rich field layer of graminids and herbs. Ferns can be included, especially in Western Norway. Bottom layer mainly of mosses, little shallow.



Intermediate moderate snow layer. Op: Vang: east of Tyinosen.
Photo: HB.

Ecological characteristics: Moderate snow beds are characterized by a medium-long snow cover that protects the vegetation from low temperatures in winter. The snow usually melts in June/July. T7-C-3 is found on slopes on medium calcareous and well-drained soils that can dry out at times. Occurs in LA and MA in lower parts of the Rabb snow bed gradient. Mouse ears are common. It borders downwards towards the late snow beds and upwards towards the leeside or mountain heath. Distinguished from poorer types by the inclusion of several slightly lime-requiring species.

Terrain and aerial photo characteristics: Sloping terrain.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T7-3	T7-B-3	T7-C-3	T7-D-2	T7-E-2
Basic types		T7-3	T7-3	T7-2-4,12	T7-2-4,12

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Agrostis mertensii</i> mountain sedge v*;s+[SV-blc],ta[KA-de] <i>Alchemilla alpina</i> mountain marigold v;s*[SV-blc],s*[KA-elf] <i>Anthoxanthum nipponicum</i> mountain gulaks v;s-[SV-blc],s+[KA-elf] <i>Athyrium distentifolium</i> mountain buckthorn <i>Avenella flexuosa</i> smyle v*;s+[SV-blc],s-[KA-elf] <i>Bartsia alpina</i> blacktop v;s*[SV-blc],s+[KA-dlc] <i>Bistorta vivipara</i> harerug v;s+[KA-dlc] <i>Carex bigelowii</i> rigidus v*;s-[SV-blc],s+[KA-elf] <i>Carex brunnescens</i> ssp. <i>brunnescens</i> brown cataract v;s+[SV-blc],s+[KA-elf] <i>Carex lachenalii</i> ryegrass v;s-[KA-elf] <i>Cerastium cerastoides</i> glacier heritage v <i>Euphrasia wettsteinii</i> small-eyed thrush <i>Harrimanella hypnoides</i> heather <i>Hieracium alpinum</i> agg. mountain hoverer v;s+[SV-blc],s-[KA-elf] <i>Luzula multiflora</i> ssp. <i>frigida</i> seterfrytle v;s+[SV-blc],ta[KA-de] <i>Luzula spicata</i> aksfrytle v;ta[KA-de] <i>Lysimachia europaea</i> forest star v;s*[SV-blc],s+[KA-elf]	<i>Omalotheca norvegica</i> v ;s+[SV-blc],ta[KA-de] <i>Omalotheca supina</i> dwarf graywort v;s-[KA-elf] <i>Oxyria digyna</i> mountain acid v;s-[SV-blc],s+[KA-dlc] <i>Phleum alpinum</i> mountain timotei v;s*[SV-blc],ta[KA-de] <i>Poa alpina</i> mountain rat v;s-[SV-blc],s*[KA-dlc] <i>Pyrola minor</i> pearl winter green v;s+[SV-blc],s-[KA-dlc] <i>Ranunculus acris</i> ground sunbed v;s+[SV-blc],s+[KA-dlc] <i>Rumex acetosa</i> meadow sorrel v;s-[SV-blc],ta[KA-de] <i>Salix herbacea</i> mouse ear v*;s+[KA-elf] <i>Saussurea alpina</i> mountain thistle v;s*[SV-blc],s-[KA-dlc] <i>Sibbaldia procumbens</i> three-finger herb v*;s-[SV-blc],ta[KA-de] <i>Silene acaulis</i> fjellsmelle v;s*[KA-dlc] <i>Solidago virgaurea</i> golden rice v;s-[SV-blc],ta[KA-de] <i>Taraxacum crocea</i> agg. mountain lion teeth v;s+[KA-dlc] <i>Trisetum spicatum</i> black sedge v;s-[KA-dlc]	<i>Vahlodea atropurpurea</i> grouse pile v;s+[SV-blc],ta[KA-de] <i>Veronica alpina</i> snow veronika v*s-[SV-blc],ta[KA-de] <i>Viola biflora</i> mountain violet v;s+[SV-blc],s+[KA-dlc] <i>Viola palustris</i> marsh violet v;s+[SV-blc],ta[KA-de] <i>Barbilophozia florekei</i> v;s*[SV-blc],s+[KA-elf] <i>Barbilophozia lycopodioides</i> goosefoot egg moss v;s+[SV-blc],s-[KA-elf] <i>Dicranum fuscescens</i> bergsigd v;ta[SV-ab],s-[KA-elf] <i>Hylocomium splendens</i> floor moss v;s*[SV-blc],ta[KA-de] <i>Kiaeria starkei</i> snow frost moss v;s*[KA-elf] <i>Pohlia drummondii</i> red-bud nock v;s-[KA-elf] <i>Polytrichastrum alpinum</i> mountain binnemoss v;s-[KA-elf] <i>Polytrichastrum sexangulare</i> snow binnemo see v;s-[KA-elf] <i>Cetraria islandica</i> islandslav v;s-[SV-blc]
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Distribution and regional distribution: LA-MA, O2-C1. Most common in LA.

Most important types of confusion: Weakly calcareous moderate snow bed (T7-C-2), weakly calcareous and intermediate late snow bed (T7-C-4), weakly calcareous moderate snow bed (T7-C-6).

Red list status (2018): Snøleie (VU mainland, LC Svalbard;<).

References and type parallels: T3 (VN).

T7-C-4 Weak calcareous and intermediate late

snow bed NiN characteristics: Mainland systems:

Snow bed (T7), one basic type (4). Defined by LKM: KA \ddot{y} 2,3 & SV 2 & Kl \ddot{y} 1. LKM base steps: KA \ddot{y} bcde & SV \ddot{y} cd & Kl \ddot{y} 0a.



Physiognomy: Lacks shrub layer. Field layer with dense mats of dwarf sedges, and scattered herbs and graminids.

Ferns are common, especially in Western Norway. Bottom layer of small, acrocarp mosses and some lichen.

Weakly calcareous and intermediately late snow bed. Op: Vang: east of Tyinosen. Photo: HB.

Ecological characteristics: Seine's snow beds are characterized by a long-lasting snow cover that protects the vegetation from low temperatures in winter and melts late in July/August. T7-C-4 occurs on slopes without stagnant water on calcareous to slightly calcareous moraines and on humus over rock.

Moist when the snow melts, but dries out quickly. Soil flow occurs. Occurs in LA and MA in lower parts of the Rabb snow bed gradient. Limits downwards towards extreme snow beds and upwards towards moderate snow beds.

Common mouse's ear, with and without elements of heather. Dominated by species with low requirements for lime content. Differentiated from so-called fern snow beds, which belong to rasmork (T13), by greater inclusions of graminids and herbs.

Terrain and aerial photo characteristics: Inclined to concave flat terrain. Some greenish color.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T7-B-4	T7-C-4	T7-D-2	T7-E-2
Basic types	T7-4	T7-4	T7-4	T7-2-4,12	T7-2-4,12

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta**- gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Agrostis mertensii</i> mountain sedge v; s*[SV-dle],s+[KA-bla] <i>Anthoxanthum nipponicum</i> mountain gulaks v; s*[SV-dle],s*[KA-bla] <i>Avenella flexuosa</i> smyle v; s*[SV-dle],s-[KA-elf] <i>Bistorta vivipara</i> harerug v; s*[SV-dle],s-[KA-bla] <i>Carex bigelowii</i> sorghum v; s*[SV-dle],s-[KA-bla] <i>Carex lachenalii</i> ryegrass v; ta[SV-cd],s*[KA-bla] <i>Ceratium cerastoides</i> glacier v; s+[SV-dle],s+[KA-bla] <i>Cryptogramma crispa</i> horse spurt <i>Harrimanella hypnoides</i> heather v; ta[SV-cd],s-[KA-bla] <i>Juncus trifidus</i> rabbesiv s-[SV-dle] <i>Luzula arcuata</i> bow fly s-[SV-dle] <i>Luzula spicata</i> aksfrytle v; s*[SV-dle],s-[KA-elf] <i>Micranthes stellaris</i> star trout s-[SV-dle]	<i>Omalotheca supina</i> dwarf graywort v; s*[SV-dle],s+[KA-bla] <i>Poa alpina</i> mountain thrush v; s*[SV-dle],s-[KA-bla] <i>Ranunculus glacialis</i> ice soleie <i>Rumex acetosa</i> meadowsweet v; s*[SV-dle],s+[KA-bla] <i>Sagina saginoides</i> ssetersarve v; s*[SV-dle],s-[KA-bla] <i>Salix herbacea</i> mouse ear v; ta[SV-cd],s-[KA-bla] <i>Sibbaldia procumbens</i> three-finger herb v; s*[SV-dle],s*[KA-bla] <i>Silene acaulis</i> fjellsmelle v; s*[SV-dle] <i>Taraxacum crocea</i> agg. mountain lion teeth v; s*[SV-dle],s*[KA-bla] <i>Trisetum spicatum</i> black sedge v; ta[SV-cd],s+[KA-bla] <i>Veronica alpina</i> snow veronika v; s*[SV-dle],s*[KA-bla] <i>Viola biflora</i> mountain violet v; s*[SV-dle],s-[KA-bla]	<i>Anthelia juratzkana</i> krypsnemosis v; s*[SV-clb],s*[KA-bla] <i>Conostomum tetragonum</i> helmet moss v; ta[SV-cd],s+[KA-bla] <i>Kiaeria starkei</i> snow frost moss v; s-[SV-clb],s-[KA-bla] <i>Lophozia sudetica</i> red tab v; s-[KA-bla] <i>Marsupella brevissima</i> snow-hut tremose v; s-[SV-clb],s*[KA-bla] <i>Pleurocladula albescens</i> bremose v; s+[SV-clb],s*[KA-bla] <i>Polytrichastrum alpinum</i> mountain binnemoss v; s*[SV-dle],s-[KA-bla] <i>Polytrichastrum sexangulare</i> snowdrop moss v; s*[KA-bla] <i>Cetraria islandica</i> islandslav v; s-[SV-dle] <i>Cladonia bellidiflora</i> flower lichen v; s-[SV-dle],s-[KA-elf] <i>Cladonia uncialis</i> spikelav v; s*[SV-dle],s-[KA-elf] <i>Solorina crocea</i> saffron lichen v; ta[SV-cd],s+[KA-bla]
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Distribution and regional distribution: LA-MA, O3-C1.

Most important types of confusion: Weakly calcareous moderate snow bed (T7-C-2), intermediate moderate snow bed (T7-C-3), intermediate extreme snow bed (T7-C-5), weakly calcareous late snow bed (T7-C-7), intermediate and slightly calcareous gravel- and sand-dominated ground (T13-C-6).

Red list status (2018): Snøleie (VU mainland, LC Svalbard;<).

References and type parallels: T4 (VN).

T7-C-5 Weak calcareous and intermediate

extreme snow bed NiN characteristics: Mainland

systems: Snow bed (T7), one basic type (5). Defined by LKM: KA^y2,3 & SV 3 & Kl^y1. LKM base steps: KA^ybcde & SV^yef & Kl^y0a.

Physiognomy: Very species-poor type. Missing shrub layer. Field layers are usually absent.

Cohesive bottom layer of mosses, especially on fine material where creeping mosses can completely dominate.

More scattered moss populations on rock and boulder-rich ground. Lacks strongly lime-demanding mosses. Some lichen occurs.



Weakly calcareous and intermediate extreme snow bed. Op: Vågå: Blåhøveien at Rundhø. Photo: HB.

Ecological characteristics: Extreme snow beds are characterized by a very long-lasting snow cover that protects the vegetation from low temperatures in winter and normally melts away in August. Some years without melting. A short growing season prevents the growth of vascular plants. T7-C-5 is found on low-to-medium-rich, moist soil on both fine and coarse substrates. Occurs throughout the mountain, at the very bottom of the Rabb snow bed gradient, often together with wet snow beds. Crypsnemesis often dominant. Solifluction may occur.

Terrain and aerial photo characteristics: Gently sloping to concave or flat terrain. Often dark gray or black color due to dominance of krypsnemesis.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T7-5	T7-B-5	T7-C-5	T7-D-3	T7-E-3
Basic types		T7-5	T7-5	T7-5	T7-5

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Carex bigelowii</i> rigid s+[KA·elf] <i>Carex lachenalii</i> black grouse s-[KA·elf] <i>Harrimanella hypnoides</i> heather s-[KA·elf] <i>Omalotheca supina</i> dwarf graywort s-[KA·elf] <i>Ranunculus glacialis</i> ice soleie <i>Salix herbacea</i> mouse ear s+[KA·elf] <i>Anthelia julacea</i> creeping snow moss s-[KA·elf] <i>Anthelia juratzkana</i> creeping snow m;v*;s-[SV·eld],s*[KA·bla] <i>Cephalozia ambigua</i> snow patch v;s+[SV·eld],s-[KA·bla] <i>Conostomum tetragonum</i> helmet moss v;s-[KA·bla]	<i>Gymnomitrion concinnatum</i> rabbeåmem ose s-[KA·elf] <i>Kiaeria starkei</i> snow frost moss v;s*[KA·elf] <i>Lophozia sudetica</i> red lobe v;s-[SV·eld],s*[KA·elf] <i>Lophozia wenzelii</i> skeiflik v;s-[SV·eld],s+[KA·bla] <i>Marsupella brevissima</i> snow-hut tremose v;s-[SV·eld],s+[KA·bla] <i>Marsupella condensata</i> trinhhutremose v;s-[SV·eld],s+[KA·elf] <i>Moerckia blyttii</i> mountain loop v;s-[SV·eld],s+[KA·bla] <i>Oligotrichum hercynicum</i> gravel moss s-[KA·elf]	<i>Pleurocladula albescens</i> bremose v;s*[KA·bla] <i>Pohlia drummondii</i> red-bud nock v;s*[KA·bla] <i>Polytrichastrum alpinum</i> s+[KA·elf] <i>Polytrichastrum sexangulare</i> snow binnemo see v;s-[SV·eld],s*[KA·bla] <i>Racomitrium sudeticum</i> seder gray moss v;s-[SV·eld],s+[KA·elf] <i>Cetraria islandica</i> islandslav v <i>Cetrariella delisei</i> snow sedge s-[KA·elf] <i>Solorina crocea</i> saffron lichen v;s-[KA·bla] <i>Stereocaulon paschale</i> common salt lichen v;s+[KA·bla]
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Distribution and regional distribution: LA-HA, O2-C1. In LA mostly in north and east facing terrain.

Most important types of confusion: Weakly calcareous and intermediate late snow bed (T7-C-4), calcareous extreme snow bed (T7-C-10), wet snow bed (V6).

Red list status (2018): Snøleie (VU mainland, LC Svalbard;<).

References and type parallels: T8 (VN).

T7-C-6 Slightly calcareous moderate snow bed

NiN characteristics: Firm ground systems: Snow bed (T7), one base type (6). Defined by LKM: KA^y4 & SV 1 & Kl^y1. LKM base steps: KA^yfg & SV^yab & Kl^y0a.

Physiognomy: Lacks shrub layer. Species-rich and lush meadow-like vegetation with a field layer of several moisture-demanding and medium lime-demanding graminids and herbs. Bottom layer mainly of mosses, but is poorly developed.

Ecological characteristics: Moderate snow beds are characterized by a medium-long snow cover that protects the vegetation from low temperatures in winter.

The snow usually melts in June/July. T7-C-6 is found on slopes on somewhat calcareous soils. Good leachate influence throughout the season. Occurs both in LA and MA in lower parts of the Rabb snow bed gradient. It borders downwards towards the late snow beds and upwards towards the leeside or mountain heath. Distinguished from poorer types by the relatively high content of lime-demanding species, both graminids, herbs and mosses.

Terrain and aerial photo characteristics: Sloping terrain.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T7-6	T7-B-6	T7-C-6	T7-D-4	T7-E-4
Basic types		T7-6	T7-6	T7-6,7,13	T7-6,7,13

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity type (t* = characteristic t., t^y- gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.)

<i>Anthoxanthum nipponicum</i> mountain gulaks <i>v;s-[SV-blc],s+[KA-glh]</i> <i>Astragalus alpinus</i> milkweed <i>v;s+[SV-blc],s+[KA-fle]</i> <i>Avenella flexuosa</i> smyle <i>v*s+[SV-blc],s*[KA-glh]</i> <i>Bartsia alpina</i> blacktop <i>v;s*[SV-blc],t*[KA-fg]</i> <i>Bistorta vivipara</i> harerug <i>v*s-[KA-fle]</i> <i>Carex atrata</i> black starr <i>v;s+[SV-blc],s*[KA-fle]</i> <i>Carex bigelowii</i> styrstarr <i>v;s-[SV-blc],s*[KA-glh]</i> <i>Carex lachenalii</i> grouse starr <i>v</i> <i>Carex norvegica</i> mountain sedge <i>Cerastium cerastoides</i> glacier heritage <i>v;s-[KA-fle]</i> <i>Erigeron uniflorus</i> snow star <i>s*[KA-fle]</i> <i>Harrimanella hypnoides</i> heather <i>Hieracium alpinum</i> agg. mountain hoverer <i>v;s-[SV-blc],s-[KA-glh]</i> <i>Juncus biglumis</i> twin rush <i>Luzula spicata</i>	<i>Lysimachia europaea</i> forest star <i>v;s*[SV-blc],s-[KA-glh]</i> <i>Minuartia biflora</i> tuerve <i>s-[KA-fle]</i> <i>Omalotheca supina</i> dwarf graywort <i>v;s-[KA-glh]</i> <i>Oxyria digyna</i> mountain acid <i>v;s-[SV-blc],s-[KA-fle]</i> <i>Parnassia palustris</i> jablom <i>s-[KA-fle]</i> <i>Pedicularis oederi</i> s * [KA-fle] <i>Petasites frigidus</i> mountain plague <i>s-[KA-fle]</i> <i>Poa alpina</i> mountain thrush <i>v;s-[SV-blc],s-[KA-fle]</i> <i>Potentilla crantzii</i> spotted wall <i>s-[KA-fle]</i> <i>Pyrola minor</i> pearl winter green <i>v;s-[SV-blc],s-[KA-glh]</i> <i>Ranunculus acris</i> ground sunbed <i>v;s-[SV-blc],s-[KA-fle]</i> <i>Rumex acetosa</i> meadowsweet <i>v;s-[SV-blc],s-[KA-glh]</i> <i>Salix herbacea</i> mouse ear <i>v;s-[SV-blc],s+[KA-glh]</i> <i>Salix polaris</i> polarvier <i>v;s*[KA-fle]</i> <i>Salix reticulata</i> _ <i>[SV-blc],s*[KA-fle]</i>	<i>Saussurea alpina</i> mountain thistle <i>v;s*[SV-blc],t*[KA-fg]</i> <i>Saxifraga cernua</i> bud <i>s+[KA-fle]</i> <i>Saxifraga oppositilifolia</i> red herring <i>v;s-[SV-blc],s+[KA-fle]</i> <i>Selaginella selaginoides</i> dwarf dwarf <i>v;s-[SV-blc],t*[KA-fg]</i> <i>Silene acaulis</i> fjellsmelle <i>v</i> <i>Solidago virgaurea</i> golden rice <i>v;s-[SV-blc],s+[KA-glh]</i> <i>Taraxacum crocea</i> agg. mountain lion teeth <i>v;s-[KA-glh]</i> <i>Thalictrum alpinum</i> mountain seed star <i>v;s*[SV-blc],s*[KA-fle]</i> <i>Tofieldia pusilla</i> bear sting <i>v;s-[SV-blc],s*[KA-fle]</i> <i>Veronica alpina</i> snow veronica <i>v;s-[SV-blc]</i> <i>Viola biflora</i> mountain violet <i>v;s-[SV-blc],t*[KA-fg]</i> <i>Distichium capillaceum</i> cushion plane moss <i>v;s-[KA-fle]</i> <i>Oncophorus virens</i> sedge moss <i>v;s-[SV-blc],t*[KA-fg]</i>
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Slightly calcareous moderate snow bed. Op: Lom: Dumdalen.
Photo: RH.

Distribution and regional distribution: LA-MA, O2-C1.

Most important types of confusion: Intermediate moderate snow bed (T7-C-3), weak calcareous late snow bed (T7-C 7), strong calcareous moderate snow bed (T7-C8).

Red list status (2018): Snøleie (VU mainland, LC Svalbard;<).

References and type parallels: T6 (VN), C01 snow bed (DNHB13).

T7-C-7 Weak calcareous late snow bed

NiN characteristics: Firm ground systems: Snow bed (T7), one base type (7). Defined by LKM: KAj4 & SV 2 & Klj1. LKM base steps: KAjfg & SVjcd & Klj0a.

Physiognomy: Lacks shrub layer. Field layer with sedges and/or sedges, as well as scattered herbs and graminids. Dense bottom layer of small, acroparp mosses.

Ecological characteristics: Seine's snow beds are characterized by a long-lasting snow cover that protects the vegetation from low temperatures in winter and melts late in July/August. T7-C-7 is found on slopes without stagnant water on medium calcareous moraines. Moist when the snow melts, but dries out quickly (seasonally moist). Little exposed to soil flow. Occurs both in LA and MA in lower parts of the Rabb snow bed gradient. Limits downwards towards extreme snow beds and upwards towards moderate snow beds. Difficult to distinguish from calcareous late snow bed, which contains several strongly calcareous species. Rynkevier design best developed in the north, polarier design scattered in most of the mountain range.



Weak calcareous late snow bed. Op: Lom: Bøverdalens, Breidseterdalen. Photo: RH

Terrain and aerial photo characteristics: Inclined to concave flat terrain.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T7-7	T7-B-7	T7-C-7	T7-D-4	T7-E-4
Basic types		T7-7	T7-7	T7-6,7,13	T7-6,7,13

Diagnostic species m =

abundance species (**m*** = dominant m.); v = common species (**v*** = constant v.); t = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); s = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Anthoxanthum nipponicum</i> mountain gulaks <i>v;s*[SV-dle],s+[KA-glh]</i> <i>Avenella flexuosa</i> smyle <i>v;s*[SV-dle],s+[KA-glh]</i> <i>Bistorta vivipara</i> harerug <i>v;s*[SV-dle],s-[KA-fle]</i> <i>Carex bigelowii</i> styrterr <i>v;s*[SV-dle],s-[KA-glh]</i> <i>Carex lachenalii</i> ryegrass <i>v;ta[SV-cd]</i> <i>Cerastium cerastoides</i> glacial heritage <i>v;s+[SV-dle],s-[KA-fle]</i> <i>Draba alpina</i> gullrublom <i>s+[KA-fle]</i> <i>Equisetum scirpoides</i> s- [KA-fle] <i>Harrimanella hypnoides</i> heather <i>Luzula spicata</i> <i>Minuartia stricta</i> spruce scar s-[KA-fle] <i>Omalotheca supina</i> dwarf graywort <i>v;s*[SV-dle],s-[KA-glh]</i> <i>Parnassia palustris</i> jablom s+[KA-fle] <i>Pedicularis oederi</i> golden anthill <i>s+[KA-fle]</i>	<i>Poa alpina</i> mountain thrush <i>v;s*[SV-dle],s-[KA-fle]</i> <i>Ranunculus nivalis</i> snow sunflower <i>s-[KA-fle]</i> <i>Ranunculus pygmaeus</i> dwarf sunflower <i>v;ta[SV-cd],s-[KA-fle]</i> <i>Rumex acetosa</i> meadow sorrel <i>v;s*[SV-dle],s-[KA-glh]</i> <i>Sagina nivalis</i> s- [KA-fle] <i>Sagina saginoides</i> ssetersarve <i>v;s*[SV-dle],s-[KA-glh]</i> <i>Salix herbacea</i> mouse ear <i>v; ta [SV-cd],s-[KA-glh]</i> <i>Salix polaris</i> polarier <i>s+[KA-fle]</i> <i>Salix reticulata</i> sedge <i>v*s*[SV-dle],s*[KA-fle]</i> <i>Saxifraga cernua</i> bud <i>s+[KA-fle]</i> <i>Silene acaulis</i> fjellsmelle <i>v;s*[SV-dle],s+[KA-fle]</i> <i>Taraxacum crocea</i> agg. mountain lion teeth <i>v;s*[SV-dle],s-[KA-glh]</i>	<i>Thalictrum alpinum</i> mountain seed star <i>s*[KA-fle]</i> <i>Tofieldia pusilla</i> bear sting <i>s+[KA-fle]</i> <i>Trisetum spicatum</i> blackthorn <i>v;ta[SV-cd],s-[KA-glh]</i> <i>Veronica alpina</i> snow veronica <i>v;s*[SV-dle],s+[KA-glh]</i> <i>Viola biflora</i> mountaint violet <i>v;s*[SV-dle],ta[KA-fg]</i> <i>Anthelia juratzkana</i> krypsnemosis <i>v;s*[SV-clb],s-[KA-glh]</i> <i>Distichium capillaceum</i> cushion plane moss <i>v;s*[KA-fle]</i> <i>Pohlia drummondii</i> red-bud nock <i>v;s-[SV-clb],s-[KA-glh]</i> <i>Polytrichastrum sexangulare</i> snow cone <i>moss v;s+[SV-clb],s-[KA-glh]</i> <i>Preissia quadrata</i> s +[KA-fle]
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Distribution and regional distribution: LA-MA, O2-C1. Rare in C1.

Most important types of confusion: Weakly calcareous and intermediate late snow bed (T7-C-4), weakly calcareous moderate snow bed (T7-C-6), late calcareous snow bed (T7-C-9), calcareous extreme snow bed (T7-C-10).

Red list status (2018): Snøleie (VU mainland, LC Svalbard;<).

References and type parallels: T6, T7 (VN). C01 snow rental (DNHB13).

T7-C-8 Strong calcareous moderate

snow rent

NiN characteristics: Firm ground systems: Snow bed (T7), one base type (8). Defined by LKM: KAy5 & SV 1 & Klj1. LKM base steps: KAyhi & SVyab & Klj0a.

Physiognomy: Shrub layer missing. Species-rich field layer dominated by sedges and/or sedges and several lime-demanding herbs. Little grass, but several semi-grasses that require lime. Bottom layer of lime-demanding mosses, but poorly developed.



Strong calcareous moderate snow bed. Op: Lom: Dumdalens.
Photo: HB

Ecological characteristics: Moderate snow beds are characterized by a medium-long snow cover that protects the vegetation from low temperatures in winter. The snow usually melts in June/July. T7-C-8 is found on slopes of highly nutritious and calcareous moraine or weathered soil. Good leachate influence throughout the season. Occurs both in LA and MA in lower parts of the Rabb snow bed gradient. It borders downwards towards the late snow beds and upwards towards the leeside or mountain heath. Differs from T7-C-6 by lacking mouse ears and other low-lime-demanding willows, heather species and graminids and very little lichen. Higher frequency and coverage of lime-requiring species.

Terrain and aerial photo characteristics: Sloping terrain.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T7-B-8	T7-C-8	T7-D-5	T7-E-5
Basic types	T7-8	T7-8	T7-8	T7-8,9,14	T7-8,9,14

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **tn-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Antennaria alpina</i> mountain cat's foot s-[SV-blc] <i>Astragalus alpinus</i> milkweed v;s+[SV-blc] <i>Bartsia alpina</i> blacktop v;s*[SV-blc] <i>Bistorta vivipara</i> harerug v* <i>Carex atrata</i> black starr v;s+[SV-blc] <i>Carex bigelowii</i> sedum s-[SV-blc] <i>Carex lachenalii</i> grouse starr v <i>Cerastium alpinum</i> mountain heirloom <i>Cerastium cerastoides</i> glacier heritage v <i>Equisetum scirpoides</i> dwarf rush <i>Equisetum variegatum</i> v ;s+[SV-blc],s-[KA-hlg] <i>Juncus biglumis</i> twin rush <i>Omalotheca supina</i> dwarf graywort <i>Oxyria digyna</i> mountain sorrel v;s-[SV-blc] <i>Parnassia palustris</i> jablom s-[SV-blc]	<i>Pedicularis oederi</i> s-[KA-hlg] <i>Petasites frigidus</i> mountain plague s-[KA-hlg] <i>Poa alpina</i> mountain thrush v;s-[SV-blc] <i>Potentilla crantzii</i> spotted wall v;s+[SV-blc] <i>Ranunculus acris</i> ground soleie v;s+[SV-blc] <i>Ranunculus nivalis</i> snow sunflower s-[KA-hlg] <i>Rumex acetosa</i> meadowsweet v;s-[SV-blc] <i>Salix polaris</i> polarvier v;s-[KA-hlg] <i>Salix reticulata</i> nettle v*s-[SV-blc] <i>Saussurea alpina</i> mountain thistle v;s*[SV-blc] <i>Saxifraga aizoides</i> yellow perch s-[KA-hlg] <i>Saxifraga oppositifolia</i> red herring v;s-[SV-blc],s-[KA-hlg] <i>Selaginella selaginoides</i> dwarf dwarf v;s+[SV-blc]	<i>Silene acaulis</i> fjellsmelle v <i>Silene wahlbergella</i> blindwort s-[KA-hlg] <i>Taraxacum crocea</i> agg. mountain lion teeth v <i>Thalictrum alpinum</i> mountain seed star v;s*[SV-blc] <i>Tofieldia pusilla</i> bear sting v;s-[SV-blc] <i>Triisetum spicatum</i> black oak v <i>Viola biflora</i> mountain violet v;s+[SV-blc] <i>Asterella lindenbergiana</i> large veil moss s-[KA-hlg] <i>Blepharostoma trichophyllum</i> barbed wire moss v;s-[SV-blc] <i>Distichium capillaceum</i> cushion plane moss v*s-[KA-hlg] <i>Sauteria alpina</i> crater moss s+[KA-hlg] <i>Cladonia arbuscula</i> light lichen v;s-[SV-blc]
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Distribution and regional distribution: LA-MA, O2-C1.

Most important types of confusion: Weak calcareous moderate snow bed (T7-C-6), late calcareous snow bed (T7-C-9).

Red list status (2018): Snøleie (VU mainland, LC Svalbard;<).

References and type parallels: T6 (VN), C01 snow bed (DNHB13).

T7-C-9 Strong calcareous late snow bed

NiN characteristics: Firm ground systems: Snow bed (T7), one base type (9). Defined by LKM: KAy5 & SV 2 & Klj1. LKM base steps: KAyh1 & SVycd & Klj0a.

Physiognomy: Lacks shrub layer. Field layer dominated by wrinkled and/or polar curls. Spread strongly lime-demanding herbs and graminids. Dense bottom layer of low-growing, acrocarp mosses.

Ecological characteristics: Seine's snow beds are characterized by a very long-lasting snow cover that protects the vegetation from low temperatures in winter and melts late in the second half of July/August. T7-C-9 occurs on slopes without stagnant water on calcareous moraines and weathering soils. Moist when the snow melts, but dries out quickly (seasonally moist). Little exposed to soil flow. Occurs both in LA and MA in lower parts of the Rabb snow bed gradient. Limits downwards towards extreme snow beds and upwards towards moderate snow beds. Distinguished from T7-C-7 (weakly calcareous late snow bed) by the presence of small herds, higher frequency/coverage and more center of gravity for lime-requiring species, especially mosses, as well as the presence of a few low-lime-demanding species. Rynkeviers design best developed in the north, polarier design scattered in most of the mountain range.

Terrain and aerial photo characteristics: Inclined to concave flat terrain.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T7-9	T7-B-9	T7-C-9	T7-D-5	T7-E-5
Basic types		T7-9	T7-9	T7-8,9,14	T7-8,9,14

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **tt**- gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Avenella flexuosa</i> smyle s*[SV-dle] <i>Bistorta vivipara</i> harerug v;s*[SV-dle] <i>Carex bigelowii</i> rigid s*[SV-dle] <i>Carex lachenalii</i> ryegrass v;ta[SV-cd] <i>Cerastium cerastoides</i> glacier v;s*[SV-dle] <i>Draba alpina</i> gold rub flower <i>Equisetum scirpooides</i> dwarf rush <i>Equisetum variegatum</i> s-[KA-hlg] <i>Juncus biglumis</i> twin rush <i>Parnassia palustris</i> yellow flower <i>Pedicularis oederi</i> s-[KA-hlg] <i>Poa alpina</i> mountain thrush v;s*[SV-dle] <i>Ranunculus glacialis</i> ice soleie s-[SV-clb] <i>Ranunculus nivalis</i> snow sunflower s-[KA-hlg] <i>Ranunculus pygmaeus</i> dwarf sunflower v;ta [SV-cd]	<i>Sagina caespitosa</i> small heirloom s-[KA-glh] <i>Sagina nivalis</i> s-[KA-glh] <i>Salix herbacea</i> mouse ear t[SV-cd] <i>Salix polaris</i> polarvier v;ta[SV-c d],s-[KA-glh] <i>Salix reticulata</i> Wrinkled nettle v*s*[SV-dle] <i>Saxifraga aizoides</i> yellow perch s-[KA-hlg] <i>Saxifraga oppositifolia</i> red herring s-[KA-hlg] <i>Sibbaldia procumbens</i> three-finger herb s*[SV-dle] <i>Silene acaulis</i> fjellsmelle v;s*[SV-dle] <i>Silene wahlbergella</i> blindwort <i>Taraxacum crocea</i> agg. mountain lion teeth v;s*[SV-dle] <i>Thalictrum alpinum</i> mountain seed star <i>Tofieldia pusilla</i> bear bite <i>Trisetum spicatum</i> black sedge v;ta[SV-cd]	<i>Veronica alpina</i> snow veronica s*[SV-dle] <i>Viola biflora</i> mountain violet v;s*[SV-dle] <i>Anthelia juratzkana</i> s *[SV-clb] <i>Asterella gracilis</i> s-[KA-hlg] <i>Asterella lindbergiana</i> s-[KA-hlg] <i>Athalamia hyalina</i> navel moss s-[KA-hlg] <i>Distichium capillaceum</i> cushion plane moss v;s-[KA-hlg] <i>Polytrichastrum sexangulare</i> snowdrop moss s+[SV-clb] <i>Preissia quadrata</i> joint moss v;s+[KA-hlg] <i>Sauteria alpina</i> crater moss s-[KA-hlg] <i>Solorina crocea</i> saffron lichen t[SV-cd] <i>Stereocaulon paschale</i> common salt lichen v
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Strong calcareous late snow bed. ST: Oppdal: S Knutshø.
Photo: HB.

Distribution and regional distribution: LA-MA, O2-C1. Rare in C1.

Most important types of confusion: Weakly calcareous late snow bed (T7-C-7), strongly calcareous moderately calcareous snow bed (T7-C-8), calcareous extreme snow bed (T7-C-10), rich wet snow beds (V6).

Red list status (2018): Snøleie (VU mainland, LC Svalbard;<).

References and type parallels: T6, T7 (VN), C01 snow bed (DNHB13).

T7-C-10 Calcareous extreme snow bed

NiN characteristics: Firm ground systems: Snowbed (T7), one base type (10). Defined by LKM: KAý4,5 & SV 3 & Klý1. LKM base step: KAýfghi & SVýef & Klý0a.

Physiognomy: Lacks shrub layer. Field layers are usually absent. Cohesive bottom layer of mosses, especially on fine calcareous material. More scattered moss populations on rocky and boulder-rich ground. Several mosses that require a lot of lime.



Ecological characteristics: Extreme snow beds are characterized by a very long-lasting snow cover that protects the vegetation from low temperatures in winter and normally melts in August. Some years without melting.

Calcareous extreme snow bed. ST: Oppdal: between S and M Knutshoe. Photo: HB.

A short growing season prevents the growth of vascular plants. Found throughout the mountain on very calcareous ground, usually on fine substrate with varying moisture at the very bottom of the rabb-snowbed gradient, often together with wet snowbeds. Pillow plan moss can dominate completely on fine calcareous material, while creeping nemo moss can dominate with somewhat lower lime content.

Terrain and aerial photo characteristics: Gently sloping to concave or flat terrain. Somewhat greener and lighter in color than poorer extreme snow beds, due to greater occurrences of spring mosses and nodding mosses, as well as less coverage of creeping mosses.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T7-B-10	T7-C-10	T7-D-6	T7-E-6
Basic types	T7-10	T7-10	T7-10	T7-10	T7-10

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-**gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

Carex bigelowii sedge	Anthelia juratzkana creeping nemosis v;s-[SV-eld]	Pohlia drummondii red-bud nick v
Carex lachenalii grouse sedge	Blepharostoma trichophyllum barbed wire moss s+[KA-fle]	Pohlia wahlenbergii cold nod
Cerastium cerastoides glacier heritage s-[KA-fle]	Blindia acuta red sigmoid s-[KA-fle]	Polytrichastrum alpinum mountain moss
Micranthes stellaris Starfish	Distichium capillaceum cushion plane moss v;s-[SV-eld],s*[KA-fle]	Polytrichastrum sexangulare snowdrop moss v;s-[SV-eld]
Omalotheca supina dwarf graywort	Philonotis fontana carpet spring moss	Preissia quadrata joint moss v;s+[KA-fle]
Ranunculus glacialis ice soleie	Pleurocladula albescens bremose	Sauteria alpina crater moss s+[KA-hig]
Salix herbacea mouse ear		Cetraria islandica islandslav v
Salix polaris polarvier s*[KA-fle]		Stereocaulon paschale common salt lichen v

Distribution and regional distribution: LA-HA, O2-C1. In LA most north and east facing.

Most important types of confusion: Intermediate extreme snow bed (T7-C-5), weak calcareous late snow bed (T7-C-7), strong calcareous late snow bed (T7-C-9), calcareous late wet snow bed (V6-C-4), calcareous extreme wet snow bed (V6-C-6).

Red list status (2018): Snøleie (VU mainland, LC Svalbard;<).

References and type parallels: T7 (VN), C01 snow bed (DNHB13).

T7-C-11 Vegetation-free snow bed

NiN characteristics: Firm ground systems: Snow bed (T7), one base type (11). Defined by LKM: KAÿ2-5 & SV 4 & Klÿ1.

LKM base steps: KAÿbcdefghi & SVÿ¤ & Klÿ0a.

Physiognomy: Vegetation-free substrate of sand, gravel, stone or blocks.

Ecological characteristics: The natural system occurs at the bottom of the snow bed gradient throughout the mountain, where the snow melts so late that the vegetation period is too short for vegetation to be established. Does not molt every year. T7-C-11 includes vegetation-free snow beds on both calcareous and calcareous bedrock. Also includes areas that have been covered by permanent snowdrifts, but which have melted out due to higher temperatures.

Terrain and aerial photo characteristics: Flat or concave terrain.

Mapping rules, map technical specifications and scale adjustments:



Vegetation-free snow bed. Bu:
Hol: Halne area. Photo: RH.

Distribution and regional distribution: LA-HA, O2-C1. Mostly in MA and HA.

Main types of confusion: None

Red list status (2018): Snøleie (VU mainland, LC Svalbard;<).

References and type parallels: None.

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T7-B-11	T7-C-11	Dissolve	Dissolve
Basic types	T7-11	T7-11	T7-11	T7-11	T7-11

T7-C-12 Source-influenced intermediate snow bed

NiN characteristics: Firm ground systems: Snow bed (T7), one base type (12). Defined by LKM: KAÿ3 & SV 1 & Klÿ2. LKM basic steps: KAÿde & SVÿab & Klÿbc.

Physiognomy: Lacks shrub layer. Relatively species-poor field layer of less demanding, low-growing herbs and graminids, where individual species can have large coverage. Varying coverage of the bottom layer with highly moisture-demanding mosses.

Ecological characteristics: Characterized by a medium-long snow cover that protects the vegetation from low temperatures in winter. The snow usually melts in June/July. Found on slopes on low to medium calcareous soil with a lot of open gravel and stone, and is sprinkled by meltwater from snowdrifts for most of the growing season. Borders downwards towards wet snow beds or late snow beds, and upwards towards lee side or mountain heath.

Spring-influenced snow beds are delimited to moderate snow beds along the variable snow cover-related growth reduction, and are distinguished from other moderate snow beds by spring water influence, i.e. supply of fresh, oxygen- and lime-rich groundwater where the water movement is parallel to the ground surface. Wet snow beds (V6), on the other hand, are characterized by a longer duration of snow cover and ground that is supplied with meltwater from glaciers and fonnss throughout the growing season and therefore has such high, permanent soil moisture that they form part of wetland systems.

Terrain and aerial photo characteristics: Under slopes on very gently sloping ground. Often somewhat green in color due to source and nod bogs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T7-12	T7-B-12	T7-C-12	T7-D-2	T7-E-2
Basic types		T7-12	T7-12	T7-2-4,12	T7-2-4,12

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity species (t* = characteristic t., t¤- gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.)

<i>Alchemilla glabra</i> ladybug s+[KA-dlc],s-[Kl-bla]	<i>Equisetum arvense</i> s+[KA-dlc] <i>Juncus biglumis</i> twin rush s+[KA-dlc] <i>Lysimachia europaea</i> forest star v;s*[SV-bl c],s+[KA-elf] <i>Micranthes stellaris</i> starfish s-[KA-dlc]	<i>Rumex acetosa</i> meadow sorrel v;s-[[SV-blc],t¤[KA-de] <i>Saussurea alpina</i> mountain thistle v;s*[SV-blc],s-[KA-dlc] <i>Solidago virgaurea</i> golden rice v;s-[[SV-blc],t¤[KA-de] <i>Taraxacum crocea</i> agg. mountain lion teeth v;s+[KA-dlc],s-[Kl-bla] <i>Trisetum spicatum</i> black sedge v;s-[KA-dlc] <i>Vahlodea atropurpurea</i> grouse pile v;s+[[SV-blc],t¤[KA-de] <i>Viola biflora</i> mountain violet v;s+[SV-blc],s+[KA-dlc] <i>Viola palustris</i> marsh violet v;s+[SV-blc],t¤[KA-de] <i>Pohlia drummondii</i> red-bud nock v;s-[[KA-elf],s-[Kl-bla]
<i>Alchemilla glomerulans</i> source ladybug v;t¤[KA-de],s-[Kl-bla]	<i>Omalotheca norvegica</i> v ;s+[SV-blc],t¤[KA-de]	
<i>Arabis alpina</i> mountain ash flower s-[KA-dlc],s-[Kl-bla]	<i>Oxyria digyna</i> mountain acid v;s-[SV-blc],s+[KA-dlc],s-[Kl-bla]	
<i>Bartsia alpina</i> blacktop v;s*[SV-blc],s+[KA-dlc]	<i>Phleum alpinum</i> mountain timotei v;s*[SV-blc],t¤[KA-de]	
<i>Bistorta vivipara</i> harerug v;s+[KA-dlc]	<i>Poa alpina</i> mountain thrush v;s-[SV-blc],s*[KA-dlc]	
<i>Carex lachenalii</i> ryegrass v;s-[KA-elf]	<i>Pyrola minor</i> pearl wintergreen v;s+[SV-blc],s-[KA-dlc]	
<i>Cerastium cerastoides</i> glacier heritage v;s-[Kl-bla]	<i>Ranunculus acris</i> ground sunbed v;s+[SV-blc],s+[KA-dlc],s-[Kl-bla]	
<i>Deschampsia alpina</i> mountain pile v;s-[Kl-bla]	<i>Ranunculus pygmaeus</i> dwarf sunflower s+[KA-dlc]	
<i>Epilobium anagallidifolium</i> dwarf milkweed s-[KA-dlc]		
<i>Epilobium hornemannii</i> milkweed s-[KA-dlc]		
<i>Epilobium lactiflorum</i> white milk s-[KA-dlc]		

Distribution and regional distribution: LA-MA, O2-C1.

Most important types of confusion: Source-influenced weak calcareous snow bed (T7-C-13), slightly calcareous and weak intermediate weak source (V4-C-1), calcareous and intermediate moderate wet snow bed (V6-C-1).

Red list status (2018): Snøleie (VU mainland, LC Svalbard;<).

References and type parallels: T8 (VN).

T7-C-13 Source-influenced weak calcareous snow bed

NiN characteristics: Firm ground systems: Snow bed (T7), one base type (13). Defined by LKM: KAÿ4 & SV 1 & Klÿ2. LKM base steps: KAÿfg & SVÿab & Klÿbc.

Physiognomy: Lacks shrub layer. Species-rich field layer of low-growing, medium-lime-demanding herbs and graminids, especially semi-grasses. Poorly developed bottom layer of moisture-demanding mosses.

Ecological characteristics: Characterized by a medium-long snow cover that protects the vegetation from low temperatures in winter. The snow usually melts in June/July. Found on slopes on somewhat calcareous soil with sprinkling of meltwater from snowdrifts for most of the season. Borders downwards towards wet snow beds or late snow beds, and upwards towards lee side or mountain heath. Spring-influenced snow beds are delimited to moderate snow beds along the variable snow cover-related growth reduction, and are distinguished from other moderate snow beds by spring water influence, i.e. supply of fresh, oxygen- and lime-rich groundwater where the water movement is parallel to the ground surface. See T7-C-12 for distinction from wet snow beds (V6). Distinguished from poorer types with the presence of several moderately lime-requiring species.

Terrain and aerial photo characteristics: Under slopes on very gently sloping ground.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T7-13	T7-B-13	T7-C-13	T7-D-4	T7-E-4
Basic types		T7-13	T7-13	T7-6,7,13	T7-6,7,13

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta** = gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Alchemilla glabra</i> smooth marigold v;s-[KA-fle],s-[Kl-bla]	<i>Lysimachia europaea</i> forest star v;s*[SV-blc],s-[KA-gh]	<i>Salix herbacea</i> mouse ear v;s-[SV-blc],s+[KA-gh]
<i>Alchemilla glomerulans</i> spring ladybug v;s-[Kl-bl-a]	<i>Micranthes stellaris</i> Starfish	<i>Saussurea alpina</i> mountain thistle v;s*[SV-blc],t*[KA-fg]
<i>Arabis alpina</i> mountain ash flower v;ta[KA-f g],s-[Kl-bla]	<i>Omalotheca norvegica</i> s+[SV-blc]	<i>Saxifraga cernua</i> bud herring ta[SV-ab],s+[KA-fle]
<i>Bartsia alpina</i> blacktop v;s*[SV-blc],ta[KA-fg]	<i>Oxyria digyna</i> mountain acid v;s-[SV-blc],s-[KA-fle],s-[Kl-bla]	<i>Selaginella selaginoides</i> dwarf dwarf v;s+[SV-blc],ta[KA-fg]
<i>Bistorta vivipara</i> harerug v*s-[KA-fle]	<i>Petasites frigidus</i> mountain plague s+[KA-fle]	<i>Solidago virgaurea</i> golden rice v;s-[SV-blc],s+[KA-gh]
<i>Carex atrata</i> black starr v;s+[SV-blc],s*[KA-fle]	<i>Phleum alpinum</i> mountain timotei ta[SV-ab]	<i>Taraxacum crocea</i> agg. mountain lion teeth v;s-[KA-gh],s-[Kl-bla]
<i>Carex lachenalii</i> grouse starr v	<i>Poa alpina</i> mountain thrush v;s-[SV-blc],s-[KA-fle]	<i>Trisetum spicatum</i> black sedge v;s-[KA-gh]
<i>Ceratium cerastoides</i> glacier heritage v;s-[KA-fle],s-[Kl-bla]	<i>Pyrola minor</i> pearl wintergreen v;s-[SV-blc],s-[KA-gh]	<i>Vahlodea atropurpurea</i> grouse pile
<i>Deschampsia alpina</i> mountain pile v;s-[Kl-bla]	<i>Ranunculus acris</i> ground sunflower v;s+[SV-blc],s-[KA-fle],s-[Kl-bla]	<i>Viola biflora</i> mountain violet v;s+[SV-blc],ta[KA-fg]
<i>Epilobium anagallidifolium</i> dwarf milkweed ta[SV-ab],s-[KA-gh]	<i>Ranunculus pygmaeus</i> dwarf sunflower s-[KA-fle]	<i>Oncophorus virens</i> sedge moss v;s-[SV-blc],ta[KA-fg]
<i>Epilobium lactiflorum</i> white milk	<i>Rumex acetosa</i> meadowsweet v;s-[SV-blc],s-[KA-gh]	<i>Pohlia drummondii</i> red bud nock v;s+[KA-g h],s-[Kl-bla]
<i>Equisetum arvense</i> s+[KA-fle]	<i>Sagina saginoides</i> sedera s+[KA-gh]	
<i>Juncus biglumis</i> twin rush		



Source-influenced weakly calcareous snow bed. Op: Lom: Bøverdalens, Bøvertun. Photo: RH.

Distribution and regional distribution: LA-MA, O2-C1.

Most important types of confusion: Source-influenced intermediate snow bed (T7-C-12), source-influenced calcareous snow bed (T7-C-14), strongly intermediate and slightly calcareous springs (V4-C-2), rich wet snow beds (V6).

Red list status (2018): Snøleie (VU mainland, LC Svalbard;<).

References and type parallels: T8, T9 (VN), C01 snow bed (DNHB13).

T7-C-14 Source-influenced calcareous snow bed

NiN characteristics: Firm ground systems: Snow bed (T7), one base type (14). Defined by LKM: KAÿ5 & SV 1 & Klÿ2. LKM base steps: KAÿhi & SVÿab & Klÿbc.

Physiognomy: Lacks shrub layer. Low-growing, species-rich, open and disjointed field and ground layer of moisture-demanding and lime-demanding species without high coverage.

Ecological characteristics: Characterized by a medium-long snow cover that protects the vegetation from low temperatures in winter. The snow usually melts in June/July. Found on stony, gently sloping or flat ground with an uneven surface characterized by erosion furrows, solar flux valleys and areas affected by frost. Characterized by a thin, very calcareous soil on calcareous rocks with the sprinkling of meltwater from snowdrifts for most of the season. Very calcareous. Borders downwards towards wet snow beds or late snow beds, and upwards towards lee side or mountain heath. Spring-influenced snow beds are delimited to moderate snow beds along the variable snow cover-related growth reduction, and are distinguished from other moderate snow beds by spring water influence, i.e. supply of fresh, oxygen- and lime-rich groundwater where the water movement is parallel to the ground surface. See T7-C-12 for distinction from wet snow beds (V6).

Terrain and aerial photo characteristics: Under slopes on very gently sloping ground.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T7-14	T7-B-14	T7-C-14	T7-D-5	T7-E-5
Basic types		T7-14	T7-14	T7-8,9,14	T7-8,9,14

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta**- gradient t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Alchemilla glabra</i> smooth marigold v;s-[Kl-bla] <i>Alchemilla glomerulans</i> spring ladybug v;s-[Kl-bl-a] <i>Arabis alpina</i> mountain ash flower s-[Kl-bla] <i>Bartsia alpina</i> blacktop v;s*[SV-blc] <i>Bistorta vivipara</i> harerug v* <i>Carex atrata</i> black starr v;s+[SV-blc] <i>Carex lachenalii</i> grouse starr v <i>Cerastium cerastoides</i> glacier heritage v;s-[Kl-bla] <i>Chamerion angustifolium</i> geitrams v;s+[SV-blc] <i>Deschampsia alpina</i> mountain pile v;s-[Kl-bla] <i>Deschampsia cespitosa</i> ssp. <i>cespitosa</i> silver pile v;s-[SV-blc]	<i>Epilobium anagallidifolium</i> dwarf milkweed <i>Equisetum arvense</i> s+[KA-fle] <i>Equisetum scirpoides</i> dwarf rush <i>Equisetum variegatum</i> v ;s+[SV-blc],s-[KA-hlg] <i>Juncus biglumis</i> twin rush <i>Micranthes stellaris</i> Starfish <i>Oxyria digyna</i> mountain acid v;s-[SV-blc],s-[Kl-bla] <i>Pedicularis oederi</i> s-[KA-hlg] <i>Petasites frigidus</i> mountain plague s-[KA-hlg] <i>Poa alpina</i> mountain thrush v;s-[SV-blc] <i>Ranunculus acris</i> ground sunflower v;s+[SV-blc],s-[Kl-bla] <i>Ranunculus nivalis</i> snow sunflower s-[KA-hlg] <i>Ranunculus pygmaeus</i> dwarf sunflower	<i>Rumex acetosa</i> meadowsweet v;s-[SV-blc] <i>Salix polaris</i> polarvier v;s-[KA-hlg] <i>Saussurea alpina</i> mountain thistle v,s*[SV-blc] <i>Saxifraga aizoides</i> yellow perch ta*[KA-hi] <i>Saxifraga cernua</i> bud ta [SV-ab] <i>Selaginella selaginoides</i> dwarf dwarf v;s+[SV-blc] <i>Taraxacum crocea</i> agg. mountain lion teeth v;s-[Kl-bla] <i>Trisetum spicatum</i> black oak v <i>Viola biflora</i> mountain violet v;s+[SV-blc] <i>Asterella lindbergiana</i> s-[Kl-hlg] <i>Blepharostoma trichophyllum</i> barbed wire mo see v;s-[SV-blc] <i>Preissia quadrata</i> s+[Kl-hlg] <i>Sauteria alpina</i> crater moss s+[Kl-hlg]
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Distribution and regional distribution: LA-MA, O2-C1.

Most important types of confusion: Source-influenced slightly calcareous moderate snow beds (T7-C-13), fairly to extremely calcareous sources (V4-C-3), rich wet snow beds (V6).

Red list status (2018): Snøleie (VU mainland, LC Svalbard;<).

References and type parallels: T9 (VN), C01 snow bed (DNHB13).



Source-influenced calcareous snow bed.
Op: Lom: Bøverdalen, Bøvertun. Photo: RH.

T8-C-1 Fuglefjell meadows

NiN characteristics: Fixed land systems: Fuglefjell-meadow and fugletopp (T8), three basic types (1-3). Defined by LKM: UFÿA & NGÿ1-3. LKM basis steps: UFÿabcd & NGÿabcd & Klÿ0a.

Physiognomy: Fuglefjell meadows are dense and lush grass- and herb-dominated meadow vegetation that occurs most typically on steep slopes below Fuglefjell. The type can also occur on islets and headlands along the coast with a high bird density.

Ecological characteristics: Bird mountain meadows are formed on slopes below and in bird mountains. The bird fertilization produces a soil with a very high content of phosphorus and nitrogen, which more or less overrides variation related to mineral nutrition along the lime content gradient. In places with bird manure, a vegetation dominated by species that utilize elevated nitrogen and phosphorus concentrations develops. The meadows are poor in mosses and lichens are usually lacking. Within the type, there is variation in species composition related to the amount of phosphorus and nitrogen. Differs from spring-affected bird mountain meadows by having smaller elements of species that are favored by fresh spring water, such as tall perennials. Often species-poor, as only a few species can withstand strong natural fertilisation. Fuglefjell meadows are often grazed by sheep.

Terrain and aerial photo characteristics: Distinguished from surrounding rock by clear green colour. Often shadow effects on images due to sloping terrain.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T8-1-3	T8-B-1,2	T8-C-1	T8-D-1	T8-E-1
Basic types		T8-1-3	T8-1-3	T8-1-4	T8-1-4

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Agrostis capillaris</i> meadowsweet v	<i>Festuca rubra</i> red fescue m	<i>Rubus chamaemorus</i> molte v
<i>Aira praecox</i> dvergsmyle v	<i>Festuca vivipara</i> goat's fescue v	<i>Rumex acetosa</i> meadow sorrel v
<i>Anthoxanthum odoratum</i> yellow v	<i>Linaria vulgaris</i> lincod v	<i>Rumex longifolius</i> haymole v
<i>Anthriscus sylvestris</i> dog biscuits v	<i>Luzula multiflora</i> ground beetle v	<i>Sedum acre</i> bitterbergknapp v
<i>Armeria maritima</i> forekoll v	<i>Oxyria digyna</i> mountain acid v	<i>Sedum anglicum</i> coast rock knapp v
<i>Avenella flexuosa</i> smyle v	<i>Plantago lanceolata</i> slimy giant v	<i>Silene uniflora</i> strandschmelle v
<i>Barbarea stricta</i> cress v	<i>Plantago maritima</i> beach giant v	<i>Stellaria media</i> vassarve v
<i>Cerastium fontanum</i> inherit v	<i>Poa annua</i> tunrapp v	<i>Stellaria nemorum</i> forest star flower v
<i>Chamerion angustifolium</i> geitrams v	<i>Poa humilis</i> small rap v	<i>Tripleurospermum maritimum</i> strandbal derbrå v
<i>Cochlearia officinalis</i> scurvy herb m	<i>Poa trivialis</i> markrapp v	<i>Viola tricolor</i> stepmother v
<i>Draba incana</i> lodnerublom v	<i>Rhodiola rosea</i> rose root v	



Bird mountain meadows. MR: Herøy:
Round: Raudenipa/Storehaugen. Photo: RH.

Distribution and regional distribution: BN-NB and ASHTZ, O3-OC. Most common along the outer coast from MR to Fi.

Most important types of confusion: Open shallow land (T2), moss tundra (T9), semi-natural meadow (T32).

Red list status (2018): Fuglefjell meadow and fugletopp (VU on the mainland, LC on Svalbard;<) and fuglefjell meadow (NT on Svalbard;=).

References and type parallels: X2 (VN), G10 bird mountain (DNHB13)

T8-C-2 Fuglefjell-Högstaudeen meadow

NiN characteristics: Fixed land systems: Bird mountain meadow and bird peak (T8), one basic type (4). Defined by LKM: UFyA & NGy1 & Klý2. LKM base steps: UFyabcd & NGyb & Klýbc.



Physiognomy: Fuglefjell-högstaude-mead is source-influenced dense and lush grass- and herb-dominated meadow vegetation that occurs most typically on steep slopes below Fuglefjell.

Ecological characteristics: Fuglefjell-högstaude-mead forms on slopes below and in Fuglefjell in places affected by spring water. The bird fertilization produces a soil with a very high content of phosphorus and nitrogen, which more or less overrides variation related to mineral nutrition along the lime content gradient. In places with bird manure, a vegetation dominated by species that utilize elevated nitrogen and phosphorus concentrations develops. The meadows are poor in mosses and lichens are usually lacking.

Fuglefjell-högstaude-eng. MR: Herøy: Round: Kaldekloven.
Photo: RH.

Within the type, there is variation in species composition related to the amount of phosphorus and nitrogen. Often species-poor, as only a few species can withstand strong natural fertilisation. Distinguished from other bird mountain meadows by being dominated by species that are favored by fresh spring water, typically tall perennials. Fuglefjell meadows are often grazed by sheep.

Terrain and aerial photo characteristics: Distinguished from surrounding rock by clear green colour. Often shadow effects on images due to sloping terrain.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T8-B-3	T8-C-2	T8-D-1	T8-E-1
Basic types	T8-4	T8-4	T8-4	T8-1-4	T8-1-4

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity species (t* = characteristic t., t̄- gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.)

<i>Agrostis capillaris</i> meadowsweet v	<i>Festuca rubra</i> red fescue v	<i>Silene dioica</i> red jonsokblom v
<i>Angelica archangelica</i> ssp. <i>archangelica</i> mountain water v	<i>Festuca vivipara</i> goat's fescue v	<i>Stellaria nemorum</i> forest star flower v
<i>Anthriscus sylvestris</i> dog biscuits v	<i>Oxyria digyna</i> mountain acid v	<i>Tripleurospermum maritimum</i> strandbal derbrå v
<i>Chamerion angustifolium</i> geitrams v	<i>Poa trivialis</i> markrapp v	<i>Valeriana sambucifolia</i> root v
<i>Cochlearia officinalis</i> scurvy herb m	<i>Rumex acetosa</i> meadow sorrel v	
	<i>Rumex longifolius</i> haymole v	

Distribution and regional distribution: BN-NB and ASHTZ, O3-OC. Most common along the outer coast from MR to Fi.

Most important types of confusion: Open shallow land (T2), moss tundra (T9), semi-natural meadow (T32).

Red list status (2018): Fuglefjell meadow and bird peak (VU on the mainland, LC on Svalbard;<).

References and type parallels: X2 (VN), G10 bird mountain (DNHB13)

T8-C-3 Bird peak

NiN characteristics: Fixed land systems: Bird mountain meadow and bird peak (T8), one basic type (5). Defined by LKM: UFyb & NGy1. LKM basic steps: UFyefgh & NGyab.

Physiognomy: Bird peaks are marked tufts at high points in the terrain that are regularly used by birds.

Consists of lush grass- and herb-dominated vegetation which is favored by a high nutrient content.

Ecological characteristics: Bird peaks are tufts that form at high points in the terrain or other places with a wide view, which birds regularly use. The bird's peaks cover a small area and occur in other open habitats, most often coastal heathland or open shallow land. The bird fertilization produces a soil with a very high content of phosphorus and nitrogen, and in bird-fertilized places a vegetation dominated by species that utilize elevated nitrogen and phosphorus concentrations develops. The bird peaks lack mosses and lichens and are species-poor. Distinguished from the surrounding vegetation by a strong influence of nitrophilous species and a marked tuft shape. It also differs from bird rock meadows by being more prone to drought.



Bird top. No: Bodø: Bliksvær. Photo: RH.

Terrain and aerial photo characteristics: Usually small areas in the highest places in the terrain, often in coastal heather and difficult to distinguish from surrounding vegetation on aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T8-5	T8-B-4	T8-C-3	T8-D-2	T8-E-2
Basic types		T8-5	T8-5	T8-5	T8-5

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Achillea millefolium</i> yarrow v	<i>Draba incana</i> lodnerblom v	<i>Rhodiola rosea</i> rose root v
<i>Antennaria dioica</i> cat's foot v	<i>Festuca ovina</i> sheep fescue v	<i>Rubus saxatilis</i> teaberry v
<i>Armeria maritima</i> forekoll v	<i>Festuca rubra</i> red fescue v	<i>Rumex acetosa</i> meadow sorrel v
<i>Campanula rotundifolia</i> bluebell v	<i>Festuca vivipara</i> goat's fescue v	<i>Sagina nodosa</i> budding heirloom v
<i>Cerastium fontanum</i> inherit v	<i>Potentilla crantzii</i> spotted wall v	<i>Sedum acre</i> bitterbergknapp v
<i>Cochlearia officinalis</i> scurvy herb v	<i>Ranunculus acris</i> ground soleie v	<i>Sedum anglicum</i> coast rock knapp v
		<i>Silene uniflora</i> strandschmelle v

Distribution and regional distribution: BN-NB and ASHTZ, O3-OC. Most common along the outer coast from MR to Fi.

Most important types of confusion: Open shallow land (T2), moss tundra (T9), semi-natural meadow (T32).

Red list status (2018): Fuglefjell meadow and bird peak (VU on the mainland, LC on Svalbard;<).

References and type parallels: X2 (VN)

T9-C-1 Poor-intermediate moss tundra

NiN characteristics: Permanent land systems: Moss tundra (T9), one basic type (1). Defined by LKM: KAÿ1.
LKM base step: KAÿcde.

Physiognomy: Characterized by moss mats that lie directly on permafrost layers. Scattered vascular plants.

Ecological characteristics: Mossy tundra is arctic, permafrost-conditioned moss-dominated land without wetland characteristics. It is conditioned by the combination of permafrost and natural fertilization and is characterized by continuous mats of large, relatively fast-growing mosses that lie directly on a permafrost layer 20–40 cm below the moss surface. Mossy tundra is a peat-forming system, but is distinguished from wetland by the lack of a free groundwater table in the active layer. Typically found on slopes with a 5–30° slope under bird rock. Bird fertilization gives high productivity and the combination of low temperatures and the fact that the moss mat insulates deeper soil layers against heat means that decomposition is lower than production, so that accumulation of organic material takes place. In Svalbard there is also a special type of moss tundra in flatter terrain conditioned by fertilization from large populations of stationary Svalbard reindeer.

The moss mats are also not grazed by small rodents, which are lacking in Svalbard. Poor-intermediate moss tundra occurs on slightly lime-poor and intermediate land, and is characterized by the lack of the most lime-demanding species.

In oceanic areas of the northern Arctic, there is often fog, especially where there are high mountains along the coast. In such areas, moss-dominated vegetation develops because high humidity, low temperatures and little sun favor mosses over vascular plants. Some of these areas are little affected by fertilization. It is unclear whether these areas are included in moss tundra (T9) or should be considered a separate type.

Terrain and aerial photo characteristics: Mainly in sloping terrain under bird rock. Also found outside birdfjell, on slightly hilly ground with strong reindeer grazing.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T9-1	TP-B-1	T9-C-1	T9-D-1	T9-E-1
Basic types		T9-1	T9-1	T9-1	T9-1

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+ =** strong relative s., **s- =** weak relative s.)

<i>Equisetum arvense</i> ssp. <i>alpine</i> po larsnelle v	<i>Aulacomnium palustre</i> peat moss v <i>Sanionia uncinata</i> claw white moss v	<i>Polytrichastrum alpinum</i> mountain binnemoss v
<i>Alopecurus ovatus</i> arctic fox butt v	<i>Polytrichum strictum</i> felt bear moss v	
<i>Luzula arcuata</i> bow fly v <i>Salix polaris</i> polarvier v	<i>Aplodon wormskjoldii</i> cadaver moss v	

Distribution and regional distribution: NATZ. Typical arctic tundra zone, in the middle arctic zone only smaller areas on north-facing slopes.

Most important types of confusion: Calcareous moss tundra (T9-C-2), bird mountain meadows (T8)

Red list status (2018): Mossy tundra (LC;<).

References and type parallels:

T9-C-2 Calcareous moss tundra

NiN characteristics: Fixed land systems: Moss tundra (T9), one basic type (2). Defined by LKM: KAy2. LKM base step: KAyfghi.

Physiognomy: Characterized by moss mats that lie directly on permafrost layers. Scattered vascular plants.

Ecological characteristics: Mossy tundra is arctic, permafrost-conditioned moss-dominated land without wetland characteristics. It is conditioned by the combination of permafrost and natural fertilization and is characterized by continuous mats of large, relatively fast-growing mosses that lie directly on a permafrost layer 20–40 cm below the moss surface. Mossy tundra is a peat-forming system, but is distinguished from wetland by the lack of a free groundwater table in the active layer. Typically found on slopes with a 5–30° slope under bird rock. Bird fertilization gives high productivity and the combination of low temperatures and the fact that the moss mat insulates deeper soil layers against heat means that decomposition is lower than production, so that accumulation of organic material takes place. In Svalbard there is also a special type of moss tundra in flatter terrain conditioned by fertilization from large populations of stationary Svalbard reindeer. The moss mats are also not grazed by small rodents, which are lacking in Svalbard. Calcareous moss tundra occurs on slightly calcareous ground, and is characterized by the fact that even the most calcareous species are often found. Golden moss is an important species.

In oceanic areas of the northern Arctic there is often fog, especially where there are high mountains along the coast. In such areas, moss-dominated vegetation develops because high humidity, low temperatures and little sun favor mosses over vascular plants. Some of these areas are little affected by fertilization. It is unclear whether these areas are part of the moss tundra (T9) or should be defined as a separate type.

Terrain and aerial photo characteristics: Mainly in sloping terrain under bird rock. Also found outside birdfjell, on slightly hilly ground with strong reindeer grazing.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		TP-B-2	T9-C-2	T9-D-2	T9-E-2
Basic types	T9-2	T9-2	T9-2	T9-2	T9-2

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Bistorta vivipara</i> harerug v <i>Equisetum arvense</i> ssp. <i>alpine</i> po larsnelle v <i>Equisetum variegatum</i> mountain fescue v <i>Ranunculus hyperboreus</i> swamp soleie v <i>Salix polaris</i> polarvier v <i>Aneura pinguis</i> fat moss v <i>Aulacomnium turgidum</i> rock felt moss v <i>Brachythecium turgidum</i> mountain-alve moss v <i>Breidleria pratensis</i> shriveled moss v	<i>Bryum pseudotriquetrum</i> see v <i>Calliergon richardsonii</i> swamp iron moss v <i>Catoscopium nigritum</i> black button moss v <i>Dicranum angustum</i> grass sided t*:s+[KA:glf] <i>Distichium capillaceum</i> cushion plan moss s+ [KA:fle] <i>Ditrichum flexicaule</i> storburst v <i>Drepanocladus trifarium</i> navargulmose v	<i>Loeskypnum badium</i> brass moss v <i>Meesia uliginosa</i> nervous swan moss v <i>Pseudocalliergon brevifolium</i> arctic yellow moss v <i>Sanionia uncinata</i> claw white moss v <i>Sarmentypnum tundrae</i> chinchnut moss v <i>Timmia norvegica</i> vortesliremose v <i>Tomentypnum nitens</i> golden moss m;t*:s+[KA:glf]
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Distribution and regional distribution: NATZ. Typical arctic tundra zone, in the middle arctic zone there are only smaller areas on north-facing slopes.

Most important types of confusion: Poor-intermediate moss tundra (T9-C-1), bird mountain meadows (T8)

Red list status (2018): Mossy tundra (LC;<).

References and type parallels:

T10-C-1 Arctic steppes

NiN characteristics: Mainland systems: Arctic steppe (T10), two basic types (1,2). Defined by LKM: Vlý1,2. LKM base step: Vlý0abc.

Physiognomy: Grass-dominated scattered vegetation on dry soil with salt enrichment in the upper soil layer.

Ecological characteristics: Arctic steppe is characterized by soils characterized by upward water transport, salt enrichment near the soil surface and pH usually in the range 8.5–10.5. The type is known from distinctly continental areas along the Wijdefjorden in Svalbard, an area with a strong rain shadow and very dry climate (well below 100 mm average annual rainfall). The dry conditions result in upward transport of water with salt enrichment close to the soil surface. The pH in the soil is very high, typically 8.5–10.5. Here, steppe vegetation characterized by the dominance of grassy species has developed, and mosses and lichens, which are otherwise common in the Arctic, are missing. Extreme heather with a lack of snow in the winter and extreme drying in the summer dominates in the mapping unit with polar salt grass *Puccinellia angustata* and tueumure *Potentilla pulchella* as the most important species and features of stiltgrass *Poa hartzii* and Svalbard salt grass *Puccinellia svalbardensis*. The mapping unit also occurs in somewhat less wind-exposed places, then often with a dominance of mountain red fescue *Festuca rubra* ssp. *richardsonii* and purple cress *Braya glabella* ssp. *purpurascens*. Dry steppe-like vegetation without salt enrichment with a dominance of sedge *Carex rupestris* is to be typified as continental designs of Fjellhei, leeside and tundra (T3).

Terrain and aerial photo characteristics: Open and sparse vegetation both on blown-off slopes and in more wind-sheltered places.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T10-B-1.2	T10-C-1	T10-D-1	T10-E-1
Basic types	T10-1,2	T10-1.2	T10-1,2	T10-1,2	T10-1,2

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

Arenaria pseudofrigida calcareous v Braya glabella ssp. <i>purpurascens</i> purple cress v Calamagrostis <i>purpurascens</i> steppe sedge kvein v	<i>Carex rupestris</i> rock sedge v <i>Festuca rubra</i> ssp. <i>richardsonii</i> mountain red's wing v <i>Poa abbreviata</i> puterapp v	<i>Poa hartzii</i> stirapp v <i>Potentilla pulchella</i> tuemure t* <i>Puccinellia angustata</i> polar salt grass t* <i>Puccinellia svalbardensis</i> Svalbard salt grass v
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Distribution and regional distribution: MATZ, C2. Occurs in continental areas along the Wijdefjord in Svalbard.

Most important types of confusion: Rabber (T14)

Red list status (2018): Arctic steppe (CR;=).

References and type parallels:

T11-C-1 Salt enrichment fields in geolittoral

NiN characteristics: Fixed soil systems: Salt enrichment soil (T11), two basic types (1,3). Defined by LKM: S1ÿA & TVÿ1 and S1ÿB & TVÿ1. LKM basic steps: S1ÿde & S1ÿhi & TVÿcdefgh.

Physiognomy: **Glissen** and low-growing vegetation on gravel, silt or clay, dominated by annual or short-lived herbs. Often dominated by single species and with vegetation-free areas in between.



Salt enrichment fields in geolittoral on gravel. NT: Fosnes: Jøa.
Photo: HB.

Ecological characteristics: Species-poor type with highly specialized, salt-tolerant species, often succulents or species with other adaptations to extreme salinity. Occurs in slight depressions in the lower part of the geolittoral belt in places where salt enrichment of the land takes place due to evaporation of salt water. Ice scouring and erosion from waves and wind prevent the establishment of salt marsh vegetation and contribute to the formation of open, weak depressions. The roughness of the substrate gives an indication of the degree of wave exposure and erosion vulnerability - the rougher, the more exposed. Single-species communities with saltwort are typical on fine-material beaches, somewhat more species-rich vegetation with sammel, marigold, saltwort and saltwort can be found on fine gravel. Seaweed species can be found occasionally. The boundary towards graminid-dominated salt meadows is usually relatively clear.

Terrain and aerial photo characteristics: Gently sloping surfaces and depressions in salt marshes. Photo time in relation to water level affects visibility in aerial photos. FF: The color is also largely controlled by the substrate, which overrides the signals from the vegetation. Texture and color consistent within and between regions.

Mapping rules, map technical specifications and scale adjustments: Composed of the basic types salt enrichment land on gravel in the geolittoral (T11-1) and salt enrichment land on silt and clay in the geolittoral (T11-3). Small deposits will often be included in compound polygons.

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T11-B-1.3	T11-C-1	T11-D-1	T11-E-1
Basic types	T11-1,3	T11-1.3	T11-1,3	T11-1,3	T11-1-3

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **tx-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Lysimachia maritima</i> beach creeper	<i>Salicornia europaea</i> saltwort v*	<i>Spergularia salina</i> saltbendel v
<i>Plantago maritima</i> beach giant	<i>Salicornia procumbens</i> spring saltwort <i>Spergularia media</i> sea urchin	<i>Suaeda maritima</i> saftmelde v <i>Tripolium pannonicum</i> beach star

Distribution and regional distribution: BN-NB, O3-OC. Found along the entire coast. Thins out northwards, and is relatively rare in Troms/Finnmark.

Most important types of confusion: Salt enrichment land on gravel in the supralittoral (T11-2), euphotic marine sediment bed (M4), marine underwater bed (M7).

Red list status (2018): Salt enrichment land in the spring zone (LC;<).

References and type parallels: U3 (VN). Parts of G05 (DNHB-13).

T11-C-2 Upper salt enrichment field on gravel

NiN characteristics: Fixed soil systems: Salt enrichment soil (T11), one soil type (2). Defined by LKM: S1ÿA & TVÿ2. LKM basic level: S1ÿde & TVÿijk.

Physiognomy: **Glissen** and low-growing vegetation on gravel or finer material, dominated by annual or short-lived herbs. Often dominated by single species and with parts free of vegetation, or more or less free of vegetation.

Ecological characteristics: Species-poor type with highly specialized, salt-tolerant species, often succulents or species with other adaptations to extreme salinity. Occurs in slight depressions in the supralittoral in places where seawater remains after high tides so that salt enrichment of the land takes place when the saltwater evaporates; typically in openings and depressions in closed salt marsh vegetation. Becomes less common towards the north because the cooler climate results in reduced evaporation of salt water.

Terrain and aerial photo characteristics: Depressions and openings in salt marshes, gently sloping surfaces. Photo time in relation to water level affects visibility in aerial photos. FF: Mostly light green color with a very even texture. Texture and color consistent within regions.

Mapping rules, map technical specifications and scale adjustments: Small deposits will be included in composite polygons.

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T11-B-2	T11-C-2	T11-D-2	T11-E-1
Basic types	T11-2	T11-2	T11-2	T11-2	T11-1-3

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Juncus gerardii</i> salt reed	<i>Salicornia europaea</i> saltwort v	<i>Spergularia salina</i> saltbendel
<i>Lysimachia maritima</i> beach creeper	<i>Salicornia pojarkovae</i> white sea saltwort	<i>Suaeda maritima</i> sapmelde
<i>Odontites litoralis</i> beach red top v	<i>Salicornia procumbens</i> spring saltwort	<i>Triplium pannonicum</i> beach star v
<i>Plantago maritima</i> beach giant v		

Distribution and regional distribution: BN-NB, O3-OC. Found along the entire coast. Thins out northwards, and is relatively rare in Troms/Finnmark.

Most important types of confusion: Geolittoral salt enrichment land (T11-C-1).

Red list status (2018): Salt enrichment land in the spring zone (LC;<).

References and type parallels: U3 (VN). Parts of G05 (DNHB-13).

T12-C-1 Beach meadows in the lower and middle geolittoral

NiN characteristics: Fixed land systems: Beach meadow (T12), two basic types (1,2). Defined by LKM: TVý1,2. LKM base step: TVýcdef.

Physiognomy: Low-growing, often closed, meadow-like vegetation dominated by salt-tolerant graminids.

Ecological characteristics: Lower part of the salt marsh (lower and middle geolittoral belt) in protected, low-erosion-prone places; most often on fine material (silt and clay), but sometimes on gravel. Regularly inundated by seawater and dominated by specialized, salt-tolerant species. Well drained, without salt enrichment. Often dominated by single species that can occur in relatively distinct belts that run parallel to the shoreline; at the outer end a belt of salt grass, then a belt of salt reeds and within this a belt of red fescue. Brackish water characteristics at river outlets and other places where fresh water is supplied. Beach meadows occur naturally as new land is exposed through uplift. In northern Norway, salt meadows are stable over a long period of time, in southern Norway, meadow-dominated salt meadows are often a short-term successional stage before reeds and/or other tall species enter. The end stage of such successions is often a helophyte saltwater swamp (M8). Strong exposure, grazing by ducks, etc., can help prolong the open meadow stage. Deep, permanent pools in salt marshes belong to saltwater bottoms, most often on sediment bottoms.



Beach meadow in the lower and middle geolittoral. NT: Fosnes: Leirvika. Photo: HB.

Terrain and aerial photo characteristics: Gently sloping surfaces in the outer parts of the salt marsh. Smooth structure. Photo time in relation to water level affects visibility in aerial photo FF: Color usually light green to light brown, but darker if the water level is high at the time of photo or if tall graminids dominate. Very smooth texture. Dry clay and silt can give a grayer colour. Texture and color consistent within regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T12-B-1.2	T12-C-1	T12-D-1	T12-E-1
Basic types	T12-1,2	T12-1.2	T12-1,2	T12-1,2	T12-1-4

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Agrostis stolonifera</i> creeper v <i>Armeria maritima</i> forekoll v <i>Atriplex prostrata</i> færemelde v;s-[TVýflg] <i>Bolboschoenus maritimus</i> sea urchin v;s+[TVýflg] <i>Carex xsalina</i> spring starr v <i>Carex paleacea</i> sea sedge v;s+[TVýflg] <i>Carex subspathacea</i> Arctic sea sedge t* <i>Cochlearia officinalis</i> scurvy herb v	<i>Festuca rubra</i> red fescue m*;v* <i>Juncus gerardii</i> salt reed m*;v* <i>Limonium humile</i> beach gorse t* <i>Lysimachia maritima</i> beach creeper m;v*s+[TVýflg] <i>Phragmites australis</i> roof pipes m*,v <i>Plantago maritima</i> beach giant v* <i>Potentilla anserina</i> ssp. <i>anserina</i> goose wall v <i>Puccinellia maritima</i> spring salt grass v <i>Puccinellia phryganodes</i> carpet salt grass v	<i>Salicornia europaea</i> saltwort s-[TVýflg] <i>Spergularia salina</i> saltbendel s-[TVýflg] <i>Stellaria humifusa</i> Arctic star flower <i>Suaeda maritima</i> sapmelde s-[TVýflg] <i>Triglochin maritima</i> spring onion v;s-[T Výflg] <i>Tripleurospermum maritimum</i> strandbal derbrå v <i>Triplium pannonicum</i> starfish v*;s-[TVýflg]
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Distribution and regional distribution: BN-NB and ASHTZ, O3-OC. Found along the entire coast. Regional layouts with characteristic species composition for southern (south-eastern) and northern (north-eastern) salt meadows.

Most important types of confusion: Beach meadow in the upper geolittoral and supralittoral (T12-C-2), semi-natural salt marsh (T33). T12 is distinguished from semi-natural salt meadows by the lack of a clear element of semi-natural species.

Red list status (2018): Strandeng (VU mainland, NT Svalbard;<).

References and type parallels: U4 (VN), G05 (DNHB-13).

T12-C-2 Beach meadows in the upper geolittoral and supralittoral

NiN characteristics: Fixed land systems: Beach meadow (T12), two basic types (3,4). Defined by LKM: TVý3,4.

LKM basic step: TVýghijk.

Physiognomy: Low-growing, stunted, meadow vegetation dominated by salt-tolerant graminids and herbs.

Ecological characteristics: Upper part of the salt marsh (upper geolittoral and supralittoral belt) in protected, low erosion-prone places, most often on fine material (silt and clay), but sometimes on gravel. Flooded by seawater at high tide or spring tides. Well drained, without salt enrichment. Brackish water characteristics in places with a supply of fresh water. Herbaceous vegetation dominated by salt-tolerant land plants in addition to beach plants. Beach meadows occur naturally as new land is exposed through uplift. In northern Norway, low-growing, herbaceous salt meadows are stable over a long period of time, also in the upper part of the spring belt. In southern Norway, this mapping unit is most often dominated by reeds and other tall species, while salt meadows with a meadow feel are most often the result of heavy grazing and therefore semi-natural salt meadows (T33). Beach meadows with low-growing herbs and grasses can be species-rich, and several rare vascular plants are associated with the type. Deep, permanent pools in salt marshes belong to saltwater bottoms, most often on sediment bottoms.



Beach meadow in the upper geolittoral and supralittoral. No: Andøy: Bjørnskinn, Store Risøya. Photo: RH.

Terrain and aerial photo characteristics: Gently sloping surfaces in the outer parts of the salt marsh. Mostly smooth structure. FF: Color most often light green to green; any drift embankment elements are seen as dark stripes. Smooth texture. Texture and color consistent within regions. Tide level at the time of photography affects visibility in aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T12-B-3,4	T12-C-2	T12-D-2	T12-E-1
Basic types	T12-3,4	T12-3,4	T12-3,4	T12-3,4	T12-1-4

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity species (t* = characteristic t., t# = gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.)

<i>Agrostis stolonifera</i> creeper v <i>Armeria maritima</i> spring colt v* <i>Artemisia vulgaris</i> burot s+[TVýglf] <i>Blysmopsis rufa</i> rustsivaks v <i>Carex xsalina</i> spring starr v <i>Carex xvaccinoides</i> saltmarsh v <i>Carex distans</i> glisnestarr s-[TVýglf] <i>Carex glareosa</i> gravel sedge <i>Carex maritima</i> bow star <i>Centaurium littorale</i> s-[TVýglf] <i>Festuca rubra</i> red fescue m*;v* <i>Filipendula ulmaria</i> meadowsweet v <i>Gentianella aurea</i> pale sweet v	<i>Gentianopsis detonsa</i> feather sweet <i>Juncus gerardii</i> salt reed m;v* <i>Ligusticum scoticum</i> beach biscuits v <i>Lotus corniculatus</i> tiriltongue v;s-[TVýglf] <i>Lysimachia maritima</i> beach creeper v <i>Ophioglossum vulgatum</i> worm tongue s-[TVýglf] <i>Parnassia palustris</i> jåblom v <i>Phragmites australis</i> roof pipe m*[S];v*[S] <i>Plantago major</i> plantain v;s+[TVýglf] <i>Plantago maritima</i> beach giant v <i>Poa pratensis</i> engrapp v <i>Polygonum aviculare</i> tungras v <i>Potentilla anserina</i> ssp. <i>anserina</i> goose wall v	<i>Rhinanthus minor</i> small meadow call s-[TVýglf] <i>Rumex crispus</i> krushaymol v <i>Sagina nodosa</i> budding heirloom v <i>Scorzoneroidea autumnalis</i> follblom v;s-[TVýglf] <i>Sonchus arvensis</i> akerdylle v <i>Trifolium repens</i> white clover v;s-[TVýglf] <i>Triglochin maritima</i> spring onion v <i>Triglochin palustris</i> marsh onion v <i>Tripleurospermum maritimum</i> strandbal derbrå v* <i>Tripolium pannonicum</i> beach star v <i>Vicia cracca</i> bird's vetch v
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Distribution and regional distribution: BN-NB and ASHTZ, O3-OC. Found along the entire coast. Regional designs with characteristic species composition for southern and northern salt meadows.

Most important types of confusion: Lower and middle salt marsh (T12-C-1), semi-natural salt marsh (T33).

T12 is distinguished from semi-natural salt meadows by lacking a clear element of species that characterize semi-natural systems.

Red list status (2018): Strandeng (VU mainland, NT Svalbard;<).

References and type parallels: U5 (VN). G05 (DNHB-13).

T13-C-1 Lime-poor rough watch

NiN characteristics: Solid ground systems: Turf (T13), one ground type (1) and parts of a dissolved ground type (16). Defined by LKM: UEy2 & KAy1 & S1yA. LKM base steps: UEydefg & KAyabc & S1yb.

Physiognomy: Open block-dominated bare scrubland or with moss and lichen vegetation.

Ecological characteristics: Lime-poor coarse rock consists of large blocks that have come down from the overlying rock through rock slides and rockfalls. It is distinguished from open lowland land (T2), mountain heath, lee side and tundra (T3) and heath meadow and heath (T16) by lacking soil cover and by being dominated by mosses and lichens. Drought-tolerant vascular plants can be established on top of large blocks. Lime-poor rough ur is distinguished from other wasteland by the dominance of very coarse weathering material, significantly large blocks (size between approx. 26 and 410 cm) and by the lime content in the bedrock. Lime-poor coarse ur lacks lime-demanding mosses and lichens. The nature type comprises low-limestone coarse slag that is exposed to drought, while moist coarse slag belongs to T13-C-10. With desiccation exposure is meant the humidity of the air close to the ground and in T13-C-1 the humidity is low (fairly to very exposed to desiccation). Desiccation exposure depends, among other things, on sun exposure, and dry grasslands are exposed to light and are often located in open terrain, not covered by a dense layer of trees, and on steep slopes facing S-SW. Unstable stone watches are also included in the type. The largest blocks in a landslide are transported furthest down and in a talus slope, blocks will most often be found in the lower part. The species composition is poorly known and no list of diagnostic species has been drawn up. Only a few examples of species that may occur are inserted below.

Terrain and aerial photo characteristics: Found under rock slopes on steep slopes. Identifiable on aerial photographs based on texture and gray to brown colour. Often lies in shadow on aerial photographs due to steep valley sides.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T13-B-1	T13-C-1	T13-D-1	T13-E-1
Basic types	T13-1	T13-1	T13-1*	T13-1.2*	T13-1.2*

* Note: The basic type T13-16 Unstable rough watch (UE-1-2&KA-1-3&S1-A&RU-B) is dissolved and included in T13-C,D,E-1

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

Examples of species	<i>Arctoparmelia centrifuga</i> large yellow chrysanthemum v;s*[UE-dlc] <i>Arctoparmelia incurva</i> little yellow-crested slave v;s*[UE-dlc] <i>Lecidea lapicida</i> v*s*[UE-dlc] <i>Ophioparma ventosa</i> common seal v;s*[UE-dlc] <i>Parmelia saxatilis</i> gray lichen v <i>Rhizocarpon geographicum</i> common map lichen v	<i>Stereocaulon</i> spp. salt lichen v <i>Umbilicaria cylindrica</i> fringe shield v;s*[UE-dlc] <i>Umbilicaria deusta</i> pin navel lichen v;s*[UE-dlc] <i>Umbilicaria hirsuta</i> meal navel lichen v;s*[UE-dlc] <i>Umbilicaria hyperborea</i> common navel lichen v;s*[UE-dlc] <i>Umbilicaria polyphylla</i> smooth navel lichen v;s*[UE-dlc]
<i>Ptilidium ciliare</i> ground fringe v <i>Hedwigia ciliata</i> gray stone moss ta-[UF-fg];s*[UE-dlc] <i>Hypnum cupressiforme</i> mat flette v <i>Polytrichum juniperinum</i> juniper moss v;s*[UE-dlc] <i>Sanionia uncinata</i> claw white moss v	<i>Arctoparmelia</i> spp. salt lichen v <i>Umbilicaria</i> spp. fringe shield v;s*[UE-dlc] <i>Umbilicaria</i> spp. pin navel lichen v;s*[UE-dlc] <i>Umbilicaria</i> spp. meal navel lichen v;s*[UE-dlc] <i>Umbilicaria</i> spp. common navel lichen v;s*[UE-dlc] <i>Umbilicaria</i> spp. smooth navel lichen v;s*[UE-dlc]	

Distribution and regional distribution: BN-LA, O3-C1.

Most important types of confusion: Other poor and intermediate to slightly calcareous grassland types (T13), grassland and heath (T16).

Red list status (2018): Rasmask (LC;<).

References and type parallels: F1c(VN)



Lime-poor rough watch. Ro: Gjesdal: Gloppedalsura. Photo: HB.

T13-C-2 Lime-poor clock

NiN characteristics: Solid ground systems: Turf (T13), one ground type (2) and parts of a dissolved ground type (17). Defined by LKM: UEÿ2 & KAÿ1 & S1ÿB. LKM base steps: UEÿdefg & KAÿabc & S1ÿc.

Physiognomy: Open rock-dominated bare scrubland with moss and lichen vegetation.

Ecological characteristics: Lime-poor ur consists of rocks that have fallen from the overlying rock through rock slides and rockfalls. It is distinguished from open lowland land (T2), mountain heath, lee side and tundra (T3) and heath meadow and heath (T16) by lacking soil cover and by being dominated by mosses and lichens.

Drought-tolerant vascular plants can be established on top of rocks that have been dormant for a long time. Lime-poor ur is distinguished from other wasteland on the basis of the size of the weathering material with a dominance of stone (size between approx. 6 and 26 cm), and on the basis of the lime content in the bedrock. Lime-poor ur lacks lime-demanding mosses and lichens. The nature type includes low-limestone that is drought-prone, while moist soil belongs to T13-C-11. With desiccation exposure is meant the humidity of the air close to the ground and in T13-C-2 the humidity is low (fairly to very exposed to desiccation). Desiccation exposure depends, among other things, on sun exposure, and dry grasslands are exposed to light and are often located in open terrain, not covered by a dense layer of trees, and on steep slopes facing S-SW. Unstable stone watches are also included in the type. The species composition is poorly known and no list of diagnostic species has been drawn up. Only a few examples of species that may occur are inserted below.



Calcareous urn mainly dominated by stone. SF: Luster:
The wolf in Fortunsdalen. Photo: RH.

Terrain and aerial photo characteristics: Found under rock slopes on steep slopes. Identifiable on aerial photographs based on texture and gray to brown colour. Often lies in shadow on aerial photographs due to steep valley sides.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T13-2	T13-B-2	T13-C-2	T13-D-1	T13-E-1
Basic types		T13-2	T13-2*	T13-1.2*	T13-1.2*

* Note: The basic type T13-17 Unstable watch (UE-1-2&KA-1-3&S1-B&RU-B) is dissolved and included in T13-C,D,E-2

Distribution and regional distribution: BN-LA, O3-C1.

Most important types of confusion: Other poor and intermediate to slightly calcareous grassland types (T13), grassland and heath (T16).

Red list status (2018): Rasmrk (LC;<).

References and type parallels: F1c(VN), B01 south facing (DNHB13)

T13-C-3 Lime-poor gravel and sand-dominated wasteland

NiN characteristics: Solid ground systems: Grassland (T13), one ground type (3) and parts of a dissolved ground type (18). Defined by LKM: UEy2 & KAy1 & S1yC. LKM base steps: UEy defg & KAyabc & S1ydef.

Physiognomy: Gravel and sand-dominated wasteland with moss and lichen vegetation.

Ecological characteristics: Lime-poor gravel and sand-dominated landslides consist of sand and gravel that have come down from the overlying rock through landslides. It is distinguished from open lowland land (T2), mountain heath, lee side and tundra (T3) and heath meadow and heath (T16) by the lack of soil cover and by the lack of stable plant communities. The type is dominated by mosses and lichens, but can also have scattered vascular plants that can withstand severe disturbance. Lime-poor gravel and sand-dominated wasteland is distinguished from other wasteland on the basis of the size of the weathering material dominated by sand and gravel (ie grain size between approx. 0.5 and 6 cm), and on the basis of the lime content in the bedrock. Lime-poor wasteland lacks lime-demanding species. The nature type includes both moist and dry scrublands (all steps along desiccation exposure). Unstable gravel- and sand-dominated heath land is also included in the type. The species composition is poorly known and no list of diagnostic species has been drawn up. Only a few examples of species that may occur are inserted below.

Terrain and aerial photo characteristics: Found under rock slopes on steep slopes. Identifiable on aerial photographs based on texture and gray to brown colour. Often lies in shadow on aerial photographs due to steep valley sides.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T13-3	T13-B-3	T13-C-3	T13-D-2	T13-E-2
Basic types		T13-3	T13-3*	T13-3*	T13-3*

* Note: The ground type T13-18 Unstable gravel and sand-dominated landslide (UE-1-2&KA-1-3&S1-C&RU-B) is dissolved and included in T13-C,D,E-3

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity species (t* = characteristic t., t#- gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.)

Examples of species	<i>Polytrichum piliferum</i> raccoon moss v;s*[UE-dl c] <i>Polytrichum juniperinum</i> juniper moss v;s*[UE-dl c] <i>Cladonia</i> spp. lichen v <i>Peltigera canina</i> bikkjenever v <i>Peltigera</i> spp _ <i>Stereocaulon</i> spp. salt lichen v	<i>Stereocaulon glareosum</i> gravel lichen v <i>Stereocaulon condensatum</i> sandy salt lichen v
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Distribution and regional distribution: BN-LA, O3-C1.

Most important types of confusion: Other poor and intermediate to slightly calcareous grassland types (T13), grassland and heath (T16).

Red list status (2018): Rasmrk (LC;<).

References and type parallels: F1c(VN), B01 south facing (DNHB13)



Lime-poor gravel and sand-dominated alluvial land. SF: Luster: Fortun, Lower Ormelid V. Photo: RH.

T13-C-4 Intermediate and slightly calcareous coarse chert

NiN characteristics: Solid ground systems: Turf (T13), one ground type (4) and parts of a dissolved ground type (16). Defined by LKM: UEy2 & KAy2 & S1yA. LKM base step: UEydefg & KAydefg & S1yb.

Physiognomy: Block-dominated heathland with moss and lichen vegetation.

Ecological characteristics: Intermediate and weakly calcareous coarse gravel consists of large blocks that have come down from the overlying rock through rockslides and rockfalls. It is distinguished from open lowland land (T2), mountain heath, lee side and tundra (T3) and heath meadow and heath (T16) by lacking soil cover and by being dominated by mosses and lichens. Drought-tolerant vascular plants can be established on top of large blocks. Intermediate and weakly calcareous coarse gravel is distinguished from other rubble by the dominance of very coarse weathering material, substantially large blocks (size between approx. 26 and 410 cm) and based on the lime content in the bedrock. The type has somewhat more lime-demanding species than lime-poor types, but lacks lime-demanding mosses and lichens. The natural type is drought-prone (fairly to very desiccation-exposed). With drying exposure is meant the humidity of the air near the ground. Desiccation exposure depends, among other things, on sun exposure, and dry grasslands are exposed to light and are often located in open terrain, not covered by a dense layer of trees, and on steep slopes facing S-SW. Unstable rough watches are also included in the type. The largest blocks in a landslide are transported furthest down and in a talus slope, blocks will most often be found in the lower part. The species composition is poorly known and no list of diagnostic species has been drawn up. Only a few examples of species that may occur are inserted below.

Terrain and aerial photo characteristics: Found under rock slopes on steep slopes. Identifiable on aerial photographs based on texture and gray to brown colour. Often lies in shadow on aerial photographs due to steep valley sides.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T13-4	T13-B-4	T13-C-4	T13-D-3	T13-E-3
Basic types		T13-4	T13-4*	T13-4.5*	T13-4.5*

* Note: The basic type T13-16 Unstable coarse watch (UE-1-2&KA-1-3&S1-A&RU-B) is dissolved and included in T13-C,D,E-4

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

Examples of species Hypnum cupressiforme mat flette v Ptilidium ciliare ground fringe v Syntrichia ruralis pillow hair star v	Parmelia saxatilis gray lichen v Physcia caesia head rosette lichen v;s*[UE-dlc] Physcia dubia lichen v;s*[UE-dlc] Parmelia saxatilis gray lichen v	Rhizocarpon geographicum common map lichen v Stereocaulon spp. salt lichen v Umbilicaria spp. navel lichen v
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Distribution and regional distribution: BN-LA, O3-C1.

Most important types of confusion: Other grassland types (T13), grassland meadow and heath (T16).

Red list status (2018): Rasmrk (LC;<).

References and type parallels: B01 south facing (DNHB13)



Intermediate and slightly calcareous coarse grain. MR: Fræna: Hustad, N for Hostad. Photo: RH.

T13-C-5 Intermediate and slightly calcareous chert

NiN characteristics: Fixed land systems: Turf (T13), one ground type (5) and parts of a dissolved ground type (17). Defined by LKM: UEy2 & KAy2 & S1yB. LKM base step: UEydefg & KAydefg & S1yC.

Physiognomy: Stone-dominated heathland with moss and lichen vegetation.

Ecological characteristics: Intermediate and weakly calcareous urn consists of rock that has fallen from the overlying rock through rock slides and rockfalls.

It is distinguished from open lowland land (T2), mountain heath, lee side and tundra (T3) and heath meadow and heath (T16) by lacking soil cover and by being dominated by mosses and lichens. Intermediate and weakly calcareous ur is distinguished from other rubble on the basis of the size of the weathering material with a dominance of stone (size between approx. 6 and 26 cm) and on the basis of lime content in the bedrock. The type has somewhat more lime-demanding species than lime-poor types, but lacks lime-demanding mosses and lichens. The natural type is drought-prone (fairly to very desiccation-exposed). With drying exposure is meant the humidity of the air near the ground.

Desiccation exposure depends, among other things, on sun exposure, and dry grasslands are exposed to light and are often located in open terrain, not covered by a dense layer of trees, and on steep slopes facing S-SW. Unstable stone watches are also included in the type. The species composition is poorly known and no list of diagnostic species has been drawn up. Only a few examples of species that may occur are inserted below.

Terrain and aerial photo characteristics: Found under rock slopes on steep slopes. Identifiable on aerial photographs based on texture and gray to brown colour. Often lies in shadow on aerial photographs due to steep valley sides.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T13-5	T13-B-5	T13-C-5	T13-D-3	T13-E-3
Basic types		T13-5	T13-5*	T13-4.5*	T13-4.5*

* Note: The basic type T13-17 Unstable watch (UE-1-2&KA-1-3&S1-B&RU-B) is dissolved and included in T13-C,D,E-5



Intermediate and slightly calcareous urn. MR: Fræna: Hustad, N for Hostad. Photo: RH.

Distribution and regional distribution: BN-LA, O3-C1.

Most important types of confusion: Other grassland types (T13), grassland meadow and heath (T16).

Red list status (2018): Rasmrk (LC;<).

References and type parallels: B01 south facing (DNHB13)

T13-C-6 Intermediate and slightly calcareous gravel- and sand-dominated heathland NiN characteristics:

Solid ground systems: Heathland (T13), one soil type (6) and parts of a dissolved soil type (18). Defined by LKM: UEy2 & KAy2 & S1yC. LKM base step: UEydefg & KAydefg & S1ydef.

Physiognomy: Gravel and sand-dominated wasteland with moss and lichen vegetation. Scattered vascular plants.

Ecological characteristics: Intermediate and slightly calcareous gravel and sand-dominated alluvium consists of sand and gravel that has fallen from the overlying rock through landslides. It is distinguished from open lowland land (T2), mountain heath, lee side and tundra (T3) and heath meadow and heath (T16) by the lack of soil cover and by the lack of stable plant communities. The type is dominated by mosses and lichens, but can also have scattered vascular plants that can withstand severe disturbance. Intermediate and slightly calcareous gravel- and sand-dominated alluvial soils are distinguished from other alluvial soils on the basis of the size of the weathering material dominated by sand and gravel (grain size between approx. 0.5 and 6 cm), and on the basis of lime content. The type has somewhat more lime-demanding species than lime-poor types, but lacks lime-demanding mosses and lichens. The nature type includes both moist and dry scrublands (all steps along desiccation exposure). Unstable gravel- and sand-dominated heath land is also included in the type. The species composition is poorly known and no list of diagnostic species has been drawn up. Only a few examples of species that may occur are inserted below.

Terrain and aerial photo characteristics: Found under rock slopes on steep slopes. Identifiable on aerial photographs based on texture and gray to brown colour. Often lies in shadow on aerial photographs due to steep valley sides.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T13-B-6	T13-C-6	T13-D-4	T13-E-4
Basic types	T13-6	T13-6	T13-6*	T13-6*	T13-6*

* Note: The soil type T13-18 Unstable gravel and sand-dominated wasteland (UE-1-2&KA-1-3&S1-C&RU-B) is dissolved and included in T13-C,D,E-6

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

Examples of species Arenaria serpyllifolia sandarve v;s*[UE-dlc]	Arabis hirsuta bergschrinneblom v Erysimum virgatum berggull v Turritis glabra tower herb Abietinella abietina granmose v;s*[KA-eld]	Ptilidium ciliare ground fringe v Syntrichia ruralis pillow hair star v;s+ [KA-eld]
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Distribution and regional distribution: BN-LA, O3-C1.

Most important types of confusion: Other grassland types (T13), grassland meadow and heath (T16).

Red list status (2018): Rasmrk (LC;<).

References and type parallels: B01 south facing (DNHB13)



Intermediate and slightly calcareous gravel- and sand-dominated alluvium. MR: Sunndal: Romfo, Gravemsura. Photo: RH.

T13-C-7 Strongly calcareous coarse urn

NiN characteristics: Solid ground systems: Turf (T13), one ground type (7) and parts of a dissolved ground type (16). Defined by LKM: UEÿ2 & KAÿ3 & S1ÿA. LKM base steps: UEÿdefg & KAÿhi & S1ÿb.

Physiognomy: Block-dominated heathland with moss and lichen vegetation.

Ecological characteristics: Strongly calcareous coarse gravel consists of large blocks that have come down from the overlying rock through rock slides and rockfalls. It is distinguished from open lowland land (T2), mountain heath, lee side and tundra (T3) and heath meadow and heath (T16) by lacking soil cover and by being dominated by mosses and lichens.

Drought-tolerant vascular plants can be established on top of large blocks. Strongly calcareous coarse ura is distinguished from other alluvium by the dominance of very coarse weathering material, significantly large blocks (size between approx. 26 and 410 cm), and by the lime content in the bedrock. It is also drought-prone (fairly to very desiccation-prone) and lime-demanding, drought-tolerant mosses and lichens also characterize the type.

With drying exposure is meant the humidity of the air near the ground.

Desiccation exposure depends, among other things, on sun exposure, and dry grasslands are exposed to light and are often located in open terrain, not covered by a dense layer of trees, and on steep slopes facing S-SW. Unstable rough watches are also included in the type. The largest blocks in a landslide are transported furthest down and in a talus slope, blocks will most often be found in the lower part. The species composition is poorly known and no list of diagnostic species has been drawn up. Only a few examples of species that may occur are inserted below.

Terrain and aerial photo characteristics: Found under rock slopes on steep slopes. Identifiable on aerial photographs based on texture and gray to brown colour. Often lies in shadow on aerial photographs due to steep valley sides.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T13-7	T13-B-7	T13-C-7	T13-D-5	T13-E-5
Basic types		T13-7	T13-7*	T13-7.8*	T13-7.8*

* Note: The basic type T13-16 Unstable coarse watch (UE-1-2&KA-1-3&S1-A&RU-B) is dissolved and included in T13-C,D,E-7

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity species (t* = characteristic t., t- = gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.)

Examples of species Asplenium ruta-muraria murburkne s-[KA-glf] Asplenium trichomanes black jar v*	Rhytidium rugosum paw moss v;s-[KA-glf] Syntrichia ruralis pillow hair star v Phaeophyscia constipata calrosette lichen v;s*[KA-glf]	Physconia muscigena calkdogglav v;s*[KA-glf] Rusavskia elegans raudberglav v*s+[KA-glf] Xanthoparmelia stenophylla yellow stone lichen v;s*[UE-dlc]
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Distribution and regional distribution: BN-LA, O3-C1.

Most important types of confusion: Other intermediate and slightly calcareous scrubland types (T13), scrubland meadow and heath (T16).

Red list status (2018): Rasmrk (LC;<).

References and type parallels: B01 south facing (DNHB13)



Strong calcareous rough watch. Op: Vang: Ø for Vennis. Photo: HB.

T13-C-8 Highly calcareous urn

NiN characteristics: Solid ground systems: Grassland (T13), one ground type (8) and parts of a dissolved ground type (17). Defined by LKM: UEÿ2 & KAÿ3 & S1ÿB. LKM base step: UEÿdefg & KAÿhi & S1ÿc.

Physiognomy: Stone-dominated heathland with moss and lichen vegetation.

Ecological characteristics: Strongly calcareous ur consists of large blocks that have come down from the overlying rock through rock slides and rockfalls. It is distinguished from open lowland land (T2), mountain heath, lee side and tundra (T3) and heath meadow and heath (T16) by lacking soil cover and by being dominated by mosses and lichens. Highly calcareous ur is distinguished from other wasteland based on the size of the weathering material with a dominance of stone (size between approx. 6 and 26 cm), and based on the lime content in the bedrock. It is also drought-prone (fairly to very desiccation-prone) and lime-demanding, drought-tolerant mosses and lichens also characterize the type. With drying exposure is meant the humidity of the air near the ground. Desiccation exposure depends, among other things, on sun exposure, and dry grasslands are exposed to light and are often located in open terrain, not covered by a dense layer of trees, and on steep slopes facing S-SW. Unstable stone watches are also included in the type. The species composition is poorly known and no list of diagnostic species has been drawn up. Only a few examples of species that may occur are inserted below.



Strong calcareous clock. Op: Dovre: Grimsdalen, where Buåi meets Grimsa. Photo: RH.

Terrain and aerial photo characteristics: Found under rock slopes on steep slopes. Identifiable on aerial photographs based on texture and gray to brown colour. Often lies in shadow on aerial photographs due to steep valley sides.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T13-8	T13-B-8	T13-C-8	T13-D-5	T13-E-5
Basic types		T13-8	T13-8*	T13-7.8*	T13-7.8*

* Note: The basic type T13-17 Unstable watch (UE-1-2&KA-1-3&S1-B&RU-B) is dissolved and included in T13-C,D,E-8

Distribution and regional distribution: BN-LA, O3-C1.

Most important types of confusion: Other intermediate and slightly calcareous scrubland types (T13), scrubland meadow and heath (T16).

Red list status (2018): Rasmrk (LC;<).

References and type parallels: B01 south facing (DNHB13)

T13-C-9 Strongly calcareous gravel and sand-dominated alluvial soil

NiN characteristics: Solid ground systems: Grassland (T13), one ground type (9) and parts of a dissolved ground type (18). Defined by LKM: UEy2 & KAy3 & S1yC. LKM base step: UEydefg & KAyhi & S1ydef.

Physiognomy: Gravel and sand-dominated wasteland with moss and lichen vegetation. Scattered vascular plants.

Ecological characteristics: Highly calcareous gravel- and sand-dominated alluvial soil consists of calcareous sand and gravel that has collapsed from the overlying rock through landslides. It is distinguished from open lowland land (T2), mountain heath, lee side and tundra (T3) and heath meadow and heath (T16) by the lack of soil cover and by the lack of stable plant communities. The type is dominated by mosses and lichens, but can also have scattered vascular plants that can withstand severe disturbance. Highly calcareous gravel- and sand-dominated alluvial soil is distinguished from other alluvial soil on the basis of the size of the weathering material dominated by sand and gravel (grain size between approx. 0.5 and 6 cm), and on the basis of lime content. Highly calcareous gravel and sand-dominated heathland is characterized by lime-demanding species. The nature type includes both moist and dry scrublands (all steps along desiccation exposure). Unstable gravel- and sand-dominated heath land is also included in the type. The species composition is poorly known and no list of diagnostic species has been drawn up. Only a few examples of species that may occur are inserted below.

Terrain and aerial photo characteristics: Found under rock slopes on steep slopes. Identifiable on aerial photographs based on texture and gray to brown colour. Often lies in shadow on aerial photographs due to steep valley sides.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T13-B-9	T13-C-9	T13-D-6	T13-E-6
Basic types	T13-9	T13-9	T13-9*	T13-9*	T13-9*

* Note: The soil type T13-18 Unstable gravel and sand-dominated wasteland (UE-1-2&KA-1-3&S1-C&RU-B) is dissolved and included in T13-C, D, E-9

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity type (t* = characteristic t., t- gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.)

Examples of species	<i>Minuartia rubella</i> needle inheritance <i>Papaver radicatum</i> Icelandic poppy t* <i>Saxifraga adscendens</i> skaresildre v <i>Veronica fruticans</i> bergveronika v <i>Turritis glabra</i> Turritis v <i>Abietinella abietina</i> grannose v <i>Syntrichia ruralis</i> pillow hair star v <i>Buellia epigaea</i> ground bean lichen s*[KA-flg]	<i>Peltigera lepidophora</i> shield fists v;s-[KA-flg] <i>Physconia muscigena</i> calkdogglav v;s-[KA-flg] <i>Psora decipiens</i> red brick lichen s*[KA-flg] <i>Psora rubiformis</i> s*[KA-flg] <i>Solorina spongiosa</i> sponge lichen s+[KA-flg]
<i>Arabis hirsuta</i> bergschrinneblom v		
<i>Arenaria norvegica</i> landslide legacy t*		
<i>Draba glabella</i> avalanche flower		
<i>Epipactis atrorubens</i> red flanger		
<i>Erysimum virgatum</i> berggull v		
<i>Euphrasia salisburgensis</i> lapwing t*		

Distribution and regional distribution: BN-LA, O3-C1.

Most important types of confusion: Other intermediate and slightly calcareous scrubland types (T13), scrubland meadow and heath (T16).

Red list status (2018): Rasmek (LC;<).

References and type parallels: B01 south facing (DNHB13)



Strong calcareous clock. Op: Dovre: Grimsdal, where Buåi meets Grimsa. Photo: RH.

T13-C-10 Lime-poor damp coarse clock

NiN characteristics: Solid ground systems: Grassland (T13), one ground type (10) and parts of a dissolved ground type (16). Defined by LKM: UEÿ1 & KAÿ1 & S1ÿA. LKM base step: UEÿabc & KAÿabc & S1ÿb.

Physiognomy: Block-dominated heathland with moss and lichen vegetation.

Ecological characteristics: Lime-poor, moist, coarse gravel consists of large blocks that have fallen from the overlying rock through rock slides and rockfalls. It is distinguished from open lowland land (T2), mountain heath, lee side and tundra (T3) and heath meadow and heath (T16) by lacking soil cover and by being dominated by mosses and lichens. Potted plants can be established on top of large blocks. Lime-poor, moist coarse urs is distinguished from other alluvium by the dominance of very coarse weathering material, significantly large blocks (size between 26 and 410 cm), and based on the lime content in the bedrock. Lime-poor coarse ur lacks lime-demanding mosses and lichens. Lime-poor, moist rough ura is not susceptible to drought and is also characterized by more humid conditions. With drying exposure is meant the humidity of the air close to the ground and in T13-C-10 the humidity is relatively high and stable (not exposed to drying or very or rather slightly exposed to drying). Desiccation exposure depends, among other things, on sun exposure, which decreases behind a closed tree layer, in narrow valleys or in N-NE-facing lysides. Unstable block-rich clocks are also included in the type. The largest blocks in a landslide are transported furthest down and in a talus slope, blocks will most often be found in the lower part. The species composition is poorly known and no list of diagnostic species has been drawn up. Only a few examples of species that may occur are inserted below.



Lime-poor damp rough clock. SF: Aurland: S for Bakka. Photo: RH.

Terrain and aerial photo characteristics: Found under rock slopes on steep slopes. Identifiable on aerial photographs based on texture and gray to brown colour. Often lies in shadow on aerial photographs due to steep valley sides.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T13-10	T13-B-10	T13-C-10	T13-D-7	T13-E-7
Basic types		T13-10	T13-10*	T13-10,11*	T13-10,11*

* Note: The basic type T13-16 Unstable rough watch (UE-1-2&KA-1-3&S1-A&RU-B) is dissolved and included in T13-C,D,E-10

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

Examples of species	<i>Dicranodontium denudatum</i> fleinljåmose s*[UE:cld] <i>Hymenophyllum peltatum</i> hemlock fern s*[UE:cld] <i>Anastrepta orcadensis</i> heimose s*[UE:cld] <i>Mylia taylorii</i> red mussel moss s*[UE:cld]	<i>Cladonia amaurocraea</i> goblet pinglav v <i>Cladonia</i> spp. lichen v <i>Hypogymnia vittata</i> s *[UE:cld] <i>Lepraria membranacea</i> rosette mellow v <i>Peltigera</i> spp _ <i>Stereocaulon dactylophyllum</i> finger salt lichen v <i>Stereocaulon vesuvianum</i> shield salt lichen v
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Distribution and regional distribution: BN-LA, O3-C1.

Most important types of confusion: Other poor and intermediate to slightly calcareous grassland types (T13), grassland and heath (T16).

Red list status (2018): Rasmrk (LC;<).

References and type parallels: F1d(VN), B01 south facing (DNHB13)

T13-C-11 Lime-poor moist urn

NiN characteristics: Fixed land systems: Turf (T13), one ground type (11) and parts of a dissolved ground type (17).

Defined by LKM: UEy1 & KAy1 & S1yB. LKM base steps: UEyabc & KAyabc & S1yc.

Physiognomy: Stone-dominated heathland with moss and lichen vegetation.

Ecological characteristic: Lime-poor moist urn consists of rock that has come down from the overlying rock through rock slides and rockfalls. It is distinguished from open lowland land (T2), mountain heath, lee side and tundra (T3) and heath meadow and heath (T16) by lacking soil cover and by being dominated by mosses and lichens. Low-calcareous moist ur is distinguished from other wasteland on the basis of the size of the weathering material with a dominance of stone (size between approx. 6 and 26 cm), and on the basis of the lime content in the bedrock. Lime-poor coarse ur lacks lime-demanding mosses and lichens. Lime-poor, moist rough ura is not susceptible to drought and is also characterized by more humid conditions. With desiccation exposure is meant the humidity of the air close to the ground and in T13-C-11 the humidity is relatively high and stable (not exposed to desiccation or very or rather slightly exposed to desiccation). Desiccation exposure depends, among other things, on sun exposure, which decreases behind a closed tree layer, in narrow valleys or in N-NE-facing lysides. Unstable stone watches are also included in the type.

The species composition is poorly known and no list of diagnostic species has been drawn up. Only a few examples of species that may occur are inserted below.

Terrain and aerial photo characteristics: Found under rock slopes on steep slopes. Identifiable on aerial photographs based on texture and gray to brown colour. Often lies in shadow on aerial photographs due to steep valley sides.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T13-11	T13-B-11	T13-C-11	T13-D-7	T13-E-7
Basic types		T13-11	T13-11*	T13-10,11*	T13-10,11*

* Note: The basic type T13-17 Unstable watch (UE-1-2&KA-1-3&S1-B&RU-B) is dissolved and included in T13-C,D,E-11

Distribution and regional distribution: BN-LA, O3-C1.

Most important types of confusion: Other poor and intermediate to slightly calcareous grassland types (T13), grassland and heath (T16).

Red list status (2018): Rasmek (LC;<).

References and type parallels: F1d(VN), B01 south facing (DNHB13)



Lime-poor moist clock. MR: Volda: Lia SW for Kjellstad in Bjørkedalen. Photo: RH.

T13-C-12 Intermediate and slightly calcareous moist

coarse ur NiN characteristics: Solid ground systems: Turf (T13), one soil type (12) and parts of a dissolved soil type (16). Defined by LKM: UE \ddot{y} 1 & KA \ddot{y} 2 & S1 \ddot{y} A. LKM base steps: UE \ddot{y} abc & KA \ddot{y} defg & S1 \ddot{y} b.

Physiognomy: Block-dominated heathland with moss and lichen vegetation.

Ecological characteristics: Intermediate and slightly calcareous moist coarse gravel consists of large blocks that have come down from the overlying rock through rock slides and rockfalls. It is distinguished from open lowland land (T2), mountain heath, lee side and tundra (T3) and heath meadow and heath (T16) by lacking soil cover and by being dominated by mosses and lichens. Potted plants can be established on top of large blocks. Intermediate and weakly calcareous moist coarse gravel is distinguished from other alluvium by the dominance of very coarse weathering material, significantly large blocks (size between approx. 26 and 410 cm), and based on the lime content in the bedrock. The type has somewhat more lime-demanding species than lime-poor types, but lacks lime-demanding mosses and lichens. It is not prone to drought and is also characterized by more humid conditions. With desiccation exposure is meant the humidity of the air close to the ground and in T13-C-12 the humidity is relatively high and stable (not exposed to desiccation or very or rather slightly exposed to desiccation). Desiccation exposure depends, among other things, on sun exposure, which decreases behind a closed tree layer, in narrow valleys or in N-NE-facing lysides. Unstable block-rich clocks are also included in the type. The largest blocks in a landslide are transported furthest down and in a talus slope, blocks will most often be found in the lower part. The species composition is poorly known and no list of diagnostic species has been drawn up. Only a few examples of species that may occur are inserted below.



Intermediate and weakly calcareous moist coarse clay. SF: Årdal: Utladalen by Avdalsfossen. Photo: HB.

Terrain and aerial photo characteristics: Found under rock slopes on steep slopes. Identifiable on aerial photographs based on texture and gray to brown colour. Often lies in shadow on aerial photographs due to steep valley sides.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T13-B-12	T13-C-12	T13-D-8	T13-E-8
Basic types	T13-12	T13-12	T13-12*	T13-12,13*	T13-12,13*

* Note: The basic type T13-16 Unstable rough watch (UE-1-2&KA-1-3&S1-A&RU-B) is dissolved and included in T13-C,D,E-12

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **tr-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

Examples of species Cystopteris fragilis brittle lok v Hymenophyllum peltatum hemlock fern s*[UE-cld] Anastrepta orcadensis heimose s*[UE-cld] Breutelia chrysocoma s * [UE-cld] Dicranodontium denudatum fleinljåmose s*[UE-cld]	Homalia trichomanoides gloss moss Hylocomiastrum umbratum shade house moss s-[KA-cld] Isothecium alopecuroides rat tail moss v Isothecium myosuroides mouse tail moss v Neckera complanata flatfell moss Bryoria bicolor short beard s+[UE-cld]	Cetrelia olivetorum magnificent lichen s+[UE-cld] Chrysotrichia chlorina rock powder lichen v Collema flaccidum skjelglye v;s-[UE-cld] Menegazzia terebrata schoddelav s+[UE-cld] Nephroma parile grynvrente v Peltigera praetextata shell fists s-[KA-cld] Sphaerophorus globosus brown coral v
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Distribution and regional distribution: BN-LA, O3-C1.

Most important types of confusion: Other grassland types (T13), grassland meadow and heath (T16).

Red list status (2018): Rasmark (LC;<).

References and type parallels: B01 south facing (DNHB13)

T13-C-13 Intermediate and slightly calcareous moist chert

NiN characteristics: Solid ground systems: Turf (T13), one ground type (13) and parts of a dissolved ground type (17). Defined by LKM: UEy1 & KAy2 & S1yB. LKM base steps: UEyabc & KAydefg & S1yc.

Physiognomy: Stone-dominated heathland with moss and lichen vegetation.

Ecological characteristics: Intermediate and weakly calcareous moist soil consists of rock that has fallen from the overlying rock through rock slides and rockfalls. It is distinguished from open lowland land (T2), mountain heath, lee side and tundra (T3) and heath meadow and heath (T16) by lacking soil cover and by being dominated by mosses and lichens. Intermediate and weakly calcareous wet loam are distinguished from other alluvium based on the size of the weathering material with a dominance of stone (size between approx. 6 and 26 cm), and on the basis of the lime content in the bedrock. The type has somewhat more lime-demanding species than lime-poor types, but lacks lime-demanding mosses and lichens. It is not exposed to drought and is therefore characterized by more humid conditions. With drying exposure is meant the humidity of the air close to the ground and in T13-C-13 the humidity is relatively high and stable (not exposed to drying or very or rather slightly exposed to drying). Desiccation exposure depends, among other things, on sun exposure, which decreases behind a closed tree layer, in narrow valleys or in N-NE-facing lysides. Unstable stone watches are also included in the type. The species composition is poorly known and no list of diagnostic species has been drawn up. Only a few examples of species that may occur are inserted below.



Intermediate and weakly calcareous moist clay. MR: Rauma: Nordre Flatmark. Photo: RH.

Terrain and aerial photo characteristics: Found under rock slopes on steep slopes. Identifiable on aerial photographs based on texture and gray to brown colour. Often lies in shadow on aerial photographs due to steep valley sides.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T13-13	T13-B-13	T13-C-13	T13-D-8	T13-E-8
Basic types		T13-13	T13-13*	T13-12,13*	T13-12,13*

* Note: The basic type T13-17 Unstable watch (UE-1-2&KA-1-3&S1-B&RU-B) is dissolved and included in T13-C,D,E-13

Distribution and regional distribution: BN-LA, O3-C1.

Most important types of confusion: Other grassland types (T13), grassland meadow and heath (T16).

Red list status (2018): Rasmak (LC;<).

References and type parallels: B01 south facing (DNHB13)

T13-C-14 Strongly calcareous moist coarse urn

NiN characteristics: Solid ground systems: Turf (T13), one ground type (14) and parts of a dissolved ground type (16). Defined by LKM: UE^y1 & KA^y3 & S1^yA. LKM basic steps: UE^yabc & KA^yhi & S1^yb.

Physiognomy: Block-dominated grassland with moss and low vegetation.

Ecological characteristics: Strongly calcareous, moist coarse gravel consists of large blocks that have come down from the overlying rock through rock slides and rockfalls. It is distinguished from open lowland land (T2), mountain heath, lee side and tundra (T3) and heath meadow and heath (T16) by lacking soil cover and by being dominated by mosses and lichens. Potted plants can be established on top of large blocks. Strongly calcareous moist coarse gravel is distinguished from other alluvium by the dominance of very coarse weathering material, substantially large blocks (size between approx. 26 and 410 cm), and from calcareous bedrock. The type has lime-demanding mosses and lichens.

It is not prone to drought and is also characterized by more humid conditions. With desiccation exposure is meant the humidity of the air close to the ground and in T13-C-14 the humidity is relatively high and stable (not exposed to desiccation or very or rather slightly exposed to desiccation). Desiccation exposure depends, among other things, on sun exposure, which decreases behind a closed tree layer, in narrow valleys or in N-NE-facing lysides. Unstable block-rich clocks are also included in the type. The largest blocks in a landslide are transported furthest down and in a talus slope, blocks will most often be found in the lower part. The species composition is poorly known and no list of diagnostic species has been drawn up. Only a few examples of species that may occur are inserted below.

Terrain and aerial photo characteristics: Found under rock slopes on steep slopes. Identifiable on aerial photographs based on texture and gray to brown colour. Often lies in shadow on aerial photographs due to steep valley sides.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T13-B-14	T13-C-14	T13-D-9	T13-E-9
Basic types	T13-14	T13-14	T13-14*	T13-14,15*	T13-14,15*

* Note: The basic type T13-16 Unstable rough clock (UE-1-2&KA-1-3&S1-A&RU-B) is dissolved and included in T13-C,D,E-14

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity species (t* = characteristic t., t_a-gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.)

Examples of species	<i>Isothecium alopecuroides</i> rat tail moss v <i>Apometzgeria pubescens</i> scarf moss s*[UE-cl d] <i>Anomodon viticulosus</i> calcareous moss s*[UE-cld] <i>Cololejeunea calcarea</i> spider moss s*[UE-cl d] <i>Homalia trichomanoides</i> gloss moss v	<i>Neckera complanata</i> flatfellmose v <i>Neckera crispa</i> curled moss <i>Cetraria olivetorum</i> magnificent lichen <i>Heterodermia speciosa</i> ivory slave s*[KA-glf] <i>Menegazzia terebrata</i> shoe lichen s*[UE-cld]	<i>Phaeophyscia kairamoii</i> shell rosette lichen s*[KA-hlg] <i>Phaeophyscia sciastra</i> Stifrosette lichen v <i>Physconia detersa</i> brown dogglav s+[KA-glf] <i>Ramalina pollinaria</i> pulvragg v <i>Solorina saccata</i> common shell lichen s+[KA-glf]
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Distribution and regional distribution: BN-LA, O3-C1.

Most important types of confusion: Other intermediate and slightly calcareous scrubland types (T13), scrubland meadow and heath (T16).

Red list status (2018): Rasmrk (LC;<).

References and type parallels: B01 south facing (DNHB13)



Strong calcareous moist coarse clock. Tea:
Porsgrunn: Skjelsvik. Photo: RH.

T13-C-15 Strongly calcareous moist urn

NiN characteristics: Solid ground systems: Grassland (T13), one ground type (15) and parts of a dissolved ground type (17). Defined by LKM: UEy1 & KAy3 & S1yb. LKM base steps: UEyabc & KAyhi & S1yc.

Physiognomy: Stone-dominated heathland with moss and lichen vegetation.

Ecological characteristics: Highly calcareous moist urn consists of rock that has fallen from the overlying rock through rock slides and rockfalls. It is distinguished from open lowland land (T2), mountain heath, lee side and tundra (T3) and heath meadow and heath (T16) by lacking soil cover and by being dominated by mosses and lichens. Strongly calcareous moist urn is distinguished from other alluvial soils by the size of the weathering material with a dominance of stone (size between approx. 6 and 26 cm), and by the calcareous bedrock. The type has lime-demanding mosses and lichens. It is not exposed to drought and is therefore characterized by more humid conditions. With desiccation exposure is meant the humidity of the air close to the ground and in T13-C-15 the humidity is relatively high and stable (not exposed to desiccation or very or rather slightly exposed to desiccation). Desiccation exposure depends, among other things, on sun exposure, which decreases behind a closed tree layer, in narrow valleys or in N-NE-facing lysides. Unstable stone watches are also included in the type. The species composition is poorly known and no list of diagnostic species has been drawn up. Only a few examples of species that may occur are inserted below.



Strongly calcareous moist urn. Op: Dovre: Upper Grimsdalen west of Verkensetra. Photo: RH.

Terrain and aerial photo characteristics: Found under rock slopes on steep slopes. Identifiable on aerial photographs based on texture and gray to brown colour. Often lies in shadow on aerial photographs due to steep valley sides.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T13-15	T13-B-15	T13-C-15	T13-D-9	T13-E-9
Basic types		T13-15	T13-15*	T13-14,15*	T13-14,15*

* Note: The basic type T13-17 Unstable watch (UE-1-2&KA-1-3&S1-B&RU-B) is dissolved and included in T13-C,D,E-15

Distribution and regional distribution: BN-LA, O3-C1.

Most important types of confusion: Other intermediate and slightly calcareous scrubland types (T13), scrubland meadow and heath (T16).

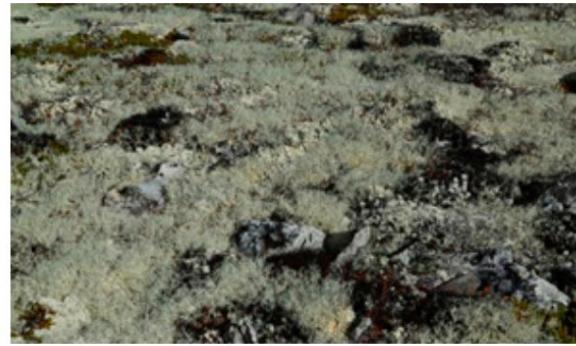
Red list status (2018): Rasmark (LC;<).

References and type parallels: B01 south facing (DNHB13)

T14-C-1 Lime-poor and intermediate rabbe

NiN characteristics: Solid ground systems: Rabbe (T14), one basic type (1) and parts of a dissolved basic type (3). Defined by LKM: VlýAB & KAŷ1. LKM Basic Steps: Vlýabc& & KAŷabcde.

Physiognomy: Sparse or absent shrub layer. Species-poor low-growing field layer of creeping, woody species, drought-tolerant graminids, mosses and lichens. The bottom layer on extreme reefs is dominated by lichen, which can be split up by strong wind erosion.



Lime-poor and intermediate rabbe. He: Stor-Elvdal: Gravskardhøgda west. Photo: HB.

Ecological characteristics: On low to medium calcareous soil, associated with wind-exposed rabs which usually lacks or has a thin and unstable snow cover in winter. The plants have a long growing season. The type is exposed to wind and drying out, as well as large temperature changes. On heavily exposed slopes, the vegetation cover can split up due to erosion, so that mineral soil remains during the day (deflation land). Characterized by species that are snow-clouding, but not lime-demanding. Found at the top of the Rabb snow bed gradient. Great variation from oceanic to continental areas. Heron gray moss and sturgeon are numerous species along the coast, and voles here go far up on the rocks. Dwarf birch grows on ridges in continental **areas. Terrain and aerial photo characteristics:** Ridges are found on convex landforms – mountain peaks, hills, ridges and slightly convex slopes where the wind gets a good hold. Lighter in color than the surroundings.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T14-B-1	T14-C-1	T14-D-1	T14-E-1
Basic types	T14-1	T14-1	T14-1.3*	T14-1.3*	T14-1.3*

* Note: The basic type T14-3 Deflation rabbit (Vlý& & KAŷabcdefghi) dissolves and is included in T14-C,D,E-1

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

Arctostaphylos uva-ursi honeydew	Vaccinium uliginosum blockberry v	Cetraria islandica islandslav v
Arctous alpina grouse berry v	Vaccinium vitis-idaea lingonberry v;s+ [KA-elf]	Cladonia amaurocraea goblet pinglav v;s-[KA-elf]
Betula nana ssp. nana dwarf birch	Dicranum fuscescens bergsigd v;s- [KA-elf]	Cladonia arbuscula light lichen v;s-[KA-elf]
Bistorta vivipara harerug v	Polytrichum juniperinum juniper moss v;s-[KA-elf]	Cladonia rangiferina gray lichen v;s-[KA-elf]
Campanula rotundifolia bluebell v	Polytrichum piliferum raccoon moss v;s-[KA-elf]	Cladonia stellaris white curl v;s+[KA-elf]
Carex bigelowii s- [KA-elf]	Racomitrium lanuginosum heath gray moss m[O1-02]	Cladonia spp. lichen v
Diapensia lapponica fjellpryd v	Alectoria nigricans wolverine v	Flavocetraria cucullata yellow skerpe v
Empetrum nigrum cricket v;s-[KA-elf]	Alectoria ochroleuca raccoon's beard m;v*s- [KA-elf]	Flavocetraria nivalis yellow skin v*
Euphrasia wettsteinii small- eyed thrush	Bryocaulon divergens mountain thorn v;s- [KA-elf]	Pseudoephebe pubescens common stone beard v;s-[KA-elf]
Festuca ovina sheep fescue v	Cetraria aculeata pit tag v	Sphaerophorus fragilis gray coral v
Huperzia appressa mountain loose grass v	Cetraria ericetorum smal Icelandslav v	Sphaerophorus globosus brown coral v
Juncus trifidus rabbesiv v;s-[KA-elf]		Stereocaulon paschale common salt lichen v
Kalmia procumbens greplyng v;s-[KA-elf]		Thamnolia vermicularis makklav v
Luzula arcuata bow fly		
Pulsatilla vernalis mogop		
Salix herbacea mouse ear		
Silene acaulis fjellsnelle v		

Distribution and regional distribution: LA-MA, O2-C1. In the entire mountain range except the coastal section, mostly in LA and in lower parts of MA.

Main types of confusion: Calcareous rabs (T14-C-2), calcareous mountain-low heath (T3-C-3), intermediate mountain-low heath (T3-C-6), poor and intermediate boreal low heath (T31-C-3, T31 -C-6).

Red list status (2018): Rabbe (NT mainland, LC Svalbard;<).

References and type parallels: R1 (VN).

T14-C-2 Calcareous gravel

NiN characteristics: Solid ground systems: Rabbe (T14), one base type (2) and parts of a dissolved base type (3). Defined by LKM: VlýAB & KAý2.

LKM basic steps: Vlý abc¤ & KAýfghi.

Physiognomy: Lacks shrub layer. Medium to very species-rich field layer dominated by dwarf shrubs and woody plants, low field layer of graminids and scattered herbs. Well-developed bottom layer with lichens and mosses that split up due to strong wind erosion.



Calcareous rabbe. Op: Lom: Dumdalen. Photo: HB.

Ecological characteristic: On calcareous soil with high base saturation values. Associated with wind-exposed rabbets that usually lack or have a thin and unstable snow cover in winter and thus have a long growing season. Exposed to wind and drying out, as well as large temperature changes. The soil can be more moist than on limestone-poor rabs, which is due to a higher content of clay particles from weathered bedrock. On heavily exposed slopes, the vegetation cover can split up due to erosion, so that mineral soil remains during the day (deflation land). Characterized by species that are both snow-clouding and lime-demanding.

Terrain and aerial photo characteristics: Rags are found on convex landforms – mountain peaks, hills, ridges and slightly convex slopes where the wind gets a good hold. Can be seen as glowing colors on aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T14-2	T14-B-2	T14-C-2	T14-D-2	T14-E-2
Basic types		T14-2	T14-2.3*	T14-2.3*	T14-2.3*

* Note: The basic type T14-3 Deflation rabbet (Vlý¤ & KAýabcdefghi) dissolves and is included in T14-C,D,E-2

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Antennaria alpina</i> mountain cat 's foot	<i>Comastoma tenellum</i> small sweet s+[KA-fle]	<i>Salix reticulata</i> nettle v;s*[KA-fle]
<i>Arctous alpina</i> grouse berry v	<i>Diapensia lapponica</i> mountain ornamental v;s-[KA-fle]	<i>Saxifraga oppositifolia</i> red herring v;s+[KA-fle]
<i>Artemisia norvegica</i> Norwegian wormwood	<i>Draba nivalis</i> snow rub flower s-[KA-fle]	<i>Silene acaulis</i> fjellsnelle v*s+[KA-fle]
<i>Astragalus alpinus</i> milkweed v;s*[KA-fle]	<i>Draba norvegica</i> bergrblom s-[KA-fle]	<i>Thalictrum alpinum</i> mountain seed star v;s*[KA-fle]
<i>Bistorta vivipara</i> harerug v;s-[KA-fle]	<i>Dryas octopetala</i> reinrose v;s*[KA-fle]	<i>Tofieldia pusilla</i> bear sting v;s*[KA-fle]
<i>Campanula rotundifolia</i> bluebell v	<i>Euphrasia wettsteinii</i> small-eyed thrush s-[KA-fle]	<i>Rhytidium rugosum</i> paw moss v;s*[KA-fle]
<i>Campanula uniflora</i> high mountain bell s-[KA-hlg]	<i>Festuca ovina</i> sheep's fescue v;s-[KA-fle]	<i>Tortella tortuosa</i> pillow mousse
<i>Carex atrata</i> s *[KA-fle]	<i>Huperzia appressa</i> mountain loose grass v;s-[KA-fle]	<i>Alectoria ochroleuca</i> rabbit v
<i>Carex bigelowii</i> ricketts <i>Carex capillaris</i> ricketts s+[KA-fle]	<i>Juncus trifidus</i> rabbetiv v	<i>Cetraria ericetorum</i> smal Icelandslav v
<i>Carex fuliginosa</i> ssp. <i>misandra</i> dub bestar s-[KA-fle]	<i>Kobresia myosuroides</i> rabbetust v;s-[KA-fle]	<i>Cetraria islandica</i> islandslav v
<i>Carex glacialis</i> rabbestar s-[KA-fle]	<i>Minuartia rubella</i> needle inheritance s-[KA-fle]	<i>Cladonia arbuscula</i> light lichen v
<i>Carex rupestris</i> rock sedge v;s+[KA-fle]	<i>Potentilla nivea</i> snow wall s-[KA-hlg]	<i>Cladonia spp.</i> lichen v
<i>Ceratium alpinum</i> mountain heather s+[KA-fle]	<i>Rhododendron lapponicum</i> laprose s-[KA-hlg]	<i>Flavocetraria cucullata</i> yellow skerpe v
<i>Chamorchis alpina</i> mountain curlew s-[KA-fle]		<i>Flavocetraria nivalis</i> yellow skin v
		<i>Thamnolia vermicularis</i> makklav v

Distribution and regional distribution: LA-MB, O2-C1. In the entire mountain range except the coastal section with calcareous rocks and loose masses, mostly in LA and lower parts of MB. The nature type shows great regional floristic variation linked to gradients in oceanicity/continentality and north/south location. The central mountain areas in southern Norway and in northern Norway contain the most rare, lime-demanding mountain species.

Most important types of confusion: Lime-poor and intermediate rabble (T14-C-1), strong calcareous mountain-low heath (T3-C-12), slightly calcareous boreal low heath (T31-C-9), strong calcareous boreal low heath (T31-C-12).

Red list status (2018): Rabbe (NT mainland, LC Svalbard;<).

References and type parallels: R3 (VN), C01 rabbe (DNHB13).

T15-C-1 Calcareous and intermediate fosse-meadow

NiN characteristics: Solid ground systems: Fosse-meadow (T15), one ground type (1). Defined by LKM: KAy1. LKM base step: KAycde.

Physiognomy: Open lush, meadow-like vegetation with herbs and grasses in the field layer, mosses in the bottom layer. Low-growing and with the strongest elements of moss closest to the waterfall, increasing elements of grass, herbs and ferns with greater distance from the waterfall.



Calcareous and intermediate fosse-meadow. No: Rana: Dunderfossen. Photo: HB.

Ecological characteristics: Fosse-mead includes naturally

open, low-lying, but earth-covered, meadow-like moorland areas in the waterfall splash zone along rivers with waterfalls and cascades. Waterfall meadows are primarily found at the outer edge of the waterfall splash zone, especially in the lower part of the waterfall, between waterfall rock and forest or mountain heath and other open solid ground types. Forests are not established, primarily because woody plants cannot withstand freezing in ice in winter. The type is characterized by a constantly moist microclimate, but many species can also tolerate drier periods. The humidity decreases with increasing distance from the waterfall, as the water supply changes from "waterfall rain" with heavy drops near the waterfall to fine "waterfall dust" further away. In the summer it is cooler in the waterfall meadow than in adjacent areas further from the waterfall due to the waterfall spray, in the winter milder until the waterfall eventually freezes with ice. The species in T15-C-1 must therefore withstand freezing into ice in winter. Lime-poor and intermediate fosse meadows lack lime-requiring species.

Terrain and aerial photo characteristics: Relatively clear, light to dark green, relatively homogeneous and treeless areas next to waterfalls. Usually stands out well against the surrounding rock. Steep terrain, may lie in shadow on aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T15-B-1	T15-C-1	T15-D-1	T15-E-1
Basic types	T15-1	T15-1	T15-1	T15-1	T15-1

Diagnostic species m =

abundance species (**m*** = dominant m.); v = common species (**v*** = constant v.); t = center of gravity type (**t*** = characteristic t., **ta-** gradient t.); s = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Athyrium distentifolium</i> fjellburkne s+[KA-dlc]	<i>Calamagrostis phragmitoides</i> forest sorrel vein v,s+[KA-dlc]	<i>Oxyria digyna</i> mountain acid v <i>Rhodiola rosea</i> rose root v
<i>Athyrium filix-femina</i> forest burkne v;s+[KA-dlc]	<i>Cerastium cerastoides</i> glacier heritage v	<i>Rumex acetosa</i> meadow sorrel v
<i>Dryopteris expansa</i> agg. sheep tail v;s-[KA-dlc]	<i>Chamerion angustifolium</i> geitrams v	<i>Solidago virgaurea</i> golden rice v
<i>Oreopteris limbosperma</i> buttertelg v	<i>Cirsium heterophyllum</i> white-leaved thistle v;s-[KA-dlc]	<i>Blindia acuta</i> red sigmoid v
<i>Phegopteris connectilis</i> hanging wing v;s-[KA-dlc]	<i>Deschampsia alpina</i> mountain pile v	<i>Hygrohypnum alpinum</i> step brook moss
<i>Agrostis capillaris</i> meadowsweet v	<i>Deschampsia cespitosa</i> ssp. <i>cespitosa</i> silver pile v	<i>Hylocomiastrum pyrenaicum</i> seat house moss v
<i>Alchemilla glabra</i> smooth marigold v	<i>Epilobium alsinifolium</i> spring milk s+[KA-dlc]	<i>Hylocomium splendens</i> floor moss v
<i>Angelica sylvestris</i> sloke v	<i>Festuca rubra</i> red fescue v	<i>Mylia taylorii</i> red mussel moss v
<i>Anthoxanthum odoratum</i> yellow v;s-[KA-dlc]	<i>Geranium sylvaticum</i> wood stork beak v	<i>Rhytidadelphus loreus</i> coastal wreath moss v
<i>Avenella flexuosa</i> smyle v	<i>Luzula sylvatica</i> large fry v	<i>Rhytidadelphus squarrosus</i> Meadow Wreath moss v
	<i>Micranthes stellaris</i> star trout v	<i>Sarmentypnum exannulatum</i> agg. vrangnökkmose v

Distribution and regional distribution: BN-MA, O3-C1. Probably the whole country, but distribution not known.

Most important types of confusion: Mountain heath, floodplain and tundra (T3), scrub meadow and heath (T16), open flood-resistant land (T18).

Red list status (2018): Fosse-eng (VU;<).

References and type parallels: Q4 (VN), F05 (DNHB13).

T15-C-2 Calcareous waterfall meadow

NiN characteristics: Solid ground systems: Fosse-meadow (T15), one ground type (2). Defined by LKM: KAÿ2.

LKM basic step: KAÿfgh.

Physiognomy: Open lush, meadow-like vegetation with herbs and grasses in the field layer, mosses in the bottom layer. Low-growing and with the strongest elements of moss closest to the waterfall, increasing elements of grass, herbs and ferns with greater distance from the waterfall.



Calcareous waterfall meadow. MR: Sunndal: Åmotan. Photo: RH.

Ecological characteristics: Fosse-mead includes naturally open, low-lying, but earth-covered, meadow-like moorland areas in the waterfall splash zone along rivers with waterfalls and cascades. Waterfall meadows are primarily found at the outer edge of the waterfall splash zone, especially in the lower part of the waterfall, between waterfall rock and forest or mountain heath and other open solid ground types. Forests are not established, primarily because woody plants cannot withstand freezing in ice in winter. The type is characterized by a constantly moist microclimate, but many species can also tolerate drier periods. The humidity decreases with increasing distance from the waterfall, as the water supply changes from "waterfall rain" with heavy drops near the waterfall to fine "waterfall dust" further away. In the summer it is cooler in the waterfall meadow than in adjacent areas further from the waterfall due to the waterfall spray, in the winter milder, until the waterfall eventually freezes over with ice. The species in T15-C-2 must therefore withstand freezing into ice in winter. Calcareous fosse-meadows contain lime-demanding species in addition to species from low-calcareous and intermediate fosse-meadows.

Terrain and aerial photo characteristics: Relatively clear, light to dark green, relatively homogeneous and treeless areas next to waterfalls. Usually stands out well against the surrounding rock. Steep terrain, may lie in shadow on aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T15-2	T15-B-2	T15-C-2	T15-D-2	T15-E-2
Basic types		T15-2	T15-2	T15-2	T15-2

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

Athyrium distentifolium fjellburkne s+[KA-dlc]	Deschampsia cespitosa ssp. cespitosa silver pile v	Saxifraga cernua bud s*[KA-fle]
Athyrium filix-femina forest burkne v;s+[KA-dlc]	Epilobium alsinifolium spring milk s+[KA-dlc]	Saxifraga oppositifolia red herring s*[KA-fle]
Dryopteris expansa agg. sheep tail v;s-[KA-dlc]	Filipendula ulmaria meadowsweet s-[KA-fle]	Solidago virgaurea golden rice v
Agrostis capillaris meadowsweet v	Geranium sylvaticum wood stork beak v	Trollius europaeus ball flower s-[KA-fle]
Alchemilla glabra smooth marigold v	Geum rivale meadow bumblebee v;s+[KA-fle]	Valeriana sambucifolia root v ;s+[KA-fle]
Angelica sylvestris sloke v	Micranthes nivalis snowdrift v;s-[KA-fle]	Climacium dendroides palm moss s-[KA-fle]
Anthoxanthum odoratum yellow v;s-[KA-dlc]	Micranthes stellaris star trout v	Hygrohypnum alpinum step brook moss
Calamagrostis phragmitoides sko gørkvein v	Milium effusum musk grass s-[KA-fle]	Hylocomiastrum pyrenaicum seat house moss v
Cerastium cerastoides glacier heritage v	Oxyria digyna mountain acid v	Hylocomium splendens floor moss v
Chamerion angustifolium geitram v	Poa alpina mountain thrush s+[KA-fle]	Rhytidadelphus triquetrus s- [KA-fle]
Cicerbita alpina turt s-[KA-fle]	Poa nemoralis lundrapp s-[KA-fle]	Sarmentypnum sarmentosum blood neck moss s-[KA-fle]
Cirsium heterophyllum white-leaved thistle v;s-[KA-dlc]	Ranunculus acris ground soleie v;s+[KA-fle]	Scorpidium revolvens red mackerel moss s*[KA-fle]
Deschampsia alpina mountain pile v	Ranunculus repens krypsoleie v;s-[KA-fle]	
	Rhodiola rosea rose root v	
	Rumex acetosa meadow sorrel v	
	Saxifraga aizoides yellow perch s *[KA-fle]	

Distribution and regional distribution: BN-MA, O3-C1. Probably the whole country, but distribution not known.

Most important types of confusion: Mountain heath, floodplain and tundra (T3), scrub meadow and heath (T16), open flood-resistant land (T18).

Red list status (2018): Fosse-eng (VU;<).

References and type parallels: Q4 (VN), F05 (DNHB13).

T16-C-1 Lime -poor heathland meadow and heath NiN

characteristics: Solid ground systems: Heathland heath and meadow (T16), one basic type (1).

Defined by LKM: KAÿ1 & Klÿ1. LKM base steps: KAÿabc & Klÿ0a.

Physiognomy: Meadow or mounded vegetation on steep, landslide-prone slopes.

Ecological characteristics: Rasmarken meadow and heath comprise parts of talus slopes with stabilized, soil-covered ground and closed vegetation. Conditioned by a constant supply of landslide material (snow, stones) from above, but is stable enough for vascular plants to dominate the vegetation.

Sorting the debris with fine material at the top and coarser blocks at the bottom of the debris field means that debris meadows and heaths are most common at the top of debris fields. Bare wasteland lacks soil cover and is dominated by mosses and lichens. Unstabilized vegetation with a clear rasp character distinguishes it from mountain heath. Lacks intermediate and lime-requiring species. Can occasionally be affected by grazing.

Terrain and aerial photo characteristics: Green relatively uniform structure on aerial images contrasts well with bare scrubland, mountains and forest. Often in mosaic with bare wasteland (T13). Steep terrain produces shadow effects.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T16-1	T16-B-1	T16-C-1	T16-D-1	T16-E-1
Basic types		T16-1	T16-1	T16-1	T16-1-7

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradt ent-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Achillea millefolium</i> yarrow v	<i>Epilobium collinum</i> mountain milk v	<i>Rhodiola rosea</i> rose root v
<i>Agrostis capillaris</i> meadow sweet v	<i>Festuca ovina</i> sheep fescue v	<i>Rumex acetosella</i> small acid v
<i>Alchemilla alpina</i> mountain marigold v	<i>Festuca rubra</i> red fescue v	<i>Sedum annuum</i> small rock knapp v
<i>Antennaria dioica</i> cat's foot v	<i>Geranium robertianum</i> stink stork v	<i>Solidago virgaurea</i> golden rice v
<i>Anthoxanthum odoratum</i> yellow v	<i>Hylotelephium maximum</i> butterbuck v	<i>Stellaria graminea</i> grass star flower v
<i>Arctostaphylos uva-ursi</i> honeydew v	<i>Linaria vulgaris</i> lincod v	<i>Trifolium pratense</i> red clover v
<i>Atocion rupestre</i> småsmelle v	<i>Luzula spicata</i> aksfrytle v	<i>Trifolium repens</i> white clover v
<i>Avenella flexuosa</i> smyle v	<i>Molinia caerulea</i> blue top v	<i>Vaccinium vitis-idaea</i> cranberry v
<i>Campanula rotundifolia</i> bluebell v	<i>Myosotis arvensis</i> akerforglemmei v	<i>Vicia cracca</i> bird's vetch v
<i>Cerastium fontanum</i> inherit v	<i>Pilosella officinarum</i> hair fly v	<i>Viola tricolor</i> stepmother v
<i>Dactylis glomerata</i> dog grass v	<i>Polypodium vulgare</i> sisselroot v	<i>Viscaria vulgaris</i> meadow tar flower v
<i>Empetrum nigrum</i> kreklings v	<i>Prunella vulgaris</i> blåkoll v	



Lime-poor grassland and heathland. No: Flakstad: NW for Napp.
Photo: RH.

Distribution and regional distribution: BN-LA, O3-C1. Most common in Western Norway, in Northern Norway and in the mountains.

Most important types of confusion: Open shallow land (T2), mountain heath, lee side and tundra (T3), semi-natural meadow (T32).

Red list status (2018): Rasmarkhei og -eng (LC;<).

References and type parallels: F1ab (VN), B01 in part (DNHB13).

T16-C-2 Intermediate race meadow and heath

NiN characteristics: Grassland systems: Rasmark heath and meadow (T16), one basic type (2). Defined by LKM: KAjy2 & Kljy1. LKM base step: KAjyde & Kljy0a.

Physiognomy: Meadow or mounded vegetation on steep, landslide-prone slopes.

Ecological characteristics: Rasmarken meadow and heath comprise parts of talus slopes with stabilized, soil-covered ground and closed vegetation. Conditioned by a constant supply of landslide material (snow, stones) from above, but is stable enough for vascular plants to dominate the vegetation. Sorting the debris with fine material at the top and coarser blocks at the bottom of the debris field means that debris meadows and heaths are most common at the top of debris fields. Bare wasteland lacks soil cover and is dominated by mosses and lichens. Unstabilized vegetation with a clear rasp character distinguishes it from mountain heath. Lacks lime-requiring species, but contains somewhat more lime-requiring species than lime-poor rasmarken. Can occasionally be affected by grazing.

Terrain and aerial photo characteristics: Green relatively uniform structure on aerial images contrasts well with bare scrubland, mountains and forest. Often in mosaic with bare wasteland (T13). Steep terrain produces shadow effects.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T16-2	T16-B-2	T16-C-2	T16-D-2	T16-E-1
Basic types		T16-2	T16-2	T16-2.5	T16-1-7

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Achillea millefolium</i> yarrow v <i>Agrostis capillaris</i> meadowsweet v <i>Alchemilla alpina</i> mountain marigold v <i>Anthoxanthum odoratum</i> yellow v <i>Arctostaphylos uva-ursi</i> honeydew v <i>Atocion rupestre</i> småsmelle v <i>Avenella flexuosa</i> smyle v <i>Calamagrostis epigejos</i> rock reed vein s+ [KA-dlc] <i>Campanula rotundifolia</i> bluebell v <i>Convallaria majalis</i> lily of the valley s-[KA-dlc] <i>Dactylis glomerata</i> dog grass v <i>Epilobium collinum</i> mountain milk v <i>Euphrasia stricta</i> glandular thrush s- [KA-dlc]	<i>Festuca ovina</i> sheep fescue v <i>Festuca rubra</i> red fescue v <i>Fragaria vesca</i> field strawberry s+[KA-dlc] <i>Galium boreale</i> white ants s+[KA-dlc] <i>Hylotelephium maximum</i> butterbuck v <i>Knautia arvensis</i> red button s+[KA-dlc] <i>Lathyrus linifolius</i> tuberous button s+ [KA-dlc] <i>Lathyrus sylvestris</i> forest flat pod s+ [KA-dlc] <i>Linaria vulgaris</i> lincod v <i>Lotus corniculatus</i> tiriltongue s+[KA-dlc] <i>Luzula spicata</i> aksfrytle v <i>Molinia caerulea</i> blue top v <i>Pilosella officinarum</i> hair fly v	<i>Poa glauca</i> bluebell s+[KA-dlc] <i>Rodiola rosea</i> rose root v <i>Rubus saxatilis</i> teaberry s+[KA-dlc] <i>Stellaria graminea</i> grass star flower v <i>Trifolium pratense</i> red clover v <i>Trifolium repens</i> white clover v <i>Vaccinium vitis-idaea</i> cranberry v <i>Veronica chamaedrys</i> two-bearded veronica s*[KA-dlc] <i>Veronica officinalis</i> legeveronika s*[KA-dlc] <i>Vicia cracca</i> bird's vetch v <i>Vicia sepium</i> hedge vetch s-[KA-dlc] <i>Viola canina</i> field violet s+[KA-dlc] <i>Viola tricolor</i> stepmother v <i>Viscaria vulgaris</i> meadow tar flower v
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Distribution and regional distribution: BN-LA, O3-C1. Most common in Western Norway, in Northern Norway and in the mountains.

Most important types of confusion: Open shallow land (T2), mountain heath, lee side and tundra (T3), semi-natural meadow (T32).

Red list status (2018): Rasmarkhei og -eng (LC;<).

References and type parallels: F1ab (VN), B01 in part (DNHB13).



Intermediate racing meadow and heath.
MR: Rauma: Grytten, Trollstigen. Photo: RH.

T16-C-3 Weakly calcareous

heath meadow and heath

NiN characteristics: Grassland systems: Rasmark

heath and meadow (T16), one basic type (3).

Defined by LKM: KAy3 & Klý1. LKM base steps: KAyfg & Klý0a.



Physiognomy: Meadow or mounded vegetation on steep, landslide-prone slopes.

Ecological characteristics: Rasmarken meadow and heath comprise parts of talus slopes with stabilized, soil-covered ground and closed vegetation. Conditioned by a constant supply of landslide material (snow, stones) from above, but is stable enough for vascular plants to dominate the vegetation. Sorting the debris with fine material at the top and coarser blocks at the bottom of the debris field means that debris meadows and heaths are most common at the top of debris fields. Bare wasteland lacks soil cover and is dominated by mosses and lichens. Unstabilized vegetation with a clear rasp character distinguishes it from mountain heath. Distinguished from poor and intermediate rasmarken by the presence of clear lime lime-requiring species, but lacking species that are strongly lime-requiring. Can occasionally be affected by grazing.

Strongly calcareous rasmarken meadow and heath. Op: Lom: The right-wing campaign.
Photo: RH.

Terrain and aerial photo characteristics: Green relatively uniform structure on aerial images contrasts well with bare scrubland, mountains and forest. Often in mosaic with bare wasteland (T13). Steep terrain produces shadow effects.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T16-B-3	T16-C-3	T16-D-3	T16-E-1
Basic types	T16-3	T16-3	T16-3	T16-3,4,6	T16-1-7

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity species (t* = characteristic t., t̄ - gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.)

<i>Alchemilla alpina</i> mountain marigold v <i>Anthoxanthum odoratum</i> yellow v <i>Anthyllis vulneraria</i> round pod s-[KA-fle] <i>Arabidopsis thaliana</i> spring flower s-[KA-fle] <i>Arabis hirsuta</i> bergschrinneblom s-[KA-fle] <i>Arctostaphylos uva-ursi</i> honeydew v <i>Arenaria serpyllifolia</i> sandarve v;s-[KA-fle] <i>Campanula rotundifolia</i> bluebell v <i>Carex digitata</i> sedge s+[KA-fle] <i>Carex muricata</i> sedge s+[KA-fle] <i>Carex ornithopoda</i> s+[KA-fle] <i>Cerastium alpinum</i> mountain heather s+[KA-fle] <i>Clinopodium vulgare</i> spearmint s+[KA-fle] <i>Convallaria majalis</i> lily of the valley s-[KA-dlc] <i>Corydalis intermedia</i> larkspore s+[KA-fle] <i>Cotoneaster integerrimus</i> dwarf medlar s+[KA-fle]	<i>Daphne mezereum</i> tysbast s-[KA-fle] <i>Draba incana</i> lodnerublom s-[KA-fle] <i>Elymus caninus</i> dog croak s-[KA-fle] <i>Erigeron acris</i> ground star s-[KA-fle] <i>Erysimum virgatum</i> rock gold s+[KA-fle] <i>Euphrasia stricta</i> glandular thrush s-[KA-dlc] <i>Fragaria vesca</i> field strawberry s+[KA-dlc] <i>Galium boreale</i> white ants s+[KA-dlc] <i>Galium verum</i> yellow ant s+[KA-fle] <i>Hypochaeris maculata</i> spotted pig's ear s-[KA-fle] <i>Knautia arvensis</i> red button s+[KA-dlc] <i>Lappula deflexa</i> hanging spike seed s+[KA-fle] <i>Lathyrus linifolius</i> tuberous button s+[KA-dlc] <i>Lathyrus sylvestris</i> forest flat pod s+[KA-dlc] <i>Lotus corniculatus</i> tirlitongue s+[KA-dlc] <i>Melica nutans</i> hanging ax s-[KA-fle] <i>Moehringia trinervia</i> ant vein s-[KA-fle]	<i>Origanum vulgare</i> rock mint s+[KA-fle] <i>Pilosella officinarum</i> hair fly v <i>Pimpinella saxifraga</i> s+[KA-fle] <i>Poa glauca</i> bluebell s+[KA-dlc] <i>Poa nemoralis</i> lundrapp s+[KA-fle] <i>Polygonatum odoratum</i> lily of the valley s-[KA-fle] <i>Rubus saxatilis</i> teaberry s+[KA-dlc] <i>Salix hastata</i> s+[KA-fle] <i>Thalictrum alpinum</i> mountain seed star s+[KA-fle] <i>Trifolium pratense</i> red clover v <i>Trifolium repens</i> white clover v <i>Turritis glabra</i> Turritis s+[KA-fle] <i>Veronica chamaedrys</i> two-bearded veronica s-[KA-fle] <i>Veronica officinalis</i> legeveronica s*[KA-dlc] <i>Vicia cracca</i> bird's vetch v <i>Viola canina</i> field violet s+[KA-dlc]
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Distribution and regional distribution: BN-LA, O3-C1. Most common in Western Norway, in Northern Norway and in the mountains.

Most important types of confusion: Open shallow land (T2), mountain heath, lee side and tundra (T3), semi-natural meadow (T32).

Red list status (2018): Rasmarkhei og -eng (LC;<).

References and type parallels: F1ab (VN), B01 in part (DNHB13).

T16-C-4 Strongly calcareous

heath meadow and heath

NiN characteristics: Grassland systems: Rasmark

heath and meadow (T16), one basic type (4).

Defined by LKM: KAy4 & Klj1. LKM base steps: KAyhi & Klj0a.

Physiognomy: Meadow or mounded vegetation on steep, landslide-prone slopes.



Strongly calcareous rasmarken meadow and heath. Op: Lom: The right-wing campaign.
Photo: RH.

Ecological characteristics: Rasmarken meadow and heath comprise parts of talus slopes with stabilized, soil-covered ground and closed vegetation. Conditioned by a constant supply of landslide material (snow, stones) from above, but is stable enough for vascular plants to dominate the vegetation. Sorting the debris with fine material at the top and coarser blocks at the bottom of the debris field means that debris meadows and heaths are most common at the top of debris fields. Bare wasteland lacks soil cover and is dominated by mosses and lichens. Unstabilized vegetation with a clear rasp character distinguishes it from mountain heath. Distinguished from slightly calcareous rasmarkeng by the occurrence of strongly calcareous species. Can occasionally be affected by grazing.

Terrain and aerial photo characteristics: Green relatively uniform structure on aerial images contrasts well with bare scrubland, mountains and forest. Often in mosaic with bare wasteland (T13). Steep terrain produces shadow effects.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T16-B-4	T16-C-4	T16-D-3	T16-E-1
Basic types	T16-4	T16-4	T16-4	T16-3,4,6	T16-1-7

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Acinos arvensis</i> groundmint s+[KA:hlg] <i>Alchemilla alpina</i> mountain marigold v <i>Anthoxanthum odoratum</i> yellow v <i>Anthyllis vulneraria</i> round pod s+[KA:fle] <i>Arabis hirsuta</i> bergschrinneblom s-[KA:fle] <i>Arctostaphylos uva-ursi</i> honeydew v <i>Arenaria serpyllifolia</i> sandarve v;s-[KA:fle] <i>Calamagrostis epigejos</i> rock reed vein s+[KA:dlc] <i>Campanula rotundifolia</i> bluebell v <i>Carex digitata</i> sedge s+[KA:fle] <i>Carex muricata</i> sedge s+[KA:fle] <i>Carex ornithopoda</i> s+[KA:fle] <i>Ceratium alpinum</i> mountain heather s+[KA:fle] <i>Clinopodium vulgare</i> spearmint s+[KA:fle] <i>Convallaria majalis</i> lily of the valley s-[KA:dlc] <i>Corydalis intermedia</i> larkspore s+[KA:fle] <i>Cotoneaster integrifolius</i> dwarf medlar s+[KA:fle]	<i>Cypripedium calceolus</i> marisko s-[KA:hlg] <i>Draba incana</i> lodnerblom s-[KA:fle] <i>Daphne mezereum</i> tysbast s-[KA:fle] <i>Dryas octopetala</i> reindeer s+[KA:hlg] <i>Elymus caninus</i> dog croak s-[KA:fle] <i>Epipactis atrorubens</i> red flanger s+[KA:hlg] <i>Erysimum virgatum</i> rock gold s+[KA:fle] <i>Fragaria vesca</i> field strawberry s+[KA:dlc] <i>Galium boreale</i> white ants s+[KA:dlc] <i>Galium verum</i> yellow ant s+[KA:fle] <i>Geranium lucidum</i> white stork 's bill s+[KA:fle] <i>Hypochaeris maculata</i> spotted pig's ear s-[KA:fle] <i>Knautia arvensis</i> red button s+[KA:dlc] <i>Lappula deflexa</i> hanging spike seed s+[KA:fle] <i>Lathyrus vernus</i> spring pea button s+[KA:fle] <i>Lotus corniculatus</i> tilitongue s+[KA:dlc] <i>Melica nutans</i> hanging ax s-[KA:fle] <i>Moehringia trinervia</i> ant vein s-[KA:fle]	<i>Origanum vulgare</i> rock mint s+[KA:fle] <i>Polygonatum odoratum</i> lily of the valley s+[KA:hlg] <i>Polystichum lonchitis</i> thorn fern s-[KA:hlg] <i>Saxifraga adscendens</i> s-[KA:hlg] <i>Saxifraga oppositifolia</i> red herring s-[KA:hlg] <i>Thalictrum alpinum</i> mountain seed star s+[KA:hlg] <i>Trifolium pratense</i> red clover v <i>Trifolium repens</i> white clover v <i>Turritis glabra</i> Turritis s+[KA:fle] <i>Veronica chamaedrys</i> two-bearded veronica v <i>Veronica fruticans</i> bergveronica s+[KA:hlg] <i>Vicia cracca</i> bird's vetch v <i>Viola canina</i> meadow violet v <i>Viola mirabilis</i> scrub violet s+[KA:hlg] <i>Viola rupestris</i> gravel violet s-[KA:hlg]
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Distribution and regional distribution: BN-LA, O3-C1. Most common in Western Norway, in Northern Norway and in the mountains.

Most important types of confusion: Open shallow land (T2), mountain heath, lee side and tundra (T3), semi-natural meadow (T32).

Red list status (2018): Rasmarkhei og -eng (LC;<).

References and type parallels: F1ab (VN), B01 in part (DNHB13).

T16-C-5 Source-influenced intermediate racemeadow and heath

NiN-characteristics: Solid land systems: Rasmark heath and meadow (T16), one basic type (5). Defined by LKM: KAy2 & Kly2. LKM basic steps: KAyde & Klybc.

Physiognomy: Meadow or mounded vegetation on steep, landslide-prone slopes.

Ecological characteristics: Rasmarken meadow and heath comprise parts of talus slopes with stabilized, soil-covered ground and closed vegetation. Conditioned by a constant supply of landslide material (snow, stones) from above, but is stable enough for vascular plants to dominate the vegetation.

Sorting the debris with fine material at the top and coarser blocks at the bottom of the debris field means that debris meadows and heaths are most common at the top of debris fields. Bare wasteland lacks soil cover and is dominated by mosses and lichens. Unstabilized vegetation with a clear rasp character distinguishes it from mountain heath. Spring water supply with relatively high soil moisture and mineral nutrition gives elements of spring soil species. Distinguished from spring-affected calcareous rasmarken by the lack of clearly calcareous species. Can occasionally be affected by grazing.

Terrain and aerial photo characteristics: Green relatively uniform structure on aerial images contrasts well with bare scrubland, mountains and forest. Often in mosaic with bare wasteland (T13). Steep terrain produces shadow effects.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T16-B-5	T16-C-5	T16-D-2	T16-E-1
Basic types	T16-5	T16-5	T16-5	T16-2.5	T16-1-7

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Agrostis capillaris</i> meadowsweet v <i>Alchemilla glabra</i> marigold s-[Kl·bla] <i>Alchemilla glomerulans</i> spring ladybug s-[Kl·bla] <i>Angelica sylvestris</i> gorse s-[Kl·bla] <i>Athyrium distentifolium</i> fjellburkne v <i>Avenella flexuosa</i> smyle v <i>Calamagrostis epigejos</i> rock reed vein s+[KA·dlc] <i>Campanula rotundifolia</i> bluebell v <i>Cerastium fontanum</i> inherit v <i>Chamerion angustifolium</i> geitrams s-[Kl·bla] <i>Cicerbita alpina</i> turt s-[Kl·bla] <i>Cirsium heterophyllum</i> white-leaved thistle s-[Kl·bla] <i>Convallaria majalis</i> lily of the valley s-[KA·dlc] <i>Dactylis glomerata</i> dog grass v	<i>Dryopteris expansa</i> agg. sheep's milk s-[Kl·bla] <i>Equisetum arvense</i> _ <i>Festuca rubra</i> red fescue v <i>Filipendula ulmaria</i> meadowsweet s-[Kl·bla] <i>Geranium sylvaticum</i> stork's bill s-[Kl·bla] <i>Hypericum maculatum</i> St. John's wort v <i>Knautia arvensis</i> red button s+[KA·dlc] <i>Lathyrus linifolius</i> tuberous button s+[KA·dlc] <i>Lathyrus pratensis</i> yellow flat pod v <i>Lotus corniculatus</i> tirltongue s+[KA·dlc] <i>Molinia caerulea</i> blue top v <i>Mycelis muralis</i> forest lettuce v <i>Myosotis decumbens</i> mountain forget-me-not s-[Kl·bla]	<i>Oxyria digyna</i> mountain sorrel s-[Kl·bla] <i>Ranunculus acris</i> ground soleie v <i>Ribes spicatum</i> wild currant v <i>Rubus idaeus</i> raspberry v <i>Rubus saxatilis</i> teaberry s-[KA·dlc] <i>Rumex acetosa</i> meadow sorrel v <i>Salix glauca</i> ssp. <i>glauca</i> silver willow v <i>Salix lapponum</i> lappvier v <i>Silene dioica</i> red jonsok flower s-[Kl·bla] <i>Solidago virgaurea</i> golden rice v <i>Stachys sylvatica</i> wood vine root s-[Kl·bla] <i>Stellaria borealis</i> mountain star flower s-[Kl·bla] <i>Trifolium pratense</i> red clover v <i>Valeriana sambucifolia</i> root s-[Kl·bla] <i>Veronica chamaedrys</i> two-bearded veronika s*[KA·dlc] <i>Vicia cracca</i> bird's vetch v
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Source-influenced intermediate rasmarkeng and –hei. SF: Luster: Jostedal, Bjørnsteigane. Photo: RH.

Distribution and regional distribution: BN-LA, O3-C1. Most common in Western Norway, in Northern Norway and in the mountains.

Most important types of confusion: Open shallow land (T2), mountain heath, lee side and tundra (T3), semi-natural meadow (T32).

Red list status (2018): Rasmarkhei og -eng (LC;<).

References and type parallels: F1ab (VN), B01 in part (DNHB13).

T16-C-6 Spring-affected calcareous racemeadow and heath

NiN characteristics: Solid land systems: Grassland heath and meadow (T16), one basic type (6). Defined by LKM: KAy3,4 & Klÿ2. LKM base steps: KAÿfghi & Klÿbc.

Physiognomy: Meadow or mounded vegetation on steep, landslide-prone slopes.

Ecological characteristics: Rasmarken meadow and heath include parts of talus slopes with stabilized, soil-covered ground and closed vegetation. Conditioned by a constant supply of landslide material (snow, stones) from above, but is stable enough for vascular plants to dominate the vegetation. Sorting the debris with fine material at the top and coarser blocks at the bottom of the debris field means that debris meadows and heaths are most common at the top of debris fields. Bare wasteland lacks soil cover and is dominated by mosses and lichens. Unstabilized vegetation with a clear rasp character distinguishes it from mountain heath. Spring water supply with relatively high soil moisture and mineral nutrition gives elements of spring soil species. Distinguished from source-influenced intermediate rasmarken by presence of clearly lime-requiring species. Can occasionally be affected by grazing.



Spring-affected calcareous heath meadow and heath. MR: Fræna: Hustad, N for Hostad. Photo: RH.

Terrain and aerial photo characteristics: Green, relatively even structure on aerial images contrasts well with the bare rugged ground, mountains and forest. Often in mosaic with bare wasteland (T13). Steep terrain produces shadow effects.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T16-6	T16-B-6	T16-C-6	T16-D-3	T16-E-1
Basic types		T16-6	T16-6	T16-3,4,6	T16-1-7

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Agrostis capillaris</i> meadowsweet v <i>Alchemilla glabra</i> marigold s-[Kl·bla] <i>Alchemilla glomerulans</i> spring ladybug s-[Kl·bla] <i>Angelica sylvestris</i> gorse s-[Kl·bla] <i>Athyrium distentifolium</i> fjellburkne v <i>Angelica archangelica</i> ssp. <i>archangelica</i> mountain water s*[KA-fle] <i>Calamagrostis epigejos</i> rock pipe kvein v <i>Campanula rotundifolia</i> bluebell v <i>Chamerion angustifolium</i> geitrams s-[Kl·bla] <i>Cicerbita alpina</i> turt s+[Kl·bla] <i>Cirsium heterophyllum</i> white-leaved thistle s-[Kl·bla] <i>Corydalis intermedia</i> larkspore s+[KA-fle] <i>Cotoneaster integrifolius</i> dwarf medlar s+[KA-fle] <i>Cypripedium calceolus</i> marisko s*[KA-fle] <i>Daphne mezereum</i> tysbast s-[KA-fle]	<i>Dryopteris expansa</i> agg. sheep's milk s-[Kl·bla] <i>Elymus caninus</i> dog croak s- [KA-fle] <i>Equisetum arvense</i> _ <i>Filipendula ulmaria</i> meadowsweet s-[Kl·bla] <i>Geranium sylvaticum</i> stork's bill s-[Kl·bla] <i>Geum urbanum</i> kratbhumbleblom s-[Kl·bla] <i>Gymnadenia conopsea</i> bridal spore s*[KA-fle] <i>Hypericum maculatum</i> St. John's wort v <i>Lathyrus vernus</i> spring pea button s+[KA-fle] <i>Lotus corniculatus</i> tirltongue v <i>Melica nutans</i> hanging ax s- [KA-fle] <i>Milium effusum</i> musk grass s+[KA-fle] <i>Molinia caerulea</i> blue top v <i>Mycelis muralis</i> forest lettuce v <i>Myosotis decumbens</i> mountain forget-me-not s-[Kl·bla] <i>Oxyria digyna</i> mountain sorrel s-[Kl·bla] <i>Petasites frigidus</i> mountain plague s-[KA-fle] <i>Poa nemoralis</i> lundrapp s+[KA-fle]	<i>Polygonatum verticillatum</i> lily of the valley s+[KA-fle] <i>Ranunculus acris</i> ground soleie v <i>Ranunculus platanifolius</i> white sunbed s-[KA-fle] <i>Ribes spicatum</i> wild currant v <i>Rubus idaeus</i> raspberry v <i>Rubus saxatilis</i> teaberry v <i>Rumex acetosa</i> meadow sorrel v <i>Salix glauca</i> ssp. <i>glauca</i> silver willow v <i>Salix hastata</i> bleached heifers v <i>Salix lapponum</i> lappvier v <i>Saussurea alpina</i> mountain thistle s+[KA-fle] <i>Saxifraga aizoides</i> yellow perch s *[KA-fle] <i>Silene dioica</i> red jonsock flower s-[Kl·bla] <i>Solidago virgaurea</i> golden rice v <i>Stachys sylvatica</i> wood vine root s-[Kl·bla] <i>Stellaria borealis</i> mountain star flower s-[Kl·bla] <i>Trollius europaeus</i> ball flower s-[KA-fle] <i>Valeriana sambucifolia</i> root s-[Kl·bla] <i>Vicia sylvatica</i> wood vetch s-[KA-fle]
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Distribution and regional distribution: BN-LA, O3-C1. Most common in Western Norway, in Northern Norway and in the mountains.

Most important types of confusion: Open shallow land (T2), mountain heath, lee side and tundra (T3), semi-natural meadow (T32).

Red list status (2018): Rasmarkhei og -eng (LC;<).

References and type parallels: F1ab (VN), B01 in part (DNHB13).

T16-C-7 Strongly marked race meadow and heath

NiN characteristics: Grassland systems: Rasmark heath and meadow (T16), one basic type (7). Defined by LKM: KAÿ1-4 & Klÿ1 & RUÿ2. LKM base step: KAÿabcdefghi & Klÿ0a & RUÿde.

Physiognomy: Meadow or mounded vegetation on steep, landslide-prone slopes with such strong disturbance that the vegetation is patchy and incoherent Unstable soil material due to constant landslides.

Ecological characteristics: Strongly marked landslide meadows and heaths comprise parts of talus slopes where landslides occur very often, so that the ground is unstable and closed vegetation does not develop. Conditioned by very frequent supply of landslide material (snow, stones) from above. Sorting the debris with fine material at the top and coarser blocks at the bottom of the debris field means that debris meadows and heaths are most common at the top of debris fields. Strongly racially marked racemark meadow and heath is a poorly known type and the species composition is therefore little known. The species table below is therefore provisional. The type is also characterized by a reduced number of species due to the unstable conditions with strong race characteristics. Bare wasteland lacks soil cover and is dominated by mosses and lichens. Unstabilized vegetation with a clear rasp character distinguishes it from mountain heath.

Terrain and aerial photo characteristics: Green, relatively even structure on aerial images contrasts well with bare scrubland, mountains and forest. Often in mosaic with bare wasteland (T13). Steep terrain produces shadow effects.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T16-B-7	T16-C-7	T16-D-4	T16-E-1
Basic types	T16-7	T16-7	T16-7	T16-7	T16-1-7

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **tx**- gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Agrostis capillaris</i> meadow sweet v	<i>Campanula rotundifolia</i> bluebell v	<i>Juncus trifidus</i> rabbesive
<i>Alchemilla alpina</i> mountain marigold v	<i>Cerastium fontanum</i> inherit v	<i>Lappula deflexa</i> hanging spike seed
<i>Arabidopsis petraea</i> aurskrinneblom	<i>Dactylis glomerata</i> dog grass v	<i>Linaria vulgaris</i> lincod v
<i>Arabidopsis thaliana</i> spring box flower v	<i>Draba incana</i> lodnerublom v	<i>Lotus corniculatus</i> tiriltongue v
<i>Arabis hirsuta</i> bergschrinneblom v	<i>Erysimum virgatum</i> berggull v	<i>Molinia caerulea</i> blue top v
<i>Calamagrostis epigejos</i> rock pipe kvein v	<i>Festuca rubra</i> red fescue v	<i>Poa glauca</i> bluebell v

Distribution and regional distribution: BN-LA, O3-C1. Most common in Western Norway, in Northern Norway and in the mountains.

Most important types of confusion: Open shallow land (T2), mountain heath, lee side and tundra (T3), semi-natural meadow (T32).

Red list status (2018): Rasmarkhei og -eng (LC;<).

References and type parallels: F1ab (VN), B01 in part (DNHB13).



Strongly racially marked racemark meadow and heath. SF: Aurland: S for Bakka. Photo: RH.

T17-C-1 Landslide

NiN characteristics: Solid ground systems: Active landslide (T17), one base type (1). Defined by LKM: S1jA. LKM basic step: S1j0.

Physiognomy: Consists of bare soil or low-growing, pioneer vegetation with mosses, lichens and vascular plants on regularly disturbed ground.

Ecological characteristics: Landslides include land on unstable substrate, dominated by soil. The type is found on steep slopes with active mass movement processes that lead to frequent landslide activity, where constant sliding of soil masses leads to a small-scale variation of bare soil and pioneering vegetation.

Landslide means that it is the loose masses themselves that slide out, as opposed to landslides, where the loose masses slide over the ground. Landslides occur most frequently along rivers and streams that flow through layers of loose material, e.g. in ravine valleys. Rivers that undermine slopes with soil will, due to lateral erosion from the water, keep the slope steep and ensure that the landslide field is constantly disturbed by repeated small landslides and thereby kept open. Landslide intensity can vary, but is strong enough that the species composition is significantly different from correspondingly stable ground. Landslides require that the disturbance is not so strong that mineral soil is exposed. Since the soil layer is usually quite thin, it is uncertain whether the type actually occurs, and the species composition is therefore little known. Bare soil or pioneer vegetation characterizes the nature type, which is also distinguished from other landslides by substrate.

Terrain and aerial photo characteristics: Covers small areas on steep slopes. Bare landslides are distinguished in aerial photographs from the surrounding vegetation by color and terrain shape.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T17-1	T17-B-1	T17-C-1	T17-D-1	T17-E-1
Basic types		T17-1	T17-1	T17-1	T17-1

Distribution and regional distribution: Distribution unknown.

Most important types of confusion: Grasslands (T13), gravel and sandslides (T17-C-2), silt and clayslides (T17-C-3), historical landslides (T25).

Red list status (2018): Active landslide area (DD mainland, LC Svalbard;<).

References and type parallels: –

T17-C-2 Gravel and sand landslides

NiN characteristics: Firm ground systems: Active landslide ground (T17), two basic types (2,3). Defined by LKM: S1yB,C. LKM basic step: S1ydefg.

Physiognomy: Consists of bare sand and gravel or low-growing, pioneer vegetation with mosses, lichens and vascular plants on regularly disturbed ground.

Ecological characteristics: Gravel and sand slides include land on an unstable substrate, dominated by gravel and/or sand. The type is found on steep slopes with active mass movement processes that lead to frequent landslide activity, where constant sliding of loose masses causes small-scale variation of bare sand or gravel and pioneering vegetation. Landslide means that it is the loose masses themselves that slide out, as opposed to landslides, where the loose masses slide over the ground. Landslides occur most frequently along rivers and streams that flow through layers of loose material, e.g. glacial lake deposits. Rivers that undermine slopes with sand and gravel will, due to lateral erosion from the water, keep the slope steep and ensure that the landslide field is constantly disturbed by repeated smaller landslides and thereby kept open. The landslide intensity will vary, but is strong enough that the species composition is significantly different from correspondingly stable ground. Variation with bare sand or gravel on land recently affected by landslides and more vegetated areas where it has been longer since the last landslide is also typical. Over time, scattered bushes can be established. If avalanche activity ceases, the succession will result in forest. Landslides imply the start of a primary succession course. Small, frequent landslides result in mineral soil being exposed enough for the species composition to include disturbance-tolerant species such as pioneer mosses and vascular plants. The species composition is poorly investigated, but bare sand and gravel alternating with pioneer vegetation characterizes the mapping unit. Also distinguished from other landslides by substrate. Typical are sandy gray moss *Racomitrium canescens* and salt lichen species *Stereocaulon* spp. A special case of gravel and sand landslides is earth pyramids.

Terrain and aerial photo characteristics: Occurs on steep slopes. Gravel and sand slides are distinguished in aerial photographs from the surrounding vegetation by color and terrain shape.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T17-B-2,3	T17-C-2	T17-D-2	T17-E-2
Basic types	T17-2,3	T17-2,3	T17-2,3	T17-2,3	T17-2,3



Gravel and sand slides. He: Folldal: Grimsmoen. Photo: HB.

Distribution and regional distribution: Distribution unknown, probably BN-NB, O3-C1.

Most important types of confusion: Wasteland (T13), landslides (T17-C-1), silt and clay landslides (T17-C-3), historical landslides (T25).

Red list status (2018): Active landslide area (DD mainland, LC Svalbard; <).

References and type parallels: –

T17-C-3 Silt and clay landslides

NiN characteristics: Solid ground systems: Active landslide (T17), one base type (4). Defined by LKM: S1yD. LKM basic step: S1yhi.

Physiognomy: Consists of bare silt and clay or low-growing, pioneer vegetation with mosses, lichens and vascular plants on regularly disturbed ground.

Ecological characteristics: Silt and clay landslides include land on an unstable substrate, dominated by silt and/or clay. The type is found on steep slopes with active mass movement processes that lead to frequent landslide activity, where constant sliding of loose masses produces small-scale variation of bare silt or clay and pioneer vegetation. Landslide means that it is the loose masses themselves that slide out, as opposed to landslides, where the loose masses slide over the ground. Landslides occur most frequently along rivers and streams that flow through layers of loose material, e.g. in ravines. Rivers that undermine slopes will, due to lateral erosion from the water, keep the slope steep and ensure that the landslide field is constantly disturbed by repeated smaller landslides and thereby kept open. Landslide intensity can vary, but is strong enough that the species composition is significantly different from correspondingly stable ground. Typical is variation with bare silt or clay where landslides have recently occurred and vegetated areas where it has been longer since the last landslide. Over time, scattered bushes can be established. If avalanche activity ceases, the succession will result in forest. Landslides imply the start of a primary succession course. Small, frequent landslides result in mineral soil being exposed enough for the species composition to include disturbance-tolerant species (typically small pioneer mosses, and vascular plant species that depend on exposed mineral soil to germinate). The species composition is poorly investigated. Bare silt and clay alternating with pioneer vegetation characterizes the nature. Also distinguished from other landslides by substrate.



Silt and mudslides. NT: Grong: Fiskumfoss. Photo: RH.

Terrain and aerial photo characteristics: Occurs on steep slopes. Silt and mudslides are distinguished in aerial photographs from the surrounding vegetation by color and terrain shape.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T17-4	T17-B-4	T17-C-3	T17-D-3	T17-E-3
Basic types		T17-4	T17-4	T17-4	T17-4

Distribution and regional distribution: Distribution unknown, probably BN-MB, O3-OC.

Most important types of confusion: Wasteland (T13), landslides (T17-C-1), silt and clay landslides (T17-C-3), historical landslides (T25).

Red list status (2018): Silt and mudslides (EN;=).

References and type parallels: –

T18-C-1 Open flood-resistant fields on sand, gravel and stone

NiN characteristics: Solid ground systems: Open flood resistant soil (T18), two soil types (1,2) and parts of a dissolved soil type (4). Defined by LKM: S1ýA,B & VFý1. LKM base steps: S1ýcdefg & VFýcdef.

Physiognomy: River ears with stone, gravel or sand. Varies from heavily flood-prone pebble banks without vegetation, to less flood-prone river banks and beaches with stone, gravel or sand. Open, pioneer vegetation dominated by herbs, graminids and scattered shrubs. Vegetation cover varies from absent to relatively dense. The flood impact is so strong that trees are not established.

Ecological characteristic: Occurs in the flood zone primarily along rivers, but also on flat beaches along larger lakes. Formed by alternating sedimentation and erosion by floodwaters. Occurs in relatively shallow river sections, and as sand dunes where glacial rivers pass larger river plains, but with such strong exposure that a layer of wood does not form. Degree of exposure increases from the inner edge outwards towards the river course itself, where vegetation is most often lacking. Humus-poor substrate dominated by sand, gravel or stone, on poor and intermediate substrate. Distinguished from calcareous floodplain by the lack of calcareous species. Distinguished from floodplain on silt and clay by grain size. Mountain plants that spread downwards along the rivers are common especially in the northern boreal zone.



Open flood-resistant fields on sand, gravel and stone. NT: Meråker:
The skin. Photo: HB.

Terrain and aerial photo characteristics: Gently sloping surfaces adjacent to lakes and rivers. Largest extent in the lower part of the watercourse, where the valleys flatten out. Also typical in gentle valley stretches and where a river flows into another river. Often bright colors in aerial photographs due to low vegetation cover, increasing vegetation cover towards the inner edge, often with strips of vegetation. Also banks and islands out in the river course. Often in mosaic with open floodplain on silt and clay.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T18-B-1	T18-C-1	T18-D-1	T18-E-1
Basic types	T18-1,2	T18-1	T18-1.2*	T18-1.2*	T18-1-3*

*Note: The basic type T18-4 Strongly exposed open flood-resistant soil (Slýcde-C & VFýgha) is dissolved and included in T18-C,D,E.

Diagnostic species

m = type of quantity (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity species (t* = characteristic t., t- gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.)

<i>Agrostis capillaris</i> meadow sweet v	<i>Equisetum arvense</i> _	<i>Scorzoneroidea autumnalis</i> follblom v
<i>Arabidopsis petraea</i> aurskrinneblom t*	<i>Juncus arcticus</i> finnmarksiv v	<i>Vicia cracca</i> bird's vetch v
<i>Astragalus alpinus</i> setermelt v	<i>Leucanthemum vulgare</i> collard v	<i>Stereocaulon glareosum</i> gravel lichen t*
<i>Calamagrostis neglecta</i> _	<i>Lotus corniculatus</i> tirltongue v	<i>Stereocaulon rivulorum</i> bresalt lichen t*
<i>Campanula rotundifolia</i> bluebell v	<i>Lupinus polyphyllus</i> garden lupine v	<i>Calliergonella lindbergii</i> meadow moss v
<i>Carex bicolor</i> white star t*	<i>Micranthes stellaris</i> star trout v	<i>Polytrichum piliferum</i> raccoon moss s*[S1·gl]
<i>Deschampsia cespitosa</i> ssp. <i>glauca</i> river pile t*	<i>Myricaria germanica</i> clawwood t*	Racomitrium canescens sandy gray moss s*[S1·gl]
<i>Elymus caninus</i> dog croak v	<i>Oxyria digyna</i> mountain acid v	h]
	<i>Rumex acetosella</i> small acid v	

Distribution and regional distribution: BN-LA, O2-C1. Found throughout the country, most typically in Eastern Norway, in Trøndelag and Nordland to Finnmark, as well as inner fjords in Western Norway. Missing in outer coastal areas. **Most important types of confusion:** Open flood-resistant soil on silt and clay (T18-C-2), or calcareous gravel and stone (T18-C-3). Gradual transition towards floodplain forest (T-30). Floodplain scrub with willow, willow, sea buckthorn, gray alder and willow species is taken to T-30.

Red list status (2018): Open flood-resistant land (NT mainland, LC Svalbard;<).

References and type parallels: Q1, Q2 and Q3 (in part) in (VN). E04 without scrub vegetation (DNHB13).

T18-C-2 Open flood resistant soil on silt and clay

NiN characteristics: Firm ground systems: Open flood firm ground (T18), one foundation type (3). Defined by LKM: S1yC & VFy1. LKM base step: S1yhi & VFydef.

Physiognomy: River estuaries with silt and clay in protected places, often in the inner part of river estuaries, floodplains or ridges. Open, pioneer vegetation dominated by mosses, herbs and graminids. Vegetation cover varies from absent to relatively dense.



Open flood-resistant ground on silt and clay. Ak:
Eidsvoll: Kommersrud. Photo: HB.

Ecological characteristics: Occurs in the flood zone primarily along rivers, but also on flat beaches along larger lakes, where the flood impact is so strong that trees are not established. Formed by alternating sedimentation and erosion by floodwaters. Occurs in slow, still-flowing river sections, but with such strong exposure that a layer of wood does not form. Degree of exposure lower than for T18-C-1. Humus-poor substrate dominated by silt and clay, on poor and intermediate substrate. Distinguished from calcareous floodplain by the lack of lime-demanding species and from floodplain on sand, gravel and stone by grain size. Mountain plants that spread downwards along the rivers are common especially in the northern boreal zone.

Terrain and aerial photo characteristics: Gently sloping surfaces along lakes and rivers. Largest extent in the lower part of the watercourse, where the valleys flatten out. Also typical in gentle valley stretches and where a river flows into another river. Often in floodplains or in mosaics with open floodplains on silt and clay.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T18-B-3	T18-C-2	T18-D-2	T18-E-1
Basic types	T18-3	T18-3	T18-3	T18-3	T18-1-3

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **tr-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Equisetum arvense</i> – <i>Agrostis stolonifera</i> creeper v <i>Alopecurus aequalis</i> water fox butt s*[S1-hlg] <i>Alopecurus geniculatus</i> s *[S1-hlg] <i>Caltha palustris</i> brook flower s*[S1-hlg] <i>Cardamine amara</i> watercress s*[S1-hlg] <i>Crassula aquatica</i> quadruped <i>Deschampsia cespitosa</i> ssp. <i>cespitosa</i> silver pile v <i>Elatine</i> spp. ivy flower species s*[S1-hlg] <i>Eleocharis acicularis</i> conifer s*[S1-hlg] <i>Filipendula ulmaria</i> meadowsweet v <i>Galium palustre</i> marsh anemone v <i>Juncus filiformis</i> thread reed v	<i>Limosella aquatica</i> sea buckthorn s*[S1-hlg] <i>Lythrum portula</i> reed creeper s*[S1-hlg] <i>Mentha arvensis</i> field mint s*[S1-hlg] <i>Myosotis laxa</i> swamp forget-me-not s*[S1-hlg] <i>Persicaria minor</i> s *[S1-hlg] <i>Poa palustris</i> marsh frog <i>Prunella vulgaris</i> blåkoll v <i>Ranunculus repens</i> krypsoleie v <i>Ranunculus reptans</i> evjesoleie v <i>Subularia aquatica</i> awl v; s*[S1-hlg] <i>Tussilago farfara</i> horse hoof v <i>Viola palustris</i> marsh violet v <i>Acaulon muticum</i> warty moss s*[S1-hlg]	<i>Blasia pusilla</i> spotted moss s*[S1-hlg] <i>Calliergonella cuspidata</i> marsh moss v <i>Fossombronia wondraczekii</i> clay burrow s*[S1-hlg] <i>Riccia beyrichiana</i> sunfork moss s*[S1-hlg] <i>Riccia bifurca</i> s *[S1-hlg] <i>Riccia canaliculata</i> furrow fork moss s*[S1-hlg] <i>Riccia cavernosa</i> crystal fork moss s*[S1-hlg] <i>Riccia huebeneriana</i> sponge fork moss s*[S1-hlg]
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Distribution and regional distribution: BN-LA, O2-C1. Found throughout the country, most typically in Eastern Norway, in Trøndelag and Nordland to Finnmark, as well as inner fjords in Western Norway. Missing in outer coastal areas.

Most important types of confusion: Open flood-resistant ground on sand, gravel and stone (T18-C-1), or calcareous gravel and stone (T18-C-3). Gradual transition towards floodplain forest (T-30). Floodplain scrub with willow, willow, sea buckthorn, gray alder and willow species is taken to T-30.

Red list status (2018): Open flood-resistant land (NT mainland, LC Svalbard;<).

References and type parallels: O1, Q1, Q2 and Q3 (in part) in (VN). E02, E03, E04, E12 (DNHB13).

T18-C-3 Open flood-resistant ground on calcareous gravel and stone

NiN characteristics: Firm ground systems: Open flood firm ground (T18), one foundation type (5). Defined by LKM: S1ÿA & VFÿ1 & KAÿ2. LKM base steps: S1ÿcde & VFÿcdef & KAÿfgh.

Physiognomy: River ears with stone, gravel or sand. Varies from heavily flood-prone pebble banks without vegetation, to less flood-prone river banks and beaches with stone, gravel or sand. Open, pioneer vegetation dominated by herbs, graminids and scattered shrubs. Vegetation cover varies from absent to relatively dense.



Open flood-resistant ground on calcareous gravel and stone. SF: Luster: Joranger, Marheimsgilet. Photo: RH.

Ecological characteristics: Occurs in the flood zone primarily along rivers, but also on flat beaches along larger lakes, where the flood impact is so strong that trees are not established. Formed by alternating sedimentation and erosion by floodwaters. Occurs in relatively shallow river sections, and as sand dunes where glacial rivers pass larger river plains, but with such strong exposure that a layer of wood does not form. Degree of exposure increases from the inner edge outwards towards the river course itself, where vegetation is most often lacking. Humus-poor substrate dominated by sand, gravel or stone on a calcareous substrate. Distinguished from poor flood-resistant soil by the presence of lime-requiring species. Distinguished from floodplain on silt and clay by grain size. Mountain plants that spread downwards along the rivers are common especially in the northern boreal zone.

Terrain and aerial photo characteristics: Gently sloping surfaces adjacent to lakes and rivers. Largest extent in the lower part of the watercourse, where the valleys flatten out. Also typical in gentle valley stretches and where a river flows into another river. Often bright colors in aerial photographs due to low vegetation cover, increasing vegetation cover towards the inner edge, often with strips of vegetation. Also banks and islands out in the river course. Often in mosaic with open floodplain on silt and clay.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T18-5	T18-B-5	T18-C-3	T18-D-3	T18-E-2
Basic types		T18-5	T18-5	T18-5	T18-5

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity species (t* = characteristic t., t¤- gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.)

<i>Equisetum variegatum</i> mountain fescue v	<i>Ceratium cerastoides</i> glacier heritage v	<i>Saxifraga aizoides</i> yellow perch s * [KA-fle]
<i>Selaginella selaginoides</i> divergjammne v	<i>Galium boreale</i> white ant v	<i>Saxifraga oppositifolia</i> red herring s * [KA-fle]
<i>Agrostis capillaris</i> meadow sweet v	<i>Juncus arcticus</i> finnmarksiv v	<i>Tofieldia pusilla</i> bear sting s * [KA-fle]
<i>Astragalus alpinus</i> setermelt v	<i>Juncus castaneus</i> chestnut rush s * [KA-fle]	<i>Triisetum spicatum</i> black sedge s * [KA-fle]
<i>Bistorta vivipara</i> harerug v	<i>Juncus triglumis</i> triple reed s * [KA-fle]	<i>Climaciumpendroides</i> palm moss v
<i>Calamagrostis neglecta</i> _	<i>Lotus corniculatus</i> tiritongue v	<i>Polytrichum piliferum</i> raccoon moss s * [S1-gh]
<i>Campanula rotundifolia</i> bluebell v	<i>Micranthes stellaris</i> star trout v	<i>Racomitrium canescens</i> sandy gray moss s * [S1-gh]
<i>Carex bicolor</i> white star t*	<i>Myrica germanica</i> clawwood t*	
<i>Carex panicea</i> sorghum v	<i>Oxyria digyna</i> mountain acid v	
<i>Ceratium alpinum</i> mountain heirloom v	<i>Pinguicula vulgaris</i> s * [KA-fle]	

Distribution and regional distribution: BN-LA, O2-C1. Found throughout the country on calcareous substrate, most typically in Eastern Norway, in Trøndelag and Nordland to Finnmark, as well as inner fjord stok in Western Norway.

Most important types of confusion: Open flood-resistant ground on sand, gravel and stone (T18-C-1), or silt and clay (T18-C-2). Gradual transition towards floodplain forest (T-30). Floodplain scrub with willow, willow, sea buckthorn, gray alder and willow species is taken to T-30.

Red list status (2018): Open flood-resistant land (NT mainland, LC Svalbard;<).

References and type parallels: Q1, Q2 and Q3 (in part) in (VN). E04 without scrub vegetation (DNHB13).

T18-C-4 Open flood-proof land on sand with clear signs of erosion

NiN characteristics: Firm ground systems: Open flood firm ground (T18), one foundation type (6). Defined by LKM: S1ÿB & VFÿ1 & FRÿB. LKM Basic Steps: S1ÿfg & VFÿcdef & FRÿa.

Physiognomy: Floodplains on lake shores and pothole lakes with sandy substrate. Open, pioneer vegetation dominated by mosses, herbs and graminids. Open flood-resistant land on sand with a clear sign of erosion. Alas: Vegetation cover varies from absent to relatively closely. Ullensaker: Hovin, Nordkulpen N for Sand. Photo: RH.



Ecological characteristics: Occurs in the flood zone around pothole lakes and on flat beaches along larger lakes. Formed by erosion of floodwater in loose masses. Characterized by prolonged flooding in the spring, and gradually dries up over the course of the summer. Relatively nutritious. Sometimes used for house grazing.

Terrain and aerial photo characteristics: Gently sloping surfaces along lakes and ponds. Recognized as a relatively homogenous, green barrier between the water surface and outside habitat types, most often forest edge or meadow vegetation.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T18-6	T18-B-6	T18-C-4	T18-D-4	T18-E-3
Basic types		T18-6	T18-6	T18-6	T18-6

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Galium palustre</i> marsh anemone v	<i>Mentha arvensis</i> field mint v	<i>Rumex longifolius</i> haymole v
<i>Juncus filiformis</i> thread reed v	<i>Ranunculus repens</i> krypsoleie v	<i>Veronica scutellata</i> veikveronika v

Rorippa palustris watercress v *Viola persicifolia* bleach violet t*

Distribution and regional distribution: Bn-MB, O2-OC. Distribution poorly known.

Most important types of confusion: Helophyte swamp (L4), open floodplain on silt and clay (T18-C-2), semi-natural wet meadow (V10).

Red list status (2018): Open flood-resistant land (NT mainland, LC Svalbard;<).

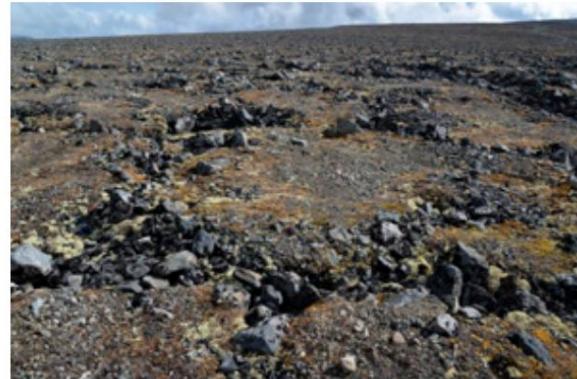
References and type parallels: O1, Q1, Q2 in (VN). E02, E03, E04, E12 (DNHB13).

T19-C-1 Lime-poor fine soil patches

NiN characteristics: Solid ground systems:

Freezing ground (T19), one ground type (1) and parts of a dissolved ground type (3). Defined by LKM: SlýAB & KAý1. LKM base steps: Slýcdh & KAýbcd.

Physiognomy: Regular ring, polygon or strip structure of coarse mineral material alternating with silt-dominated fine material. Species-poor and scattered vegetation with a field layer of graminids, herbs and creeping dwarf shrubs. Bottom layer of mosses and lichens.
Lots of bare soil. Encrusting lichens on coarse stone substrates may occur.



Polygon field with lime-poor fine soil patches. Op: Lom: Near Juvasshytta. Photo: HB.

Ecological characteristics: Freezing soil is conditioned by permafrost, which in combination with a cool climate and a short growing season ensures that the soil becomes relatively stable moist. Thin snow cover leads to strong refreezing, and the type is characterized by a combination of moist soil and strong frost activity. The frost sorts the loose material and causes a characteristic pattern with coarse stone substrate in rings or polygons and silt-dominated mineral soil inside the rings. In sloping terrain, soil flow (solifluction) is common and the rings are pulled out in strips. Occurs in flat or sloping terrain in the Arctic and high up in the mountains (MA and HA) where permafrost, little snow cover, and a short growing season cause frost stirring of the soil. Characterized by disturbance-tolerant vascular plants, mosses and lichens that withstand frost disturbance. Often placed in a similar location as lee side or moderate snow bed in the rabbe-snow bed gradient in the mid-alpine zone and the vegetation has elements from both rabbe and snow bed vegetation. The type occurs on lime-poor to intermediate soil and is distinguished from lime-rich freezing soil (T19-C-2) by the lack of lime-requiring species.

Terrain and aerial photo characteristics: Flat to gently sloping terrain. Clear rock polygons can be seen on aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T19-B-1	T19-C-1	T19-D-1	T19-E-1
Basic types	T19-1	T19-1.3*	T19-1.3*	T19-1.3*	T19-1.3*

* Note: The basic type T19-3 Rock-dominated frozen ground (Slýcd & KAýabcdefghi) is dissolved and included in T19-C,D,E-1

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **tm-** gradent t.); **s** = distinction (**s*** = absolute s., **s+/-** = strong relative s., **s-/-** = weak relative s.)

<i>Cardamine bellidifolia</i> high mountain cress v <i>Carex bigelowii</i> sorghum etc <i>Deschampsia alpina</i> mountain pile v <i>Festuca vivipara</i> goat's fescue v <i>Hieracium alpinum</i> agg. mountain glider <i>Luzula confusa</i> _ <i>Ranunculus glacialis</i> issoleie v	<i>Poa flexuosa</i> mykrapp v <i>Salix herbacea</i> mouse ear v <i>Vaccinium vitis-idaea</i> lingonberry <i>Anthelia julacea</i> creeping snow m;v <i>Anthelia juratzkana krypsnemosis</i> etc <i>Gymnomitrion concinnatum</i> rabbeåme moss m	<i>Kiaeria starkei</i> snow frost moss <i>Marsupella brevissima</i> snow-hut tremose m <i>Polytrichastrum sexangulare</i> snowdrop moss <i>Cetrariella delisei</i> snow sharp m <i>Flavocetraria cucullata</i> yellow sedge <i>Flavocetraria nivalis</i> yellow skin <i>Thamnolia vermicularis</i> macklav
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Distribution and regional distribution: MA-HA, O1-C1.

Most important types of confusion: Calcareous fine soil patches (T19-C-2), calcareous and intermediate rabble (T14-C-1), calcareous and intermediate mountain grassland (T22-C-1).

Red list status (2018): Freezing ground (LC;<).

References and type parallels: R6ab (VN).

T19-C-2 Calcareous fine soil patches

NiN characteristics: Solid ground systems:

Freezing ground (T19), one ground type (2) and parts of a dissolved ground type (3). Defined by LKM: SlÿAB & KAÿ2. LKM base steps: Slÿcdh & KAÿfgh.

Physiognomy: Regular ring, polygon or strip structure of coarse mineral material alternating with silt-dominated fine material. Moderately species-rich and scattered vegetation with a field layer of graminids, herbs and creeping dwarf shrubs (mouse-ear and/or polar willows). Bottom layer dominated by mosses and lichens. Lots of bare soil. Encrusting lichens on coarse stone substrates may occur.



Calcareous freezing ground. ST: Oppdal: S. Knutshø, the top, approx. 1690 m a.s.l. Photo: RH.

Ecological characteristics: Freezing soil is conditioned by permafrost, which in combination with a cool climate and a short growing season ensures that the soil becomes relatively stable moist. Thin snow cover leads to strong refreezing, and the type is characterized by a combination of moist soil and strong frost activity.

The frost sorts the loose material and causes a characteristic pattern with coarse stone substrate in rings or polygons and silt-dominated mineral soil inside the rings. In sloping terrain, soil flow (solifluction) is common and the rings are pulled out in strips. Occurs in flat or sloping terrain in the Arctic and high up in the mountains (MA and HA) where permafrost, little snow cover, and a short growing season cause frost stirring of the soil.

Characterized by disturbance-tolerant vascular plants, mosses and lichens that withstand frost disturbance. Often placed in a similar location as lee side or moderate snow bed in the rabbe-snow bed gradient in the mid-alpine zone and the vegetation has elements from both rabbe and snow bed vegetation. Occurs on calcareous ground with several strongly calcareous species. Growing place for rare plants such as snow fritillary and snow star flower and several lime-loving species of ruby loam.

Terrain and aerial photo characteristics: Flat to gently sloping terrain. Clear rock polygons can be seen on aerial photos.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T19-B-2	T19-C-2	T19-D-2	T19-E-2
Basic types	T19-2	T19-2.3*	T19-2.3*	T19-2.3*	T19-2.3*

* The basic type T19-3 Rock-dominated frozen ground (Slÿcd & KAÿabcdefghi) dissolves and is included in T19-C,D,E-2

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **tx**- gradient ent.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Cardamine bellidifolia</i> mountain cress <i>Carex fuliginosa</i> ssp. <i>misandra</i> dubbe starr s+[KA:fle] <i>Cerastium alpinum</i> mountain sage m;v;s-[KA:fle] <i>Draba alpina</i> gullrblom s+[KA:fle] <i>Draba lactea</i> laprblom s+[KA:fle] <i>Draba oxyacarpa</i> bleikrblom s+[KA:fle] <i>Festuca rubra</i> red fescue etc	<i>Luzula arcuata</i> bow fly v <i>Luzula nivalis</i> snowfinch s*[KA:fle] <i>Micranthes tenuis</i> s [KA:fle] <i>Poa arctica</i> jerboa s-[KA:fle] <i>Ranunculus glacialis</i> issoleie v <i>Sagina caespitosa</i> small heirloom s+ [KA:fle] <i>Salix herbacea</i> mouse ear v <i>Salix polaris</i> polarvær s*[KA:fle] <i>Saxifraga oppositifolia</i> red herring v;s+[KA:fle]	<i>Silene acaulis</i> fjellsmelle etc <i>Stellaria longipes</i> snow star flower s+ [KA:fle] <i>Aulacomnium turgidum</i> rock felt moss v <i>Blindia acuta</i> red sigmoid v;s-[KA:fle] <i>Distichium capillaceum</i> cushion plane moss m;v;s*[KA:fle] <i>Scorpidium revolutum</i> red mackerel moss s*[KA:fle]
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Distribution and regional distribution: MA-HA, O1-C1.

Most important types of confusion: Lime-poor fine soil patches (T19-C-1), calcareous mountain grass heath (T22-C-3), calcareous rabble (T14-C-2).

Red list status (2018): Freezing ground (LC;<).

References and type parallels: R6c (VN), C01 (DNHB13).

T20-C-1 Lime-poor and intermediate ice-freezing ground

NiN characteristics: Solid ground systems: Ice freezing ground (T20), one basic type (1). Defined by LKM: KAÿ1. LKM base step: KAÿcde.

Physiognomy: Open mounded vegetation with perennial herbs and grasses, sometimes with elements of heather. Both mosses and lichens are common in the bottom layer. Scattered bushes may occur.



Ecological characteristics: The type occurs in depressions and dead ice pits on loose masses that are so easily drained that the depressions are not filled with water.

Lime-poor and intermediate ice-freezing ground. He: Foldal: Grimsmoen. Photo: HB.

This means that wetland vegetation is not formed either. However, when there is a lot of rainfall on frozen ground and in the melting snow, water collects at the bottom of the depressions and in some years the vegetation can freeze into ice. Under such conditions, a dense vegetation develops with species that can withstand freezing into ice. The type requires occasional long-lasting and stable frost, and is promoted by cold winters and thin or missing snow cover. It therefore seems to be restricted to areas with a weak continental climate and is not known from the lowlands. Wood layer is partially missing due to low winter temperatures; directly because the recesses are cold stores. Lime-poor and intermediate glaciation soils lack lime-requiring species.

Terrain and aerial photograph characteristics: Depressions with ice-freezing ground are clearly seen on aerial images with good resolution. The type is clearly distinguished from the surrounding forest and low-dominant heath at the top of the pits by having a tufted structure.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T20-B-1	T20-C-1	T20-D-1	T20-E-1
Basic types	T20-1	T20-1	T20-1	T20-1	T20-1

Diagnostic species

m = type of quantity (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity species (t* = characteristic t., ta- gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.)

<i>Anthoxanthum nipponicum</i> mountain gulaks v	<i>Vaccinium uliginosum</i> blackberry v	<i>Sanionia uncinata</i> claw white moss v
<i>Avenella flexuosa</i> smyle m;v*	<i>Vaccinium vitis-idaea</i> cranberry v	<i>Cetraria islandica</i> islandslav v
<i>Carex bigelowii</i> stivstarr v	<i>Aulacomnium palustre</i> peat moss v	<i>Cetrariella delisei</i> snow sharp v
<i>Carex brunneoscens</i> ssp. <i>brunneoscens</i> brown cataract v	<i>Dicranum scoparium</i> rib sickle v	<i>Cladonia arbuscula</i> light lichen v
<i>Deschampsia cespitosa</i> ssp. <i>cespitosa</i> silver pile v	<i>Hylocomium splendens</i> floor moss v	<i>Cladonia gracilis</i> syllav v
<i>Empetrum nigrum</i> krekling v	<i>Pleurozium schreberi</i> furumose v	<i>Cladonia pyxidata</i> grain brown calyx v
<i>Festuca ovina</i> sheep fescue v	<i>Polytrichum commune</i> large bear moss v	<i>Cladonia rangiferina</i> gray lichen v
<i>Lysimachia europaea</i> forest star v	<i>Polytrichum strictum</i> felt bear moss v	<i>Cladonia stellaris</i> white curl v
	<i>Ptilidium ciliare</i> ground fringe v	<i>Flavocetraria nivalis</i> yellow skin v
		<i>Peltigera aphthosa</i> green liver v

Distribution and regional distribution: MB-LA, OC-C1. Distribution not known.

Most important types of confusion: Mountain heath, lee side and tundra (T3)

Red list status (2018): Ice freezing ground (DD;<).

References and type parallels: –

T20-C-2 Calcareous ice-freezing ground

NiN characteristics: Solid ground systems: Ice frozen ground (T20), one basic type (2). Defined by LKM: KAÿ2. LKM basic step: KAÿfgh.

Physiognomy: Open meadow-like vegetation with perennial herbs and grasses. Both mosses and lichens are common in the bottom layer. Scattered bushes may occur.

Ecological characteristics: The type occurs in depressions and dead ice pits on loose masses that are so easily drained that the depressions are not filled with water. This means that wetland vegetation is not formed either. However, when there is a lot of rainfall on frozen ground and in the melting snow, water collects at the bottom of the depressions and in some years the vegetation can freeze into ice. Under such conditions, a meadow or mound-like vegetation develops with species that can withstand freezing into ice. The type requires occasional long-lasting and stable frost, and is promoted by cold winters and thin or missing snow cover. It therefore seems to be restricted to areas with a weak continental climate and is not known from the lowlands. Wood layer is partially missing due to low winter temperatures; directly because the recesses are cold stores. Distinguished from lime-poor and intermediate ice-freezing ground by the presence of lime-requiring species.

Terrain and aerial photograph characteristics: Depressions with ice-freezing ground are clearly seen on aerial images with good resolution.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T20-2	T20-B-2	T20-C-2	T20-D-2	T20-E-2
Basic types		T20-2	T20-2	T20-2	T20-2

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Botrychium boreale</i> s [KA:fle]	<i>Euphrasia stricta</i> glandular thrush v <i>Festuca ovina</i> sheep fescue v <i>Galium boreale</i> white ants s+[KA:fle] <i>Gentiana nivalis</i> snow sweet s+[KA:fle] <i>Linnaea borealis</i> linnea v <i>Luzula multiflora</i> ground beetle v <i>Lysimachia europaea</i> forest star v <i>Potentilla crantzii</i> spotted wall s+[KA:fle] <i>Pulsatilla vernalis</i> mogop s-[KA:fle] <i>Pyrola minor</i> pearl wintergreen v <i>Ranunculus acris</i> ground soleie v <i>Thalictrum alpinum</i> mountain seed star s+[KA:fle] <i>Vicia cracca</i> bird's vetch v	<i>Dicranum scoparium</i> rib sickle v <i>Hylocomium splendens</i> floor moss v <i>Pleurozium schreberi</i> furmose v <i>Polytrichum commune</i> large bear moss v <i>Ptilidium ciliare</i> ground fringe v <i>Sanionia uncinata</i> claw white moss v <i>Cetraria islandica</i> islandslav v <i>Cetrariella delisei</i> snow sharp v <i>Cladonia arbuscula</i> light lichen v <i>Cladonia rangiferina</i> gray lichen v <i>Cladonia stellaris</i> white curl v
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Distribution and regional distribution: MB-LA, OC-C1. Distribution not known.

Most important types of confusion: Mountain heath, lee side and tundra (T3)

Red list status (2018): Ice freezing ground (DD;<).

References and type parallels: –

T21-C-1 Foreshore and primary dunes

NiN characteristics: Firm ground systems: Dune ground (T21), two basic types (1,2). Defined by LKM: SSy1,2. LKM base step: SSyabc.

Physiognomy: Low-growing, sparse vegetation with herbs and grasses, without bottom layer, or sandy surface without vegetation. Sandy substrate dominates.



Foreshore and primary dunes. VA: Farsund: Einarsneset.
Photo: HB.

Ecological characteristics: Found in open sand-dominated areas, preferably in relatively exposed places along the coast, exceptionally inland. Conditional on the supply of sand (from the sea) with strong winds. Foreshore and primary dunes comprise the outermost unstable parts of active dune systems, as well as "normal" sandy beaches outside the dune systems. Dominated by open, unstable sand surfaces with sparse vegetation that can withstand wind erosion and sand deposition. Dry sand in the upper layer and furthest from the beach, usually stable moist sand in deeper layers. Almost without organic matter, but some seaweed and kelp may occur. Species-poor, often single-species communities. Regional designs with characteristic species composition in southern and northern parts of the country. Occurs inland in connection with river banks along larger rivers (e.g. Tana) or in erosion-prone places with open sandy surfaces (e.g. in Folldal where the sandy moraines are cut through by the river Folla).

Terrain and aerial photo characteristics: Primarily on very gently sloping surfaces facing the sea. Relatively smooth structure. FF: Sand dominance gives light gray to white colors in aerial photos: gravel dominance gives somewhat darker shades of colour. Patches of light green to brown vegetation. Very smooth texture. Texture and color consistent within and between regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T21-B-1.2	T21-C-1	T21-D-1	T21-E-1
Basic types	T21-1,2	T21-1.2	T21-1,2	T21-1,2	T21-1-8

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Cakile maritima</i> beach radish v;s- [SSycl]	<i>Elytrigia juncea</i> shorebird <i>Kali turgida</i> sodawort s- [SSycl]	<i>Leymus arenarius</i> beach rye v <i>Honckenya peploides</i> strand heritage v ;s- [SSycl]
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Distribution and regional distribution: BN-NB and ASHTZ, O3-OC. Found along the entire coast.

Main types of confusion: White and gray quilts (T21-C-2).

Red list status (2018): Sanddynemark (VU;<).

References and type parallels: V6 (VN), partly G03 and G04 (DNHB-13).

T21-C-2 White and gray quilts

NiN characteristics: Fixed land systems:

Dune land (T21), two ground types (3,4), as well as parts of unstable (eroded) dune (8). Defined by LKM: SSy3,4. LKM base step: SSydef.

Physiognomy: Glissen to fairly sparse vegetation, mostly dominated by large grasses; gradual increase in cover of low-growing herbs and grass with increasing distance from the beach. Bottom layer is missing or has low coverage. Sandy substrate dominates.

Ecological characteristics: Occurs within foreshores and primary dunes in dune systems, preferably in relatively exposed places along the coast, exceptionally inland. Conditional on the supply of sand (from the sea) with strong winds. Kvit dyne is a species-poor, grass-dominated, dry habitat type, without a bottom layer, typically with open sandy areas between tall grasses that can withstand strong sand deposits and wind wear. Marehalm dominates in the south, beach rye in the north. The sand stabilizes more and more with increasing distance from the shoreline. White dunes then turn into gray dunes, which are characterized by lower sand supply and weaker wind disturbance, which opens up soil development so that a humus layer builds up and soil moisture increases. Dominated by low-growing herbs and grasses, patchy with mosses and lichens. The lime content depends on the amount of shell remains in the sand, added and accumulated organic material (seaweed and kelp, humus development), and the leaching of nutrients, which increases with increasing distance from the beach (time since the land rose from the sea). Occurs inland in connection with river banks or in other erosion-prone places with open sandy surfaces.

Terrain and aerial photo characteristics: FF: Light green or light brown color; against grey-white with high coverage of bare sand. Slightly less uniform texture than foreshore and primary dunes. Texture and color consistent within and between regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T21-3,4	T21-B-3,4	T21-C-2	T21-D-2	T21-E-1
Basic types		T21-3,4	T21-3,4	T21-3,4	T21-1-8

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta** - gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

Achillea millefolium yarrow v;s+[SSydlc]	Festuca rubra red fescue m;v*s+[SSydlc]	Potentilla anserina ssp. anserina goosemu re v;s+[SSydlc]
Ammophila arenaria marehalm t*m*v;s+[SSyelf][S]	Galium verum yellow ant v;s*[SSyel Id]	Salix repens heivier s-[SSydlc]
Astragalus alpinus milkweed v;s-[SSyeld][N]	Gentianella aurea pale sweet s-[SSyeld]	Sedum acre bitterbergknapp v;s+[SSydlc]
Campanula rotundifolia bluebell v;s+[SSydlc]	Hieracium umbellatum screen hover v	Sonchus arvensis akerdylle v
Carex arenaria sand starr v;t*[SS-ef]	Honckenya peploides beach heritage s-[SSyflg]	Thalictrum minus coastal seed star s*[SSyld lc]
Dianthus superbus silk carnation s-[SSydlc][N]	Lathyrus japonicus beach flat pod ta [SS-d]	Vicia cracca bird's vetch v;s+[SSyld lc]
Eryngium maritimum sea buckthorn t*	Leymus arenarius beach rye v;s+[SSyflg]	Viola tricolor motherwort s-[SSydlc]
Euphrasia wettsteinii small-eyed thrush v;s-[SSyeld]	Lotus corniculatus tirltongue v;s-[SSyeld]	Systrichia ruraliformis downy hair star m;v*
	Pimpinella saxifraga v;s*[SSyel Id]	Sanionia uncinata claw white moss v;s*[SSyeld]
	Poa pratensis engrapp v;s+[SSyeld]	

Distribution and regional distribution: BN-NB and ASHTZ, O3-OC. Spotted in suitable places along the entire coast. Regional designs with characteristic species composition.

Most important types of confusion: Foreshore and primary dune (T21-C-1), brown dune and dune heath (T21-C-3).

Red list status (2018): Sanddynemark (VU;<).

References and type parallels: V7, W1 (VN), partly G03 (DNHB-13).



White and gray quilt with mare straw, brown quilts on the right and foreshore on the left. VA: Farsund: Lomsesanden. Photo: HB.

T21-C-3 Brown quilts and quilt heather

NiN characteristics: Fixed land systems: Dune land (T21), two ground types (5,6), as well as parts of unstable (eroded) dune (8). Defined by LKM: SSy5,6. LKM base step: SSyghi.

Physiognomy: Endless meadow or mounded vegetation, dominated by low-growing herbs and grasses or heather and low shrubs. Bottom layer with mosses and lichens.

Ecological characteristics: Occurs on stabilized dunes within white and gray dunes, typically in the innermost open parts of large dune areas, in relatively exposed places along the coast, exceptionally inland. The supply of sand is low, and the vegetation in the herb- and grass-dominated, often very species-rich brown dunes with a meadow feel and in the heather-dominated dune heaths is dominated by species without special adaptations to withstand sand deposition. The lime content depends on the amount of shell remains in the sand, the degree of leaching and how thick the humus layer has built up. In general, the thickness of the humus layer and the soil moisture increase with increasing distance from the beach. The content of shell remains in the sand is important for the species composition. Mosses and lichens may dominate, while marsh straw and beach rye are missing or sparsely present. Often used for scattered open field grazing (clearly marked by grazing, Hlýa).

The dune heaths are dominated by heather and low bushes, in the south often creeping heather and heather, in the north teal and sometimes reindeer rose. Can occur inland along large rivers.



Brown dunes and dyne heath with eroded parts. Fi: Vadso: Skalbukta. Photo: HB.

Terrain and aerial photograph characteristics: FF: Dark to green color in aerial photograph, often somewhat varying texture. Texture and color consistent within and between regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2.500	1:5,000	1:10,000	1:20,000
Code		T12-B-5,6	T12-C-3	T21-D-3	T21-E-1
Basic types	T21-5,6	T21-5,6	T21-5,6	T21-5,6	T21-1-8

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta** = gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Achillea millefolium</i> yarrow v* <i>Anthyllis vulneraria</i> round pod s-[SSyglf] <i>Astragalus alpinus</i> milkweed v[N] <i>Calluna vulgaris</i> heather m;v;s*[SSylh] <i>Campanula rotundifolia</i> bluebell v <i>Carex arenaria</i> sandstarr v <i>Carex rupestris</i> sedge s-[SSyglf][N] <i>Dianthus superbus</i> silk carnation t[N] <i>Dryas octopetala</i> reindeer s-[SSyglf] [N] <i>Empetrum nigrum</i> cricket v;s-[SSylh] <i>Festuca rubra</i> red fescue v* <i>Galium verum</i> yellow ant v; ta [SS·gh]	<i>Gentianella aurea</i> pale sweet <i>Helictotrichon pubescens</i> down oats s+[SSyglf] <i>Hieracium umbellatum</i> screen hover v;s-[SSyglf] <i>Jasione montana</i> blue monk s-[SSyglf] <i>Linum catharticum</i> wild-lin s-[SSyglf] <i>Lotus corniculatus</i> tirltongue v <i>Pilosella officinarum</i> s-[SSyglf] <i>Pimpinella saxifraga</i> v; ta [SSygh]	<i>Plantago lanceolata</i> s-[SSyglf] <i>Salix repens</i> heivier ta-[SSygh] <i>Sedum acre</i> bitterbergknapp v <i>Thalictrum minus</i> coastal seed star ta [SS·gh] <i>Viola tricolor</i> motherwort ta [SS·gh] <i>Brachythecium albicans</i> bleiklundmose v <i>Syntrichia ruraliformis</i> downy hair star m;v* <i>Cetraria islandica</i> island slave v*s+[SSyglf]
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Distribution and regional distribution: BN-NB and ASHTZ, O3-OC. Found in patches in suitable places along the entire coast.

Regional designs with characteristic species composition in southern and northern parts of the country.

Most important types of confusion: Gray and brown dune (T21-C-2), dune-meadow with clear heaving and manure influence (T32-C-19).

Red list status (2018): Sand dune field (VU;<) and southern established dune field (EN;ü).

References and type parallels: V7, W1 (VN), partly G03 (DNHB-13).

T21-C-4 Quilt trough

NiN characteristics: Firm ground systems:

Dune ground (T21), one ground type (7). Defined by LKM:
SSý5,6 & VMý2. LKM basic steps: SSýghi & VMýab.



Large quilt trough with creepers. VA: Farsund: Asen. Photo: RH.

Physiognomy: Open to the end, often hilly vegetation, dominated by low-growing herbs and grasses, often also low shrubs. The bottom layer can have high moss coverage.

Ecological characteristics: Occurs on stabilized dunes in exposed places along the coast, exceptionally inland. Dynetrau is formed in places where the wind has got an extra good hold, the sand is eroded right down to the groundwater and depressions are formed. These recesses can be filled with water and ice in the winter, while they can dry up in the summer. These depressions (dyne trough as a landform) can alternatively contain marsh and/or freshwater bodies. The nature type dune trough includes alternately moist or moist (but not wet) places in depressions in dune areas, with significant humus formation and a strong influence of moisture-demanding species. The content of shell remains in the sand is important for the species composition; lime-demanding species and a species-rich flora can occur.

Terrain and aerial photo characteristics: FF: Mostly dark green color in aerial photos, but can vary quite a bit. The range of variation includes light brown-green and grey-green hues (e.g. in the case of creeping willow dominance). Recesses in established quilts, even structure in the bottom which gives a very even texture. Texture and color consistent within and between regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T21-B-8	T21-C-4	T21-D-4	T21-E-1
Basic types	T21-8	T21-8	T21-8	T21-8	T21-1-8

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity species (t* = characteristic t., tñ- gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.)

Agrostis stolonifera creeper v;s*[VMýal0]	Juncus alpinoarticulatus reed v;s*[VMýal0] Juncus anceps black rush t* Juncus arcticus finnmarksiv v Juncus articulatus rush v;s*[VMýal0] Juncus balticus sand rush v Juncus bulbosus ssp. bulbosus crysiv s* [VMýal0] Parnassia palustris jáblom s*[VMýal0] Pedicularis sceptrum-carolinum king's spire s*[VMý0][N] Phragmites australis roof pipe v;s*[VMýal0] Plantago maritima beach giant s*[VMýal0]	Poa pratensis engrapp v Primula stricta narrow key flower s*[VMýal0] [N] Rhinanthus minor small meadow call s-[VMýal0] Sagina nodosa bud microheritage s*[VMý0] Salix hastata s *[VMýal0] Salix repens heivier m*; Triglochin palustris marsh onion s*[VMýal0] Calliergonella cuspidata marsh bramble m;v;s*[VMýal0] Sanionia uncinata claw white moss etc Syntrichia ruraliformis quilt hair star v
Calamagrostis neglecta small tuber v;s*[VMýal0]		
Carex flacca s +[VMýal0]		
Carex maritima bow starr v;s*[VMýal0]		
Carex nigra ssp. nigra sedge v;s*[VMýal0]		
Carex viridula ssp. pulchella mouse cataract s*[VMýal0]		
Equisetum arvense field rush v;s+[VMýal0]		
Festuca rubra red fescue v		

Distribution and regional distribution: BN-NB and ASHTZ, O3-OC. Found in patches in suitable places along the entire coast. Regional designs with characteristic species composition in southern and northern parts of the country.

Main types of confusion: Gray and brown quilt (T21-C-2).

Red list status (2018): Sanddynemark (VU;<).

References and type parallels: W4 (VN), partly G03 (DNHB-13).

T22-C-1 Calcareous and intermediate mountain grass heath

NiN characteristics: Permanent land systems: Mountain grassland and grass tundra (T22), one basic type (1). Defined by LKM: KAý1 & SVý1. LKM basis steps: KAýbcd & SVý0.

Physiognomy: Lacks shrub layer. Species-poor to moderately species-rich heaths with a relatively dense field layer of graminids. Often contains both snow-bearing species and snow-clouding species. Bottom layer often dominated by lichens and some leaf mosses.



Lime-poor and intermediate mountain grassland. Op: Vågå: Sikkilsdalshø. Photo: RH.

Ecological characteristics: The natural type consists of grass heath, among other things, with sedge, sedge and sedge and with ice sedge in the bottom layer, and replaces mountain heath, leeside and tundra (T3) in the upper part of LA and MA. Up in the middle parts of the rabb-snow bed gradient on drought-prone soils (dry grass heaths) with fine to medium-coarse, calcareous substrate and without clear stratification. Soil seepage and frost stirring are widespread. Distinguished from calcareous mountain grass heath (T22-C-3) by the lack of strongly calcareous species.

Terrain and aerial photo characteristics: Flat to sloping terrain.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T22-B-1	T22-C-1	T22-D-1	T22-E-1
Basic types	T22-1	T22-1	T22-1	T22-1,2	T22-1,2

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Diphasiastrum alpinum</i> fjelljamne v	<i>Vaccinium uliginosum</i> blackberry v	<i>Cladonia bellidiflora</i> lichen v
<i>Huperzia appressa</i> mountain louse grass v	<i>Vaccinium vitis-idaea</i> cranberry v	<i>Cladonia pyxidata</i> grain brown calyx v
<i>Avenella flexuosa</i> smyle v	<i>Viscaria alpina</i> ssp. <i>alpina</i> mountain tar flower v	<i>Cladonia coccifera</i> agg. semolina beaker v
<i>Carex bigelowii</i> sorghum etc	<i>Barbilophozia floerkei</i> heather moss v	<i>Cladonia crispata</i> funnel lichen v
<i>Carex vaginata</i> slirestarr v	<i>Lophozia sudetica</i> red tab v	<i>Cladonia deformis</i> beaker fausklav v
<i>Empetrum nigrum</i> krekling v	<i>Ptilidium ciliare</i> ground fringe v	<i>Cladonia ecmocyna</i> snow awl v
<i>Festuca ovina</i> sheep's fescue etc	<i>Dicranum fuscescens</i> bergsigd v	<i>Cladonia gracilis</i> syllav v
<i>Hieracium alpinum</i> agg. mountain glider v	<i>Pohlia nutans</i> vegnikke v	<i>Cladonia macrophylla</i> stringy lichen v
<i>Juncus trifidus</i> rabbesiv etc	<i>Polytrichum juniperinum</i> juniper bear moss v	<i>Cladonia rangiferina</i> gray lichen v
<i>Kalmia procumbens</i> greplyng v	<i>Cetraria ericetorum</i> smal Icelandslav v	<i>Cladonia squamosa</i> fnaslav v
<i>Luzula arcuata</i> bow fly v	<i>Cetraria islandica</i> island slave m;v	<i>Cladonia stellaris</i> white curl v
<i>Luzula spicata</i> aksfrytle v	<i>Cetrariella delisei</i> snow sharp v	<i>Cladonia uncialis</i> spikelav v
<i>Phyllodoce caerulea</i> blue heather v	<i>Cladonia amara</i> goblet pinglav v	<i>Flavocetraria cucullata</i> yellow skerpe v
<i>Pulsatilla vernalis</i> mogop v[OC-C1]	<i>Cladonia arbuscula</i> light lichen etc	<i>Flavocetraria nivalis</i> yellow skin v
<i>Salix herbacea</i> mouse ear v		<i>Stereocaulon paschale</i> common salt lichen v
<i>Vaccinium myrtillus</i> blueberry v		

Distribution and regional distribution: LA-MA, O2-C1. Upper part of LA only.

Most important types of confusion: calcareous and intermediate grass snow bed (T22-C-2), calcareous mountain grass heath (T22-C-3), calcareous loess side (T3-C-1), intermedial loess side (T3-C-4).

Red list status (2018): Mountain grassland and grass tundra (LC;<).

References and type parallels: R5abde (VN).

T22-C-2 Lime-poor and intermediate**grass snow bed NiN characteristics:**

Permanent land systems: Mountain grassland and grass tundra (T22), one basic type (2). Defined by LKM: KAյ1 & SVў2. LKM basic steps: KAўbcde&. SVўab.

Physiognomy: Lacks shrub layer. Species-poor to moderately species-rich vegetation with a dense to open field layer dominated by graminids, with scattered elements of herbs and some heather. Bottom layer of mosses and/or lichens.



Lime-poor and intermediate grass snow bed. Op: Vågå: NW of Blåhø. Photo: HB.

Ecological characteristics: On slopes, depressions and on surfaces with medium-thick snow cover that melts in June/July. Good water supply throughout most of the season, but can dry out in periods after snowmelt. Highly moisture-demanding species can occur in depressions. On relatively nutrient-poor land, often with a podsol profile. Solifluction and other frost effects are common. Distinguished from calcareous grass snow bed (T22-C-4) by the lack of lime indicators and more lichen. Lime-poor and intermediate grass snow beds replace mountain heath, leeside and tundra (T3) in the upper part of the low alpine and mid-alpine zone and are delimited to moderate snow beds along the variable snow cover-related growth reduction.

Terrain and aerial photo characteristics: Flat to sloping terrain.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T22-2	T22-B-2	T22-C-2	T22-D-1	T22-E-1
Basic types		T22-2	T22-2	T22-1,2	T22-1,2

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Alchemilla alpina</i> mountain marigold etc	<i>Kalmia procumbens</i> greplyng v	<i>Polytrichum juniperinum</i> juniper moss v
<i>Agrostis mertensii</i> mountain sedge etc	<i>Luzula spicata</i> aksfrytle v	<i>Sanionia uncinata</i> claw white moss v
<i>Diphasiastrum alpinum</i> fjelljamme v	<i>Nardus stricta</i> fin beard etc	<i>Cetraria islandica</i> island slave m;
<i>Huperzia appressa</i> mountain loose grass v	<i>Omalotheca supina</i> dwarf graywort v	<i>Cetrairiella delisei</i> snow sharp t*
<i>Anthoxanthum nipponicum</i> mountain gulaks etc	<i>Salix herbacea</i> mouse ear v	<i>Cladonia arbuscula</i> light lichen v
<i>Avenella flexuosa</i> smyle m;v	<i>Sibbaldia procumbens</i> three-finger herb v	<i>Cladonia bellidiflora</i> lichen v
<i>Carex bigelowii</i> sorghum etc	<i>Solidago virgaurea</i> golden rice v	<i>Cladonia pyxidata</i> grain brown calyx v
<i>Carex brunnescens</i> ssp. brownishness brown tetanus v	<i>Vahlodea atropurpurea</i> grouse pile t*	<i>Cladonia coccifera</i> agg. groat red beaker v
<i>Carex vaginata</i> slirestarr v	<i>Barbilophozia floerkei</i> heather beard moss v	<i>Cladonia crispata</i> funnel lichen v
<i>Empetrum nigrum</i> kreklings v	<i>Barbilophozia lycopodioides</i> goosefoot beard moss v	<i>Cladonia ecmocyna</i> snow awl v
<i>Festuca ovina</i> sheep fescue v	<i>Lophozia sudetica</i> red tab v	<i>Cladonia phyllophora</i> blackfoot lichen v
<i>Festuca vivipara</i> goat's fescue v[O2-O1]	<i>Conostomum tetragonum</i> helmet moss v	<i>Cladonia squamosa</i> fnaslav v
<i>Harriemannella hypnooides</i> moss heather v	<i>Dicranum fuscescens</i> bergsgild v	<i>Cladonia subfurcata</i> mountain fork lichen v
<i>Hieracium alpinum</i> agg. mountain glider v	<i>Pohlia nutans</i> vegnikke v	<i>Cladonia uncialis</i> spikelav v
<i>Juncus trifidus</i> rabbesiv v	<i>Polytrichastrum alpinum</i> mountain binnemoss v	<i>Psoroma hypnorum</i> shell felt lichen v
	<i>Polytrichum commune</i> large bear moss v	<i>Stereocaulon paschale</i> common salt lichen v

Distribution and regional distribution: LA-MA, O2-C1.

Most important types of confusion: Calcareous and intermediate mountain grass heath (T22-C-1), calcareous grass snow bed (T22-C-4), slightly calcareous moderate snow bed (T7-C-2), intermediate moderate snow bed (T7-C-3).

Red list status (2018): Mountain grassland and grass tundra (LC;<).

References and type parallels: T1 (VN).

T22-C-3 Calcareous mountain grass heath

NiN characteristics: Permanent land systems: Mountain grassland and grass tundra (T22), one basic type (3). Defined by LKM: KAy2 & SVy1. LKM base steps: KAyfgh & SVy0.

Physiognomy: Lacks shrub layer. Fairly species-rich moors with a relatively dense field layer of graminids and herbs.

Little heather. Often contains both snow-bearing species and snow-clouding species. Bottom layer often dominated by lichen and something mossy.



Calcareous mountain grassland. ST: Oppdal: between S and M Knutshø.
Photo: HB.

Ecological characteristics: The nature type consists of grass heath, and replaces mountain heath, leeside and tundra (T3) in the upper part of the low alpine and mid-alpine zone. Thin snow cover and long growing season (June-September). Drought-prone soil (dry grass heaths) with a fine to medium coarse calcareous substrate and without clear stratification. Soil seepage and frost stirring are widespread. Often well exposed to the sun. The limestone richness is reflected in the presence of, among other things rock sedge, as well as several lime-requiring herbs and mosses. Most graminids, however, have little lime requirement, such as sedges, sedges and sheep's fescue.

Terrain and aerial photo characteristics: Flat to sloping terrain.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T22-B-3	T22-C-3	T22-D-2	T22-E-2
Basic types	T22-3	T22-3	T22-3	T22-3,4	T22-3,4

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **tn-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

In addition to species from T22-C-1	<i>Poa arctica</i> jerboa s-[KA-fle] <i>Potentilla crantzii</i> spotted wall v;s+ [KA-fle] <i>Salix polaris</i> polarvier s*[KA-fle] <i>Saussurea alpina</i> mountain thistle s-[KA-fle]	<i>Silene acaulis</i> fjellsmelle v <i>Thalictrum alpinum</i> mountain seed star v;s+[KA-fle] <i>Rhytidium rugosum</i> paw moss v;s*[KA-fle]
<i>Carex rupestris</i> rock sedge v;s*[KA-fle] <i>Draba</i> spp. rublom species v;s-[KA-fle] <i>Minuartia biflora</i> tuerve s-[KA-fle] <i>Pedicularis oederi</i> s *[KA-fle]		

Distribution and regional distribution: LA-MA, O2-C1. Only in the upper part of LA.

Most important types of confusion: Calcareous intermediate mountain grass heath (T22-C-1), calcareous grass snow bed (T22-C-4), weakly calcareous loess (T3-C-6), strong calcareous loess (T3-C-10).

Red list status (2018): Mountain grassland and grass tundra (LC;<).

References and type parallels: R5c (VN), C01 rabb (DNHB13).

T22-C-4 Calcareous grass snow bed

NiN characteristics: Permanent land systems: Mountain grassland and grass tundra (T22), one basic type (4). Defined by LKM: KAÿ2 & SVÿ2. LKM basic steps: KAÿfgh & SVÿab.

Physiognomy: Lacks shrub layer. Species-rich vegetation with a dense field layer dominated by graminids, with a touch of lime-demanding herbs. Bottom layer of mosses and/or low.

Ecological characteristics: Found in the upper part of LA and in MA on slopes, depressions and on surfaces with medium-thick snow cover that melts in June/July. On calcareous ground and characterized by calcareous species.

The type is limited to moderate snow beds along the variable snow cover-related growth reduction. Good water availability throughout large parts of the season, but may be subject to drought after snowmelt. Strong moisture-demanding species can occur in depressions. Solifluction and other frost effects are common. Calcareous grass snow bed replaces mountain heath, leeside and tundra (T3) in the upper part of the low-alpine and mid-alpine zone

Terrain and aerial photo characteristics: Flat to sloping terrain.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T22-4	T22-B-4	T22-C-4	T22-D-2	T22-E-2
Basic types		T22-4	T22-4	T22-3,4	T22-3,4

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

In addition to several graminids and other species from T22-C-2 <i>Selaginella selaginoides</i> dwarf dwarf v;s*[KA-fle]	<i>Equisetum variegatum</i> s+[KA-fle] <i>Koenigia islandica</i> dwarf sorrel <i>Poa alpina</i> mountain thrush m;v*s-[KA-fle] <i>Potentilla crantzii</i> spotted wall v;s+[KA-fle] <i>Ranunculus nivalis</i> snow sunflower s+[KA-fle] <i>Ranunculus pygmaeus</i> dwarf sunflower s-[KA-fle]	<i>Salix polaris</i> polarier s+[KA-fle] <i>Salix reticulata</i> s *[KA-fle] <i>Vahlodea atropurpurea</i> grouse pile <i>Viola biflora</i> mountain violet <i>Cinclidium stygium</i> marsh grid moss
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Distribution and regional distribution: LA-MA, O2-C1.

Most important types of confusion: Lime-poor and intermediate grass snow bed (T22-C-2), calcareous mountain grass heath (T22-C-3), weakly calcareous moderate snow bed (T7-C-6), strongly calcareous moderate snow bed (T7-C-8).

Red list status (2018): Mountain grassland and grass tundra (LC;<).

References and type parallels: T1/T3b (VN), C01 snow bed (DNHB13).



Calcareous grass snow bed. ST: Oppdal: between S and M Knutshø.
Photo: RH.

T23-C-1 Freshwater impoundment

NiN characteristics: Fixed land systems:

Freshwater drift embankment (T23), one foundation type (1).

Physiognomy: Mostly low-growing vegetation with annual to perennial herbs and grass on drift material in the flood zone.

Ecological characteristics: Freshwater drift dikes occur scattered in the supralittoral and upper geolittoral belt along large lakes which are supplied with significant amounts of more or less coarse organic material, e.g. twigs, leaves, dead plant material from helophyte belts, squeegees, pollen etc. Freshwater drift dikes have relatively clear similarities with drift dikes in saltwater systems and, like these, a strong element of nitrophilous species, including characteristic pioneer species such as e.g. marsh forget-me-not *Myosotis laxa*, reed pepper *Persicaria hydropiper* and nodding bramble *Bidens cernua*. Usually occurs on soil rich in fine material, on moist and nutrient-rich soil.

Terrain and aerial photo characteristics: Occurs on beaches in the flood zone along large lakes. Probably covers small areas and is therefore difficult to identify on aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T23-1	T23-B-1	T23-C-1	T23-D-1	T23-E-1
Basic types		T23-1	T23-1	T23-1	T23-1

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Agrostis stolonifera</i> creeper v <i>Alopecurus aequalis</i> water fox butt v <i>Biden's cernua</i> nikkebrønsle v	<i>Bidens tripartita</i> flikbrønsle v <i>Myosotis laxa</i> swampforglemmegei v <i>Persicaria hydropiper</i> water pepper v	<i>Persicaria lapathifolia</i> glandular hen's grass v <i>Persicaria minor</i> small sheath v
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Distribution and regional distribution: BN-SB, O3-OC. Distribution little known. Probably mainly in the lowlands.

Most important types of confusion: Helophyte-freshwater swamp (L4).

Red list status (2018): Freshwater impoundment (LC;=).

References and type parallels: O2 (VN)



Freshwater dike. ST: Bjugn: Eidsvatnet. Photo: AL.

T24-C-1 Protected and moderately exposed drift embankments

NiN characteristics: Fixed land systems: Drift embankment (T24), two foundation types (1,2). Defined by LKM: VFy1,2. LKM base step: VFycede.

Physiognomy: Herb-dominated relatively tall vegetation on perennial kelp embankments, often as long narrow belts along beaches.

Ecological characteristics: Drift embankments are formed in the upper geolittoral and supralittoral zone in relatively exposed locations that are regularly supplied with seaweed and kelp from the sea.

The added material is accumulated in the form of permanent drift embankments. The drift material is rich in N and P and the vegetation is therefore dominated by nitrophilous "weed" species. The amount of added organic matter and the degree of disturbance (from wave impact) vary widely. Protected and moderately exposed drift dykes are distinguished from one-year drift dykes in that they occur in more protected locations and are therefore less susceptible to disturbance. This allows perennial species to dominate. On sunny days, drift embankments have a much higher temperature than their surroundings due to their dark color and the rapid decomposition of organic matter. Heat-demanding species are therefore often found further north in drift embankments than in other habitat types. Inflow of fresh water from the landward side reduces salinity and increases the presence of nitrophilous wetland species.



One-year operation. MR: Fræna: Storholmen. Photo: HB.

Terrain and aerial photo characteristics: Can be seen as narrow green to dark brown belts on beaches, usually clearly separated from the surrounding vegetation. Often more untidy structure than salt marshes.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T24-1,2	T24-B-1.2	T24-C-1	T24-D-1	T24-E-1
Basic types		T24-1.2	T24-1,2	T24-1,2	T24-1-3

Diagnostic species m =

abundance species (**m*** = dominant m.); v = common species (**v*** = constant v.); t = center of gravity type (**t*** = characteristic t., **t±** - gradient-t.); s = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Agrostis stolonifera</i> creeper v <i>Alopecurus arundinaceus</i> fox butt v <i>Angelica archangelica</i> ssp. <i>litoralis</i> beach water s-[VF-elf] <i>Angelica sylvestris</i> slope v <i>Anthriscus sylvestris</i> dog biscuits v <i>Artemisia vulgaris</i> burot s-[VF-elf] <i>Atriplex littoralis</i> strandmelde v <i>Atriplex prostrata</i> færermelde v <i>Barbarea stricta</i> cress s-[VF-elf] <i>Bidens tripartita</i> flirkørnsle v <i>Calystegia sepium</i> strandvinde v <i>Catabrosa aquatica</i> spring grass v <i>Cochlearia officinalis</i> scurvy herb v <i>Dactylis glomerata</i> dog grass v	<i>Elytrigia repens</i> kveke v <i>Euphorbia palustris</i> milkweed v <i>Festuca rubra</i> red fescue v <i>Filipendula ulmaria</i> meadowsweet v <i>Galeopsis bifida</i> vrangdå v <i>Galeopsis tetrahit</i> kvassdå v <i>Galium aparine</i> klengemaure v <i>Geranium pratense</i> meadow stork beak v <i>Leymus arenarius</i> beach rye v <i>Ligisticum scoticum</i> beach biscuits s-[VF-elf] <i>Persicaria hydropiper</i> water pepper v <i>Phalaris arundinacea</i> beach reed v <i>Poa trivialis</i> markrapp v <i>Potentilla anserina</i> ssp. <i>anserina</i> goose wall v <i>Ranunculus repens</i> krypsoleie v	<i>Ranunculus sceleratus</i> beggar soleie v <i>Rorippa palustris</i> watercress s-[VF-elf] <i>Rumex aquaticus</i> water hay mole v <i>Rumex crispus</i> mugwort s-[VF-elf] <i>Rumex longifolius</i> high mole s-[VF-elf] <i>Silene uniflora</i> strandschmelle v <i>Sonchus arvensis</i> akerdylle v <i>Stachys palustris</i> field pig's root v <i>Stellaria crassifolia</i> star flower <i>Stellaria media</i> vassarve v <i>Tripleurospermum maritimum</i> strandbalderbrå v <i>Tripolium pannonicum</i> beach star v <i>Urtica dioica</i> stinging nettle s-[VF-elf] <i>Valeriana sambucifolia</i> root v <i>Vicia cracca</i> bird's vetch v
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Distribution and regional distribution: BN-NB and ASHTZ, O3-OC. Along the entire coast.

Most important types of disturbance: Strand meadow (T12), gravel- and rock-dominated beach and shoreline (T29).

Red list status (2018): Drift embankment (LC;<).

References and type parallels: V2, V3 (VN), G06 (DNHB13)

T25-C-1 Historic landslide

NiN characteristics: Firm ground systems: Historical landslide ground (T25), one ground type (1). Defined by LKM: S1yA. LKM basic step: S1y0.

Physiognomy: Varies from bare soil or low-growing, pioneer vegetation with mosses, lichens and vascular plants to more established vegetation with shrubs and trees.

Ecological characteristic: Historical landslides have arisen after one single disturbance event (one disruptive landslide event), which is not followed by repeated, similar disturbance events and where the exposed soil therefore undergoes rapid succession towards a post-succession state that is typically firm ground forest land. The type is therefore found in steep terrain where erosion in the loose masses has caused a landslide. The extent can vary, but must be large enough that it can constitute a separate area unit for natural systems. Landslides include land dominated by soil. Since the soil layer is usually quite thin, it is uncertain whether the type actually occurs, and the species composition is therefore little known. Bare soil, pioneer vegetation and subsequent steps of succession towards forest characterize the nature type, which will therefore be characterized by some randomness in relation to which species are established. Distinguished from other historical landslides by substrate. Historical landslides are distinguished from active landslides on the basis of whether the land is characterized by an active destabilizing disturbance (landslide) or is in succession after an earlier, larger landslide and is unaffected by active landslide processes.



Historic landslide. SF: Stryn: Oppstryn, Berstad. Photo: RH.

Terrain and aerial photo characteristics: Covers small areas on steep slopes. Bare landslides are distinguished in aerial photographs from the surrounding vegetation by color and terrain shape.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T25-1	T25-B-1	T25-C-1	T25-D-1	T25-E-1
Basic types		T25-1	T25-1	T25-1	T25-1

Distribution and regional distribution: Distribution unknown.

Most important types of confusion: Rasmark (T13), active landslide (T17), other historic landslides (T25).

Red list status (2018): Historic landslide area (LC;<).

References and type parallels: –

T25-C-2 Historic gravel and sand slides

NiN characteristics: Firm ground systems: Historic landslide ground (T25), two ground types (2,3). Defined by LKM: S1ÿB,C. LKM basic step: S1ÿdefg.

Physiognomy: Varies from bare sand and gravel, low-growing, pioneer vegetation with mosses, lichens and vascular plants to more established vegetation with shrubs and trees.

Ecological characteristic: Historical landslides have arisen after one single disturbance event (one disruptive landslide event), which is not followed by repeated, similar disturbance events and where the exposed land therefore undergoes rapid succession towards a post-succession state that is typically permanent forest land. The type is therefore found in steep terrain where erosion in the loose masses has caused a landslide. The extent can vary, but must be large enough that it can constitute a separate area unit for natural systems. Historical gravel and sand landslides include gravel- and/or sand-dominated land. Bare gravel and sand, pioneer vegetation with mosses and vascular plants, and subsequent steps of succession towards forest characterize the mapping unit, which will therefore be characterized by some randomness in relation to which species establish themselves. Distinguished from other historical landslides by substrate. Historical landslides are distinguished from active landslides on the basis of whether the land is characterized by an active destabilizing disturbance (landslide) or is in succession after an earlier, larger landslide and is unaffected by active landslide processes. The species composition is significantly different from similar stable land, but is widely known.

Terrain and aerial photo characteristics: Covers small areas on steep slopes. Bare gravel and sand slides are distinguished in aerial photographs from the surrounding vegetation by color and terrain shape.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T25-B-2.3	T25-C-2	T25-D-2	T25-E-2
Basic types	T25-2.3	T25-2.3	T25-2.3	T25-2.3	T25-2.3

Distribution and regional distribution: Distribution unknown, probably BN-NB, O3-C1.

Most important types of confusion: Rasmark (T13), active landslide (T17), other historic landslides (T25).

Red list status (2018): Historic landslide area (LC;<).

References and type parallels: –

T25-C-3 Historic silt and clay landslides

NiN characteristics: Firm ground systems: Historic landslide (T25), one ground type (4). Defined by LKM: S1yD. LKM basic step: S1yh.

Physiognomy: Varies from bare silt and clay, low-growing, pioneer vegetation with mosses, lichens and vascular plants to more established vegetation with shrubs and trees.

Ecological characteristics: Historical landslides have arisen after one single disturbance event, one disruptive landslide event, which is not followed by repeated, similar disturbance events. The exposed field then undergoes rapid succession towards a post-succession state which is typically permanent forest land. The type is therefore found in steep terrain where erosion in the loose masses has caused a landslide. The extent can vary, but must be large enough that it can constitute a separate area unit for natural systems. Historic silt and clay landslides include silt and/or clay-dominated land. Bare silt and clay, pioneer vegetation with mosses and vascular plants, and subsequent steps of succession towards forest characterize the nature type, which will therefore be characterized by some randomness in relation to which species establish themselves first. Distinguished from other historical landslides by substrate. Historic landslides are also distinguished from active landslides on the basis of whether the land is characterized by an active destabilizing disturbance (landslide) or is in succession after an earlier, larger landslide and is unaffected by active landslide processes.



Historic silt and clay landslide. Ac: South room: Asak S. Photo: RH.

The species composition is significantly different from similar stable land, but is widely known.

Clay landslides that occur in marine clay, below the marine boundary from the last Ice Age. The landslides are linked to the leaching of salt minerals in the marine clay. When the salt is washed out, the clay loses its stability and becomes quick, which means that due to external influences (erosion, digging etc.) it becomes liquefied and a mudslide occurs. Such clay avalanche pits are most often leveled out and become heavily altered ground. Natural clay avalanche pits that are not planned are most often found as small pits in forests or near watercourses.

Terrain and aerial photo characteristics: Covers small areas, often on steep slopes or ravine landscapes.

Bare silt and clay landslides are distinguished in aerial photographs from the surrounding vegetation by color and terrain shape.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T25-4	T25-B-4	T25-C-3	T25-D-3	T25-E-3
Basic types		T25-4	T25-4	T25-4	T25-4

Distribution and regional distribution: Distribution unknown, probably BN-MB, O3-OC.

Most important types of confusion: Rasmark (T13), active landslide (T17), other historic landslides (T25).

Red list status (2018): Historic landslide area (LC;<).

References and type parallels: –

T26-C-1 Fjellhei initials

NiN characteristics: Solid land systems: Glacier foreland and snowmelt area (T26), two ground types (1,2). Defined by LKM: SVy1 & VMy1,2. LKM base step: SVy0 & VMy0ab.

Physiognomy: Most often visible moraine steps in increasing distance from the glacier front.

Varying coverage of heather species, graminids, herbs, mosses and lichens depending on the ecological conditions and thereby which main types are formed through the primary succession. Shrubs and trees can occur in late successional stages.



Fjellhei initials. Op: Lom: Storbreen-glacier foreland.
Photo: RH.

Ecological characteristics: Fjellhei initials are found in areas that have melted after the Little Ice Age maximum, that is for the Norwegian mainland after approx. 1750, in the Arctic somewhat later, and which is covered by loose masses. Here, a slow primary succession takes place where, through the establishment and consolidation phase (LAycdef), a gradual differentiation in the direction of normal natural systems across the forest boundary takes place. In mountain heath initials, this is primarily mountain heath, lee side and tundra (T3), but also, in places with a supply of stagnant or moving water, towards open groundwater marsh (V1) or cold spring (V4). The development towards these main types depends on local ecological conditions, topography, snow cover duration and soil moisture. Fjellhei initials differ from these in that the soil is thin and without clear layers. Distinguished from snow layer initials based on the duration of the snow cover.

Glacier foreland in the pioneer phase is characterized by a lot of exposed mineral soil and pioneer species where differentiation of habitat types has not begun. Best mapped by knowing the location of the 1750 moraines.

The species composition will gradually change in the direction of the post-successional state and lists of diagnostic species can be found under these natural systems.

Terrain and aerial photo characteristics: Found below glaciers, most often in the mountains, but also below glacier tongues in valleys. Rabber and lesides.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T26-B-1,2	T26-C-1	T26-D-1	T26-E-1
Basic types	T26-1,2	T26-1,2	T26-1,2	T26-1-4	T26-1-7

Distribution and regional distribution: SB-HA, O3-C1. Most common in NB and in the mountains, rarely in O3.

Most important types of confusion: mountain heath, lee side and tundra (T3), snow bed (T7), rabbe (T14), open ground water bog (V1).

Red list status (2018): Glacier foreland and snowmelt area (LC;<).

References and type parallels: –

T26-C-2 Snow bed initials

NiN characteristics: Solid ground systems: Glacier foreland and snowmelt area (T26), two ground types (3,4). Defined by LKM: SVy2 & VMy1,2. LKM base steps: SVyabcd & VMy0ab.

Physiognomy: Most often visible moraine steps in increasing distance from the glacier front. Varying coverage of graminids, herbs and mosses depending on the ecological conditions and thereby which main types are formed through the primary succession.

Ecological characteristics: Snow bed initials are found in areas that have melted after the Little Ice Age maximum, that is for the Norwegian mainland after approx.

1750, in the Arctic somewhat later, and which is covered by loose masses. Here, a slow primary succession takes place where, through the establishment and consolidation phase (LAycdef), a gradual differentiation in the direction of normal natural systems across the forest boundary takes place. In snow bed initials, this is in places where the snow lies for a long time and a snow bed (T7) or wet snow bed and snow bed source (V6) gradually develops.

The development towards these main types depends on local ecological conditions. Distinguished from mountain heath initials based on the duration of the snow cover. Glacier foreland in the pioneer phase is characterized by a lot of exposed mineral soil and pioneer species where differentiation of habitat types has not begun. Best mapped by knowing the location of the 1750 moraines. The species composition will gradually change in the direction of the post-successional state and lists of diagnostic species can be found under these natural systems.

Terrain and aerial photo characteristics: Found below glaciers in the mountains. Snow renter.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T26-3,4	T26-B-3,4	T26-C-2	T26-D-1	T26-E-1
Basic types		T26-3,4	T26-3,4	T26-1-4	T26-1-7

Distribution and regional distribution: LA-HA, O3-C1. Rare in O3.

Most important types of confusion: Snow bed (T7), wet snow bed and snow bed source (V6).

Red list status (2018): Glacier foreland and snowmelt area (LC;<).

References and type parallels: –



Snow bed initials. Op: Lom: Storbrean-glacier foreland.
Photo: RH.

T26-C-3 Gravel and stone-dominated glacier foreland in the pioneer phase

NiN characteristics: Solid ground systems: Glacier foreland and snowmelt area (T26), one ground type (5). Defined by LKM: LA \ddot{y} 1 & S1 \ddot{y} A. LKM base steps: LA \ddot{y} 0ab & S1 \ddot{y} cd.

Physiognomy: Bare ground below glaciers and permanent snowdrifts, dominated by rock and gravel. Widespread occurrence of graminids, herbs, mosses and lichens.

Ecological characteristics: Gravel- and stone-dominated glacier foreland in the pioneer phase is found in areas that have melted after the Little Ice Age maximum, that is for the Norwegian mainland after approx. 1750, in the Arctic somewhat later, and which is covered by loose masses. Here, a slow primary succession takes place, first a pioneer phase (LA \ddot{y} 0ab), which is characterized by a lot of bare ground with inorganic mineral soil. Soil development has not yet started, or has started very shortly. This contrasts with mountain heath and snow bed initials (T26-C-1 and T26-C-2), where soil and vegetation development have reached the establishment and consolidation phase (LA \ddot{y} cdef), where a gradual differentiation in the direction of normal natural systems takes place above the forest line. In the pioneer phase, the grain size distribution of the glacially deposited loose masses is important for the species composition. Gravel and stone, i.e. grain size between 1.6-

25.6 cm dominates in gravel- and stone-dominated glacial foreland in the pioneer phase. The order of immigration of species does not vary systematically and also varies with local ecological conditions and habitat types in the surroundings.

Therefore, no lists of diagnostic species have been drawn up, but some typical pioneer species in the mountains are included in the table below.

Terrain and aerial photo characteristics: Found below glaciers and permanent snow banks in the mountains.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T26-5	T26-B-5	T26-C-3	T26-D-2	T26-E-1
Basic types		T26-5	T26-5	T26-5	T26-1-7

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity species (t* = characteristic t., t \ddot{a} - gradient-t.); pp = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.)

Examples of pioneer species Arabis alpina mountain ash flower Cerastium cerastoides glacial heritage Deschampsia alpina mountain pile Oxyria digyna mountain sorrel	Poa alpina mountain thrush Poa flexuosa soft crab Sagina saginoides sedera Saxifraga cernua bud trout Saxifraga cespitosa teal Saxifraga oppositifolia red herring	Trisetum spicatum black yew Ceratodon purpureus weed moss Pohlia drummondii red-bud nodule Pohlia nutans veginke Pohlia wahlenbergii cold nod Solorina crocea saffron lichen Stereocaulon alpinum rock salt lichen
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Distribution and regional distribution: LA-HA, O3-C1. Rare in O3.

Most important disturbance types: Glacier foreland and snowmelt areas in pioneer phase, dominated by fine gravel, sand, silt to clay (T26-C-4).

Red list status (2018): Glacier foreland and snowmelt area (LC;<).

References and type parallels: –



Gravel and stone-dominated glacier foreland in the pioneer phase. Op: Lom: Storbrean-glacier foreland. Photo: RH.

T26-C-4 Glacier foreland and snowmelt areas in pioneer phase, dominated by fine gravel, sand, silt to clay

NiN characteristics: Solid ground systems: Glacier foreland and snowmelt area (T26), two ground types (6,7). Defined by LKM: LAy1 & S1yB,C. LKM base step: LAy0ab & S1yefghi.

Physiognomy: Bare ground below glaciers and permanent snowdrifts, dominated by fine gravel, sand, silt and clay.

Widespread occurrence of graminids, herbs, mosses and lichens.

Ecological characteristics: Glacier foreland and snowmelt areas in the pioneer phase, dominated by fine gravel, sand, silt to clay are found in areas that have melted after the Little Ice Age maximum, that is for the Norwegian mainland after approx. 1750, in the Arctic somewhat later, and which is covered by loose masses. Here, a slow primary succession takes place, first a pioneer phase (LAy0ab), which is characterized by a lot of bare ground with inorganic mineral soil. Soil development has not yet started, or has started very shortly. This contrasts with mountain heath and snow bed initials (T26-C-1 and T26-C-2), where soil and vegetation development have reached the establishment and consolidation phase (LAycdef), where a gradual differentiation in the direction of normal natural systems takes place above the forest line. In the pioneer phase, the grain size distribution of the glacially deposited loose masses is important for the species composition. Fine gravel, sand, silt and clay, i.e. fine particles with a grain size of up to 1.6 cm dominate in the habitat type. The order of immigration of species does not vary systematically and also varies with local ecological conditions and habitat types in the surroundings.



Glacier foreland and snowmelt areas in the pioneer phase, dominated by fine gravel, sand, silt to clay. Op: Lom: Storbreen-glacier foreland. Photo: RH.

Therefore, no lists of diagnostic species have been drawn up, but some typical pioneer species in the mountains are included in the table below.

Terrain and aerial photo characteristics: Found below glaciers and permanent snow banks in the mountains.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T26-B-6.7	T26-C-4	T26-D-3	T26-E-1
Basic types	T26-6.7	T26-6.7	T26-6.7	T26-6.7	T26-1-7

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **tp**- gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

Examples of pioneer species	<i>Poa alpina</i> mountain thrush <i>Poa flexuosa</i> soft crab <i>Arabis alpina</i> mountain ash flower <i>Cerastium cerastoides</i> glacial heritage <i>Deschampsia alpina</i> mountain pile <i>Oxyria digyna</i> mountain sorrel	<i>Sagina saginoides</i> sedera <i>Saxifraga cernua</i> bud trout <i>Saxifraga cespitosa</i> teal <i>Saxifraga oppositifolia</i> red herring	<i>Trisetum spicatum</i> black yew <i>Ceratodon purpureus</i> weed moss <i>Pohlia drummondii</i> red-bud nodule <i>Pohlia nutans</i> vignikke <i>Pohlia wahlenbergii</i> cold nod <i>Solorina crocea</i> saffron lichen <i>Stereocaulon alpinum</i> rock salt lichen
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Distribution and regional distribution: LA-HA, O3-C1. Rare in O3.

Most important types of disturbance: Gravel and stone-dominated glacial foreland in the pioneer phase (T26-C-3).

Red list status (2018): Glacier foreland and snowmelt area (LC;<).

References and type parallels: –

T27-C-1 Calcareous and intermediate block soil

NiN characteristics: Firm ground systems: Block ground (T27), one ground type (1). Defined by LKM: SVy1 & KAy1. LKM basis steps: SVy0 & KAyabcde.

Physiognomy: Boulder land consists of boulders of varying size with vegetation dominated by lichens and scattered mosses. Vascular plants can occur on small patches of fine material between the blocks.

Ecological characteristics: Block fields are continuous areas dominated by blocks or stones which may occasionally have elements of finer mineral material between the stones, but which mostly lack soil between the blocks. Apart from rock-dwelling lichen and moss species, the vegetation is very sparse or completely absent. Block soil can occur through weathering on the spot, and is then called weathering block soil, or it can consist of coarse glacial sediments (the rogen moraine), possibly as a result of the fine material having been washed out and/or the blocks having come to the surface during refreezing. This type is called frozen block land. Calcareous and intermediate block soils are formed from rocks that are calcareous to intermediate (KA stage ae), typically gneisses, granites, sparagmites, quartzites, poorer shale rocks, amphibolite and sandstone.

The nature type is characterized by alpine and northern boreal species adapted to acidic and intermediate rocks. The species composition has similarities with bare rock and boulder-rich scrubland. Variation in the species inventory is poorly known, but species that are adapted to calcareous rocks are missing. Crust lichen dominates. Some examples are shown in the table of diagnostic species.

Terrain and aerial photo characteristics: Occurs both on flat ground and on slopes that are not so steep that they are prone to landslides. Gray color in aerial photographs, stones and blocks are most often clearly visible.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T27-1	T27-B-1	T27-C-1	T27-D-1	T27-E-1
Basic types		T27-1	T27-1	T27-1,2,6	T27-1,2,6

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity species (t* = characteristic t., t_a- gradient-t.); pp = distinction (s* = absolute s., s_t = strong relative s., s_w = weak relative s.)

<i>Andreaea</i> spp. sotmoser v	<i>Lecanora polytropa</i>	<i>Protoparmelia badia</i> common glanswort v
<i>Polytrichum piliferum</i> raccoon moss v	<i>Lecidea lapicida</i> v	<i>Pseudephebe pubescens</i> common stone beard v
<i>Ptilidium ciliare</i> ground fringe v	<i>Lecidea praenubila</i> v	<i>Rhizocarpon geographicum</i> common map lichen v
<i>Racomitrium canescens</i> sandy gray moss v	<i>Melanelia hepatizon</i> svartberglav v	<i>Tremolecia atrata</i> ridge lichen v
<i>Brodoa intestiniformis</i> common rabblelav t	<i>Montanelia disjuncta</i> black lichen v	<i>Umbilicaria</i> spp. navel lichen v
	<i>Parmelia saxatilis</i> gray lichen	

Distribution and regional distribution: Distribution poorly known, mostly in MB-HA, O2-C1.

Most important types of confusion: Rasmark (T13), other poor and intermediate block land types (T27), gravel- and stone-dominated beach and shoreline (T29).

Red list status (2018): Blockmark (LC;<).

References and type parallels: –



Lime-poor and intermediate block land. Op: Lom: South of Juvasshytta. Photo: HB.

T27-C-2 Lime-poor and intermediate snow bed block land

NiN characteristics: Firm ground systems: Block ground (T27), one ground type (1). Defined by LKM: SVÿ2 & KAÿ1. LKM basis steps: SVÿabcdef & KAÿabcde.

Physiognomy: Boulder land consists of angular boulders of varying size with vegetation dominated by lichens and scattered mosses. Vascular plants can occur on small patches of fine material between the blocks.



Lime-poor and intermediate snow bed block land. Op: Vågå: Rundhø SW. Photo: RH.

Ecological characteristics: Block fields are continuous areas dominated by blocks or stones which may occasionally have elements of finer mineral material between the stones, but which mostly lack soil between the blocks. Apart from rock-dwelling lichen and moss species, the vegetation is very sparse or completely absent. The nature type has arisen through weathering on the site, and is called weathering block land. Calcareous and intermediate snow bed block soils are formed from rocks that are calcareous to intermediate (KA stage ae), typically gneisses, granites, sparagmites, quartzites, poorer shale rocks, amphibolite and sandstone. The natural type occurs in places in the snow mountains where the snow stays for a long time, so that the growing season is short. The species composition has similarities with bare rock and block-rich scrubland and is characterized by alpine species adapted to acidic and intermediate rocks. Variation in the species inventory is poorly known, but species that are adapted to calcareous rocks are missing. Crust lichen dominates.

Terrain and aerial photo characteristics: Occurs both on flat ground and on slopes that are not so steep that they are prone to landslides. Gray color in aerial photographs, stones and blocks are most often clearly visible.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T27-2	T27-B-2	T27-C-2	T27-D-1	T27-E-1
Basic types		T27-2	T27-2	T27-1,2,6	T27-1,2,6

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **pp** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Andreaea nivalis</i> snow moss v <i>Andreaea obovata</i> felesotmose v		
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Distribution and regional distribution: Distribution poorly known, mostly in LA-HA, O2-C1.

Most important types of confusion: Rasmark (T13), other poor and intermediate block land types (T27), gravel- and stone-dominated beach and shoreline (T29).

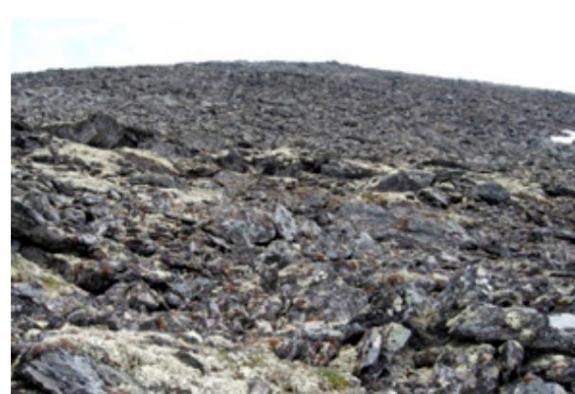
Red list status (2018): Snow rental block land (NT;<).

References and type parallels: –

T27-C-3 Calcareous block soil

NiN characteristics: Firm ground systems: Block ground (T27), one ground type (3). Defined by LKM: SVy1 & KAy2. LKM base step: SVy0 & KAyfghi.

Physiognomy: Boulder land consists of angular boulders of varying size with vegetation dominated by lichens and scattered mosses. Vascular plants can occur on small patches of fine material between the blocks.



Calcareous block land. ST: Oppdal: S Knutshø, N for the top.

Photo: RH.

Ecological characteristics: Block fields are

continuous areas dominated by blocks or stones which may occasionally have elements of finer mineral material between the stones, but which mostly lack soil between the blocks. Apart from rock-dwelling lichen and moss species, the vegetation is very sparse or completely absent. Block soil can occur through weathering on the spot, and is then called weathering block soil, or it can consist of coarse glacial sediments (the rogen moraine), possibly as a result of the fine material having been washed out and/or the blocks having come to the surface during refreezing.

This type is called frozen block land. Calcareous block soil is formed from rocks that are calcareous (KA step fi), typically mica slate, phyllite, limestone and dolomite. The natural type occurs primarily in the Sknaufjæl or the upper boreal zones, and is characterized by alpine and boreal species. The species composition has similarities with bare rock and boulder-rich scrubland. Variation in the species inventory is poorly known, but is characterized by species that are adapted to calcareous rocks. Crust lichen dominates.

Terrain and aerial photo characteristics: Occurs both on flat ground and on slopes that are not so steep that they are prone to landslides. Gray color in aerial photographs, stones and blocks are most often clearly visible.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T27-3	T27-B-3	T27-C-3	T27-D-2	T27-E-2
Basic types		T27-3	T27-3	T27-3,4,7	T27-3,4,7

Diagnostic species m =

abundance species (**m*** = dominant m.); v = common species (**v*** = constant v.); t = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); pp = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Andreaea</i> spp. sotmoser v	<i>Physcia caesia</i> head rosette lichen v	<i>Umbilicaria</i> spp. navel lichen v
<i>Abietinella abietina</i> granmose s*[KA:fle]	<i>Physcia dubia</i> bird lichen v	
<i>Rhytidium rugosum</i> paw moss s*[KA:fle]	<i>Physconia muscigena</i> lime dogwood s*[KA:glf]	

Distribution and regional distribution: Distribution poorly known, mostly in MB-HA, O2-C1.

Most important types of confusion: Rasmark (T13), other limestone-rich block land types (T27), gravel- and stone-dominated beach and shoreline (T29).

Red list status (2018): Blockmark (LC;<).

References and type parallels: –

T27-C-4 Calcareous snow bed block land

NiN characteristics: Firm ground systems: Block ground (T27), one ground type (4). Defined by LKM: SVÿ2 & KAÿ2. LKM basis steps: SVÿabcdef & KAÿfghi.

Physiognomy: Boulder land consists of angular boulders of varying size with vegetation dominated by lichens and scattered mosses. Vascular plants can occur on small patches of fine material between the blocks.



Calcareous snow bed block land. ST: Oppdal: between S and M Knutshø. Photo: HB.

Ecological characteristics: Block fields are continuous areas dominated by blocks or stones which may occasionally have elements of finer mineral material between the stones, but which mostly lack soil between the blocks. Apart from rock-dwelling lichen and moss species, the vegetation is very sparse or completely absent. Block ground can occur through weathering on the spot, and is called weathering block ground. Calcareous block soil is formed from rocks that are calcareous (KA step fi), typically mica slate, phyllite, limestone and dolomite. The natural type occurs in places in the snow mountains where the snow stays for a long time, so that the growing season is short. The species composition has similarities with bare rock and boulder-rich scrubland. Variation in the species inventory is poorly known, but is characterized by alpine species that are adapted to calcareous rocks. Crust lichen dominates.

Terrain and aerial photo characteristics: Occurs both on flat ground and on slopes that are not so steep that they are prone to landslides. Gray color in aerial photographs, stones and blocks are most often clearly visible.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T27-B-4	T27-C-4	T27-D-2	T27-E-2
Basic types	T27-4	T27-4	T27-4	T27-3,4,7	T27-3,4,7

Diagnostic species m =

abundance species (m^* = dominant m.); v = common species (v^* = constant v.); t = center of gravity species (t^* = characteristic t., $t\pm$ gradient-t.); pp = distinction (s^* = absolute s., $s+$ = strong relative s., $s-$ = weak relative s.)

<i>Andreaea</i> spp. sotmoser v		
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Distribution and regional distribution: Distribution poorly known, mostly in LA-HA, O2-C1.

Most important types of confusion: Rasmark (T13), other limestone-rich block land types (T27), gravel- and stone-dominated beach and shoreline (T29).

Red list status (2018): Snow rental block land (NT;<).

References and type parallels: –

T27-C-5 Block land

in vegetation-free snow bed

NiN characteristics: Firm ground systems: Block ground (T27), one ground type (5). Defined by LKM: SVy3 & KAy1,2. LKM base steps: SVy& & KAyabcdefghi.

Physiognomy: Block land in a vegetation-free snow bed consists of angular boulders of varying sizes without vegetation.

Ecological characteristics: Block fields are continuous areas dominated by blocks or stones which may occasionally have elements of finer mineral material between the stones, but which mostly lack soil between the blocks. Apart from rock-dwelling lichen and moss species, the vegetation is very sparse or completely absent. The nature type has arisen through weathering on the site, and is called weathering block land. Blockland in a vegetation-free snow bed occurs in places in the Snaufjell where the snow lies for so long, and the growing season is so short, that no species can maintain permanent populations. It is found on both limestone-poor and limestone-rich rocks, and is distinguished from other types by lacking species and occurring in Sknaufjell in extreme snow beds.



Block land in vegetation-free snow bed. Op: Lom: Juvasshytta south. Photo: HB.

Terrain and aerial photo characteristics: Occurs both on flat ground and on slopes that are not so steep that they are prone to landslides. Light color due to lack of low vegetation. Rocks and blocks are often clearly visible in aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T27-5	T27-B-5	T27-C-5	T27-D-3	T27-E-3
Basic types		T27-5	T27-5	T27-5	T27-5

Distribution and regional distribution: Distribution poorly known, mostly in LA-HA, O2-C1.

Main confusion types: Other block field types (T27).

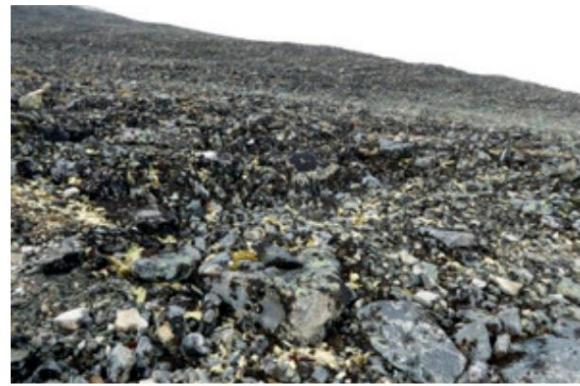
Red list status (2018): Snow rental block land (NT;<).

References and type parallels: –

T27-C-6 Lime-poor and intermediate blocky soil characterized by rabies

NiN characteristics: Firm ground systems: Block ground (T27), one ground type (6). Defined by LKM: SVÿ1 & KAÿ1 & VIÿ2. LKM base steps: SVÿ0 & KAÿabcde & VIÿbc.

Physiognomy: Boulder land consists of angular boulders of varying size with vegetation dominated by lichens and scattered mosses. Vascular plants can occur on small patches of fine material between the blocks.



Lime-poor and intermediate blocky soil characterized by roughness.
Op: Lom: Juvflye. Photo: RH.

Ecological characteristics: Block fields are continuous areas dominated by blocks or stones which may occasionally have elements of finer mineral material between the stones, but which mostly lack soil between the blocks. Apart from rock-dwelling lichen and moss species, the vegetation is very sparse or completely absent. The nature type has arisen through weathering on the site, and is called weathering block land.

Calcareous and intermediate craggy block soils are formed from rocks that are calcareous to intermediate (KA stage ae), typically gneisses, granites, sparagmites, quartzites, poorer shale rocks, amphibolite and sandstone. The nature type occurs in wind-exposed places in the Sknaufjelle, where the vegetation is exposed to low temperatures, drying out and direct physical damage due to wear and tear from particles carried by the wind. The species composition has similarities with bare rock and block-rich scrubland and is characterized by alpine species adapted to acidic and intermediate rocks. Variation in the species inventory is poorly known, but species that are adapted to calcareous rocks are missing. Crust lichen dominates.

Terrain and aerial photo characteristics: Occurs both on flat ground and on slopes that are not so steep that they are prone to landslides. Gray color in aerial photographs, stones and blocks are most often clearly visible.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T27-6	T27-B-6	T27-C-6	T27-D-1	T27-E-1
Basic types		T27-6	T27-6	T27-1,2,6	T27-1,2,6

Distribution and regional distribution: Distribution poorly known, mostly in LA-HA, O2-C1.

Most important types of confusion: Rasmark (T13), other poor and intermediate block land types (T27), gravel- and stone-dominated beach and shoreline (T29).

Red list status (2018): Rabbeblokmark (NT;<).

References and type parallels: –

T27-C-7 Calcareous craggy block ground

NiN characteristics: Firm ground systems: Block ground (T27), one ground type (7). Defined by LKM: SVy1 & KAy2 & VIy2. LKM base steps: SVy0 & KAyfghi & VIybc.

Physiognomy: Boulder land consists of angular boulders of varying size with vegetation dominated by lichens and scattered mosses. Vascular plants can occur on small patches of fine material between the blocks.



Calcareous rubble-marked blocky land. ST: Oppdal: S. Knutshø.
Photo: RH.

Ecological characteristics: Block fields are continuous areas dominated by blocks or stones which may occasionally have elements of finer mineral material between the stones, but which mostly lack soil between the blocks. Apart from rock-dwelling lichen and moss species, the vegetation is very sparse or completely absent. The nature type has arisen through weathering on the site, and is called weathering block land.

Calcareous block soil is formed from rocks that are calcareous (KA step fi), typically mica slate, phyllite, limestone and dolomite. The nature type occurs in wind-exposed places in the Sknaufjelle, where the vegetation is exposed to low temperatures, drying out and direct physical damage due to wear and tear from particles carried by the wind. The species composition has similarities with bare rock and boulder-rich scrubland and is characterized by alpine species adapted to calcareous rocks. Variation in the species inventory is poorly known, but is characterized by species that are adapted to calcareous rocks. Crust lichen dominates.

Terrain and aerial photo characteristics: Occurs both on flat ground and on slopes that are not so steep that they are prone to landslides. Gray color in aerial photographs, stones and blocks are most often clearly visible.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T27-7	T27-B-7	T27-C-7	T27-D-2	T27-E-2
Basic types		T27-7	T27-7	T27-3,4,7	T27-3,4,7

Distribution and regional distribution: Distribution poorly known, mostly in LA-HA, O2-C1.

Most important types of confusion: Rasmark (T13), other calcareous block types (T27).

Red list status (2018): Rabbeblokmark (NT;<).

References and type parallels: –

T28-C-1 Calcareous polar desert

NiN Characteristics: Mainland Systems: Polar Desert (T28), one base type (1). Defined by LKM: KAÿ1. LKM base step: KAÿabc.

Physiognomy: Stone and gravel-dominated field with a lot of fine material. Fragmentary vegetation cover dominated by tufted plants, graminids, and snowy mosses and lichens. Dwarf bushes and cattails are missing. Frost heave processes and polygonal ground common.

Ecological characteristics: The polar desert is rock- and gravel-dominated land that occurs north of, or above, the zone of arctic tundra. The nature type is the result of frost weathering which forms a fine to medium coarse substrate depending on the source rock.

In contrast to block soils, the polar desert often contains fine grain sizes, and frost heave phenomena are common. Also distinguished from block land by having a more stable summer climate and less snow.

The calcium-poor polar desert is linked to hard, often silicate-dominated rocks that most often weather into relatively coarse substrates for plant growth. Sparse occurrence of the fine grain sizes that retain water means that frost processes in the sediments are not so prominent and polygonal soil is not so common.

The coarse substrates generally make it difficult for plants to establish themselves. The type can be reminiscent of unfrozen block soil, but is distinguished from this by the fact that finer sediments can be detected, for example, directly under the coarser blocks. It is also characterized by an extremely sparse vegetation cover of species that are indifferent to the pH of the soil liquid, and which enter the APDZ.

Terrain and aerial photo characteristics: Most often large, continuous and wide areas with almost no vegetation. Can occur all the way down to sea level.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T28-B-1	T28-C-1	T28-D-1	T28-E-1
Basic types	T28-1	T28-1	T28-1	T28-1	T28-1

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Alopecurus ovatus</i> arctic fox butt v* <i>Cerastium arcticum</i> tundra heritage v* <i>Cerastium regelii</i> polar heirloom v* <i>Draba micropetala</i> polarrublom v <i>Draba pauciflora</i> tundra ruby flower <i>Luzula confusa</i> <i>Micranthes nivalis</i> snow thrush v* <i>Papaver cornwallisense</i> polar poppy v <i>Papaver dahlianum</i> Svalbard poppy v	<i>Phippia algida</i> snow grass v* <i>Potentilla hyparctica</i> ragweed <i>Saxifraga hyperborea</i> polar herring v <i>Stellaria longipes</i> snow star flower v* <i>Gymnomitrion corallioides</i> club moss v <i>Polytrichum piliferum</i> raccoon moss v	<i>Polytrichum strictum</i> felt bear moss v <i>Racomitrium lanuginosum</i> heather moss v <i>Racomitrium panschii</i> tundra gray moss v <i>Alectoria nigricans</i> wolverine v <i>Alectoria ochroleuca</i> rabbi v <i>Flavocetraria cucullata</i> yellow skerpe v <i>Flavocetraria nivalis</i> yellow skin v <i>Sphaerophorus globosus</i> brown coral v <i>Thamnolia vermicularis</i> makklav v
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Distribution and regional distribution: APDZ. As a zonal type in the northern and eastern parts of Svalbard, and in addition as an elevation design in all parts of Svalbard, above approx. 500 m above sea level in the MATZ and at sea level in the APDZ.

Most important types of confusion: Intermediate and slightly calcareous polar desert (T28-C-2), calcareous and intermediate block land (T27-C-1).

Red list status (2018): Polar desert (NT; <).

References and type parallels:

T28-C-2 Intermediate and slightly calcareous polar desert

NiN Characteristics: Mainland Systems: Polar Desert (T28), one base type (2). Defined by LKM: KAÿ2. LKM base step: KAÿdefg.

Physiognomy: Stone and gravel-dominated field with a lot of fine material between the stones. Fragmentary vegetation cover dominated by tufted plants, graminids, and snowy mosses and lichens.

Dwarf bushes and cattails are missing. Frost heave processes and polygonal ground common.

Ecological characteristics: The polar desert is rock- and gravel-dominated land that occurs north of, or above, the zone of arctic tundra. The nature type is the result of frost weathering which forms a fine to medium coarse substrate, i.e. grain sizes from silt in frozen patches to a dominance of gravel and stone.

Intermediate and weakly calcareous polar deserts are most often associated with sedimentary rocks. The weathering material often contains a lot of silt, and the frost processes sort the sediments so that the blocks lie in more or less regular strips with finer fractions in between (polygon land). The type can have a relatively continuous vegetation cover with tufted plants and snow-covered mosses. Some base-demanding species occur.

Terrain and aerial photo characteristics: Mostly large, continuous and wide surfaces. Can occur all the way down to sea level.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T28-2	T28-B-2	T28-C-2	T28-D-2	T28-E-2
Basic types		T28-2	T28-2	T28-2	T28-2

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity type (t* = characteristic t., t^a- gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.)

<i>Alopecurus ovatus</i> arctic fox butt v* <i>Cerastium arcticum</i> tundra heritage v* <i>Cerastium regelii</i> polar heirloom v* <i>Draba arctica</i> melrblobm v <i>Draba micropetala</i> polarrubbom v <i>Draba pauciflora</i> tundra ruby flower <i>Draba subcapitata</i> hemisphere rublom v <i>Luzula confusa</i> vardefrytle v <i>Micranthes nivalis</i> snow thrush v* <i>Papaver cornwallense</i> polar poppy v <i>Papaver dahlianum</i> Svalbard poppy v	<i>Phippsia algida</i> snow grass v* <i>Puccinellia angustata</i> polar salt grass v <i>Ranunculus sulphureus</i> polar sun bed <i>Saxifraga cernua</i> bud herring v <i>Saxifraga cespitosa</i> _ <i>Saxifraga hyperborea</i> polar herring v <i>Saxifraga platyphala</i> wire herring v <i>Stellaria longipes</i> snow star flower v* <i>Gymnomitrion coralliodes</i> club moss v	<i>Polytrichum piliferum</i> raccoon moss v <i>Polytrichum strictum</i> felt bear moss v <i>Racomitrium panschii</i> tundra gray moss v <i>Alectoria nigricans</i> wolverine v <i>Alectoria ochroleuca</i> rabbi v <i>Flavocetraria cucullata</i> yellow skerpe v <i>Flavocetraria nivalis</i> yellow skin v <i>Sphaerophorus globosus</i> brown coral v <i>Thamnolia vermicularis</i> makklav v <i>Dactylina ramulosa</i> finger lichen v
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Distribution and regional distribution: APDZ. As a zonal type in northern and eastern parts of Svalbard, and in addition as an elevational design in all parts of Svalbard, above 200-500 m a.s.l.

Most important types of confusion: Intermediate and slightly calcareous polar desert (T28-C-2), calcareous and intermediate block land (T27-C-1).

Red list status (2018): Polar desert (NT; <).

References and type parallels:



Intermediate and slightly calcareous polar desert. Svalbard: Zebra Mountains. Photo: GA.

T28-C-3 Highly calcareous polar desert

NiN Characteristics: Mainland Systems: Polar Desert (T28), one base type (3). Defined by LKM: KAÿ3. LKM base step: KAÿhi.

Physiognomy: Stone and gravel-dominated field with a lot of fine material between the stones. Fragmentary vegetation cover dominated by tufted plants, graminids and snowy mosses and lichens. Woody species and sturgeon are missing. Frost heave processes and polygonal ground common.



The heavily calcareous polar desert. Svalbard: Kinnvika, Northeast Norway. Photo: GA.

Ecological characteristics: The polar desert is rock- and gravel-dominated land that occurs north of, or above, the zone of arctic tundra (above 200-500 m above sea level). The nature type is the result of frost weathering which forms a fine to medium coarse substrate, i.e. grain sizes from silt in frozen patches to a dominance of gravel and stone.

The highly calcareous polar desert is linked to carbonate rocks such as marble and dolomite. Such rocks most often weather as gravel or finer fractions, often depending on the crystal structure of the source rock. Since there is often little variation in the grain size of the weathering material, the frost processes are not so visible so that polygonal soil can be difficult to detect. The vegetation cover is usually very sparse, and the type often appears as large gravel areas with scattered individuals of vascular plants.

Terrain and aerial photo characteristics: Mostly large, continuous and wide surfaces. Can occur all the way down to sea level.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T28-B-3	T28-C-3	T28-D-3	T28-E-3
Basic types	T28-3	T28-3	T28-3	T28-3	T28-3

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity type (t* = characteristic t., tÿ- gradiente-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.)

<i>Cerastium arcticum</i> tundra heritage v*	<i>Phippia algida</i> snow grass v*	<i>Polytrichum piliferum</i> raccoon moss v
<i>Cerastium regelii</i> polar heirloom v*	<i>Poa abbreviata</i> puterapp v; s+[KA-hlg]	<i>Polytrichum strictum</i> felt bear moss v
<i>Draba arctica</i> melrublom v	<i>Puccinellia angustata</i> polar salt grass v	<i>Racomitrium panschii</i> tundra gray moss v
<i>Draba corymbosa</i> puterublom v	<i>Ranunculus sulphureus</i> polar soleie v	<i>Schistidium frigidum</i> rope flower moss v
<i>Draba micropetala</i> polarrublom v	<i>Saxifraga cernua</i> bud trout v*	<i>Alectoria nigricans</i> wolverine v
<i>Draba pauciflora</i> tundrarublom v	<i>Saxifraga cespitosa</i> _	<i>Alectoria ochroleuca</i> rabbi v
<i>Draba subcapitata</i> hemisphere rublom v	<i>Saxifraga hyperborea</i> polar herring v	<i>Dactylina ramulosa</i> finger lichen v
<i>Luzula nivalis</i> snowfinch v; s+[KA-hlg]	<i>Saxifraga oppositifolia</i> red herring v; s-[KA-hlg]	<i>Flavocetraria cucullata</i> yellow skerpe v
<i>Micranthes nivalis</i> snow thrush v*	<i>Saxifraga platyspala</i> wire herring v	<i>Flavocetraria nivalis</i> yellow skin v
<i>Minuartia rossii</i> puterve s+[KA-hlg]	<i>Stellaria longipes</i> snow star flower v*	<i>Sphaerophorus globosus</i> brown coral v
<i>Papaver cornwallisense</i> polar poppy v	<i>Aulacomnium turgidum</i> rock felt moss v	<i>Thamnolia vermicularis</i> makklav v
<i>Papaver dahlianum</i> Svalbard poppy v		

Distribution and regional distribution: APDZ. As a zonal type in northern and eastern parts of Svalbard, and in addition as an elevational design in all parts of Svalbard, above 200-500 m a.s.l.

Most important types of confusion: Intermediate and slightly calcareous polar desert (T28-C-2), calcareous and intermediate block land (T27-C-1).

Red list status (2018): Polar desert (NT;<).

References and type parallels:

T29-C-1 Stone and gravel beaches and shorelines in the pioneer phase on epilittoral land

NiN characteristics: Mainland systems: Gravel and rock-dominated beach and shoreline (T29), two foundation types (1,3). Defined by LKM: TVy2 & S1yA,B & LAy1. LKM base stage: TVyl+ & S1ycde & LAy0ab.



Physiognomy: Consists of stone and gravel-dominated substrate without or with very scattered and disjointed vegetation cover of herbs and grasses.

Stone and gravel beaches and shorelines in the pioneer phase on epilittoral land. AA: Arendal: The drummers. Photo: HB.

Ecological characteristics: The mapping unit includes gravel- and stone-dominated old shorelines in exposed places within the beach, where the long-term succession to another nature type has not been completed. This comes, among other things, from strong exposure in hard-to-weather locations, in the north also a shorter growing season, and coarse-grained substrate. The course of succession also depends on the uplift. Formed in places where sediments supplied from the land side have once been in the shoreline. Erosion from waves has washed out the fine sediments, while coarser fractions have remained behind. The roughness depends on the size distribution in the sediments and degree of wave exposure when the system was formed. Stone and gravel beaches and shorelines in the establishment and consolidation phase have more dense vegetation, often also shrubs and low trees. The border against supralittoral stone and gravel beaches is drawn at the upper limit of sea spray, where the influx of salt-tolerant species stops. Intervention-created open areas with gravel or coarser as the dominant grain size must be classified as heavily altered land. Non-stable vegetation, examples of species that can be included can be found in the table below.

Terrain and aerial photo characteristics: Found above the supralittoral zone, most often in sloping terrain and close to the coast. Light gray to brown colors in aerial images, often line structures due to terraces at different elevation levels.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T29-B-1.3	T29-C-1	T29-D-1	T29-E-1
Basic types	T29-1,3	T29-1.3	T29-1,3	T29-1-4,7,8,10	T29-1-9

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Anthriscus sylvestris</i> dog biscuits v	<i>Galium aparine</i> klengemaure v	<i>Rumex longifolius</i> haymole v
<i>Cerastium fontanum</i> inherit v	<i>Galium verum</i> yellow ant v	<i>Solidago virgaurea</i> golden rice v
<i>Chamerion angustifolium</i> geitrams v	<i>Hieracium umbellatum</i> screen hover v	<i>Taraxacum officinale</i> agg. the weed lion down v
<i>Festuca rubra</i> red fescue v	<i>Linaria vulgaris</i> lincod v	<i>Trifolium repens</i> white clover v
<i>Galeopsis tetrahit</i> kvassdå v	<i>Rubus idaeus</i> raspberry v	<i>Valeriana sambucifolia</i> root v
	<i>Rubus saxatilis</i> teaberry v	<i>Vicia cracca</i> bird's vetch v

Distribution and regional distribution: Distribution and regional distribution: BN-NB and ASHTZ, O3-OC.

Most important types of confusion: Stone and gravel beaches and shorelines in the establishment and consolidation phase on epilittoral land (T29-C-2), stone and gravel beaches and shorelines in the pioneer phase in the supralittoral (T29-C-5).

Red list status (2018): Gravel- and stone-dominated beach and shoreline (LC;<).

References and type parallels: –

T29-C-2 Stone and gravel beaches and shorelines in the establishment and consolidation phase on epilittoral land

NiN characteristics: Solid ground systems: Gravel and stone-dominated beach and shoreline (T29), three ground types (2,4,10). Defined by LKM: TVÿ2 & S1ÿA,B & LAÿ2 & Vlÿ1. LKM base steps: TVÿl+ & S1ÿcde & LAÿcdef & Vlÿ¤.



Stone and gravel beaches and shorelines in the establishment and consolidation phase on epilittoral land. AA: Arendal: Tromøya. Photo: HB.

Physiognomy: Consists of gravel and stone-dominated substrate with scattered and disjointed vegetation cover of herbs and grasses. Undergrowth with bushes and low trees may occur. Lichens and mosses on larger rocks.

Ecological characteristics: The mapping unit includes gravel- and stone-dominated old shorelines in exposed places within the beach, where the long-term succession to another nature type has not been completed. This comes from strong exposure in hard-to-weather locations, in the north also a shorter growing season, and coarse-grained substrate. The course of succession also depends on the uplift. Formed in places where sediments supplied from the land side have once been in the shoreline. Erosion from waves has washed out the fine sediments, while coarser fractions have remained behind. The roughness depends on the size distribution in the sediments and degree of wave exposure when the system was formed. Often found as bare gravel and stone in a mosaic with scrub vegetation and scattered vegetation between larger stones that are naturally open, as opposed to semi-natural meadows that are kept open by hedgerows. Natural open vegetation with shallow soil on firm ground is classified as open shallow land. Stone and gravel beaches and shorelines in the pioneer phase are without or only with scattered plants. The border against supralittoral stone and gravel beaches is drawn at the upper limit of sea spray, where salt-tolerant species predominate. Intervention-created open areas with gravel or coarser as the dominant grain size must be classified as heavily altered land.

Terrain and aerial photo characteristics: Found above the supralittoral belt, most often in sloping terrain and close to the coast. Light gray to brown colors in aerial images, often line structures due to terraces at different elevation levels.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T29-B-2,4,10	T29-C-1	T29-D-1	T29-E-1
Basic types	T29-2,4,10	T29-2,4,10	T29-2,4,10	T29-1-4,7,8,10	T29-1-9

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **tt-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Agrimonia eupatoria</i> field moon v <i>Berberis vulgaris</i> berberis v <i>Corylus avellana</i> hazel v <i>Cotoneaster integrifolius</i> dwarf medlar v <i>Galium boreale</i> white ant v <i>Galium verum</i> yellow ant v <i>Geranium sanguineum</i> bloodsucker beak v <i>Juniperus communis</i> juniper v	<i>Lonicera periclymenum</i> vivendel v <i>Lotus corniculatus</i> trifoliate v <i>Melica nutans</i> hangax v <i>Primula veris</i> marigold v <i>Prunus avium</i> morell v <i>Prunus spinosa</i> blackthorn v <i>Rhamnus cathartica</i> goat wood v <i>Rosa</i> spp. rose species v	<i>Rubus saxatilis</i> teaberry v <i>Solanum dulcamara</i> creeper v <i>Sorbus aucuparia</i> roe v <i>Sorbus hybrida</i> rognasal v <i>Valeriana sambucifolia</i> root v <i>Veronica officinalis</i> legeveronika v <i>Viburnum opulus</i> crosswood v <i>Vicia cracca</i> bird's vetch v
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Distribution and regional distribution: BN-NB and ASHTZ, O3-OC.

Most important types of confusion: Stone and gravel beaches and shorelines in the pioneer phase on epilittoral land (T29-C-1), stone and gravel beaches and shorelines in the pioneer phase in the supralittoral (T29-C-5).

Red list status (2018): Gravel- and stone-dominated beach and shoreline (LC;<).

References and type parallels: Partly F5 (VN), partly B02 (DNHB13).

T29-C-3 Upper shell sand beach with pioneer vegetation

NiN characteristics: Mainland systems: Gravel and rock-dominated beach and shoreline (T29), one ground type (5). Defined by LKM: TVjy2 & S1jyC & LAjy1. LKM base step: TVjyl+ & S1jy & LAjy0ab.

Physiognomy: Shell sand-dominated substrate without or with scattered and disjointed vegetation cover of herbs and grasses.

Ecological characteristics: The type includes coarse shell sand-dominated land in exposed places within the beach, where the long-term succession to another nature type has not been completed. The course of succession also depends on the uplift. These are coarse shell banks that are kept open due to strong exposure in hard-to-weather locations, in the north also a shorter growing season. Most often without, or only with very scattered, pioneer vegetation, while the upper shell sand beach without pioneer vegetation has more closed vegetation. Is naturally open, in contrast to semi-natural meadows that are kept open by clearing. Natural open vegetation with shallow soil on firm ground is classified as open shallow land. The boundary towards the lower shell-sand beach with pioneer vegetation is drawn at the upper boundary of sea spray, where the inclusion of salt-tolerant species stops. Intervention-created open areas with shell sand must be classified as heavily altered land. Unstable vegetation, examples of species that can be included can be found in the table below.

Terrain and aerial photo characteristics: Found above the supralittoral belt, close to the coast. Light gray to brown colors in aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T29-B-5	T29-C-3	T29-D-2	T29-E-1
Basic types	T29-5	T29-5	T29-5	T29-5,6,9	T29-1-9

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Acinos arvensis</i> groundmint v	<i>Cerastium semidecandrum</i> spring heirloom v	<i>Sedum acre</i> bitterbergnapp v
<i>Anthriscus sylvestris</i> dog biscuits v	<i>Festuca ovina</i> sheep fescue v	<i>Sedum album</i> hvitbergnapp v
<i>Anthyllis vulneraria</i> round pod v	<i>Festuca rubra</i> red fescue v	<i>Trifolium repens</i> white clover v
<i>Arenaria serpyllifolia</i> sandarve v	<i>Lysimachia arvensis</i> nonsblom v	<i>Vicia cracca</i> bird's vetch v
<i>Armeria maritima</i> forekoll v	<i>Hornungia petraea</i> cress v	<i>Ceratodon purpureus</i> weed moss v
<i>Bromus hordeaceus</i> lodnefaks v	<i>Luzula campestris</i> groundfrytle v	<i>Cladonia furcata</i> fork lichen v
<i>Carex flacca</i> bluestarr v		<i>Cladonia rangiformis</i> fork v
<i>Cerastium fontanum</i> inherit v		

Distribution and regional distribution: BN-NB and ASHTZ, O3-OC.

Most important types of confusion: Upper shell sand beach without pioneer vegetation (T29-C-4), lower shell sand beach with pioneer vegetation (T29-C-6), semi-natural meadow (T32).

Red list status (2018): Gravel- and stone-dominated beach and shoreline (LC;<).

References and type parallels: –



Upper shell sand beach with pioneer vegetation. Øf: Whales: Asmaløy: Brattestø S. Photo: RH.

T29-C-4 Upper shell sand beach in the establishment and consolidation phase

NiN characteristics: Mainland systems: Gravel and rock-dominated beach and shoreline (T29), one foundation type (6). Defined by LKM: TVy2 & S1yC & LAy2. LKM base step: TVyl+ & S1yj & LAycdef.

Physiognomy: Shell sand-dominated substrate with scattered and disjointed vegetation cover of herbs and grasses. Undergrowth with bushes and low trees may occur.

Ecological characteristics: The type includes coarse shell sand-dominated land in exposed places within the beach, where the long-term succession to another nature type has not been completed. The course of succession also depends on the uplift. Formed in places where coarse shell sand is kept open due to strong exposure in weather-hardened places, in the north also a shorter growing season. Has more closed vegetation than upper shell sand beach with pioneer vegetation, which are bare shell banks with only scattered plants. Is naturally open, in contrast to semi-natural meadows that are kept open by clearing. Natural open vegetation with shallow soil on firm ground is classified as open shallow land. The boundary towards the lower shell-sand beach with pioneer vegetation is drawn at the upper boundary of sea spray, where the inclusion of salt-tolerant species stops. Intervention-created open areas with shell sand must be classified as heavily altered land. Insufficiently known, examples of species that may be included can be found in the table below.

Terrain and aerial photo characteristics: Found above the supralittoral belt, close to the coast. Light gray to brown colors in aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T29-6	T29-B-6	T29-C-4	T29-D-2	T29-E-1
Basic types		T29-6	T29-6	T29-5.6.9	T29-1-9

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity species (t* = characteristic t., t- gradient-t.); s = distinction (s+ = absolute s., s+ = strong relative s., s- = weak relative s.)

Achillea millefolium yarrow v	Cerastium fontanum inherit v	Sagina nodosa budding heirloom v
Acinos arvensis groundmint v	Cerastium semidecandrum spring heirloom v	Sedum acre bitterbergknapp v
Agrostis stolonifera creeper v	Erigeron acris ground star v	Sedum album hvitbergknapp v
Anthoxanthum odoratum yellow v	Festuca ovina sheep fescue v	Taraxacum obliquum blunt coastal dandelion
Anthriscus sylvestris dog biscuits v	Festuca rubra red fescue v	Thalictrum minus coastal seed star
Anthyllis vulneraria round pod v	Galium boreale white ant v	Tritellum repens white clover v
Arenaria serpyllifolia sandarve v	Galium verum yellow ant v	Veronica officinalis legeveronika v
Armeria maritima förekoll v	Helictotrichon pratense meadow oat v	Vicia cracca bird's vetch
Bromus hordeaceus lodnefaks v	Helictotrichon pubescens downy oats v	Cladonia foliacea lobed shell
Campanula rotundifolia bluebell v	Linum catharticum wild-lin v	Cladonia furcata fork lichen v
Carex caryophyllea spring sedge v	Luzula campestris groundfrytle v	Cladonia portentosa coastal lichen v
Carex ericetorum sedge v	Plantago lanceolata slimy giant v	Cladonia rangiformis fork v
	Potentilla argentea silver wall v	



Upper shell sand beach in the establishment and consolidation phase. No: Bodø: Bliksvær. Photo: RH.

Distribution and regional distribution: BN-NB and ASHTZ, O3-OC.

Most important types of confusion: Upper shell sand beach without pioneer vegetation (T29-C-4), lower shell sand beach with pioneer vegetation (T29-C-6), semi-natural meadow (T32).

Red list status (2018): Gravel- and stone-dominated beach and shoreline (LC;<).

References and type parallels: –

T29-C-5 Stone and gravel beaches and shorelines in the pioneer phase in the supralittoral

NiN characteristics: Solid ground systems: Gravel and rock-dominated beach and shoreline (T29), two foundation types (7,8). Defined by LKM: TVÿ1 & S1ÿA,B & LAÿ1. LKM base steps: TVÿijk & S1ÿcde & LAÿ0ab.

Physiognomy: Consists of gravel and stone-dominated substrate without or with scattered vegetation cover dominated by grasses and herbs.

Ecological characteristics: The type includes gravel- and rock-dominated land on exposed beaches in the supralittoral zone. The type is formed in places where sediments supplied from the land side are found in the shoreline. Erosion from waves has washed out the fine sediments, while coarser fractions have remained behind. The roughness depends on the size distribution in the sediments and degree of wave exposure when the system was formed. Often found as bare gravel and stone (pebble beaches) in a mosaic with scattered vegetation between larger stones. Elements of salt meadow plants on finer sediments between rocks. Often some accumulation of seaweed and kelp with fragments of seaweed embankment vegetation. The limit for supralittoral stone and gravel beaches is drawn at the upper limit for sea spray, where the inclusion of salt-tolerant species stops.

Terrain and aerial photo characteristics: Located in the supralittoral belt. Light gray to brown colors in aerial images, often line structures due to different altitude levels.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T29-7.8	T29-B-7,8	T29-C-5	T29-D-1	T29-E-1
Basic types		T29-7.8	T29-7.8	T29-1-4,7,8,10	T29-1-9

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Agrostis stolonifera</i> creeper v <i>Angelica archangelica</i> ssp. <i>litoralis</i> beach water v <i>Anthriscus sylvestris</i> dog biscuits v <i>Armeria maritima</i> förekoll v <i>Artemisia vulgaris</i> buröt v <i>Asparagus officinalis</i> asparagus <i>Atriplex littoralis</i> strandmelde v <i>Barbarea stricta</i> cress v <i>Cakile maritima</i> beach radish v <i>Calystegia sepium</i> Cochlearia <i>officinalis</i> scurvy herb <i>Crambe maritima</i> beach cabbage <i>Elytrigia repens</i> kveke v <i>Equisetum arvense</i> _ <i>Euphorbia palustris</i> milk thistle <i>Galeopsis tetrahit</i> kvassdå v	<i>Galium aparine</i> klengemaure v* <i>Geranium pratense</i> meadow stork beak v <i>Glaucium flavum</i> yellow horn poppy <i>Juncus gerardii</i> salt rush v <i>Lathyrus japonicus</i> beach flat pod <i>Leymus arenarius</i> beach rye v <i>Ligisticum scoticum</i> beach biscuits v <i>Limonium humile</i> beach gorse v <i>Linaria vulgaris</i> lincod v <i>Lotus corniculatus</i> tirltongue v <i>Lysimachia maritima</i> beach creeper v <i>Lythrum salicaria</i> cat's tail v <i>Melilotus altissimus</i> beach rock clover v <i>Mertensia maritima</i> oyster pickle <i>Ononis arvensis</i> buckthorn v <i>Plantago maritima</i> beach giant v <i>Potentilla anserina</i> ssp. <i>anserina</i> goose wall v	<i>Rumex crispus</i> krushaymol v <i>Rumex longifolius</i> haymole v <i>Schedonorus arundinaceus</i> fescue v <i>Scorzoneraoides autumnalis</i> follblom v <i>Scutellaria galericulata</i> shield bearer v <i>Senecio vulgaris</i> field pig flower v <i>Silene uniflora</i> sandpiper v* <i>Solanum dulcamara</i> creeper v <i>Sonchus arvensis</i> akerdylle v <i>Trifolium repens</i> white clover v <i>Triglochin maritima</i> spring onion v* <i>Tripleurospermum maritimum</i> strandbal derbrå v* <i>Tripolium pannonicum</i> starfish v * <i>Vicia cracca</i> bird's vetch v <i>Viola tricolor</i> stepmother v
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Stone and gravel beaches and shorelines in the pioneer phase in the littoral zone. Ro: Hå: Nærø, Obrestad guy. Photo: RH.

Distribution and regional distribution: BN-NB and ASHTZ, O3-OC.

Most important types of disturbance: Beach meadow (T12), stone and gravel beaches and shorelines in the pioneer phase on epilittoral land (T29-C-1), stone and gravel beaches and shorelines in the establishment and consolidation phase on epilittoral land (T29-C-2).

Red list status (2018): Gravel- and stone-dominated beach and shoreline (LC;<).

References and type parallels: V5 (VN), G04 (DNHB13).

T29-C-6 Lower shell sand beach with pioneer vegetation

NiN characteristics: Mainland systems: Gravel and rock-dominated beach and shoreline (T29), one ground type (9). Defined by LKM: TVy1 & S1yC & LAy1. LKM base step: TVyjik & S1yj & LAy0ab.

Physiognomy: Shell sand-dominated substrate without or with scattered and disjointed vegetation cover of herbs and grasses.



Lower shell sand beach with pioneer vegetation. Us: Rambergøya. Photo: RH.

Ecological characteristics: The type includes coarse shell sand-dominated land on exposed beaches, where the succession to another natural type has not been completed due to exposure to the weather and land elevation. Formed in places where coarse shell sand is kept open due to strong exposure in weather-hardened places, in the north also a shorter growing season. Can vary from bare shell banks to shell sand beaches with scattered plant cover. The boundary for the lower shell-sand beach with pioneer vegetation is drawn at the upper boundary for sea spray, where the inclusion of salt-tolerant species stops. Beach meadows are formed on fine sediments in more protected places. Insufficiently known, examples of species that may be included can be found in the table below.

Terrain and aerial photo characteristics: Located in the supralittoral belt. Light gray to brown colors in aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T29-9	T29-B-9	T29-C-6	T29-D-2	T29-E-1
Basic types		T29-9	T29-9	T29-5,6,9	T29-1-9

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Agrostis stolonifera</i> creeper v	<i>Festuca rubra</i> red fescue v	<i>Sagina maritima</i> saltwort v
<i>Anthriscus sylvestris</i> dog biscuits v	<i>Galium aparine</i> klengemaure v	<i>Sagina nodosa</i> budding heirloom v
<i>Anthyllis vulneraria</i> round pod v	<i>Glaucium flavum</i> yellow horn poppy v	<i>Scorzoneroidea autumnalis</i> follblom v
<i>Armeria maritima</i> førekoll v	<i>Juncus gerardii</i> salt rush v	<i>Silene uniflora</i> strandschmelle v
<i>Artemisia vulgaris</i> burot v	<i>Linum catharticum</i> wild-lin v	<i>Sonchus arvensis</i> akerdylle v
<i>Asparagus officinalis</i> asparagus v	<i>Lotus corniculatus</i> titrlontonge v	<i>Spergularia salina</i> saltbendel v
<i>Atriplex prostrata</i> færremelde v	<i>Lysimachia maritima</i> beach creeper v	<i>Trifolium repens</i> white clover v
<i>Cakile maritima</i> beach radish v	<i>Plantago maritima</i> beach giant v	<i>Triglochin maritima</i> spring onion v
<i>Calystegia sepium</i> strandvindel v	<i>Potentilla anserina</i> ssp. <i>anserina</i> goose wall v	<i>Tripleurospermum maritimum</i> strandbal derbrå v
<i>Cochlearia officinalis</i> scurvy herb v	<i>Puccinellia maritima</i> spring salt grass v	<i>Tripolium pannonicum</i> beach star v
<i>Crambe maritima</i> beach cabbage v	<i>Rosa rugosa</i> rosacea v	<i>Vicia cracca</i> bird's vetch v
<i>Elytrigia repens</i> kveke v	<i>Rumex crispus</i> krushaymol v	
<i>Euphorbia palustris</i> milkweed v		

Distribution and regional distribution: BN-NB and ASHTZ, O3-OC.

Most important types of confusion: Beach meadow (T12), upper shell sand beach with pioneer vegetation (T29-C-3), upper shell sand beach without pioneer vegetation (T29-C-4).

Red list status (2018): Gravel- and stone-dominated beach and shoreline (LC;<).

References and type parallels: G04 (DNHB13).

T30-C-1 Floodplain forests on gravel and stone NiN

characteristics: Permanent land systems: Floodplain forests (T30), two soil types (1,2). Defined by LKM: S1ÿA & VFÿ1,2. LKM base steps: S1ÿcde & VFÿbcde & Klÿ0a.



Physiognomy: Varies from scrub and scrub forest in exposed places near the river course (ground type 2) to open or denser forest in places where the flood impact is less, further away from the river course (ground type 1). Typical dominant species in exposed places are hornbeam and willow, inwards and upwards into the floodplain birch and alder come in and mixed forest and alder. Thickets of alder, birch and other boreal deciduous trees are typical. In continental areas, there are also designs dominated by pine (see picture).

The proportion of mountain plants increases upwards and towards the north, in the mountains clean willow designs take over. No particularly characteristic species.

Floodplain forest fields on gravel and stone along Folla. He: Folldal: east of Brennmoen. Photo: RH.

Ecological characteristic: Characterized by a substrate consisting of gravel and/or stone and the presence of woodland, which either consists of woody shrub-forming species that can withstand mechanical wear caused by flowing water and agitation in the substrate, or trees in less exposed locations.

Terrain and aerial photo characteristics: Widespread in the protected, inner part of the floodplain within large river courses. FF: Often a light gray color in aerial photographs when rock and gravel predominate, which is broken by vegetated areas which are colored brown to green depending on the cover of heather and bushes and the dominance conditions in the tree layer.

The texture varies, but both color and texture are usually consistent within regions, but can vary somewhat between different regions.

Mapping rules, map technical specifications and yardstick adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T30-B-1	T30-C-1	T30-D-1	T30-E-1
Basic types	T30-1,2	T30-1,2	T30-1,2	T30-1-4	T30-1-4

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity type (t* = characteristic t., tÿ- gradient-t.); s = distinction (s* = absolute s., sþ = strong relative s., s- = weak relative s.)

<i>Agrostis capillaris</i> meadowsweet v	<i>Myricaria germanica</i> clawwood v;s+[VFÿdlc],s*[S1ÿelf]	<i>Salix myrsinifolia</i> ssp. <i>myrsinifolia</i> black willow v
<i>Alnus incana</i> alder m*	<i>Oxalis acetosella</i> cuckoo acid v	<i>Salix pentandra</i> istervier v
<i>Athyrium filix-femina</i> skogburkne v	<i>Pinus sylvestris</i> pine s*[S1ÿelf]	<i>Salix phyllicifolia</i> green willow v[NB]
<i>Betula pubescens</i> birch v	<i>Poa nemoralis</i> lundrapp v	<i>Solidago virgaurea</i> golden rice v
<i>Dactylis glomerata</i> dog grass v	<i>Populus tremula</i> aspen v	<i>Sorbus aucuparia</i> roe v
<i>Deschampsia cespitosa</i> ssp. <i>cespitosa</i> silver pile v	<i>Prunus padus</i> hegg v	<i>Tanacetum vulgare</i> reindeer fawn s*[S1ÿelf]
<i>Elymus caninus</i> dog's croak m	<i>Ranunculus acris</i> ground soleie v	<i>Taraxacum officinale</i> agg. weed lion's teeth v
<i>Festuca rubra</i> red fescue v	<i>Ribes spicatum</i> wild currant v*	<i>Valeriana sambucifolia</i> root v
<i>Filipendula ulmaria</i> meadowsweet v	<i>Rubus idaeus</i> raspberry v	<i>Cirriphyllum piliferum</i> lundveikmose m
<i>Geum urbanum</i> kratbhumbleblom v	<i>Rumex acetosa</i> meadow sorrel v	<i>Racomitrium canescens</i> sandy gray moss v
<i>Gymnocarpium dryopteris</i> bird tail v	<i>Salix glauca</i> ssp. <i>glauca</i> silver willow v[NB,LA]	<i>Rhytidadelphus subpinnatus</i> plume moss v
<i>Lysimachia europaea</i> forest star v;s*[VFcl d]	<i>Salix lapponum</i> lappvier v[NB,LA]	

Distribution and regional distribution: Widely distributed in most of the country along medium and large rivers, BN–NB; but little mapped unit. Birch and willow thickets take over for gray alder, heather and rowan towards the height.

Most important types of confusion: T30-C-2 Floodplain forest on fine material.

Red list status (2018): Flomskogmark (VU;<).

References and type parallels: T7-5 Upper stone flood forest (NiN v1); Q3c River oak thicket, gray alder-birch willow formation (less exposed part), Q3d Vierkratt pp (VN).

T30-C-2 Floodplains on fine material

NiN characteristics: Solid ground systems: Flomskog's field (T30), two soil types (3,4). Defined by LKM: S1yB & VFy1,2 LKM base steps: S1yfghi & VFybcd & Kl0a.

Physiognomy: In flood-exposed places near the river course (ground type 4) variation from pure almond willow thickets to forests of white willow x willow, almond willow, other large willow species and/or gray alder. Field and bottom layers are missing or very poorly developed, especially in places with a lot of sedimentation. In less flood-exposed places (ground type 3) dominated by gray alder with varying amounts of hedges, large willow species and other boreal deciduous trees. Often together with or in mosaic with spring water affected floodplain forest land (T30-C-3). Field layer rich in species with many nitrophilous species. Spring aspect before leaf spring typically with i.a. plenty of white wheat. The type has a characteristic fungus of wood-dwelling fungi. **Ecological characteristic:** Most common mapping unit of floodplain forest land, which can cover large areas on river banks/river plains that are dominated by fine sediment material. In places exposed to flooding, the deposit of sand and silt can be large. Characterized by periodic flooding combined with effective drainage and weak humus formation, especially in the most flood-prone places.



Floodplain woodland on fine material. Ak: Bold: N. Øyeren, Kusandvika NE for Røssholmen. Photo: RH.

Terrain and aerial photo characteristics: In the flood zone along rivers and streams; in clay areas there is often a smooth transition to cultural and/or racially conditioned oaks forests. FF: Dense deciduous forest has a light to normal green colour, with dark areas in shadow areas and typical deciduous forest texture. In more slippery forests, clay soils can give a gray to black color, depending on soil moisture. Both color and texture reasonably consistent within and between regions.

Mapping rules, map technical specifications and yardstick adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T30-B-3,4	T30-C-2	T30-D-1	T30-E-1
Basic types	T30-3,4	T30-3,4	T30-3,4	T30-1-7	T30-1-7

Diagnostic species m =

abundance species (**m*** = dominant m.); v = common species (**v*** = constant v.); t = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); s = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Aconitum septentrionale</i> bull helmet v;s-[S1yfle]	<i>Humulus lupulus</i> hop v <i>Lysimachia europaea</i> forest star v <i>Mentha arvensis</i> field mint v <i>Oxalis acetosella</i> cuckoo acid m <i>Phegopteris connectilis</i> hanging wing v;s+[S1yfle] <i>Prunus padus</i> hegg m <i>Ranunculus repens</i> creeping oil m;v*s+[S1yfle] <i>Ribes spicatum</i> wild currant m <i>Rubus idaeus</i> raspberry v <i>Salix myrsinifolia</i> ssp. <i>myrsinifolia</i> black willow v <i>Gymnocarpium dryopteris</i> bird tail v	<i>Silene dioica</i> red jonsokblom v <i>Solidago virgaurea</i> golden rice v <i>Sorbus aucuparia</i> roe v <i>Stellaria nemorum</i> forest star flower v <i>Valeriana sambucifolia</i> root v <i>Viola biflora</i> mountain violet v[M,N] <i>Cirriphyllum piliferum</i> _ <i>Plagiomnium medium</i> scrub moss v <i>Rhytidadelphus squarrosus</i> meadow moss v <i>Rhytidadelphus triquetrus</i> large crown moss v <i>Sciuro-hypnum reflexum</i> sprikelundmose v
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Distribution and regional distribution: Common throughout the country, especially in Eastern Norway and in central Norway up to and including MB along large rivers. Little regional variation, with the exception of a certain species replacement from south to north.

Most important types of confusion: T30-C-1 Floodplain forest on gravel and stone; T30-C-3 Spring water-affected floodplain forest land: gray alder-dominated forests that occur when agricultural land is overgrown.

Red list status (2018): Flomskogmark (VU;<).

References and type parallels: T7-2,4 (NiN 1); C3a Gråor-hedge forest, perennial sedge-spout design pp, floodplain forest var., non livar. (VN).

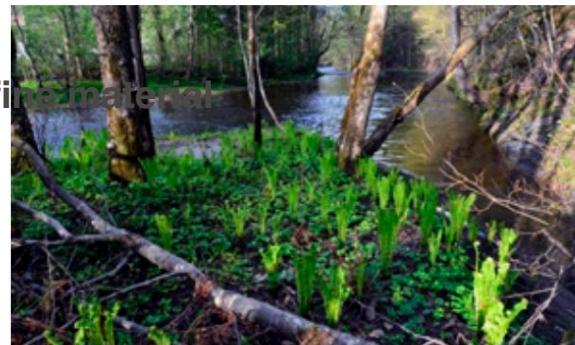
T30-C-3 Source-

influenced floodplain forests on fine material

NiN characteristics: Solid ground systems:

Floodplain forest (T30), two soil types (5,6). Defined by LKM: S1yb & VFy1,2 & Klj2. LKM base steps: S1yfghi & VFybcde & Kljbc.

Physiognomy: Forest, often open, dominated by gray alder with varying amounts of brambles and large willow species. In places less prone to flooding (ground type 5), the field layer is often completely dominated by tall perennials, primarily ostrich sedge, with a greater or lesser content of other species that require spring water influence; near the river course (ground type 6) open forest or scrub where moisture-demanding species such as water lily, watercress, field mint, forest siva and forget-me-not species dominate the field layer. The type also has a characteristic fungus of wood-dwelling fungi.



Floodplain forest land affected by spring water on fine material.

Ak: Bærum: Hamang. Photo: HB.

Ecological characteristics: The mapping unit occurs on floodplains affected by spring water, rich in fine material, with high and constant humidity throughout most of the growing season. Common type of floodplain forest, but usually covers smaller areas.

Terrain and aerial photo characteristics: Found in the flood zone along rivers and streams, in clay areas it often transitions smoothly into culture-related and/or race-related oaks forests above the flood zone. Difficult to distinguish from floodplain forests not affected by spring water (T30-C-2). FF: Dense deciduous forest has a light to normal green colour, with dark areas in shadow areas and typical deciduous forest texture. Hedge, willow and gray bush-shaped willow species often give a grey-green colour, while gray alder and larger willow species give a normal green colour. Both color and texture are reasonably consistent within and between regions.

Mapping rules, map technical specifications and yardstick adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T30-B-5.6	T30-C-3	T30-D-1	T30-E-1
Basic types	T30-5.6	T30-5.6	T30-5.6	T30-1-7	T30-1-7

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta** - gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Alnus incana</i> alder m* <i>Anemone nemorosa</i> whiteweed m <i>Angelica sylvestris</i> sloke v <i>Calamagrostis brachytricha</i> forest sorrel vein v;s+[ERy1b],[Klj1b] <i>Cardamine amara</i> watercress v <i>Deschampsia cespitosa</i> ssp. <i>cespitosa</i> silver pile v <i>Epilobium roseum</i> milkweed s+[ERy1b],[Klj1b] <i>Filipendula ulmaria</i> meadowsweet etc <i>Galium palustre</i> ant v;s+[ERy1b],[Klj1b] <i>Geranium sylvaticum</i> wood stork beak v <i>Impatiens noli-tangere</i> spring seed v;s+[Klj1b]	<i>Matteuccia struthiopteris</i> ostrich feather m*;t*[Klj-bc] <i>Paris quadrifolia</i> four leaf v <i>Phalaris arundinacea</i> reed s+[ERy1b],[Klj1b] <i>Prunus padus</i> hegg v <i>Ranunculus repens</i> krypsoleie m;v* <i>Salix myrsinifolia</i> ssp. <i>myrsinifolia</i> black willow v;s-[Klj1b] <i>Salix xfragilis</i> green willow v;s+[ERy1b],[Klj1b] <i>Stellaria nemorum</i> forest star flower v <i>Tussilago farfara</i> horseshoe m s+[Klj1b] <i>Urtica dioica</i> stinging nettle v <i>Valeriana sambucifolia</i> root v;s+[ERy1b],[Klj1b]	<i>Atrichum undulatum</i> large prickly moss v;s+[Klj1b] <i>Calliergon cordifolium</i> sedge moss v <i>Calliergonella cuspidata</i> swamp prickly moss v <i>Cirriphyllum piliferum</i> lundveikmose m <i>Kindbergia praelonga</i> _ <i>Plagiomnium elatum</i> calcareous moss v <i>Rhytidadelphus triquetrus</i> large crown moss v <i>Rhytidadelphus triquetrus</i> large crown moss v
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Distribution and regional distribution: Common in large parts of the country, fairly homogeneous.

Most important types of confusion: Floodplain forest on fine material (T30-C-2).

Red list status (2018): Flomskogmark (VU;<).

References and type parallels: T7-1.3 pp (NiN v1); C3a Gråor-hedge forest, tall perennial culvert design pp, floodplain forest var., non livar. (VN).

T30-C-4 Erosion-prone floodplain forest land

NiN characteristics: Solid ground systems:

Floodplain forest (T30), one ground type (7). Defined by LKM: S1yB & VFy1 & Klj1 & ERy2. LKM base step: S1yfghi & VFyde & Kljbc & ERyb.

Physiognomy: Vierkratt, with willow as the focal point species in its distribution area, otherwise with elements of species such as gray alder, almond willow and black willow. Also contains species that are also found in the other floodplain forest mapping units.

Squeegie and leaf litter cover the ground

in late summer, there is very little humus formation and the bottom layer is poorly developed.

Ecological characteristics: The mapping unit occurs in places that are strongly affected by floods, where erosion is more important than sedimentation.

Terrain and aerial photo characteristics: Covers a narrow belt in places prone to erosion along major rivers. FF: Light gray color in aerial photography when rock and gravel predominate, but most often dark green when dense thickets of green willows and sedges in the undergrowth. Switching between different designs can give rise to a characteristic texture in aerial photography. Both color and texture are often consistent within regions, but can vary somewhat between different regions.

Mapping rules, map technical specifications and yardstick adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T30-B-7	T30-C-4	T30-D-1	T30-E-1
Basic types	T30-7	T30-7	T30-7	T30-1-7	T30-1-7

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Equisetum pratense</i> meadowsweet v	<i>Filipendula ulmaria</i> meadowsweet v	<i>Salix myrsinifolia</i> ssp. <i>myrsinifolia</i> blackbird v
<i>Alnus incana</i> alder v	<i>Mentha arvensis</i> field mint v	<i>Salix triandra</i> almond willow m
<i>Angelica sylvestris</i> sloke v	<i>Prunus padus</i> hegg v	<i>Taraxacum officinale</i> agg. the weed lion down v
<i>Deschampsia cespitosa</i> ssp. <i>cespitosa</i> silver pile v	<i>Ranunculus repens</i> krypsoleie m	<i>Urtica dioica</i> stinging nettle v
<i>Elymus caninus</i> dog croak v	<i>Salix daphnoides</i> dog willow t[SE]	

Distribution and regional distribution: The type occurs along large rivers. The dominance of dog willow is limited to SE Norway with a center of gravity in Gudbrandsdalen and along Glomma.

Most important types of confusion: Floodplain woodland on fine material (T30-C-2).

Red list status (2018): Flomskogmark (VU;<).

References and type parallels: T7-2 pp, T7-4 pp (NiN v1); Q3e Elveørkraft, dog arrow design (VN).



Erosion-prone floodplain forest. MR: Sunndal: Romfo, river mouths in Driva N for Gjøra. Photo: RH.

T31-C-1 Calcareous boreal fresh heath

NiN characteristics: Mainland systems: Boreal heath (T31), one basic type (1). Defined by LKM: KAÿ1 & UFÿ1. LKM base steps: KAÿabc & UFÿbc.

Physiognomy: Boreal heaths are open heath-like, primarily dwarf shrub-dominated natural systems without a dominant tree layer.

Ecological characteristics: Boreal heath is formed by deforestation of permanent forest land and maintenance of open land through clearing of scrub and trees and summer grazing with moderate grazing pressure. Deforestation is caused by sawdust, wood felling, tar burning, etc., in the sawdust, as well as charcoal production for mines. Boreal heath is characterized by the fact that grazing pressure was, and is, generally weaker than in semi-natural meadows, and the vegetation is dominated by heather plants in contrast to grasses and herbs in meadows. Elements of forest species and some species associated with cultivated land occur. Lime-poor boreal fresh heath lacks intermediate or more lime-demanding species and is characterized by species associated with fresh ground. Drought-tolerant species and lichens are less important. Re-vegetation with increasing bush and tree cover when scattered open field grazing ceases. Difficult transitional forms towards coastal heather, which is characterized by heather burning, and mountain heath, which lies above the climatic forest boundary and is characterized by mountain species. Re-growing semi-natural meadows usually have clearer elements of grasses and herbs associated with cultivated fields.

Terrain and aerial photo characteristics: Most often a gradual transition towards adjacent forest vegetation. Borders against mountain heath or semi-natural meadow cannot be clearly delineated in aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T31-1	T31-B-1	T31-C-1	T31-D-1	T31-E-1
Basic types		T31-1	T31-1	T31-1	T31-1

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Anthoxanthum odoratum</i> yellow v	<i>Juncus trifidus</i> rabbesiv	<i>Solidago virgaurea</i> golden rice v
<i>Avenella flexuosa</i> smyle m	<i>Juniperus communis</i> juniper v	<i>Vaccinium myrtillus</i> blueberry v
<i>Betula nana</i> ssp. <i>nana</i> dwarf birch m	<i>Luzula multiflora</i> ground beetle v	<i>Vaccinium vitis-idaea</i> cranberry v
<i>Campanula rotundifolia</i> bellflower v	<i>Luzula pilosa</i> hair fritter v	<i>Barbilophozia floerkei</i> heather beard moss v
<i>Carex bigelowii</i> styrstarr m	<i>Lysimachia europaea</i> forest star v	<i>Barbilophozia lycopodioides</i> goosefoot beard moss v
<i>Carex brunnescens</i> ssp. <i>brunnescens</i> brown cataract v	<i>Melampyrum pratense</i> stormarimjelle v	<i>Dicranum scoparium</i> rib sickle v
<i>Chamaepericlymenum suecicum</i> scrub berry v	<i>Melampyrum sylvaticum</i> small marimjelle v	<i>Hylocomium splendens</i> floor moss v
<i>Deschampsia cespitosa</i> ssp. <i>cespitosa</i> silver pile v	<i>Nardus stricta</i> fin beard v	<i>Pleurozium schreberi</i> furumose v
<i>Empetrum nigrum</i> kreklung v	<i>Omalotheca supina</i> dwarf graywort v	<i>Polytrichum commune</i> large bear moss v
<i>Hieracium alpinum</i> agg. mountain glider v	<i>Phyllodoce caerulea</i> blue heather v	<i>Ptilidium ciliare</i> ground fringe v
	<i>Pulsatilla vernalis</i> mogop v	
	<i>Pyrola minor</i> pearl wintergreen v	

Distribution and regional distribution: BN-NB, O3-C1. The whole country, most commonly in MB and NB inland.

Most important types of confusion: Mountain heath, lee side and tundra (T3), coastal heath (T34), semi-natural meadow (T32).

Red list status (2018): Boreal hi (VU;<).

References and type parallels:



Calcareous boreal fresh hello. Op: Dovre: Avsjøen NW.

Photo: HB.

T31-C-2 Calcareous boreal heather

NiN characteristics: Mainland systems: Boreal heath (T31), one base type (2). Defined by LKM: KAÿ1 & UFÿ2. LKM basic steps: KAÿabc & UFÿde.

Physiognomy: Boreal heaths are open heath-like, primarily dwarf shrub-dominated natural systems without a dominant tree layer.



Calcareous boreal heather. No: Vestvågøy: Bø. Photo: RH.

Ecological characteristics: Boreal heath is formed by deforestation of permanent forest land and maintenance of open land through clearing of scrub and trees and summer grazing with moderate grazing pressure. Deforestation is caused by sawdust, wood felling, tar burning, etc., in the sawdust, as well as charcoal production for mines. Boreal heath is characterized by the fact that grazing pressure was, and is, generally weaker than in semi-natural meadows, and the vegetation is dominated by heather plants in contrast to grasses and herbs in meadows. Elements of forest species and some species associated with cultivated land occur. Lime-poor boreal heather lacks intermediate or more lime-demanding species and is characterized by species that favor intermediate to slightly drought-resistant conditions. Re-vegetation with increasing bush and tree cover when scattered open field grazing ceases. Difficult transitional forms towards coastal heather, which is characterized by heather burning, and mountain heath, which lies above the climatic forest boundary and is characterized by mountain species. Re-growing semi-natural meadows usually have clearer elements of grasses and herbs associated with cultivated fields.

Terrain and aerial photo characteristics: Most often a gradual transition towards adjacent forest vegetation. Borders against mountain heath or semi-natural meadow cannot be clearly delineated in aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T31-B-2	T31-C-2	T31-D-2	T31-E-2
Basic types	T31-2	T31-2	T31-2	T31-2,3	T31-2,3

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

Antennaria dioica cat's foot v	Juniperus communis juniper v	Hylocomium splendens floor moss v
Anthoxanthum odoratum yellow s-[UF-elf]	Melampyrum pratense stormarimjelle v	Paraleucobrium enerve mountain nerve moss v
Avenella flexuosa smyle v;s-[UF-elf]	Pedicularis lapponica Bleikmyrklegg v	Pleurozium schreberi furumose v
Betula nana ssp. nana dwarf birch v	Phyllodoce caerulea blue heather v	Pohlia nutans vegnikke v
Calluna vulgaris heather v	Salix glauca ssp. glauca silver willow v	Polytrichastrum alpinum mountain binnemoss v
Carex bigelowii styrstarr m	Solidago virgaurea golden rice v	Polytrichum commune large bear moss v
Carex brunneoscens ssp. brunneoscens brown cataract v	Vaccinium myrtillus blueberry v	Cetraria islandica islandslav v
Empetrum nigrum cricket m;s+[UF-dlc]	Vaccinium uliginosum blackberry v	Cladonia arbusculalis reindeer lichen v
Festuca ovina sheep fescue v	Vaccinium vitis-idaea cranberry v	Cladonia bellidiflora lichen v
Juncus trifidus rabbesiv v	Barbilophozia floerkei heather beard moss v	Cladonia rangiferina gray lichen v
	Barbilophozia lycopodioides goosefoot beard moss v	Nephroma arcticum storvrenge v
	Dicranum fuscescens bergsigd v	
	Dicranum scoparium rib sickle v	

Distribution and regional distribution: BN-NB, O3-C1. The whole country, most commonly in MB and NB inland.

Most important types of confusion: Mountain heath, lee side and tundra (T3), coastal heath (T34), semi-natural meadow (T32).

Red list status (2018): Boreal hi (VU;<).

References and type parallels:

T31-C-3 Calcareous boreal lowland

NiN characteristics: Mainland systems: Boreal heath (T31), one basic type (3). Defined by LKM: KAÿ1 & UFÿ3. LKM base steps: KAÿabc & UFÿfgh.

Physiognomy: Boreal heaths are open heath-like, primarily dwarf shrub-dominated natural systems without a dominant tree layer.

Ecological characteristics: Boreal heath is formed by deforestation of permanent forest land and maintenance of open land through clearing of scrub and trees and summer grazing with moderate grazing pressure. Deforestation is caused by sawdust, wood felling, tar burning, etc., in the sawdust, as well as charcoal production for mines. Boreal heath is characterized by the fact that grazing pressure was, and is, generally weaker than in semi-natural meadows, and the vegetation is dominated by heather plants in contrast to grasses and herbs in meadows. Elements of forest species and some species associated with cultivated land occur. Lime-poor boreal lichen lacks intermediate or more lime-demanding species and is characterized by drought-tolerant species with elements of lichen. Re-vegetation with increasing bush and tree cover when scattered open field grazing ceases. Difficult transitional forms towards coastal heather, which is characterized by heather burning, and mountain heath, which lies above the climatic forest boundary and is characterized by mountain species. Re-growing semi-natural meadows usually have clearer elements of grasses and herbs associated with cultivated fields.

Terrain and aerial photo characteristics: Most often a gradual transition towards adjacent forest vegetation. Borders against mountain heath or semi-natural meadow cannot be clearly delineated in aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T31-3	T31-B-3	T31-C-3	T31-D-2	T31-E-2
Basic types		T31-3	T31-3	T31-2,3	T31-2,3

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.; **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Antennaria dioica</i> cat's foot v <i>Avenella flexuosa</i> smyle v <i>Betula nana</i> ssp. <i>nana</i> dwarf birch v <i>Carex bigelowii</i> stivstarr v <i>Empetrum nigrum</i> cricket s+[UF-fle] <i>Festuca ovina</i> sheep 's fescue v;s+[UF-fle] <i>Juncus trifidus</i> rabbesiv v <i>Juniperus communis</i> juniper v <i>Pulsatilla vernalis</i> mogop <i>Salix herbacea</i> mouse ear v <i>Vaccinium uliginosum</i> blockberry v <i>Vaccinium vitis-idaea</i> cranberry v	<i>Dicranum fuscescens</i> mountain sickle <i>Dicranum scoparium</i> rib sickle v <i>Pleurozium schreberi</i> furmose v <i>Pohlia nutans</i> vegnikke v <i>Polytrichum juniperinum</i> juniper moss v;s-[UF-fle] <i>Ptilidium ciliare</i> ground fringe v <i>Cetraria ericetorum</i> narrow island slave s-[UF-fle] <i>Cetraria islandica</i> islandslav v	<i>Cladonia arbuscula</i> light lichen v <i>Cladonia bellidiflora</i> lichen v <i>Cladonia coccifera</i> agg. groat red beaker v <i>Cladonia gracilis</i> syllav v <i>Cladonia rangiferina</i> gray lichen v <i>Cladonia stellaris</i> white curl v;s-[UF-fle] <i>Cladonia uncialis</i> spikelav v;s-[UF-fle] <i>Flavocetraria cucullata</i> yellow sedge v;s-[UF-fle] <i>Flavocetraria nivalis</i> yellow skin v;s-[UF-fle] <i>Peltigera malacea</i> matnever v
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Distribution and regional distribution: BN-NB, O3-C1. The whole country, most commonly in MB and NB inland.

Most important types of confusion: Mountain heath, lee side and tundra (T3), coastal heath (T34), semi-natural meadow (T32).

Red list status (2018): Boreal hi (VU;<).

References and type parallels:



Calcareous boreal lowland. Op: Dovre: Hordset. Photo: RH.

T31-C-4 Intermediate boreal fresh hi

NiN characteristics: Mainland systems: Boreal heath (T31), one basic type (4). Defined by LKM: KAy2 & UFy1. LKM basic steps: KAyde & UFyb.

Physiognomy: Boreal heaths are open heath-like, primarily dwarf shrub-dominated natural systems without a dominant tree layer.

Ecological characteristics: Boreal heath is formed by deforestation of permanent forest land and maintenance of open land through clearing of scrub and trees and summer grazing with moderate grazing pressure. Deforestation is caused by sawdust, wood felling, tar burning, etc., in the sawdust, as well as charcoal production for mines. Boreal heath is characterized by the fact that grazing pressure was, and is, generally weaker than in semi-natural meadows, and the vegetation is dominated by heather plants in contrast to grasses and herbs in meadows. Elements of forest species and some species associated with cultivated land occur. Intermediate boreal fresh heath lacks slightly calcareous or more calcareous species and is characterized by species associated with fresh ground. Drought-tolerant species and lichens are less important. Re-vegetation with increasing bush and tree cover when scattered open field grazing ceases. Difficult transitional forms towards coastal heather, which is characterized by heather burning, and mountain heath, which lies above the climatic forest boundary and is characterized by mountain species. Re-growing semi-natural meadows usually have clearer elements of grasses and herbs associated with cultivated fields.



Intermediate boreal fresh hi. Op: Lom: Dumdalen.
Photo: RH.

Terrain and aerial photo characteristics: Most often a gradual transition towards adjacent forest vegetation. Borders against mountain heath or semi-natural meadow cannot be clearly delineated in aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T31-B-4	T31-C-4	T31-D-3	T31-E-3
Basic types	T31-4	T31-4	T31-4	T31-4,13	T31-4,13

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Agrostis capillaris</i> meadowsweet v <i>Alchemilla alpina</i> mountain marigold v <i>Antennaria dioica</i> cat's foot v <i>Anthoxanthum odoratum</i> yellow v <i>Avenella flexuosa</i> smyle m <i>Betula nana</i> ssp. <i>nana</i> dwarf birch v <i>Bistorta vivipara</i> harerug v;s-[KA-dlc] <i>Campanula rotundifolia</i> bluebell v <i>Carex bigelowii</i> stivstarr v <i>Carex vaginata</i> scabbard v;s-[KA-dlc] <i>Chamaepericlymenum suecicum</i> scrub berry v <i>Deschampsia cespitosa</i> ssp. <i>cespitosa</i> silver pile v <i>Empetrum nigrum</i> kreklings v <i>Euphrasia wettsteinii</i> small- eyed thrush v;s-[KA-dlc] <i>Festuca ovina</i> sheep fescue v <i>Gentianella campestris</i> ground sweet v <i>Hieracium alpinum</i> agg. mountain glider v <i>Juncus trifidus</i> rabbesiv v	<i>Juniperus communis</i> juniper v <i>Luzula multiflora</i> ground beetle v <i>Luzula pilosa</i> hair fritter v <i>Luzula spicata</i> aksfrytle v;s-[KA-dlc] <i>Lysimachia europaea</i> forest star v <i>Maianthemum bifolium</i> Maiblom v <i>Melampyrum pratense</i> stormarmjelle v <i>Melampyrum sylvaticum</i> small marmjelle v <i>Nardus stricta</i> fin beard v <i>Omalotheca norvegica</i> _ [KA-dlc] <i>Oxalis acetosella</i> cuckoo acid v;s-[KA-dlc] <i>Oxyria digyna</i> mountain acid v <i>Pedicularis lapponica</i> Bleikmyrklegg v <i>Phleum alpinum</i> mountain timotei v;s-[KA-dlc] <i>Phyllodoce caerulea</i> blue heather v <i>Poa pratensis</i> engrapp <i>Potentilla erecta</i> carpet root v <i>Pulsatilla vernalis</i> mogop v <i>Pyrola minor</i> pearl wintergreen	<i>Ranunculus acris</i> ground sunflower v;s-[KA-dlc] <i>Scorzoneroideae autumnalis</i> foiblom v;s-[KA-dlc] <i>Solidago virgaurea</i> golden rice v <i>Stellaria borealis</i> mountain star flower v;s-[KA-dlc] <i>Vaccinium myrtillus</i> blueberry m <i>Vaccinium uliginosum</i> blockberry v <i>Vaccinium vitis-idaea</i> cranberry v <i>Veronica alpina</i> snow veronika v;s-[KA-dlc] <i>Viola biflora</i> mountain violet v;s-[KA-dlc] <i>Viola palustris</i> marsh violet v;s-[KA-dlc] <i>Barbilophozia lycopodioides</i> goosefoot beard moss v <i>Dicranum scoparium</i> rib sickle v <i>Hylocomium splendens</i> floor moss m <i>Ptilidium ciliare</i> ground fringe v
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Distribution and regional distribution: BN-NB, O3-C1. The whole country, most commonly in MB and NB inland.

Most important types of confusion: Mountain heath, lee side and tundra (T3), coastal heath (T34), semi-natural meadow (T32).

Red list status (2018): Boreal hi (VU;<).

References and type parallels:

T31-C-5 Intermediate boreal heath

NiN characteristics: Mainland systems: Boreal heath (T31), one basic type (5). Defined by LKM: KAj2 & UFj2. LKM base steps: KAjde & UFjde.

Physiognomy: Boreal heaths are open heath-like, primarily dwarf shrub-dominated natural systems without a dominant tree layer.

Ecological characteristics: Boreal heath is formed by deforestation of permanent forest land and maintenance of open land through clearing of scrub and trees and summer grazing with moderate grazing pressure. Deforestation is caused by sawdust, wood felling, tar burning, etc., in the sawdust, as well as charcoal production for mines. Boreal heath is characterized by the fact that grazing pressure was, and is, generally weaker than in semi-natural meadows, and the vegetation is dominated by heather plants in contrast to grasses and herbs in meadows. Elements of forest species and some species associated with cultivated land occur. Intermediate boreal heath lacks slightly calcareous or more calcareous species and is characterized by species that favor intermediate to slightly drought-resistant conditions. Re-vegetation with increasing bush and tree cover when scattered open field grazing ceases. Difficult transitional forms towards coastal heather, which is characterized by heather burning, and mountain heath, which lies above the climatic forest boundary and is characterized by mountain species. Re-growing semi-natural meadows usually have clearer elements of grasses and herbs associated with cultivated fields.

Terrain and aerial photo characteristics: Most often a gradual transition towards adjacent forest vegetation. Borders against mountain heath or semi-natural meadow cannot be clearly delineated in aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T31-5	T31-B-5	T31-C-5	T31-D-4	T31-E-4
Basic types		T31-5	T31-5	T31-5,6	T31-5,6

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Agrostis capillaris</i> meadowsweet v <i>Alchemilla alpina</i> mountain marigold v <i>Antennaria dioica</i> cat's foot v <i>Anthoxanthum odoratum</i> yellow v <i>Avenella flexuosa</i> smyle m <i>Betula nana</i> ssp. <i>nana</i> dwarf birch v <i>Calluna vulgaris</i> heather v <i>Campanula rotundifolia</i> bluebell v <i>Carex bigelowii</i> stivstarr v <i>Carex brunnescens</i> ssp. <i>brunnescens</i> brown cataract v <i>Carex vaginata</i> scabbard v;s-[KA-dlc] <i>Deschampsia cespitosa</i> ssp. <i>cespitosa</i> silver pile v <i>Empetrum nigrum</i> kreklung v <i>Euphrasia wettsteinii</i> small-eyed thrush v;s-[KA-dlc] <i>Festuca ovina</i> sheep fescue v <i>Gentianella campestris</i> ground sweet v <i>Hieracium alpinum</i> agg. mountain glider v <i>Juncus trifidus</i> rabbesiv v	<i>Juniperus communis</i> juniper v <i>Luzula multiflora</i> ground beetle v <i>Luzula pilosa</i> hair fritter v <i>Luzula spicata</i> aksfrytle v;s-[KA-dlc] <i>Lysimachia europaea</i> forest star v <i>Melampyrum pratense</i> stormarimjelle v <i>Nardus stricta</i> fin beard v <i>Omalotheca norvegica</i> _ [KA-dlc] <i>Omalotheca supina</i> dwarf graywort v <i>Orthilia secunda</i> nodding wintergreen v;s-[KA-dlc] <i>Pedicularis lapponica</i> Bleikmyrklegg v <i>Phyllodoce caerulea</i> blue heather v <i>Pulsatilla vernalis</i> mogop v <i>Pyrola minor</i> pearl wintergreen v <i>Ranunculus acris</i> ground sunflower v;s-[KA-dlc] <i>Scorzoneroidea autumnalis</i> follblom v;s-[KA-dlc] <i>Sibbaldia procumbens</i> three-finger herb v;s-[KA-dlc]	<i>Solidago virgaurea</i> golden rice v <i>Stellaria borealis</i> mountain star flower v;s-[KA-dlc] <i>Vaccinium myrtillus</i> blueberry m <i>Vaccinium uliginosum</i> blockberry v <i>Vaccinium vitis-idaea</i> cranberry v <i>Barbilophozia lycopodioides</i> goosefoot beard moss v <i>Dicranum fuscescens</i> bergsigd v <i>Dicranum scoparium</i> rib sickle v <i>Hylocomium splendens</i> floor moss v <i>Pleurozium schreberi</i> furumose v <i>Pohlia nutans</i> vegnikke v <i>Polytrichastrum alpinum</i> mountain binnemoss v <i>Ptilidium ciliare</i> ground fringe v <i>Cetraria islandica</i> islandslav v <i>Cladonia arbuscula</i> light lichen v <i>Cladonia rangiferina</i> gray lichen v
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Intermediate boreal heath. Op: Vang: Gjendehøe, S-side.
Photo: RH

Distribution and regional distribution: BN-NB, O3-C1. The whole country, most commonly in MB and NB inland.

Most important types of confusion: Mountain heath, lee side and tundra (T3), coastal heath (T34), semi-natural meadow (T32).

Red list status (2018): Boreal hi (VU;<).

References and type parallels:

T31-C-6 Intermediate boreal lowland

NiN characteristics: Mainland systems: Boreal heath (T31), one basic type (6). Defined by LKM: KAy2 & UFy3. LKM basic steps: KAyde & UFyfgh.

Physiognomy: Boreal heaths are open heath-like, primarily dwarf shrub-dominated natural systems without a dominant tree layer.

Ecological characteristics: Boreal heath is formed by deforestation of permanent forest land and maintenance of open land through clearing of scrub and trees and summer grazing with moderate grazing pressure. Deforestation is caused by sawdust, wood felling, tar burning, etc., in the sawdust, as well as charcoal production for mines. Boreal heath is characterized by the fact that grazing pressure was, and is, generally weaker than in semi-natural meadows, and the vegetation is dominated by heather plants in contrast to grasses and herbs in meadows. Elements of forest species and some species associated with cultivated land occur. Intermediate boreal lichen heath lacks slightly to strongly lime-requiring species and is characterized by drought-tolerant species with elements of lichen. Re-vegetation with increasing bush and tree cover when scattered open field grazing ceases. Difficult transitional forms towards coastal heather, which is characterized by heather burning, and mountain heath, which lies above the climatic forest boundary and is characterized by mountain species. Re-growing semi-natural meadows usually have clearer elements of grasses associated with cultivated fields and herbs.

Terrain and aerial photo characteristics: Most often a gradual transition towards adjacent forest vegetation. Borders against mountain heath or semi-natural meadow cannot be clearly delineated in aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T31-B-6	T31-C-6	T31-D-4	T31-E-4
Basic types	T31-6	T31-6	T31-6	T31-5,6	T31-5,6

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Alchemilla alpina</i> mountain marigold v <i>Antennaria dioica</i> cat's foot v <i>Avenella flexuosa</i> smyle v <i>Betula nana</i> ssp. <i>nana</i> dwarf birch v <i>Campanula rotundifolia</i> bluebell v <i>Carex bigelowii</i> stitvast v <i>Empetrum nigrum</i> kreklung v <i>Festuca ovina</i> sheep fescue v <i>Juncus trifidus</i> rabbesiv v <i>Juniperus communis</i> juniper v <i>Luzula spicata</i> aksfrytle v;s-[KA-dlc] <i>Nardus stricta</i> fin beard v <i>Omalotheca norvegica</i> _ [KA-dlc] <i>Pulsatilla vernalis</i> mogop <i>Pyrola minor</i> pearl wintergreen v	<i>Ranunculus acris</i> ground sunflower v;s-[KA-dlc] <i>Scorzoneroidea autumnalis</i> follblom v;s-[KA-dlc] <i>Vaccinium myrtillus</i> blueberries m <i>Vaccinium uliginosum</i> blockberry v <i>Vaccinium vitis-idaea</i> lingonberry m <i>Barbilophozia lycopodioides</i> goosefoot egg moss v <i>Dicranum fuscescens</i> mountain sickle <i>Dicranum scoparium</i> rib sickle v <i>Hylocomium splendens</i> floor moss v <i>Pleurozium schreberi</i> furumose v <i>Polytrichastrum alpinum</i> mountain binnemoss v	<i>Polytrichum juniperinum</i> juniper moss v;s-[UF-fle] <i>Ptilidium ciliare</i> ground fringe v <i>Cetraria ericetorum</i> narrow island slave v;s-[UF-fle] <i>Cetraria islandica</i> islandslav v <i>Cladonia arbuscula</i> light lichen v <i>Cladonia coccifera</i> agg. groat red beaker v <i>Cladonia gracilis</i> syllav v <i>Cladonia rangiferina</i> gray lichen v <i>Cladonia uncialis</i> spikelav v;s-[UF-fle] <i>Flavocetraria cucullata</i> yellow sedge v;s-[UF-fle] <i>Flavocetraria nivalis</i> yellow skin s-[UF-fle] <i>Peltigera malacea</i> matnever v
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Distribution and regional distribution: BN-NB, O3-C1. The whole country, most commonly in MB and NB inland.

Most important types of confusion: Mountain heath, lee side and tundra (T3), coastal heath (T34), semi-natural meadow (T32).

Red list status (2018): Boreal hi (VU;<).



Intermediate boreal lowland. Op: Dovre: Avsjøen NW.
Photo: HB.

References and type parallels:

T31-C-7 Weak calcareous boreal fresh heath

NiN characteristics: Mainland systems: Boreal heath (T31), one basic type (7). Defined by LKM: KAÿ3 & UFÿ1. LKM base steps: KAÿfg & UFÿbc.

Physiognomy: Boreal heaths are open heath or slightly meadow-like, primarily dwarf shrub-dominated natural systems without a dominant tree layer.

Ecological characteristics: Boreal heath is formed by deforestation of permanent forest land and maintenance of open land through clearing of scrub and trees and summer grazing with moderate grazing pressure. Deforestation is caused by sawdust, wood felling, tar burning, etc., in the sawdust, as well as charcoal production for mines. Boreal heath is characterized by the fact that grazing pressure was, and is, generally weaker than in semi-natural meadows, and the vegetation is dominated by heather plants in contrast to grasses and herbs in meadows. Elements of forest species and some species associated with cultivated land occur. Weakly calcareous boreal fresh heath lacks strongly calcareous species and is characterized by species associated with fresh ground. Drought-tolerant species and lichens are less important. Re-vegetation with increasing bush and tree cover when scattered open field grazing ceases. Difficult transitional forms towards coastal heather, which is characterized by heather burning, and mountain heath, which lies above the climatic forest boundary and is characterized by mountain species. Re-growing semi-natural meadows usually have clearer elements of grasses and herbs associated with cultivated fields.

Terrain and aerial photo characteristics: Most often a gradual transition towards adjacent forest vegetation. Borders against mountain heath or semi-natural meadow cannot be clearly delineated in aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T31-7	T31-B-7	T31-C-7	T31-D-5	T31-E-5
Basic types		T31-7	T31-7	T31-7,10,14	T31-7,10,14

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Agrostis capillaris</i> meadowsweet v <i>Alchemilla alpina</i> mountain marigold v <i>Alchemilla wichurae</i> skarmarkiaope v;s-[KA:fle] <i>Anthoxanthum odoratum</i> yellow v <i>Astragalus alpinus</i> milkweed v;s-[KA:fle] <i>Avenella flexuosa</i> smyle v <i>Betula nana</i> ssp. nana dwarf birch v <i>Bistorta vivipara</i> harerug <i>Campanula rotundifolia</i> bluebell v <i>Carex atrata</i> s-[KA:fle] <i>Carex vaginata</i> slirestarr v <i>Deschampsia cespitosa</i> ssp. <i>cespitosa</i> silver pile v <i>Erigeron borealis</i> mountain hill star v <i>Euphrasia wettsteinii</i> small- eyed thrush v <i>Festuca ovina</i> sheep fescue v <i>Galium boreale</i> white ants v;s-[KA:fle] <i>Gentiana nivalis</i> snow sweet s-[KA:fle]	<i>Gentianella campestris</i> ground sweet v <i>Geranium sylvaticum</i> wood stork beak v <i>Hieracium alpinum</i> agg. mountain glider v <i>Juniperus communis</i> juniper v <i>Luzula multiflora</i> ground beetle v <i>Lysimachia europaea</i> forest star v <i>Melampyrum sylvaticum</i> small marimjelle v <i>Omalotheca norvegica</i> seder graywort v <i>Oxalis acetosella</i> cuckoo acid v <i>Oxyria digyna</i> mountain acid v <i>Phleum alpinum</i> mountain timotei v <i>Phylodoce caerulea</i> blue heather v <i>Poa alpina</i> mountain thrush s+[KA:fle] <i>Pyrola minor</i> pearl wintergreen <i>Ranunculus acris</i> ground soleie v <i>Rubus saxatilis</i> teaberry v;s-[KA:fle] <i>Rumex acetosa</i> meadow sorrel v <i>Saussurea alpina</i> mountain thistle m <i>Scorzoneroidea autumnalis</i> follblom v	<i>Selaginella selaginoides</i> dwarf dwarf v;s-[KA:fle] <i>Sibaldia procumbens</i> three-finger herb v <i>Solidago virgaurea</i> golden rice v <i>Stellaria borealis</i> mountain star flower v <i>Thalictrum alpinum</i> mountain seed star v;s-[KA:fle] <i>Vaccinium myrtillus</i> blueberry v <i>Vaccinium uliginosum</i> blockberry v <i>Veronica alpina</i> Snow Veronica <i>Viola biflora</i> mountain violet m <i>Barbilophozia lycopodioides</i> goosefoot beard moss v <i>Brachythecium salebrosum</i> lilundmose v <i>Hylocomium splendens</i> floor moss v <i>Tomentypnum nitens</i> golden moss v;s-[KA:fle] <i>Tritomaria quinquedentata</i> large fang v
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Distribution and regional distribution: BN-NB, O3-C1. The whole country, most commonly in MB and NB inland.

Most important types of confusion: Mountain heath, lee side and tundra (T3), coastal heath (T34), semi-natural meadow (T32).

Red list status (2018): Boreal hi (VU;<).

References and type parallels:

T31-C-8 Weak calcareous

boreal heather

NiN characteristics: Mainland systems: Boreal heath (T31), one basic type (8). Defined by LKM: KAy3 & UFy2. LKM base steps: KAyfg & UFyde.

Physiognomy: Boreal heaths are open heath or slightly meadow-like, primarily dwarf shrub-dominated natural systems without a dominant tree layer.

Ecological characteristics: Boreal heath is formed by deforestation of permanent forest land and maintenance of open land through clearing of scrub and trees and summer grazing with moderate grazing pressure. Deforestation is caused by sawdust, wood felling, tar burning, etc., in the sawdust, as well as charcoal production for mines. Boreal heath is characterized by the fact that grazing pressure was, and is, generally weaker than in semi-natural meadows, and the vegetation is dominated by heather plants, in contrast to grasses and herbs in meadows. Elements of forest species and some species associated with cultivated land occur. Weakly calcareous boreal heather lacks strongly calcareous species and is characterized by species that favor intermediate to slightly drought-resistant conditions. Re-vegetation with increasing bush and tree cover when scattered open field grazing ceases. Difficult transitional forms towards coastal heather, which is characterized by heather burning, and mountain heath, which lies above the climatic forest boundary and is characterized by mountain species. Re-growing semi-natural meadows usually have clearer elements of grasses and herbs associated with cultivated fields.



Weak calcareous boreal heath. Fi: Nesseby: Mortensnes.
Photo: RH.

Terrain and aerial photo characteristics: Most often a gradual transition towards adjacent forest vegetation. Borders against mountain heath or semi-natural meadow cannot be clearly delineated in aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T31-B-8	T31-C-8	T31-D-6	T31-E-6
Basic types	T31-8	T31-8	T31-8	T31-8,9	T31-8,9

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Alchemilla alpina</i> mountain marigold v <i>Antennaria dioica</i> cat's foot v <i>Anthoxanthum odoratum</i> yellow v <i>Anthyllis vulneraria</i> round pod v;s*[KA:fle] <i>Astragalus alpinus</i> milkweed v;s-[KA:fle] <i>Avenella flexuosa</i> smyle v <i>Bartsia alpina</i> black top v <i>Campanula rotundifolia</i> bluebell v <i>Carex atrata</i> s-[KA:fle] <i>Carex vaginata</i> slirestarr v <i>Cerastium alpinum</i> mountain sage v;s-[KA:fle] <i>Deschampsia cespitosa</i> ssp. <i>cespitosa</i> silver pile v <i>Dryas octopetala</i> reinrose s*[KA:fle] <i>Empetrum nigrum</i> kreking v <i>Erigeron uniflorus</i> snow star v;s-[KA:fle] <i>Euphrasia wettsteinii</i> small-eyed thrush v <i>Festuca ovina</i> sheep's fescue <i>Galium boreale</i> white ant v;s-[KA:fle] <i>Gentiana nivalis</i> snow sweet v;s-[KA:fle]	<i>Gentianella campestris</i> ground sweet v <i>Hieracium alpinum</i> agg. mountain glider v <i>Juncus trifidus</i> rabbesv <i>Juniperus communis</i> juniper v <i>Luzula multiflora</i> ground beetle v <i>Luzula spicata</i> aksfrytle v <i>Melampyrum sylvaticum</i> small marimjelle v <i>Omalotheca norvegica</i> seder graywort v <i>Oxyria digyna</i> mountain acid v <i>Potentilla crantzii</i> spotted wall s*[KA:fle] <i>Primula scandinavica</i> mountain key flower v;s-[KA:fle] <i>Pseudorchis straminea</i> mountain white curlew v <i>Pulsatilla vernalis</i> mogop v <i>Ranunculus acris</i> ground soleie v <i>Saussurea alpina</i> mountain thistle v <i>Saxifraga oppositifolia</i> red herring s*[KA:fle] <i>Selaginella selaginoides</i> dwarf dwarf v;s-[KA:fle] <i>Sibbaldia procumbens</i> three-finger herb v	<i>Solidago virgaurea</i> golden rice v <i>Thalictrum alpinum</i> mountain seed star v;s-[KA:fle] <i>Vaccinium uliginosum</i> blockberry v <i>Abietinella abietina</i> granmose v;s+[KA:fle] <i>Barbilophozia lycopodioides</i> goosefoot beard moss v <i>Dicranum fuscescens</i> bergsigd v <i>Dicranum scoparium</i> rib sickle v <i>Hylocomium splendens</i> floor moss v <i>Ptilidium ciliare</i> ground fringe v <i>Rhytidium rugosum</i> paw moss s+[KA:fle] <i>Tomentypnum nitens</i> golden moss v;s-[KA:fle] <i>Tortella tortuosa</i> pillow vrimose s+[KA:fle] <i>Cetraria islandica</i> islandslav v <i>Cladonia arbuscula</i> light lichen v <i>Cladonia gracilis</i> syllav v <i>Peltigera rufescens</i> brunnever v
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Distribution and regional distribution: BN-NB, O3-C1. The whole country, most commonly in MB and NB inland.

Most important types of confusion: Mountain heath, lee side and tundra (T3), coastal heath (T34), semi-natural meadow (T32).

Red list status (2018): Boreal hi (VU;<).

References and type parallels:

T31-C-9 Weak calcareous boreal lowland

NiN characteristics: Mainland systems: Boreal heath (T31), one basic type (9). Defined by LKM: KAÿ3 & UFÿ3. LKM base steps: KAÿfg & UFÿfgh.

Physiognomy: Boreal heaths are open heath or slightly meadow-like, primarily dwarf shrub-dominated natural systems without a dominant tree layer.

Ecological characteristics: Boreal heath is formed by deforestation of permanent forest land and maintenance of open land through clearing of scrub and trees and summer grazing with moderate grazing pressure. Deforestation is caused by sawdust, wood felling, tar burning, etc., in the sawdust, as well as charcoal production for mines. Boreal heath is characterized by the fact that grazing pressure was, and is, generally weaker than in semi-natural meadows, and the vegetation is dominated by heather plants, in contrast to grasses and herbs in meadows. Elements of forest species and some species associated with cultivated land occur. Weakly calcareous boreal lichen heath lacks strongly calcareous species and is characterized by drought-tolerant species with elements of lichen. Re-vegetation with increasing bush and tree cover when scattered open field grazing ceases. Difficult transitional forms towards coastal heather, which is characterized by heather burning, and mountain heath, which lies above the climatic forest boundary and is characterized by mountain species. Re-growing semi-natural meadows usually have clearer elements of grasses and herbs associated with cultivated fields.

Terrain and aerial photo characteristics: Most often a gradual transition towards adjacent forest vegetation. Borders against mountain heath or semi-natural meadow cannot be clearly delineated in aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T31-9	T31-B-9	T31-C-9	T31-D-6	T31-E-6
Basic types		T31-9	T31-9	T31-8,9	T31-8,9

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Antennaria dioica</i> cat's foot v <i>Anthyllis vulneraria</i> round pod v;s*[KA:fle] <i>Astragalus alpinus</i> milkweed v;s-[KA:fle] <i>Campanula rotundifolia</i> bluebell v <i>Carex bigelowii</i> stivstarr v <i>Carex vaginata</i> scabbard v <i>Dryas octopetala</i> reinrose s*[KA:fle] <i>Empetrum nigrum</i> krekling v <i>Euphrasia wettsteinii</i> small-eyed thrush v <i>Festuca ovina</i> sheep fescue v <i>Juniperus communis</i> juniper v <i>Luzula multiflora</i> ground beetle v	<i>Luzula spicata</i> aksfrytle v <i>Potentilla crantzii</i> spotted wall v <i>Pulsatilla vernalis</i> mogop <i>Saxifraga oppositifolia</i> red herring s*[KA:fle] <i>Silene acaulis</i> fjellsnelle v <i>Vaccinium uliginosum</i> blockberry v <i>Vaccinium vitis-idaea</i> cranberry v <i>Abietinella abietina</i> granmose v;s+[KA:fle] <i>Dicranum fuscescens</i> mountain sickle <i>Polytrichum juniperinum</i> juniper moss v;s-[UF:fle]	<i>Ptilidium ciliare</i> ground fringe v <i>Syntrichia norvegica</i> mountain hair star <i>Tortella tortuosa</i> pillow mousse <i>Cetraria ericetorum</i> narrow island slave v;s-[UF:fle] <i>Cetraria islandica</i> islandslav v <i>Cladonia arbuscula</i> light lichen v <i>Cladonia rangiferina</i> gray lichen v <i>Cladonia uncialis</i> spikelav s-[UF:fle] <i>Flavocetraria cucullata</i> s-[UF:fle] <i>Flavocetraria nivalis</i> yellow skin s-[UF:fle] <i>Peltigera rufescens</i> brunnever v
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Distribution and regional distribution: BN-NB, O3-C1. The whole country, most commonly in MB and NB inland.

Most important types of confusion: Mountain heath, lee side and tundra (T3), coastal heath (T34), semi-natural meadow (T32).

Red list status (2018): Boreal hi (VU;<).

References and type parallels:

T31-C-10 Highly calcareous boreal fresh heath

NiN Characteristics: Mainland Systems: Boreal heath (T31), one basic type (10). Defined by LKM: KAy4 & UFy1. LKM base step: KAyhi & UFybc.

Physiognomy: Boreal heaths are open heath or slightly meadow-like, primarily dwarf shrub-dominated natural systems without a dominant tree layer.

Ecological characteristics: Boreal heath is formed by deforestation of permanent forest land and maintenance of open land through clearing of scrub and trees and summer grazing with moderate grazing pressure. Deforestation is caused by sawdust, wood felling, tar burning, etc., in the sawdust, as well as charcoal production for mines. Boreal heath is characterized by the fact that grazing pressure was, and is, generally weaker than in semi-natural meadows, and the vegetation is dominated by heather plants, in contrast to grasses and herbs in meadows. Elements of forest species and some species associated with cultivated land occur. Highly calcareous boreal fresh heath is characterized by highly calcareous species and species associated with fresh ground. Drought-tolerant species and lichens are less important. Re-vegetation with increasing bush and tree cover when scattered open field grazing ceases. Difficult transitional forms towards coastal heather, which is characterized by heather burning, and mountain heath, which lies above the climatic forest boundary and is characterized by mountain species. Re-growing semi-natural meadows usually have clearer elements of grasses and herbs associated with cultivated fields.



Strong calcareous boreal fresh hi. Op: Vågå: Nordherad.
Photo: HB.

Terrain and aerial photo characteristics: Most often a gradual transition towards adjacent forest vegetation. Borders against mountain heath or semi-natural meadow cannot be clearly delineated in aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T31-B-10	T31-C-10	T31-D-5	T31-E-5
Basic types	T31-10	T31-10	T31-10	T31-7,10,14	T31-7,10,14

Diagnostic species m =

abundance species (**m*** = dominant m.); v = common species (**v*** = constant v.); t = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); s = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Alchemilla filicaulis</i> ladybug v	<i>Euphrasia wettsteinii</i> small-eyed thrush v	<i>Pyrola minor</i> pearl wintergreen v
<i>Alchemilla wichurae</i> skarmarkiaope v	<i>Galium boreale</i> white ant v	<i>Ranunculus acris</i> ground soleie v
<i>Anthoxanthum odoratum</i> yellow v	<i>Gentiana nivalis</i> snow sweet v	<i>Rubus saxatilis</i> teaberry v
<i>Astragalus alpinus</i> milkweed m	<i>Gentianella campestris</i> ground sweet v	<i>Salix hastata</i> white hemlock v;s-[KA-hlg]
<i>Astragalus frigidus</i> yellow spleen v;s+[KA-hlg]	<i>Geranium sylvaticum</i> wood stork beak v	<i>Salix lanata</i> woolly willow v;s-[KA-hlg]
<i>Astragalus norvegicus</i> blue spleen v;s+[KA-hlg]	<i>Hieracium alpinum</i> agg. mountain glider v	<i>Saussurea alpina</i> mountain thistle m
<i>Avenella flexuosa</i> smyle v	<i>Juniperus communis</i> juniper v	<i>Scorzoneroidea autumnalis</i> fallblom v
<i>Bartsia alpina</i> black top v	<i>Melampyrum sylvaticum</i> small marmjelle v	<i>Selaginella selaginoides</i> dvergjamne v
<i>Bistorta vivipara</i> harerug m	<i>Omalotheca norvegica</i> seder graywort v	<i>Sibbaldia procumbens</i> three-finger herb v
<i>Botrychium lunaria</i> sea key v	<i>Oxyria digyna</i> mountain acid v	<i>Stellaria borealis</i> mountain star flower v
<i>Campanula rotundifolia</i> bluebell v	<i>Parnassia palustris</i> jäblom v	<i>Thalictrum alpinum</i> mountain seed star v
<i>Carex atrata</i> black starr m	<i>Pedicularis oederi</i> golden anthill	<i>Trisetum spicatum</i> black oak v
<i>Cerastium alpinum</i> mountain heirloom m	<i>Phleum alpinum</i> mountain timotei v	<i>Veronica alpina</i> snow veronika v
<i>Coeloglossum viride</i> green curlew v	<i>Poa alpina</i> fjellrapp v	<i>Viola biflora</i> mountain violet m
<i>Deschampsia cespitosa</i> ssp. <i>cespitos</i> a silver pile v	<i>Poa pratensis</i> engrapp v	<i>Viola rupestris</i> gravel violet v;s+[KA-hlg]
<i>Equisetum variegatum</i> mountain rush v;s-[KA-hlg]	<i>Potentilla crantzii</i> spotted wall m	<i>Barbilophozia lycopodioides</i> goosefoot beard moss v
<i>Erigeron borealis</i> mountain hill star v	<i>Potentilla erecta</i> carpet root v	<i>Tomentypnum nitens</i> golden moss v;s-[KA-fle]
<i>Erigeron uniflorus</i> snow hill star v	<i>Primula scandinavica</i> mountain key flower	<i>Peltigera rufescens</i> fountain liver
	<i>Pseudorchis straminea</i> mountain white curlew v	

Distribution and regional distribution: BN-NB, O3-C1. The whole country, most commonly in MB and NB inland.

Most important types of confusion: Mountain heath, lee side and tundra (T3), coastal heath (T34), semi-natural meadow (T32).

Red list status (2018): Boreal hi (VU;<).

References and type parallels:

T31-C-11 Highly calcareous boreal heather

NiN characteristics: Mainland systems: Boreal heath (T31), one basic type (11). Defined by LKM: KAy4 & UFy2. LKM basic steps: KAyhi & UFyde.

Physiognomy: Boreal heaths are open heath or slightly meadow-like, primarily dwarf shrub-dominated natural systems without a dominant tree layer.

Ecological characteristics: Boreal heath is formed by deforestation of permanent forest land and maintenance of open land through clearing of scrub and trees and summer grazing with moderate grazing pressure. Deforestation is caused by sawdust, wood felling, tar burning, etc., in the sawdust, as well as charcoal production for mines. Boreal heath is characterized by the fact that grazing pressure was, and is, generally weaker than in semi-natural meadows, and the vegetation is dominated by heather plants, in contrast to grasses and herbs in meadows. Elements of forest species and some species associated with cultivated land occur. Highly calcareous boreal heather is characterized by highly calcareous species and species that are favored by intermediate to slightly drought-resistant conditions. Re-vegetation with increasing bush and tree cover when scattered open field grazing ceases. Difficult transitional forms towards coastal heather, which is characterized by heather burning, and mountain heath, which lies above the climatic forest boundary and is characterized by mountain species. Re-growing semi-natural meadows usually have clearer elements of grasses and herbs associated with cultivated fields.

Terrain and aerial photo characteristics: Most often a gradual transition towards adjacent forest vegetation. Borders against mountain heath or semi-natural meadow cannot be clearly delineated in aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T31-11	T31-B-11	T31-C-11	T31-D-7	T31-E-7
Basic types		T31-11	T31-11	T31-11,12	T31-11,12

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Alchemilla wichurae</i> skarmarkiaope v	<i>Euphrasia wettsteinii</i> small-eyed thrush v	<i>Saxifraga oppositifolia</i> red herring
<i>Anthoxanthum odoratum</i> yellow v	<i>Festuca ovina</i> sheep fescue v	<i>Selaginella selaginoides</i> dvergjamne v
<i>Astragalus alpinus</i> setermelt v	<i>Galium boreale</i> white ant v	<i>Thalictrum alpinum</i> mountain seed star v
<i>Avenella flexuosa</i> smyle v	<i>Gentiana nivalis</i> snow sweet v	<i>Trisetum spicatum</i> black oak v
<i>Bartsia alpina</i> black top v	<i>Juniperus communis</i> juniper v	<i>Veronica fruticans</i> bergveronika v;s-[KA:hlg]
<i>Bistorta vivipara</i> harerug v	<i>Omalotheca norvegica</i> seder graywort v	<i>Viola rupestris</i> gravel violet v;s+[KA:hlg]
<i>Campanula rotundifolia</i> bluebell v	<i>Poa alpina</i> fjellrapp v	<i>Rhytidium rugosum</i> paw moss v
<i>Carex atrata</i> black starr v	<i>Potentilla crantzii</i> spotted wall v	<i>Systrichia norvegica</i> mountain hair star
<i>Cerastium alpinum</i> mountain heirloom v	<i>Primula scandinavica</i> mountain key flower v	<i>Tomentypnum nitens</i> golden moss v;s-[KA:fle]
<i>Deschampsia cespitosa</i> ssp. <i>cespitosa</i> silver pile v	<i>Pyrola minor</i> pearl wintergreen v	<i>Tritomaria quinquedentata</i> large fang v
<i>Dryas octopetala</i> reindeer rose	<i>Ranunculus acris</i> ground soleie v	<i>Peltigera rufescens</i> brunnever v
<i>Equisetum variegatum</i> mountain rush v;s-[KA:hlg]	<i>Rubus saxatilis</i> teaberry v	
<i>Erigeron uniflorus</i> snow hill star v	<i>Saussurea alpina</i> mountain thistle v	

Distribution and regional distribution: BN-NB, O3-C1. The whole country, most commonly in MB and NB inland.

Most important types of confusion: Mountain heath, lee side and tundra (T3), coastal heath (T34), semi-natural meadow (T32).

Red list status (2018): Boreal hi (VU;<).

References and type parallels:

T31-C-12 Highly calcareous boreal lowland

NiN characteristics: Mainland systems: Boreal heath (T31), one basic type (12). Defined by LKM: KAÿ4 & UFÿ3. LKM base step: KAÿhi & UFÿfgh.

Physiognomy: Boreal heaths are open heath or slightly meadow-like, primarily dwarf shrub-dominated natural systems without a dominant tree layer.

Ecological characteristics: Boreal heath is formed by deforestation of permanent forest land and maintenance of open land through clearing of scrub and trees and summer grazing with moderate grazing pressure. Deforestation is caused by sawdust, wood felling, tar burning, etc., in the sawdust, as well as charcoal production for mines. Boreal heath is characterized by the fact that grazing pressure was, and is, generally weaker than in semi-natural meadows, and the vegetation is dominated by heather plants in contrast to grasses and herbs in meadows. Elements of forest species and some species associated with cultivated land occur. Highly calcareous boreal lichen heath is characterized by highly calcareous species and drought-tolerant species with elements of lichen. Re-vegetation with increasing bush and tree cover when scattered open field grazing ceases. Difficult transitional forms towards coastal heather, which is characterized by heather burning, and mountain heath, which lies above the climatic forest boundary and is characterized by mountain species. Re-growing semi-natural meadows usually have clearer elements of grasses and herbs associated with cultivated fields.

Terrain and aerial photo characteristics: Most often a gradual transition towards adjacent forest vegetation. Borders against mountain heath or semi-natural meadow cannot be clearly delineated in aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T31-B-12	T31-C-12	T31-D-7	T31-E-7
Basic types	T31-12	T31-12	T31-12	T31-11,12	T31-11,12

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Bartsia alpina</i> black top v	<i>Potentilla crantzii</i> spotted wall v	<i>Rhytidium rugosum</i> paw moss v
<i>Campanula rotundifolia</i> bluebell v	<i>Pulsatilla vernalis</i> mogop	<i>Syntrichia norvegica</i> mountain hair star v
<i>Cerastium alpinum</i> mountain heirloom v	<i>Salix reticulata</i> nettle v	<i>Tortella tortuosa</i> cushion v
<i>Dryas octopetala</i> reinrose v	<i>Saussurea alpina</i> mountain thistle v	<i>Cetraria islandica</i> islandslav v
<i>Euphrasia wettsteinii</i> small-eyed thrush v	<i>Saxifraga oppositifolia</i> red herring v	<i>Cladonia gracilis</i> syllav v
<i>Festuca ovina</i> sheep fescue v	<i>Silene acaulis</i> fjellsmelle m	<i>Cladonia uncialis</i> spikelav v;s-[UF-fle]
<i>Galium boreale</i> white ant v	<i>Veronica fruticans</i> bergveronica v;s-[KA-hlg]	<i>Flavocetraria nivalis</i> yellow skin v;s-[UF-fle]
<i>Juniperus communis</i> juniper v	<i>Viola rupestris</i> gravel violet v;s+[KA-hlg]	<i>Peltigera rufescens</i> brunnever v
<i>Omalotheca norvegica</i> seder graywort v		
<i>Poa alpina</i> fjellrapp v		

Distribution and regional distribution: BN-NB, O3-C1. The whole country, most commonly in MB and NB inland.

Most important types of confusion: Mountain heath, lee side and tundra (T3), coastal heath (T34), semi-natural meadow (T32).

Red list status (2018): Boreal hi (VU;<).

References and type parallels:

T31-C-13 Intermediate source-influenced boreal fresh heath

NiN characteristics: Mainland systems: Boreal heath (T31), one basic type (13). Defined by LKM: KAÿ2 & UFÿ1 & Klÿ2. LKM base steps: KAÿde & UFÿbc & Klÿbc.

Physiognomy: Boreal heaths are open heath-like, primarily dwarf shrub-dominated natural systems without a dominant tree layer.

Ecological characteristics: Boreal heath is formed by deforestation of permanent forest land and maintenance of open land through clearing of scrub and trees and summer grazing with moderate grazing pressure. Deforestation is caused by sawdust, wood felling, tar burning, etc., in the sawdust, as well as charcoal production for mines. Boreal heath is characterized by the fact that grazing pressure was, and is, generally weaker than in semi-natural meadows, and the vegetation is dominated by heather plants in contrast to grasses and herbs in meadows. Elements of forest species and some species associated with cultivated land occur. Intermediate spring-influenced boreal fresh heath lacks weakly or strongly lime-requiring species, and contains species associated with fresh ground and favored by spring water influence. Drought-tolerant species and lichens are of little importance. Re-vegetation with increasing bush and tree cover when scattered open field grazing ceases. Difficult transitional forms towards coastal heather, which is characterized by heather burning, and mountain heath, which lies above the climatic forest boundary and is characterized by mountain species. Re-growing semi-natural meadows usually have clearer elements of grasses and herbs associated with cultivated fields.

Terrain and aerial photo characteristics: Most often a gradual transition towards adjacent forest vegetation. Borders against mountain heath or semi-natural meadow cannot be clearly delineated in aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T31-13	T31-B-13	T31-C-13	T31-D-3	T31-E-3
Basic types		T31-13	T31-13	T31-4,13	T31-4,13

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

Aconitum septentrionale bull helmet v;s-[Kl-bla]	Cirsium heterophyllum white-leaved thistle s-[Kl-bla]	Myosotis decumbens mountain forget-me-not v;s-[Kl-bla]
Agrostis capillaris meadowsweet v	Deschampsia cespitosa ssp. cespitosa silver pile v	Omalotheca norvegica seder graywort v
Alchemilla glabra marigold s-[Kl-bla]	Dryopteris expansa agg. sheep tail v;s-[Kl-bla]	Phegopteris connectilis hanging wing v
Angelica archangelica ssp. archangelica mountain water v;s-[Kl-bla]	Filipendula ulmaria meadowsweet s-[Kl-bla]	Phleum alpinum mountain timotei v
Anthoxanthum odoratum yellow v	Geranium sylvaticum wood stork's beak v;s-[Kl-bla]	Ranunculus acris ground soleie v
Athyrium distentifolium fjellburkne s-[Kl-bla]	Geum rivale meadow bumblebee v;s-[Kl-bla]	Rumex acetosa meadow sorrel v
Athyrium filix-femina forest burkne s-[Kl-bla]	Gymnocarpium dryopteris bird tail v	Salix glauca ssp. glauca silver willow v
Avenella flexuosa smyle v	Juniperus communis juniper v	Salix lapponum lappvire v
Bartsia alpina black top v	Lysimachia europaea forest star v	Salix phylicifolia green willow v
Bistorta vivipara harerug v	Maianthemum bifolium Maiblom v ;s-[Kl-bla]	Saussurea alpina mountain thistle v
Carex vaginata scabbard v	Melampyrum sylvaticum small marimjelle v	Silene dioica red jonsock flower v;s-[Kl-bla]
Chamerion angustifolium geitrams v;s-[Kl-bla]		Solidago virgaurea golden rice v
		Stellaria borealis mountain star flower v
		Vaccinium myrtillus blueberry v
		Vaccinium uliginosum blockberry v
		Valeriana sambucifolia root v ;s-[Kl-bla]

Distribution and regional distribution: BN-NB, O3-C1. The whole country, most commonly in MB and NB inland.

Most important types of confusion: Mountain heath, lee side and tundra (T3), coastal heath (T34), semi-natural meadow (T32).

Red list status (2018): Boreal hi (VU;<).

References and type parallels:

T31-C-14 Calcareous source-influenced boreal fresh heath

NiN characteristics: Mainland systems: Boreal heath (T31), one basic type (14). Defined by LKM: KAy3,4 & UFy1 & Klj2. LKM base steps: KAyfghi & UFybc & Kljbc.

Physiognomy: Boreal heaths are open heath or slightly meadow-like, primarily dwarf shrub-dominated natural systems without a dominant tree layer.

Ecological characteristics: Boreal heath is formed by deforestation of permanent forest land and maintenance of open land through clearing of scrub and trees and summer grazing with moderate grazing pressure. Deforestation is caused by sawdust, wood felling, tar burning, etc., in the sawdust, as well as charcoal production for mines. Boreal heath is characterized by the fact that grazing pressure was, and is, generally weaker than in semi-natural meadows, and the vegetation is dominated by heather plants in contrast to grasses and herbs in meadows. Elements of forest species and some species associated with cultivated land occur. Calcareous spring-influenced boreal fresh heath is characterized by slightly to strongly lime-demanding species associated with fresh ground and species favored by spring water influence. Drought-tolerant species and lichens are of little importance. Re-vegetation with increasing bush and tree cover when scattered open field grazing ceases. Difficult transitional forms towards coastal heather, which is characterized by heather burning, and mountain heath, which lies above the climatic forest boundary and is characterized by mountain species. Re-growing semi-natural meadows usually have clearer elements of grasses and herbs associated with cultivated fields.

Terrain and aerial photo characteristics: Most often a gradual transition towards adjacent forest vegetation. Borders against mountain heath or semi-natural meadow cannot be clearly delineated in aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T31-B-14	T31-C-14	T31-D-5	T31-E-5
Basic types	T31-14	T31-14	T31-14	T31-7,10,14	T31-7,10,14

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

Aconitum septentrionale bull helmet v;s-[Kl-bla]	Cirsium heterophyllum white-leaved thistle v;s-[Kl-bla]	Oxyria digyna mountain acid v
Agrostis capillaris meadowsweet v	Coeloglossum viride green curlew v;s-[Kl-bla]	Phegopteris connectilis hanging wing v
Alchemilla glabra smooth marigold v;s-[Kl-bla]	Deschampsia cespitosa ssp. cespitosa silver pile v	Phleum alpinum mountain timotei v
Angelica archangelica ssp. archangelica mountain water v;s-[Kl-bla]	Dryopteris expansa agg. sheep tail v;s-[Kl-bla]	Pyrola minor pearl winter green v;s-[Kl-bla]
Angelica sylvestris gorse v;s-[Kl-bla]	Filipendula ulmaria meadowsweet v;s-[Kl-bla]	Ranunculus acris ground soleie v
Anthoxanthum odoratum yellow v	Geranium sylvaticum wood stork's beak v;s-[Kl-bla]	Rumex acetosa meadow sorrel v
Astragalus frigidus yellow spleen v;s+[KA-hlg]	Geum rivale meadow bumblebee v;s-[Kl-bla]	Salix glauca ssp. glauca silver willow v
Astragalus norvegicus blue spleen v;s+[KA-hlg]	Juniperus communis juniper v	Salix hastata white hemlock v;s-[KA-hlg]
Avenella flexuosa smyle v	Lysimachia europaea forest star v	Salix lanata woolly willow v;s-[KA-hlg]
Bartsia alpina black top v	Maianthemum bifolium Maiblom v;s-[Kl-bla]	Salix lapponum lappvier v
Carex atrata black starr v	Myosotis decumbens mountain forget-me-not s-[Kl-bla]	Salix phyllicifolia green willow v
Carex vaginata slirestarr v	Omalotheca norvegica seder graywort v	Saussurea alpina mountain thistle v
Chamerion angustifolium geitrams v;s-[Kl-bla]		Silene dioica red jonsock flower v;s-[Kl-bla]
Cicerbita alpina turt v;s-[Kl-bla]		Solidago virgaurea golden rice v
		Stellaria borealis mountain star flower v
		Valeriana sambucifolia root v;s-[Kl-bla]

Distribution and regional distribution: BN-NB, O3-C1. The whole country, most commonly in MB and NB inland.

Most important types of confusion: Mountain heath, lee side and tundra (T3), coastal heath (T34), semi-natural meadow (T32).

Red list status (2018): Boreal hi (VU;<).

References and type parallels:



Calcareous spring-influenced boreal fresh hi. Op: Øystre Slidre: Øvre Heimdalsvatnet, NE of Osbue. Photo: RH.

T32-C-1 Lime-poor meadow with less heather

NiN characteristics: Grassland systems: Semi natural meadow (T32), one basic type (1). Defined by LKM: KAý1 & HIý1 & UFý1 & Klý1. LKM base step: KAýabc & HIýb & UFýab & Klý0a.

Physiognomy: Species-poor meadows with dense grass cover, with few herbs. Occurs as edge zones of meadows, as open or wooded meadows/gardens and in open fields. Dominance of single grass species and tufted ground is typical for overgrowth stages.

Ecological characteristics: Species composition with few and low lime-demanding species on fresh to moist, unfertilized and often humus-rich soil. Occurs in outlying areas on limestone-poor bedrock in bedrock areas with a thin loose cover. Blåtopp typically dominates in Agder and Rogaland, where the type now primarily occurs as regrowth stages after the cessation of field mowing before the middle of the 20th century, and a strong reduction in field grazing until today. Great-frytle-dominated 'meadows' in Western Norway can also be overgrowth stages of T32-C-1. Finsbeard and smyle can dominate in T32-C-1 in other parts of the country. The type is distinguished from intermediate meadows by the absence of somewhat more lime-demanding species such as e.g. wood stork's bill, common vetiver, meadow violet and red fescue, and from permanent forest land (T4) in the absence of species such as heather and scrubberry. However, these can migrate in during the overgrowth process.

Terrain and aerial photo characteristics: Can occur in all terrain positions, but usually in sloping terrain, and along water and waterways and in edge zones against marshes. Tree- and shrub-covered meadows can be difficult to distinguish from heathland and forest (most often mixed spruce-birch forest). FF: Dominance of blue top most often gives a clear, medium dark green color in aerial photographs, while dominance of fin beard gives a grey-green (to brown) colour. In sloping terrain, often with an evenly alternating texture between tufts and uneven ground. Texture and color vary little within regions, but depend heavily on dominant species. When treed, the tree layer dominant(s) controls the texture and color in aerial photography.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T32-B-1	T32-C-1	T32-D-1	T32-E-1
Basic types	T32-1	T32-1	T32-1	T32-1,13	T32-1,2,13,14

Diagnostic species m =

abundance species (m^* = dominant m.); v = common species (v^* = constant v.); t = center of gravity species (t^* = characteristic t., ta - gradient-t.); s = distinction (s^* = absolute s., $s+$ = strong relative s., $s-$ = weak relative s.)

<i>Agrostis capillaris</i> meadowsweet v* <i>Avenella flexuosa</i> smyle m;v* <i>Dactylorhiza maculata</i> ssp. <i>maculata</i> spotted marigold v <i>Deschampsia cespitosa</i> ssp. <i>cespitosa</i> silver pile v <i>Festuca ovina</i> sheep fescue v <i>Gentiana pneumonanthe</i> bellflower t[S] <i>Juncus filiformis</i> thread reed v[S] <i>Luzula sylvatica</i> large fry m;v[O3-O2]	<i>Melampyrum pratense</i> stormarmjelle v <i>Molinia caerulea</i> blue top m*v*[AA,VA,Ro] <i>Nardus stricta</i> fin beard etc <i>Pedicularis sylvatica</i> coastal anemone v[O3-O2] <i>Potentilla erecta</i> carpet root v <i>Rumex acetosa</i> meadow sorrel v <i>Trichophorum cespitosum</i> bear 's beard v	<i>Vaccinium uliginosum</i> blackberry v <i>Vaccinium vitis-idaea</i> lingonberry s+[HIýblc] <i>Viola palustris</i> marsh violet s+[HIýbla] <i>Hylocomium splendens</i> floor moss v <i>Pleurozium schreberi</i> furmose v <i>Polytrichum commune</i> large bear moss m;v*
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Distribution and regional distribution: Found in large parts of the country (BN-LA; O3-OC), but probably has a center of gravity in lowland areas and in a wide belt along the coast.

Most important types of confusion: Calcareous dry heath with less heath (T32-C-11), calcareous boreal heath (T31-C-1,2) and the coastal heath types T34-C-1,3.

Red list status (2018): Semi-natural meadow (VU;ÿ) and hayfield (CR;ÿ).

References and type parallels: G2, partly G1 (VN). D0102, D0402; partly D0101 and D0401 (DNHB-13).



Lime-poor meadow with less heath. Ro: Egersund: Søre Eigerøy, S and W for Auglend. Photo: RH.

T32-C-2 Lime-poor meadow with clear heather

NiN characteristics: Solid ground systems: Semi natural meadow (T32), one basic type (2). Defined by LKM: KAý1 & HIý2 & UF 1 & Klý1. LKM base step: KAýabc & HIýcd & UFýab & Klý0a.

Physiognomy: Great variation. Generally poor in species, with dense grass cover (dominated by graminids). Occurs as open meadows, typically in open fields, for example on seat embankments. Often acquires a strongly tufted structure when use ceases. Juniper and boreal tree species characterize the overgrowth succession.

Ecological characteristics: On humus-rich, fresh/moist soil, in places that have been used for a long time as unfertilized pasture or combined mowed/pasture. Species composition with few and low lime-demanding species. Occurs on limestone-poor bedrock, typically in bedrock areas. Dominance of fin beard or silver pile may be due to previous overgrazing. The type is distinguished from intermediate meadows by the absence of species that require KAýbc such as e.g. wood stork's bill, doctor veronica, meadow violet and red fescue.

Terrain and aerial photo characteristics: Can occur in all terrain positions, but usually in flat to gently sloping terrain, in depressions etc. Regrowth stages with high bush and tree cover (often mixed spruce-birch-aspen forest) can be difficult to distinguish from heathland and woodland. FF: Grass dominance usually gives light green color; the color alternates with dominant species. Damp areas appear as dark green to brown. Texture mostly smooth, with the exception of large tufts. Texture and color vary little within regions. Scattered juniper clearly appears as darker parts in FF.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T32-2	T32-B-2	T32-C-2	T32-D-2	T32-E-1
Basic types		T32-2	T32-2	T32-2,14	T32-1,2,13,14

Diagnostic species m =

abundance species (**m*** = dominant m.); v = common species (**v*** = constant v.); t = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); s = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.).

<i>Agrostis capillaris</i> meadowsweet m;v* <i>Avenella flexuosa</i> smyle v <i>Carex brunneoscens</i> ssp. brownishness brown tetanus v <i>Carex nigra</i> ssp. <i>nigra</i> cornstar v <i>Carex pilulifera</i> brátstarr v <i>Dactylorhiza maculata</i> ssp. <i>maculata</i> spotted marigold v <i>Deschampsia cespitosa</i> ssp. <i>cespitosa</i> silver pile , etc <i>Festuca ovina</i> sheep's fescue m[Ø];v	<i>Gentiana purpurea</i> sweetroot v[Ro,VA,AA,Te] <i>Juniperus communis</i> juniper v <i>Melampyrum pratense</i> storm marimjelle v;s+[HIýdle] <i>Molinia caerulea</i> blue top v <i>Nardus stricta</i> fin beard m;v* <i>Potentilla erecta</i> carpet root v <i>Pedicularis sylvatica</i> coastal moorhen v[S,V] <i>Pteridium aquilinum</i> eintape v	<i>Rumex acetosa</i> meadow sorrel v <i>Scorzoneroidea autumnalis</i> fallblom v <i>Succisa pratensis</i> blue button v;s+[HIýdle] <i>Trichophorum cespitosum</i> bear 's beard v <i>Hylocomium splendens</i> floor moss v <i>Pleurozium schreberi</i> furumose v <i>Polytrichum commune</i> large bear moss v <i>Pasture fungus</i> : ta-[HIýcd]
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Distribution and regional distribution: Found in large parts of the country (BN-LA), most common in coastal areas (O3-OC), particularly large area coverage in O3-O2. In Eastern designs, sheep's fescue often dominates.

Most important types of confusion: low-calcareous dry meadows with clear heather (T32-C-12), and other low-calcareous (T32-C-1, 11) and intermediate meadows (T32-C- 3, 4, 6, 13, 14).

Red list status (2018): Semi-natural meadow (VU;ý) and hayfield (CR;ý).

References and type parallels: G1, G2, G3, G5 (VN). D01, D04 (DNHB-13).



Lime-poor meadow with a clear heather character. No: Vestvågøy: Eggum.
Photo: RH

T32-C-3 Intermediate meadow with less heat

NiN characteristics: Grassland systems: Semi natural meadow (T32), one basic type (3). Defined by LKM: KAy2 & Hly1 & UF 1 & Klý1. LKM base step: KAýde & Hlýb & UFýab & Klýo.

Physiognomy: Field layer dominated by grass species and with varying elements of herbs and forest species (vascular plants and mosses). Occurs as edge zones to meadows or as openings to wooded meadows or garden fields and in open fields.

Ecological characteristics: On relatively hard rocks and lime-poor fresh to damp ground with a certain soil depth. Occurrence of heather species and other species typical of woodland increases with reduced dominance and decreasing use (later stages of overgrowth). Species composition with presence of slightly lime-demanding species that are not common in the corresponding lime-poor mapping unit T32-C-1, such as e.g. Bleikstar, sedum sedum, wood stork's bill, doctor's veronica, meadow violet and red fescue. Later overgrowth stages on dense grass-dominated land may have sparse moss cover due to lots of daugrass.

Terrain and aerial photo characteristics: Occurs in various terrain positions, usually in flat to gently sloping terrain, in depressions etc. Tree- and shrub-covered meadows can be difficult to distinguish from heathland and forest. FF: Grass dominance usually gives a clear, medium dark green color in aerial photographs; darker color with increasing elements of heather species. Damp areas appear dark green. Texture and color vary little within regions.

Scattered juniper clearly appears as darker parts in FF. When treed, the tree layer dominant(s) controls the texture and color in aerial photography.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T32-3	T32-B-3	T32-C-3	T32-D-3	T32-E-2
Basic types		T32-3	T32-3	T32-3, 15	T32-3, 15

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **tx-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.).

<i>Achillea millefolium</i> yarrow v; s+[KAýdlc] <i>Agrostis capillaris</i> meadowsweet v* <i>Avenella flexuosa</i> smyle m;v* <i>Carex pallescens</i> bleikstarr v; s+[KAýdlc] <i>Cerastium fontanum</i> inherit v; s*[KAýdlc] <i>Deschampsia cespitosa</i> ssp. <i>cespitosa</i> silver pile , etc <i>Festuca ovina</i> sheep fescue v <i>Festuca rubra</i> red fescue v; s+[KAýdlc] <i>Geranium sylvaticum</i> wood stork's bill v; s*[KAýdlc] <i>Melampyrum pratense</i> stormarimjelle v	<i>Molinia caerulea</i> blue top v <i>Omalotheca norvegica</i> v ; s+[KAýdlc] <i>Poa pratensis</i> engrapp v; s+[KAýdlc] <i>Potentilla erecta</i> carpet root v <i>Ranunculus acris</i> ground sunbed v; s+[KAýdlc] <i>Rumex acetosa</i> meadow sorrel v <i>Scorzoneraoides autumnalis</i> folblom v <i>Succisa pratensis</i> blue button v <i>Vaccinium vitis-idaea</i> lingonberry s; [Hlýblc]	<i>Veronica officinalis</i> legeveronika v; s*[KAýdlc] <i>Viola canina</i> field violet v; s*[KAýdlc] <i>Viola palustris</i> marsh violet v <i>Hylocomium splendens</i> floor moss v <i>Plagiomnium affine</i> forest moss v; s*[KAýdlc] <i>Plagiomnium cuspidatum</i> broddfagermo see v; s*[KAýdlc] <i>Pleurozium schreberi</i> furumose v <i>Rhytidadelphus squarrosus</i> meadow moss v
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Distribution and regional distribution: Found throughout the country (BN-LA; O3-C1).

Most important types of confusion: intermediate dry heath with less heather (T32-C-13) and other intermediate (T32-C-4, 6, 14) and calcareous meadows (T32-C-1, 2,11,12).

Red list status (2018): Semi-natural meadow (VU;ÿ) and hayfield (CR;ÿ).

References and type parallels: Partially G1, G3 and G4 (VN). Partially D01, D04, D06 (DNHB-13).



Intermediate meadow with less emphasis. Ex: Aremark: Holmegil. Photo: RH.

T32-C-4 Intermediate meadow with clear hedging

NiN characteristics: Permanent land systems: Semi natural meadow (T32), one basic type (4). Defined by LKM: KAjy2 & Hljy2 & UF 1 & Kljy1. LKM base step: KAjyde & Hljydc & UFjyab & Kljy0a.



Physiognomy: Medium-high to low-growing field layer dominated by grass species and with a varying element of herbs. Occurs as open meadows, typically in open fields, and as edge zones; as former hayfield and as pasture. In hayfields the species are evenly distributed, in pastures the species occur more in clumps.

Regrowth stages have grass dominance, juniper and boreal tree species gradually enter. **Ecological**

characteristics: On relatively hard rocks and fresh to damp ground with a certain soil depth. Characterized by long-term use as pasture or mowed/pasture. Species composition with presence of slightly lime-demanding species that are not common in the corresponding lime-poor mapping unit T32-C-3, such as e.g. gorse, scurvy, wood stork's beak, periwinkle, red fescue, red clover and white clover.

Terrain and aerial photo characteristics: Occurs in all terrain positions, usually in flat to gently sloping terrain, in depressions etc. Tree- and shrub-covered meadows can be difficult to distinguish from heathland and forest. FF: Grass dominance most often gives a bright green color, but the color changes with dominant species. Damp areas appear as dark green to brown. A touch of gray sedge gives a light green colour. The color varies with use. Texture mostly smooth, with the exception of large tufts. Texture and color vary little within regions. Scattered junipers appear clearly as darker parts in FF.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T32-B-4	T32-C-4	T32-D-7	T32-E-4
Basic types	T32-4	T32-4	T32-4	T32-4.5	T32-3,4,5,i16

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t.,

ta- gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.).

Achillea millefolium yarrow v;s+[KAjydc] Agrostis capillaris meadow sweet m;v* Anthoxanthum odoratum yellow v;s+[KAjydc] Arnica montana sunflower ta[Hljydc] Campanula rotundifolia bluebell v Carex pallescens bleikstarr v;s+[KAjydc] Carex pilulifera bråtstarr v Ceratium fontanum inherit v;s*[KAjydc] Deschampsia cespitosa ssp. cespitosa silver pile , etc Festuca rubra red fescue v;s+[KAjydc] Geranium sylvaticum wood stork's bill v;s*[KAjydc]	Hypericum maculatum St. John's wort v;s+[KAjydc] Lotus corniculatus tiriltongue v;s*[KAjydc] Luzula multiflora ground beetle v Molinia caerulea blue top v Nardus stricta fin beard v Omalotheca norvegica v ;s+[KAjydc] Poa pratensis engrapp v;s+[KAjydc] Potentilla erecta carpet root v Ranunculus acris ground sunbed v;s+[KAjydc]	Rhinanthus minor small meadow call v;s+[KAjydc] Succisa pratensis blue button v;s+[Hljydc] Trifolium pratense red clover v;s+[KAjydc] Veronica officinalis legeveronika v;s*[KAjydc] Viola canina field violet v;s*[KAjydc] Plagiomnium cuspidatum prickly pear moss v;s+[KAjydc] Rhytidiodelphus squarrosus Meadow Wreath moss m Pasture fungus : ta[Hljydc]
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Distribution and regional distribution: Common meadow type, found throughout the country (BN-LA; O3-C1).

Most important types of confusion: intermediate meadow with fertilizer influence (T32-C-6) and other intermediate (T32-C-3, 13, 14) and lime-poor meadows (T32-C-1, 2, 11, 12).

Red list status (2018): Semi-natural meadow (VU;ÿ) and hayfield (CR;ÿ).

References and type parallels: G4 (VN) D0104 and D0404 (DNHB-13).

T32-C-5 Weak calcareous

meadow with less heather

NiN characteristics: Grassland systems: Semi natural meadow (T32), one basic type (6). Defined by LKM: KAy3 & Hly1 & Klj1. LKM base steps: KAyfg & Hlyb & UF ab & Klj0a.

Physiognomy: Often wooded meadows (garden fields) or open edge areas, in active use dominated by low-growing herbs and grasses, often with scattered shrubs. Bottom layer with mosses and some lichens. Regrowth stages have a higher cover of shrubs and/or trees.



Weak calcareous meadow with less heath. ST: Oppdal: by Negårdsetra. Photo: HB.

Ecological characteristic: On slightly calcareous bedrock, most often on well-drained soil. Species composition with both indifferent and slightly lime-requiring herbs and grasses, and a number of forest species. Most common in outback. Most of the area is now overgrown following the cessation of open field mowing or grazing a few decades ago, or grazing pressure has been reduced. Regrowth provides more litter, lower moss cover, often more tall vegetation and a change in species diversity. Without traces of fertilisation. Distinguished from strongly calcareous meadows by the absence of very calcareous species, from meadows with clear heaving and weak fertilizer influence by less presence of nitrogen-loving species and/or species that prefer more intensive heaving.

Terrain and aerial photo characteristics: Can occur in all terrain positions. Tree- and shrub-covered meadows can be difficult to distinguish from forest and heath. FF: Grass dominance usually gives a clear, medium-dark green colour. Moist parts darker green. Texture and color vary little within regions. Scattered juniper appears clearly as darker parts in FF. On wooded land, the tree layer dominants control texture and colour.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T32-6	T32-B-6	T32-C-5	T32-D-5	T32-E-3
Basic types		T32-6	T32-6	T32-6,9,11,17,19	T32-6-12,17-21

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **tx-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.).

<i>Agrostis capillaris</i> meadowsweet m* ;v*	<i>Deschampsia cespitosa</i> ssp. <i>cespitosa</i> silver pile , etc	<i>Solidago virgaurea</i> golden rice v <i>Trifolium medium</i> wood clover v;s-[KAyfle] <i>Vaccinium vitis-idaea</i> lingonberry s+[Hlybcl]
<i>Ajuga pyramidalis</i> jonscockoll v;s-[KAyfle]	<i>Festuca rubra</i> red fescue etc	<i>Veronica chamaedrys</i> two-bearded veronika v;s-[KAyfle]
<i>Alchemilla wichurae</i> skarmarikaope v	<i>Fragaria vesca</i> field strawberry v	<i>Vicia sepium</i> hedge vetch v
<i>Anemone nemorosa</i> white vein m;v;s+[Hlybcl]	<i>Galium boreale</i> white ants v;s+[KAyfle]	<i>Viola riviniana</i> forest violet s+[KAyfle]
<i>Anthoxanthum odoratum</i> yellow m ;v*	<i>Geranium sylvaticum</i> wood stork beak v	<i>Plagiomnium cuspidatum</i> stinging phage moss v
<i>Avenella flexuosa</i> smyle v	<i>Hieracium murorum</i> agg. forest weaver v;s+[Hlybcl]	<i>Rhytidadelphus triquetrus</i> large crown moss v;s-[KAyfle]
<i>Campanula persicifolia</i> fagerbell s+[Hlyblc] c]	<i>Hieracium vulgatum</i> agg. grazing weaver v	<i>Sanionia uncinata</i> claw white moss v
<i>Campanula rotundifolia</i> bluebell v	<i>Lathyrus linifolius</i> tuberous teaknapp v	
<i>Carex digitata</i> sedge s+[KAyfle]	<i>Luzula pilosa</i> hair frill v;s+[Hlybcl]	
<i>Cerastium fontanum</i> inherit v	<i>Maianthemum bifolium</i> Maiblom s *[Hlybcl]	
<i>Clinopodium vulgare</i> mint v;s*[Hlybcl];s+[KAyfle]	<i>Melampyrum sylvaticum</i> small marmjelle v	
	<i>Oxalis acetosella</i> cuckoo acid s*[Hlybcl]	

Distribution and regional distribution: The whole country, common type as pasture (BN-LA, O3-C1).

Most important types of confusion: Other weakly calcareous and intermediate meadows (T32-C-3,4,9,10,13, 14,20), grassland meadow and heath (T16), open shallow land (T2), mountain grass heath and grass tundra (T22) .

Red list status (2018): Semi-natural meadow (VU;ÿ) and hayfield (CR;ÿ).

References and type parallels: Partially G7-G8 (VN). Partially D01, D04, D06 (DNHB-13).

T32-C-6 Intermediate meadow with a slight hint of fertilization

NiN characteristics: Grassland systems: Semi natural meadow (T32), one basic type (5). Defined by LKM: KAjy2 & Hly3 & UF 1 & Kljy1. LKM base step: KAjde & Hlye & UFyab & Kljy0a.

Physiognomy: Medium-high to high field layer dominated by grass species and herbs that tolerate a little fertilization. Occurs as open to sparsely wooded meadows (leaf meadows or garden fields) and as edge zones; as former hayfield and as pasture. In hayfields the species are evenly distributed, in pastures the species occur more in clumps. Regrowth stages have grass dominance, juniper and boreal tree species gradually enter.

Ecological characteristics: On relatively hard rocks and fresh to damp ground with a certain soil depth. Characterized by long-term use as pasture or mowed/pasture. Species composition with presence of slightly lime-demanding species. A weak fertilizer effect is often shown by a high coverage of individual species such as white clover, dog grass, ground sedge, creeping sedge and meadow sorrel.

Terrain and aerial photo characteristics: Occur in all terrain positions, usually in flat to sloping terrain, in depressions etc. Tree- and shrub-covered meadows can be difficult to distinguish from heathland and forest. FF: Most often medium to dark green in colour, which darkens with increasing humidity. Color varies according to use. Texture and color vary little within regions. Rock piles, trees and bushes are clearly visible. Tuer provides clear texture in aerial photography with high technical quality.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T32-B-4	T32-C-4	T32-D-4	T32-E-2
Basic types	T32-4	T32-4	T32-4.5	T32-4,5,16	T32-3,4,5,15,16

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.).

Achillea millefolium yarrow v	Geranium sylvaticum wood stork beak v	Rhinanthus minor small meadow call v
Agrostis capillaris meadowsweet s+[Hlyelf]	Lotus corniculatus titrltongue v	Rumex acetosa meadow sorrel v
Campanula rotundifolia bluebell s*[Hlyelf]	Luzula multiflora ground beetle v	Scorzoneroidea autumnalis folblom v
Carum carvi carve v ;s+[Hlyelf]	Omalotheca norvegica seder graywort v	Stellaria graminea grass star flower v
Carex pilulifera sedge v;s+[Hlyelf]	Plantago lanceolata slimy giant v	Taraxacum officinale agg. the weed lion down v
Cerastium fontanum inherit v	Poa annua tunrapp v	Trifolium pratense red clover v
Dactylis glomerata dog grass m;v;s+[KAjdc]	Poa pratensis engrapp v;s+[KAjdc]	Trifolium repens white clover v.
Deschampsia cespitosa ssp. cespitosa silver pile , etc	Potentilla erecta carpet root v	Veronica serpyllifolia bleikveronika v
Festuca rubra red fescue v	Ranunculus acris ground soleie v;s+[Hlyelf]	Rhytidiodelphus squarrosus meadow kransmo see m*;v* Pasture fungus : t:[Hlycd], s*[Hlyelf].
	Ranunculus repens krypsoleie v	

Distribution and regional distribution: Common meadow type, found over most of the country (BN-LA; O3-C1).

Most important types of confusion: Low-calcareous meadow with clear heather (T32-C-2), slightly calcareous meadow with clear heather (T32-C-20) and slightly calcareous meadow with weak fertilizer influence (T32-C-21)

Red list status (2018): Semi-natural meadow (VU;ÿ) and hayfield (CR;ÿ).

References and type parallels: Partly G4 (VN), partly D0104, D0404 (DNHB-13).



Intermediate meadow with a slight hint of fertilisation.

SF: Leikanger: Grinde. Photo: RH.

T32-C-7 Strongly calcareous meadow with less heather

NiN characteristics: Grassland systems: semi-natural meadow (T32), one basic type (9). Defined by LKM: KAý4 & Hlý1 & UFý1 & Klý1. LKM base step: KAýhi & Hlýb & UFýab & Klý0a.

Physiognomy: Meadows most often dominated by low-growing herbs and grasses. Bottom layer coverage varies, with mosses and some lichens. Edge zones or sparse shrub or wooded meadows, most often in open fields.

Ecological characteristics: Species composition with very lime-demanding herbs, grasses and mosses, more rarely lichen. On calcareous bedrock, often facing south.

Protruding limestone clods are common. Mostly pasture-conditioned open field areas with a clear element of forest species or species from other naturally open habitat types. Often with scattered trees (garden fields or leafy meadows). Most of the area belonging to this nature type is now overgrown following the cessation of open field mowing or grazing a few decades ago. Great species diversity, especially of vascular plants, fungi and insects.

Terrain and aerial photo characteristics: Can occur in all terrain positions, most commonly in sloping and uneven, south-facing terrain. Meadows covered with trees and shrubs can be difficult to distinguish from heathland and forest (often pine forest). FF: Medium to dark green color that darkens with increasing humidity. Basal parts often light brown-green in FF. Texture and color vary little within regions, usually smooth, controlled by possible wood layer dominance. Tufts provide patterned texture. Juniper appears clearly as darker parts.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T32-9	T32-B-9	T32-C-7	T32-D-5	T32-E-3
Basic types		T32-9	T32-9	T32-6,9,11,17,19	T32-6-12,17-21

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity species (t* = characteristic t., tñ= gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.).

<i>Agrostis capillaris</i> meadowsweet v <i>Anthoxanthum odoratum</i> yellow v <i>Astragalus glycyphyllos</i> licorice meal <i>Bistorta vivipara</i> harerug v <i>Campanula persicifolia</i> fagerbell s-[Hlýblc] <i>Carex capillaris</i> hair loss v;s+[KAýhlg] <i>Carex digitata</i> finger sedge v;s-[Hlýblc] <i>Carex flacca</i> bluestem v;s+[KAýhlg] <i>Carex muricata</i> sedge v <i>Cotoneaster integrifolius</i> dwarf medlar v;s+ [Hlýblc] <i>Euphrasia stricta</i> glandular thrush v <i>Filipendula vulgaris</i> s +[KAýhlg]	<i>Fragaria vesca</i> field strawberry v <i>Galium boreale</i> white ant v <i>Geranium sylvaticum</i> wood stork beak v <i>Gymnadenia conopsea</i> bridal spore v;s+[KAýhlg] <i>Helictotrichon pubescens</i> down oat v;s-[KAýhlg] <i>Juniperus communis</i> juniper v*;s-[Hlýblc] <i>Knautia arvensis</i> red button v <i>Linum catharticum</i> wild-lin v;s+[KAýhlg] <i>Listera ovata</i> large-leaved s*[KAýhlg] <i>Lotus corniculatus</i> tirltongue v <i>Pimpinella saxifraga</i> _ <i>Plantago media</i> down giant v;s-[KAýhlg]	<i>Platanthera montana</i> rough night violet v <i>Primula veris</i> marigold v <i>Primula scandinavica</i> primrose s+[KAýhlg] <i>Rubus saxatilis</i> teaberry v;s-[Hlýblc] <i>Saussurea alpina</i> mountain thistle v <i>Selaginella selaginoides</i> dwarf dwarf v;s-[KAýhlg] <i>Thalictrum alpinum</i> mountain seed star v <i>Trifolium medium</i> wood clover v;s-[Hlýblc] <i>Viola canina</i> meadow violet v <i>Plagiomnium cuspidatum</i> stinging phage moss v
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Distribution and regional distribution: Scattered throughout the country on calcareous soil (BN-LA; O3-C1).

Most important types of confusion: Open highly calcareous heather and lowland (T2-C-7, T2-C-8) and grazed calcareous lowland forest (T4-C-4), highly calcareous heather and meadow (T16-C-4), other calcareous and highly calcareous meadows (T32-C-5,7,15-18,20,21), meadow-like highly altered solid land (T40), meadow-like cultivated land (T41).

Red list status (2018): Semi-natural meadow (VU;ÿ) and hayfield (CR;ÿ).

References and type parallels: G6, partly G7-G9 (VN). Parts of D01, D04, D05, D17 (DNHB-13).



Strongly calcareous meadow with less heather. ST: Røros: Torsvollen. Photo: HB.

T32-C-8 Strongly calcareous meadow with clear heather

NiN characteristics: Grassland systems: Semi natural meadow (T32), one basic type (10). Defined by LKM: KAý4 & Hlý2 & UFý1 & Klý1. LKM base step: KAýhi & Hlýcd & UFýab & Klý0a.

Physiognomy: Open meadows dominated by low-growing herbs and grasses. Field layer often slippery, with some bare soil. Sometimes with scattered bushes. The coverage of lime-requiring mosses and lichens varies. Regrowth stages with shrubs, especially junipers, and/or trees.



Strongly calcareous meadow with extensive heather character. Op: Vágá: Nordherad. Photo: HB.

Ecological characteristics: Species composition with very lime-demanding herbs and grasses. Occurred more on calcareous bedrock, often facing south. Protruding limestone clods are common. Usually occurs as pasture, hayfield formations are rare. Occurs both along the edge of infields and in outfields. Without or with negligible traces of fertilisation. Pasture that is in use has short-growing vegetation, little dead grass and only scattered bushes and trees. Most of the area belonging to this nature type is now overgrown following the cessation of open field mowing or grazing a few decades ago. Great species diversity, especially of vascular plants, fungi and insects. Differentiated from weakly calcareous meadows by the presence of very calcareous species, from meadows with weaker vigor (Hlýb) by the absence of forest species and from meadows with a weak fertilization character by the more or less complete absence of nitrogen-loving species.

Terrain and aerial photo characteristics: All terrain positions, most commonly in sloping and uneven, south-facing terrain. Tree- and shrub-covered meadows can be difficult to distinguish from heathland and forest. FF: Medium to dark green color, darkens with increasing humidity; varies with use. Grounded parties often deviate. Texture and color vary little within regions, usually smooth, controlled by possible wood layer dominance. Tufts can provide characteristic texture. Juniper appears clearly as darker parts.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T32-10		T32-C-8	T32-D-6	T32-E-3
Basic types		T32-10	T32-10	T32-10,12,18,20,21	T32-6-12,17-21

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity species (t* = characteristic t., t- gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.).

<i>Agrostis capillaris</i> meadowsweet m;v*	<i>Gymnadenia conopsea</i> bridal spore v;s+	<i>Plantago media</i> down giant v;s-[KAýhl]
<i>Alchemilla glaucescens</i> velvet marigold v	[KAýhl]	<i>Polygala vulgaris</i> large blue feather v;s-[KAýhl]
<i>Anthoxanthum odoratum</i> yellow m;v*	<i>Helictotrichon pubescens</i> down oat v;s-	<i>Potentilla crantzii</i> spotted wall v
<i>Bistorta vivipara</i> harerug v	[KAýhl]	<i>Primula veris</i> marigold v
<i>Briza media</i> heart grass v;s*[KAýhl]	<i>Knautia arvensis</i> red button v	<i>Primula scandinavica</i> primrose s+[KAýhl]
<i>Carex capillaris</i> hair loss v;s+[KAýhl]	<i>Linum catharticum</i> wild-lin v;s+[KAýhl]	<i>Saussurea alpina</i> mountain thistle v
<i>Carex ericetorum</i> sedge v ;s+[KAýhl]	<i>Listera ovata</i> large-leaved s*[KAýhl]	<i>Selaginella selaginoides</i> dwarf dwarf v;s-[KAýhl]
<i>Centaurea jacea</i> meadowsweet v	<i>Lotus corniculatus</i> tirltongue v	g]
<i>Fragaria vesca</i> field strawberry v	<i>Luzula multiflora</i> groundnut v;s-[Hlýcb]	<i>Thalictrum alpinum</i> mountain seed star v
<i>Galium boreale</i> white ant v	<i>Parnassia palustris</i> jáblom v	<i>Thalictrum simplex</i> vine seed star v
<i>Gentianella campestris</i> ground sweet v	<i>Pimpinella saxifraga</i> _	

Distribution and regional distribution: Scattered throughout the country on calcareous soil (BN-LA; O3-C1).

Most important types of change: Open highly calcareous heathland and lowland (T2-C-7), grazed calcareous lowland forest (T4-C-4), highly calcareous heather and meadow (T16-C-4), other slightly calcareous to highly calcareous meadows (T32 -C-5,7,15-18,20,21), meadow-like strongly modified permanent land (T40), meadow-like cultivated land (T41).

Red list status (2018): Semi-natural meadow (VU;ý) and hayfield (CR;ý).

References and type parallels: G6, partly G7-G9 (VN). Parts of D01, D04, D05, D17 (DNHB-13)

T32-C-9 Calcareous tall perennial meadow with less heather

NiN characteristics: Grassland systems: Semi natural meadow (T32), one basic type (11). Defined by LKM: KAÿ3,4 & HIÿ1 & UFÿ1 & Klÿ2. LKM base step: KAÿfghi & HIÿb & UFÿab & Klÿbc.

Physiognomy: Often wooded meadows (garden fields) or border areas dominated in part by tall herbs and grasses (perennial meadow), often with scattered shrubs (often willow and willow species) and trees (e.g. spruce and birch; garden land or deciduous meadow). Regrowth stages especially with willow and willow species, and/or with a more or less dense wood layer.



Calcareous tall perennial meadow with less heather. No: Beiarn: Ljøsnehammarsæter. Photo: RH.

Ecological characteristics: Occurs on calcareous bedrock with spring water influence, most often in sloping terrain. Species composition with some indifferent and some lime-demanding herbs and grasses, partly dominated by species that also require moisture; several forest species are included. Bottom layer partly with moisture-demanding forest mosses that can withstand a bit of heat. Nitrogen-tolerant species can enter more strongly when overgrowing. Most of the area belonging to this nature type is now overgrown following the cessation of field mowing or grazing a few decades ago (possibly lower grazing pressure), which results in higher litter coverage and changes in species diversity. Occurs both at the edge of infields and in outfields.

Overgrowth occurs quickly, and the type then quickly becomes more difficult to distinguish, e.g. from forest affected by spring water. Distinguished from strongly calcareous meadows by the absence of very calcareous species, from fresh and dry meadows by the presence of moisture-demanding perennials and the absence of desiccation-tolerant species, from meadows with clear heath and weak fertilizer influence by weaker elements of heath-demanding or nitrogen-loving species.

Terrain and aerial photo characteristics: Can occur in all terrain positions, but most commonly in somewhat sloping terrain. Tree- and shrub-covered meadows can be difficult to distinguish from heath, wooded bog and forest. FF: Mostly dark green color; dry parts lighter green. Texture and color vary little within regions, usually smooth (but tufts are common and give a characteristic texture), controlled by possible wood layer dominance.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T32-B-11	T32-C-9	T32-D-5	T32-E-3
Basic types	T32-11	T32-11	T32-11	T32-6,9,11,17,19	T32-6-12,17-21

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity type (t* = characteristic t., t¤- gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.).

<i>Alchemilla glabra</i> smooth marigold v;s-[Klÿbla]	<i>Geum rivale</i> meadow bumblebee v;s-[KAÿfle] <i>Milium effusum</i> musk grass v;s+ [HIÿblc];s-[Klÿbla]	<i>Kindbergia praelonga</i> sprig moss v <i>Plagiomnium affine</i> skogfagermose v <i>Plagiomnium undulatum</i> mugwort see v
<i>Anemone nemorosa</i> whitveis v	<i>Prunella vulgaris</i> blåkoll v	<i>Rhytidadelphus triquetrus</i> large wreath moss v;s+[KAÿfle]
<i>Chamerion angustifolium</i> geitrams v	<i>Ranunculus acris</i> ground soleie m	<i>Sanionia uncinata</i> claw white moss v
<i>Dactylorhiza maculata</i> ssp. <i>fuchsii</i> forest marigold v	<i>Trollius europaeus</i> ball flower v;s+[Klÿbla] <i>Veratrum lobelianum</i> misae Finnmark cut root	<i>Sciuro-hypnum reflexum</i> sprikelund moss v
<i>Deschampsia cespitosa</i> ssp. <i>cespitosa</i> silver pile v	<i>Viola palustris</i> marsh violet v <i>Atrichum undulatum</i> stortaggmose v	
<i>Equisetum pratense</i> meadowsweet v	<i>Brachythecium rutabulum</i> storlundmo see v	
<i>Equisetum sylvaticum</i> sedge v;s+[Klÿbla]		
<i>Filipendula ulmaria</i> meadowsweet m;s+[Klÿbla]		

Distribution and regional distribution: The whole country, relatively common (but often overgrown); BN-LA, O3-C1.

Most important types of confusion: Other fresh/moist and calcareous meadows (T32-C-5,8,10,20,21), spring-affected intermediate and calcareous heath meadows and heaths, T16-C-5,6).

Red list status (2018): Semi-natural meadow (VU;ÿ) and hayfield (CR;ÿ).

References and type parallels: Partially G12 (VN). Partially D01, D04, D05, D06, D09 (DNHB-13).

T32-C-10 Calcareous tall perennial meadow with a clear hint of heather or a weak hint of fertilization

NiN characteristics: Grassland systems: Semi natural meadow (T32), one basic type (12). Defined by LKM: KAÿ3,4 & Hlÿ2,3 & UFÿ1 & KI 2. LKM base step: KAÿfghi & Hlÿcde & UFÿab & Klÿbc.



Physiognomy: Most often open meadows dominated in part by tall herbs and grass (perennial meadow), sometimes with scattered bushes (often willow and willow species), possibly also trees.

Regrowth stages with shrubs, especially willow and willow species, and/or more or less dense wood layer.

Calcareous perennial meadow with a clear heather character. Tea:
Seljord: Flatdal, SW of Dale. Photo: RH.

Ecological characteristics: Occurs on calcareous ground with spring water influence, most often in sloping terrain. Species composition with both indifferent and lime-demanding herbs and grasses, dominated by moisture-demanding and some weakly nitrogen-tolerant species that often increase in the first part of the overgrowth process. Bottom layer with moisture-demanding mosses. Most often pasture, but hay field designs are also available. Occurs both at the edge of infields and in outfields. Now mostly overgrown. Regrowth is often rapid, characterized by increasing litter coverage. Regrowth designs can be difficult to place along LKM. Distinguished from strongly calcareous meadows by the absence of very calcareous species, from fresh and dry meadows by the presence of moisture-demanding tall perennials and the absence of desiccation-tolerant species, from meadows with weaker vigor by elements of forest and heathland species.

Terrain and aerial photo characteristics: Can occur in all terrain positions, but most commonly in somewhat sloping terrain. Tree- and shrub-covered meadows can be difficult to distinguish from heath, wooded bog and forest. FF: Mostly dark green color; dry parts lighter green, varies according to use. Texture and color vary little within regions, often uniform, controlled by possible wood layer dominance.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T32-B-12	T32-C-10	T32-D-6	T32-E-3
Basic types	T32-12	T32-12	T32-12	T32-10,12,18,20,21	T32-6-12,17-21

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.).

<i>Alchemilla glabra</i> smooth marigold v;s-[Klÿbla] <i>Alchemilla glomerulans</i> Ladybug s*[Hlÿelf];s+[Klÿbla] <i>Alchemilla subcrenata</i> meadowsweet v;s-[Klÿbla] <i>Briza media</i> heart grass v;s*[Hlÿelf] <i>Cardamine pratensis</i> meadow cress v <i>Carex hostiana</i> meadowsweet s*[Hlÿde];s+[KAÿfle] <i>Cirsium heterophyllum</i> white-leaved thistle v <i>Dactylorhiza maculata</i> ssp. <i>fuchsii</i> forest marigold v;s+[Hlÿde]	<i>Deschampsia cespitosa</i> ssp. <i>cespitosa</i> silver pile v <i>Filipendula ulmaria</i> meadowsweet m;s+[Klÿbla] <i>Geranium sylvaticum</i> – <i>Geum rivale</i> meadow bumblebee v;s+[Hlÿelf];s-[KAÿfle] <i>Phalaris arundinacea</i> beach reed v;s+[Hlÿelb];s+[Klÿbla] <i>Poa pratensis</i> engrapp v <i>Poa trivialis</i> markrapp v <i>Ranunculus acris</i> ground soleie m <i>Ranunculus auricomus</i> agg. kidney oil owner v <i>Ranunculus repens</i> krypsoleie v <i>Rumex acetosa</i> meadow sorrel v	<i>Trollius europaeus</i> ball flower v;s+[Hlÿelf];s-[Klÿbla] <i>Urtica dioica</i> stinging nettle v <i>Valeriana sambucifolia</i> root v <i>Veratrum lobelianum misae</i> finnmarksny serot <i>Viola palustris</i> marsh violet v;s+[Hlÿelf] <i>Atrichum undulatum</i> stortaggmose v <i>Brachythecium rutabulum</i> storlundmose v <i>Rhytidadelphus squarrosus</i> Meadow Wreath moss m <i>Rhytidadelphus triquetrus</i> large crown moss v;s*[Hlÿel];s+[KAÿfle]
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Distribution and regional distribution: The whole country, relatively common (but often overgrown). 7SO-BN-LA, 7SE-O3-C1, probably uncommon in LA (possibly at Seder).

Most important types of confusion: Other fresh/moist and calcareous meadows (T32-C-5,8,9,20,21), meadow-like highly modified solid land (T40), meadow-like cultivated land (T41), semi-natural wet meadow (V10).

Red list status (2018): Semi-natural meadow (VU;ÿ) and hayfield (CR;ÿ).

References and type parallels: Partially G12, G13 (VN). Partially D01, D04, D05, D09 (DNHB-13).

T32-C-11 Lime-poor dry rain with less heaviness

NiN characteristics: Grassland systems: Semi-natural meadow (T32), one basic type (13). Defined by LKM: KAý1 & Hlý1 & UFý2 & Klý1. LKM base steps: KAýabc & Hlýb & UFýcde & Klý0a.

Physiognomy: Often wooded meadows, or open meadows in edge zones facing inland. Low-growing vegetation, sometimes with some tall species. Characterized by drought-tolerant graminids; few herbs. Bottom layer with varying coverage of drought-tolerant mosses and lichens.

Ecological characteristics: Species composition with few and low lime-demanding species on drought-prone, often sandy and gravelly ground on limestone-poor bedrock. Often with touches of heather, juniper and boreal woods. Occurs as garden land, arable islets and other edge zones facing inland, and in other low-lying and drought-prone places that are subject to occasional use and from time to time are cleared of bushes and trees. Distinguished from intermediate dry ranges by the absence of somewhat more lime-demanding species, such as yellow sedge, square periwinkle, hairy sedge and tirl's tongue.

Terrain and aerial photo characteristics: Can occur in all terrain positions, but most commonly in sloping terrain and on raised/convex landforms. Tree- and shrub-covered meadows can be difficult to distinguish from heathland and forest. FF: Mostly light green colour. Moist parts darker green; Trampled and particularly dry areas may turn light brown. Juniper stands out clearly with a dark greenish-brown colour. Texture often smooth, but tufts give characteristic texture. Texture and color vary little within regions. When planting wood, the dominance conditions in the wood layer control the texture and color.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T32-13	T32-B-13	T32-C-11	T32-D-1	T32-E-1
Basic types		T32-13	T32-1	T32-1,13	T32-1,2,13,14

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity species (t* = characteristic t., tð - gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.).

<i>Agrostis capillaris</i> meadowsweet m;v* <i>Avenella flexuosa</i> smyle m;v* <i>Carex brunnescens</i> ssp. brownishness brown sciatica v;s-[UFýclb] <i>Carex leporina</i> harestar v <i>Carex pilulifera</i> sedge v;s-[UFýclb] <i>Deschampsia cespitosa</i> ssp. <i>cespitos</i> a silver pile v <i>Festuca ovina</i> sheep's fescue m;v*[Ø] <i>Hieracium umbellatum</i> Screen Hover v;s+[Hlýbla]	<i>Juniperus communis</i> juniper v <i>Melampyrum pratense</i> stormarimjelle v <i>Molinia caerulea</i> blue top v <i>Potentilla erecta</i> carpet root v <i>Pteridium aquilinum</i> eintape v <i>Rumex acetosella</i> small acid v;s+[UFýclb] <i>Scorzoneroidea autumnalis</i> follblom v <i>Sedum acre</i> bitterbergknapp v;s*[UFýclb] <i>Hylocomium splendens</i> floor moss v	<i>Hypnum cupressiforme</i> carpet braid v;s-[UFýclb] <i>Pleurozium schreberi</i> pine moss v* <i>Polytrichum juniperinum</i> juniper moss v;s-[UFýclb] <i>Racomitrium canescens</i> sandy moss v;s-[UFýclb] <i>Cladonia</i> spp. cup lichen v;s-[UFýclb] <i>Cetraria</i> spp. brown sedge v;s-[UFýclb]
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Distribution and regional distribution: Found in large parts of the country (BN-LA; O3-OC).

Most important types of confusion: Calcareous meadow with less heather (T-32-C-1), calcareous boreal heather T31-C-2, and other dry calcareous (T32-C-4) and intermediate meadows (T32-C-3,13, 14).

Red list status (2018): Semi-natural meadow (VU;ý) and hayfield (CR;ý).

References and type parallels: F3, G5 (VN) B0102, D0105 and D0405 (DNHB-13).



Lime-poor dry rain with less heaviness. Ro: Hå: Ogna, Homse. Photo: RH.

T32-C-12 Lime-poor dry reng with a clear heaving character

NiN characteristics: Grassland systems: Semi natural meadow (T32), one basic type (14). Defined by LKM: KA \ddot{y} 1 & Hl \ddot{y} 2 & UF \ddot{y} 2 & Kl \ddot{y} 1. LKM base steps: KA \ddot{y} abc & Hl \ddot{y} cd & UF \ddot{y} cde & Kl \ddot{y} 0a.

Physiognomy: Most often open, possibly scattered wooded meadows in outfield and edge zones to infield. Generally species-poor, low-growing meadow dominated by graminids; few herbs. Bottom layer with drought-tolerant mosses and lichens. Regrowth stages typically characterized by tuft-forming grass (e.g. silverbunch), eventually juniper and boreal tree species enter.

Ecological characteristics: Occurs on limestone-poor bedrock and loose mass ridges, typically on easily drained and thus drought-prone, sandy soil, e.g. in upper parts of calcareous meadows on sloping terrain. Has often been used as pasture, rarely hayfield, for a long time. Species composition with few and low lime-demanding species. Finsbeard and sheep's fescue can dominate; dominance of fin beard may be due to (previous) overgrazing. Distinguished from intermediate dry ranges by the absence of somewhat more lime-demanding species, such as yellow sedge, square periwinkle, hairy sedge and tirl's tongue.

Terrain and aerial photo characteristics: Occurs in sloping terrain and on raised/convex terrain forms. Tree- and shrub-covered meadows can be difficult to distinguish from heathland and forest. FF: Most often light green colour, moister parts darker green. Finsbeard or sheep fescue dominance can give a light brown-green to grey-green colour, trampled and particularly dry areas can turn light brown. Juniper stands out clearly with a dark greenish-brown colour. Color varies according to use. Texture often very even, but tufts give characteristic texture. Texture and color vary little within regions. When planting wood, the dominance conditions in the wood layer control the texture and color.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T32-14	T32-B-14	T32-C-12	T32-D-2	T32-E-1
Basic types		T32-14	T32-14	T32-2,14	T32-1,2,13,14

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **tr-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.).

<i>Agrostis capillaris</i> meadow sweet m;v* <i>Antennaria dioica</i> cat 's foot s-[Hl\ddot{y}de] <i>Atocion rupestre</i> småsmelle v;s-[UF\ddot{y}clb] <i>Avenella flexuosa</i> smyle v <i>Carex brunneoscens</i> ssp. brownishness brown scatrica v;s-[UF\ddot{y}clb] <i>Carex pilulifera</i> sedge v;s-[UF\ddot{y}clb] <i>Deschampsia cespitosa</i> ssp. <i>cespitosus</i> silver pile , etc	<i>Festuca ovina</i> sheep fescue m[0];v;s+[-Hl\ddot{y}de] <i>Melampyrum pratense</i> storm marimjelle v;s+[Hl\ddot{y}de] <i>Molinia caerulea</i> blue top v <i>Nardus stricta</i> fin beard m;v;t[0;Hl\ddot{y}cd] <i>Potentilla erecta</i> carpet root v <i>Rumex acetosella</i> small acid v;s+[UF\ddot{y}clb] <i>Rumex acetosa</i> meadow sorrel v <i>Scorzoneraoides autumnalis</i> follblom v	<i>Succisa pratensis</i> blue button v;s+[Hl\ddot{y}de] <i>Ceratodon purpureus</i> weed moss v <i>Hylocomium splendens</i> floor moss v <i>Pleurozium schreberi</i> furumose v <i>Racomitrium canescens</i> sandy gray moss v;s+[Hl\ddot{y}de] <i>Cladonia</i> spp. lichen v;s+[Hl\ddot{y}de] <i>Cetraria</i> spp. brown sedge v;s+[Hl\ddot{y}de] Pasture fungus : t[0;Hl\ddot{y}cd]
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Distribution and regional distribution: Found in large parts of the country, most commonly in coastal areas (BN-LA, O3-C1). Sheep fescue often dominates in Eastern Norway.

Most important types of confusion: Lime-poor dry meadows with less heat (T32-C-11), and other lime-poor (T32-1, 13) and intermediate meadows (T32-3, 4,5,15,16)

Red list status (2018): Semi-natural meadow (VU; \ddot{y}) and hayfield (CR; \ddot{y}).

References and type parallels: G5, partly G4 (VN) D0405 and D0105, partly D0104, D0404(DNHB-13).



Lime-poor dry reng with a clear heft. Ro: Hå: Varhaug: Snødehaugen. Photo: RH.

T32-C-13 Intermediate dry with less heaviness

NiN characteristics: Grassland systems: Semi natural meadow (T32), one basic type (15). Defined by LKM: KAÿ2 & Hlÿ1 & UF2 & Klÿ1. LKM base step: KAÿde & Hlÿb & UFÿcde & Klÿ0a.

Physiognomy: Often wooded meadows, or open meadows in edge zones facing inland. Often relatively low-growing vegetation, but some tall species occur. Characterized by drought-tolerant graminids and herbs; elements of forest species. In places, a well-developed bottom layer with drought-tolerant mosses and lichens.

Ecological characteristics: Species composition with undemanding species on drought-prone, shallow land and on sand and gravel deposits. Occurs as garden land, arable islets and other edge zones facing inland, and in other low-lying and drought-prone places that are subject to occasional use and from time to time are cleared of bushes and trees. Scattered occurrences of heather species and other forest species (vascular plants and mosses) indicate a lower degree of dominance and/or reduced use. Moderately lime-demanding species such as red fescue, meadowsweet, tirl's tongue, hairy sedge and square periwinkle distinguish the type from low-lime types.

Terrain and aerial photo characteristics: Occurs primarily on convex and raised terrain forms. Tree- and shrub-covered meadows can be difficult to distinguish from heathland and forest. FF: Most often a bright green color that varies with use. Wetter areas darker green, trampled and dry areas light brown. Juniper stands out clearly with a dark greenish-brown colour. Texture often very even, but tufts give characteristic texture. Texture and color vary little within regions, controlled by the dominance conditions in the wood layer.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T32-B-15	T32-C-13	T32-D-3	T32-E-2
Basic types	T32-15	T32-15	T32-15	T32-3.15	T32-3.15

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.).

<i>Achillea millefolium</i> yarrow v;s+[KAÿdc] <i>Agrostis capillaris</i> meadowsweet etc <i>Anthoxanthum odoratum</i> yellow v;s+[KAÿdc] <i>Avenella flexuosa</i> smyle m ;v* <i>Calluna vulgaris</i> s+[Hlÿblc] <i>Campanula persicifolia</i> bell s*[KAÿd e;Ø;s+[Hlÿblc;Ø] <i>Ceratium fontanum</i> inherit v;s*[KAÿdc] <i>Festuca ovina</i> sheep's fescue m *[Ø] <i>Festuca rubra</i> red fescue v;s+[KAÿdc] <i>Hieracium vulgatum</i> agg. grazing weaver v;s+[KAÿdc] <i>Hypericum maculatum</i> St. John's wort v;s+[KAÿdc]	<i>Lotus corniculatus</i> tirltongue v;s*[KAÿdc];s+[Hlÿbla] <i>Poa pratensis</i> engrapp v;s+[KAÿdc] <i>Potentilla erecta</i> carpet root v <i>Pilosella officinarum</i> hair fly v;s+[KAÿdc] <i>Pteridium aquilinum</i> eintape v <i>Ranunculus acris</i> ground sunflower v;s+[KAÿdc] <i>Rhinanthus minor</i> small meadow call v;s+[KAÿdc] <i>Scorzoneraoides autumnalis</i> follblom v <i>Vaccinium vitis-idaea</i> lingonberry s+[Hlÿblc]	<i>Viola canina</i> field violet v;s*[KAÿdc] <i>Hypnum cupressiforme</i> carpet braid v ;s-[UFÿclb] <i>Hylocomium splendens</i> floor moss v <i>Pleurozium schreberi</i> furumose v <i>Polytrichum juniperinum</i> juniper moss v;s-[UFÿclb] <i>Racomitrium canescens</i> sandy gray moss v;s-[Hlÿbla];s+[UFÿclb] <i>Cladonia</i> spp. lichen v;s-[UFÿclb] <i>Cetraria</i> spp. brown sedge v;s-[UFÿclb]
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Distribution and regional distribution: Common throughout the country (BN-LA; O3-OC).

Most important types of confusion: Lime-poor dry meadows with less heat (T32-C-11) and other intermediate (T32-C-3, 4,14,6) and lime-poor meadows (T32-C-1, 2, 12).

Red list status (2018): Semi-natural meadow (VU;ÿ) and hayfield (CR;ÿ).

References and type parallels: G5 and partly G4(VN) D0105, D0405, partly D0104, D0404(DNHB-13).



Intermediate, dry with less heather and stiffening trees. SF: Leikanger: Grinde. Photo: RH.

T32-C-14 Intermediate dry rain with a clear hint of heaviness or a weak hint of fertilization

NiN characteristics: Grassland systems: Semi natural meadow (T32), one basic type (16). Defined by LKM: KAy2 & HIy2,3 & UF2 & Klj1. LKM base step: KAyde & HIycde & UFycde & Klj0a.

Physiognomy: Most often open, possibly scattered wooded meadows (foliage meadows) and edge zones to inland. Medium-high to low-growing field layer with drought-tolerant grasses and herbs. In places, a well-developed bottom layer with drought-tolerant mosses and lichens. Regrowth stages typically characterized by tuft-forming grass (e.g. silverbunch), eventually juniper and boreal tree species enter.

Ecological characteristics: The species composition is a mixture of low and somewhat more lime-demanding species as well as somewhat more nitrogen-tolerant native species. Occurs on drought-prone, shallow ground and on sand and gravel deposits. Has often been used as pasture, rarely hayfield, for a long time. Slightly lime-demanding species such as e.g. red fescue, sedge, sedge, sedge and sedge separate this mapping unit from the corresponding low-calcareous unit T32-C-12. A greater dominance of individual species (often grass) indicates a stronger effect of fertilization.



Intermediate dry with clear heft. VA: Mandal: Sluggish. Photo: HB

Terrain and aerial photo characteristics: In convex and raised terrain positions. Meadows covered with trees and shrubs are difficult to distinguish from heath and forest. FF: Color most often light green, varies with use. Moist and productive areas darker green. Trampled and particularly dry areas may turn light brown. Juniper stands out clearly with a dark greenish-brown colour. Texture often very even, but tufts give characteristic texture. Texture and color vary little within regions, controlled by dominance conditions in any wood layer.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T32-B-16	T32-C-14	T32-D-4	T32-E-4
Basic types	T32-16	T32-16	T32-16	T32-16	T32-4,5,16

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.).

Achillea millefolium yarrow v;s+[KAydlc];s-[HIyelf]	Festuca ovina sheep fescue m;v;s-[HIydlc] Festuca rubra red fescue v;s+[KAydlc] Hieracium vulgatum agg. grazing weaver v;s+[KAydlc]	Hypericum maculatum St. John's wort v;s+[KAydlc] Lotus corniculatus tirltongue v;s*[KAydlc];s-[HIyelf]	Rhinanthus minor small meadow call v;s+[KAydlc] Scorzoneroidea autumnalis follblom v Taraxacum officinale agg. the weed lion down v Veronica officinalis legeveronika v;s*[KAydlc];s*[HIyelf]
Agrostis capillaris meadow sweet v;s+[HIyelf]	Pilosella officinarum hair fly v;s+[KAydlc];s-[HIydlc]	Poa pratensis engrapp v;s+[KAydlc] Ranunculus acris ground sunbed v;s+[KAydlc]	Viola tricolor motherwort ta-[HIycd] Hylocomium splendens floor moss v Pleurozium schreberi furumose v Rhytidiodelphus squarrosus Meadow Wreath moss v Pasture fungus : ta-[HIycd];s*[HI-elf]
Anthoxanthum odoratum yellow v;s+[KAydlc];s-[HIyelf]	Dactylis glomerata dog grass v;s-[KAydlc]		
Campanula rotundifolia bluebell s*[HIyel] f]	Carex pilulifera sedge v;s+[KAyelf]		
Cerastium fontanum inherit v;s*[KAydlc]	Cerastium fontanum inherit v;s*[KAydlc]		
Dactylis glomerata dog grass v;s-[KAydlc]	Dactylis glomerata dog grass v;s-[KAydlc]		
Deschampsia cespitosa ssp. cespitosa silver pile v	Deschampsia cespitosa ssp. cespitosa silver pile v		

Distribution and regional distribution: Common throughout the country (BN-LA; O3-OC).

Most important types of confusion: Intermediate meadow with fertilizer influence (T32-C-6) and other intermediate (T32-C-3, 4,13) and low-lime meadows (T32-C-1, 2,11,12).

Red list status (2018): Semi-natural meadow (VU;ü) and hayfield (CR;ü).

References and type parallels: G4 (VN). D0104 and D0404 (DNHB-13).

T32-C-15 Weakly calcareous dry soil with less heaviness

NiN characteristics: Grassland systems: Semi natural meadow (T32), one basic type (17). Defined by LKM: KAy3 & HIy1 & UFy2 & Klj1. LKM base step: KAyfg & HIyb & UFycde & Klj0a.

Physiognomy: Often wooded meadows (garden fields) or edge areas towards inland, in active use dominated by low-growing herbs and grasses. Any shrubs are junipers or roses. Often slippery field layer, preferably a little bare soil. Varying coverage of mosses and lichens in the bottom layer. Regrowth stages with shrubs, especially junipers, and/or trees.

Ecological characteristics: On slightly calcareous bedrock, especially in areas with little rainfall; often facing south and on shallow and well-drained soil, also on convex/protruding parts in fresh meadows. Indifferent to slightly lime-requiring species, some drought-tolerant herbs and grasses, elements of forest species. Occurs both along the edge of infields and in outfields. Large areas are becoming overgrown, characterized by increased flow rates, lower moss cover, more tall vegetation and changes in species diversity. Without fertilization. Distinguished from strongly calcareous meadows by the absence of very lime-demanding species, from meadows with a clear dominant character by smaller elements of typical species for semi-natural meadows and fewer nitrogen-loving species, and from fresh and moist meadows by the absence of moisture-demanding/desiccation-sensitive species.

Terrain and aerial photo characteristics: Can occur in all terrain positions, but often in sloping and uneven, south-facing terrain. Tree- and shrub-covered meadows can be difficult to distinguish from heathland and forest. FF: Mostly light green colour. Shallow, drought-prone areas may turn light brown-green, while moist areas become darker green. Texture often smooth. Juniper stands out clearly with a dark greenish-brown colour. Texture and color vary little within regions, controlled by dominance conditions in any wood layer.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T32-17	T32-B-17	T32-C-15	T32-D-5	T32-E-3
Basic types		T32-17	T32-17	T32-6,9,11,17,19	T32-6-12,17-21

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.; **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.).

<i>Agrostis capillaris</i> meadowsweet m;v* <i>Alchemilla wichurae</i> skarmarkiaope v <i>Antennaria dioica</i> cat's foot v;s-[UFyclb] <i>Anthoxanthum odoratum</i> yellow m;v* <i>Avenula flexuosa</i> smyle v <i>Calamagrostis epigejos</i> rock pipe kvein v <i>Campanula rotundifolia</i> bluebell v <i>Carex pilulifera</i> sedge v;s-[UFyclb] <i>Cerastium fontanum</i> inherit v <i>Clinopodium vulgare</i> spearmint s*[HIyb]- [blc];s+[KAyfle]	<i>Festuca ovina</i> sheep's fescue m;v*[Ø] <i>Fragaria vesca</i> field strawberry v <i>Hieracium umbellatum</i> screen hover v;s+[- HIyb]a] <i>Juniperus communis</i> juniper etc <i>Linaria vulgaris</i> cod mouth v;s+[HIyb]- [blc];s+[UFyclb] <i>Lotus corniculatus</i> tirlitongue v <i>Pilosella officinarum</i> hair fly v <i>Rosa majalis</i> cinnamon rose v;s*[KAyfle]	<i>Sedum acre</i> bitterbergknapp v;s+[UFyclb] <i>Hypnum cupressiforme</i> mat flette v <i>Pleurozium schreberi</i> pine moss m <i>Polytrichum juniperinum</i> juniper moss v;s+[UFyclb] <i>Racomitrium canescens</i> sandy gray moss v;s-[HIyb]a;s+[UFyclb] <i>Rhytidium rugosum</i> paw moss v;s+[UFyclb];s*[KAyfle]
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Distribution and regional distribution: Most common in Eastern Norway, in inner fjord areas in Western Norway and in continental parts of Northern Norway (BN-LA, O1-C1, less often O2-O3).

Most important types of confusion: Other weakly calcareous and intermediate meadows (T32-C-3,4,13, 14,16,20), open shallow land (T2), grassland bed and heath (T16), mountain grass heath and grass tundra (T22).

Red list status (2018): Semi-natural meadow (VU;ü) and hayfield (CR;ü).

References and type parallels: Partially G7-G8 (VN). Partially D01, D04, D05, D06 (DNHB-13).



Weakly calcareous dry soil with less emphasis. Ex: Sarpsborg: Skjeberg, Langsholt. Photo: RH.

T32-C-16 Weak calcareous dryland with a clear hint of heaving or a faint hint of fertilization

NiN characteristics: Grassland systems: Semi natural meadow (T32), one basic type (18). Defined by LKM: KAy3 & Hly2,3 & UFy2 & Klj1. LKM base step: KAyfg & Hlycde & UFycde & Klj0a.

Physiognomy: Mostly open meadows; in active use dominated by low-growing herbs and grasses, sometimes with scattered bushes (especially junipers and roses) or trees (garden/foliage). Often slippery field layer. Bottom layer coverage varies; with mosses, lichen and some bare soil. Regrowth stages with shrubs, especially junipers, and/or trees.



Slightly calcareous meadow. Op: Sør-Fron: Svanvollen. Photo: HB

Ecological characteristic: On slightly calcareous bedrock, preferably in a dry climate; often on shallow and well-drained soil or convex/protruding parts in fresh meadows. With a mixture of indifferent and slightly lime-requiring, drought-tolerant herbs and grasses. The unit includes lightly fertilized meadows with nitrogen-tolerant species. Usually pasture, often overgrown. Then the amount of current increases, and the vegetation becomes tall and the moss cover decreases. Outfield and edge zones along the infield.

Terrain and aerial photo characteristics: Can occur in all terrain positions, but often in sloping and uneven, south-facing terrain. Tree- and shrub-covered meadows can be difficult to distinguish from heathland and forest. FF: Most often light green color; moist areas darker and more prone to drought, shallow areas light brown-green, varies according to use. Texture and color vary little within regions, often very uniform, but tufts provide characteristic texture; controlled by any three-layer dominance.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T32-B-18	T32-C-16	T32-D-6	T32-E-3
Basic types	T32-18	T32-18	T32-18	T32-10,12,18,20,21	T32-6-12,17-21

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity type (t* = characteristic t., ta- gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.).

<i>Agrostis capillaris</i> meadowsweet m;v;s+[Hlyelf] <i>Alchemilla glaucescens</i> velvet marigold v;s*[Hlyelf] <i>Allium oleraceum</i> wild onion s+[UFyclb] <i>Antennaria dioica</i> cat 's foot v;s*[Hlyelf] <i>Anthoxanthum odoratum</i> yellow v;s+[Hlyelf] <i>Arabis hirsuta</i> bergschrinneblom v;s*[-Hlyelf] <i>Campanula rotundifolia</i> bluebell v;s*[-Hlyelf] <i>Erigeron acris</i> ground star v;s+[Hlyclb] <i>Festuca ovina</i> sheep fescue m;v;s*[Hlyelf] <i>Festuca rubra</i> red fescue m;v* <i>Fragaria vesca</i> field strawberry v;s*[Hlyelf] <i>Galium verum</i> yellow ant v;s*[KAyfile]	<i>Helictotrichon pratense</i> meadow oats v;s*[Hlyelf] <i>Hylotelephium maximum</i> butterbuck v;s*[Hlyelf];s+[UFyclb] <i>Lotus corniculatus</i> tirltongue v;s-[Hlyelf] <i>Myosotis arvensis</i> field forget-me-not v;s+[UFyclb] <i>Noccaea caerulescens</i> spring moneywort v;s+[Hlyelf] <i>Pilosella lactucella</i> auricle web v;s+[-Hlyelf] <i>Pilosella officinarum</i> v ;s+[Hlyelf] <i>Pimpinella saxifraga</i> _ Hlyelf <i>Potentilla argentea</i> silver wall v;s+[UFyclb]	<i>Rosa majalis</i> cinnamon rose v;s*[KAyfile] <i>Scleranthus perennis</i> perennial knavel v;s*[-Hlyelf];s+[UFyclb] <i>Sedum acre</i> bitterbergknapp v;s*[Hlyelf];s*[UFyclb] <i>Viola tricolor</i> motherwort v;s+[Hlyelf];s*[UFyclb] <i>Abietinella abietina</i> granmose s*[Hlyelf];s+[UFyclb] <i>Pleurozium schreberi</i> pine moss v;s*[Hlyelf] <i>Racomitrium canescens</i> sandy gray moss v;s+[Hlybla];s+[UFyclb] <i>Rhytidium rugosum</i> paw moss v;s*[KAyfile];s*[Hlyelf];s+[UFyclb] <i>Pasture fungus</i> : ta[Hlycd];s*[Hlyelf]
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Distribution and regional distribution: Most common in Eastern Norway, in inner fjord areas in Western Norway and in continental parts of Northern Norway (BN-LA, O1-C1, less often O2-O3).

Most important types of confusion: Other weakly calcareous and intermediate meadows (T32-C-3,4, 13,14,20), mountain grass heath and grass tundra (T22), meadow-like strongly altered solid land (T40), meadow-like cultivated land (T41).

Red list status (2018): Semi-natural meadow (VU;ÿ) and hayfield (CR;ÿ).

References and type parallels: Partially G7-G8 (VN). Partially D01, D04, D05, D17(DNHB-13).

T32-C-17 Strong calcareous dry soil with less heaviness

NiN characteristics: Grassland systems: Semi natural

meadow (T32), one basic type (19). Defined by LKM: KAÿ4 & HIÿ1 & UFÿ2 & Klÿ1. LKM base step: KAÿhi & HIÿb & UFycde & Klÿ0a.

Physiognomy: Meadows dominated by low-growing herbs and grasses. Bottom layer with drought-tolerant mosses and lichens. Occurs as edge zones to the infield or, most often, in the outfield. Glissent shrub or wooded meadow. **Ecological characteristics:**

Species composition with very lime-demanding and drought-tolerant herbs, grasses, mosses and lichens. On calcareous bedrock, primarily in areas with little rainfall; often facing south and on shallow and well-drained soil. Often as patches on low-lying, convex parts of garden land or fresh, semi-natural meadows. Protruding limestone clods common. Weaker marks distinguish the type from T32-C-18.

Occurs most often as pasture-grazed open field beds, with a clear element of forest species and/or species from other natural open land. Often with scattered plantings (garden fields or leafy meadows). Mostly now in overgrowth after the cessation of field mowing or grazing a few decades ago. High species diversity of vascular plants, fungi and insects.



Strong calcareous dry soil with less heaviness. Op: Sør-Fron: Forr. Photo: RH.

Terrain and aerial photo characteristics: Can occur in all terrain positions, but most commonly in sloping and uneven, south-facing terrain. Tree- and shrub-covered meadows can be difficult to distinguish from heathland and forest (most often pine forest). FF: Color most often light green, fresher parts darker green. Drought-prone, shallow areas may turn light brown-green. Juniper stands out clearly with a dark greenish-brown colour. Texture and color vary little within regions, often very uniform, controlled by possible wood layer dominance. Tues provide characteristic texture.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T32-19	T32-B-19	T32-C-17	T32-D-5	T32-E-3
Basic types		T32-19	T32-19	T32-6,9,11,17,19	T32-6-12,17-21

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **tx**- gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.).

Acinos arvensis groundmint s-[KAÿhl]	Carex rhizina sedge s-[KAÿhl]	Juniperus communis juniper v*;s-[HIÿblc]
Agrimonia eupatoria field moon s-[HIÿblc]	Carlina vulgaris star thistle s+[KAÿhl]	Origanum vulgare rock mint s-[KAÿhl]
Alchemilla glaucescens velvet marigold v	Dracocephalum ruyschiana dragon 's head s*[KAÿhl]	Oxytropis lapponica reindeer meal s+[KAÿhl];NB]
Allium oleraceum wild onion s+[UFÿclb]	Festuca ovina sheep fescue v	Polygala amarella bitter blue feather s+[KAÿhl]
Androsace septentrionalis small key s*[KA-hlg]	Geranium sanguineum s-[KAÿhl]	Sedum album whitbergknapp s-[UFÿclb]
Antennaria dioica cat's foot s-[UFÿclb]	Helictotrichon pratense meadow oats v;s+[KAÿhl]	Viola collina ground violet s-[KAÿhl]
Anthyllis vulneraria round pod s-[KAÿhl]	Helictotrichon pubescens down oat v;s-[KAÿhl]	Abietinella abietina granmose v;s-[KAÿhl]
Arabis hirsuta bergschrinneblom s-[UFÿclb]	Hypochaeris maculata spotted pig's ear s-[KAÿhl]	

Distribution and regional distribution: Eastern Norway, inner fjord areas in Western Norway, continental parts of Northern Norway on calcareous bedrock, rare (BN-LA, primarily O1-C1).

Most important types of confusion: Open highly calcareous heather and lowland (T2-C-7 and T2-C-8), berry heather calcareous gurt forest (T4-C-8) with extensive heather character (pasture forest), highly calcareous heather and meadow (T16-C-4), other calcareous and strongly calcareous meadows (T32-C-5,7,8,15,16,18,20,21).

Red list status (2018): Semi-natural meadow (VU;ÿ) and hayfield (CR;ÿ).

References and type parallels: G6, G7-G9 (VN). Partially D01, D04, D05 and D17 (DNHB-13).

T32-C-18 Strong calcareous dry soil with a clear heaving character

NiN characteristics: Grassland systems: Semi natural meadow (T32), one basic type (20). Defined by LKM: KAý4 & Hlý2 & UFý2 & Klý1. LKM base step: KAýhi & Hlýcd & UFýcde & Klý0a.

Physiognomy: Open meadows dominated by low-growing herbs and grasses, sometimes with scattered bushes. Field layer often glistening. Bottom layer with drought-tolerant mosses and low, partly bare soil. Regrowth stages with shrubs, especially junipers, and/or trees.

Ecological characteristics: Species composition with very lime-demanding and drought-tolerant herbs and grasses. On calcareous bedrock, primarily in areas with little rainfall; often facing south and on shallow and well-drained soil. Often as spots on shallow and convex areas in garden plots and in fresh semi-natural meadows. Protruding calcareous lumps are common. Usually pasture, but hay field designs also exist. Occurs both at the edge of infields and in outfields. Mostly now in overgrowth after the cessation of field mowing or grazing a few decades ago. Differentiated from meadows with less vigor by the absence of forest species and from meadows characterized by weak fertilization by the more or less complete absence of nitrogen-loving species.

Terrain and aerial photo characteristics: Can occur in all terrain positions, but most commonly in sloping and uneven, south-facing terrain. Tree- and shrub-covered meadows can be difficult to distinguish from heathland and (pine) forest. FF: Color most often light green, fresher parts darker green. Drought-prone, shallow areas may turn light brown-green. Juniper stands out clearly with a dark greenish-brown colour. Texture and color vary little within regions, often very uniform, controlled by possible wood layer dominance.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T32-B-20	T32-C-8	T32-D-6	T32-E-3
Basic types	T32-20	T32-20	T32-20	T32-10,12,18,20,21	T32-6-12,17-21

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.).

<i>Acinos arvensis</i> ground mint s+[KAýhl]	<i>Festuca ovina</i> sheep fescue v	<i>Knautia arvensis</i> red button v
<i>Androsace septentrionalis</i> minor key s*[KAýhl] g]	<i>Filipendula vulgaris</i> s-[KAýhl]	<i>Plantago media</i> down giant v;s-[KAýhl]
<i>Anthoxanthum odoratum</i> yellow m	<i>Galium boreale</i> white ant v	<i>Polygala vulgaris</i> large blue feather v;s-[KAýhl]
<i>Anthyllis vulneraria</i> round pod v;s-[KAýhl]	<i>Galium verum</i> yellow ant v	<i>Potentilla crantzii</i> spotted wall v;s-[KAýhl]
<i>Carex ericetorum</i> sedge v ;s+[KAýhl]	<i>Helictotrichon pratense</i> meadow oats v;s+[KAýhl]	<i>Silene nutan</i> 's nod s+[KAýhl]
<i>Centaurea scabiosa</i> phage budwort v;s-[KAýhl]	<i>Helictotrichon pubescens</i> down oat hlg] v;s-[KAýhl]	<i>Thalictrum simplex</i> creeping star s+[KAýhl]
<i>Dracocephalum ruyschiana</i> dragon 's head s*[KAýhl]	<i>Hypochaeris maculata</i> spotted pig's ear s-[KAýhl]	<i>Veronica verna</i> spring veronica s-[KAýhl]
	hlg]	<i>Viola rupestris</i> gravel violet s+[KAýhl]
		<i>Pasture fungus</i> : ta[Hlýcd]

Distribution and regional distribution: Eastern Norway, inner fjord areas, continental parts of Northern Norway on calcareous bedrock, rare (BN-LA, C1, scattered in OC).

Most important types of confusion: Open highly calcareous heather and lowland (T2-C-7, T2-C-8), berry heather calcareous gurt forest (T4-C-8) with extensive heather character (pasture forest), highly calcareous heather and meadow (T16-C- 4), other calcareous and highly calcareous meadows (T32-C-5,7,8,15-17,20,21), meadow-like strongly altered solid land (T40), meadow-like cultivated land (T41).

Red list status (2018): Semi-natural meadow (VU;ý) and hayfield (CR;ý).

References and type parallels: Partially G6, and G7-G9 (VN). Partially D01, D04, D05, D17 (DNHB-13).



Strong calcareous dry soil with a clear heft. Op: Vågå:
Nordherad, east of Valde. Photo: HB.

T32-C-19 Dune-meadow with a clear sign of heaving or a weak sign of fertilisation

NiN characteristics: Firm ground systems: Semi natural ground (T32), one basic type (21). Defined by LKM: KAý3 & Hlý2,3 & UFý2 & Klý1 & SSý1. LKM base steps: KAýfg & Hlýcde & Klý0a & UFýcde & Klý0a & SSýfghi.

Physiognomy: Open meadows dominated by low-growing herbs and grasses, sometimes with scattered shrubs, often with patches of bare, eroded sand. Bottom layer variable, with drought-tolerant mosses and lichens. Regrowth stages with bushes and heather.

Ecological characteristics: Species composition mainly with slightly to fairly lime-demanding and drought-tolerant herbs and grasses. Occurs on well-drained, sand-dominated land deep in dune areas along the coast. Includes both unfertilized and lightly fertilized meadows (indicated by species that tolerate nitrogen fertilization), usually pasture. Good drainage reduces the effect of fertilization. Most of the area that belonged to this nature type has been fertilized up to Cultivated permanent meadow (T45) or in overgrowth after the cessation of grazing a few decades ago. Dune meadows show little variation in lime content, mostly limited to KAýfg. Species typical for forests and heaths, and for strongly calcareous meadows, are mostly missing (an exception is yellow ants).



Sand dune meadow, slightly influenced by fertilization. VA: Farsund: Lista, Haugestranda. Photo: HB.

Terrain and aerial photo characteristics: Occurs in more or less flat terrain in dune areas, characterized by relatively light color and uniform structure. Difficult to distinguish from smooth structure compared to sand dunes. FF: Color most often light to medium green; shallow, drought-prone areas may turn light brown-green and fresher areas darker green. Texture often very smooth; texture and color vary little within regions, controlled by possible wood layer dominance.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T32-B-21	T32-C-19	T32-D-6	T32-E-3
Basic types	T32-20	T32-21	T32-21	T32-10,12,18,20,21	T32-6-12,17-21

Diagnostic species m =

abundance species (m^* = dominant m.); v = common species (v^* = constant v.); t = center of gravity type (t^* = characteristic t., $ta-$ gradient-t.); s = distinction (s^* = absolute s., $s+$ = strong relative s., $s-$ = weak relative s.).

Achillea millefolium yarrow v	Plantago lanceolata slimy giant v	Rumex acetosella small acid v
Agrostis capillaris meadowsweet s-[Hlýclb]	Rumex acetosa meadow sorrel v	Scorzoneroidea autumnalis follblom v
Armeria maritima forekoll v	Hieracium umbellatum screen hover v	Stellaria graminea grass star flower v
Arrhenatherum elatius horse oat v;s+[Hlýclb]	Knautia arvensis red button v	Thalictrum alpinum mountain seed star v[N]
Campanula rotundifolia bluebell v	Jasione montana blue monk v;s*[SSýhl]	Thalictrum minus coastal seed star [S,O]
Carex arenaria sand sedge v;s*[SSýhl]	Linaria vulgaris lincod v	Trifolium repens white clover v
Cerastium fontanum inherit v	Lotus corniculatus tiriltongue v	Vicia cracca bird's vetch v
Festuca ovina sheep fescue v	Luzula campestris groundfrytle v	Viola canina field violet v;s-[Hlýclb]
Festuca rubra red fescue etc	Pilosella officinarum hair fly v	Viola tricolor stepmother v
	Pimpinella saxifraga _	Brachythecium albicans bleiklundmoss m;v;s+[SSýhl]

Distribution and regional distribution: Patchy along the coast in suitable places; BN-NB and ASHTZ; O3-OC. Regional designs in the south and north.

Most important types of confusion: Open weakly calcareous shallow heathland (T2-C-5), weakly calcareous mountain heather (T3-C-5), brown dunes and dune heath (C21-C-3), weakly calcareous boreal heather (C-31- 8), other intermediate, calcareous and highly calcareous dry fields (T32-C-4-8, 14-19), meadow-like cultivated land (T41).

Red list status (2018): Semi-natural meadow (VU;ý) and hayfield (CR;ý).

References and type parallels: Partly G7, G9 and G10, partly W2 (VN). Partially D04, and D01? (DNHB-13).

T32-C-20 Weakly calcareous meadow with clear heather

NiN characteristics: Grassland systems: Semi-natural meadow (T32), one basic type (7). Defined by LKM: KAý3 & HIý2 & UFý1 & Klý1. LKM base steps: KAýfg & HIýcd & UFýab & Klý0a.

Physiognomy: Mostly open meadows, in active use dominated by low-growing (and some tall-growing) herbs and grasses; may contain scattered bushes and possibly trees. Varying coverage of mosses and some lichens in the bottom layer. Regrowth stages with shrubs and/or trees.

Ecological characteristic: Occurs on somewhat calcareous bedrock, most often on well-drained soil. Species composition with indifferent and slightly lime-requiring herbs and grasses. Most often pasture, but hayfield designs exist. Occurs in Sanddyne meadows, slightly affected by fertilization. VA: outfield, but also on edges towards the infield. Usually pasture, for Farsund: Lista, Haugestrand and Photouf ~~Haugestrand and Photouf increases growth.~~ the vegetation becomes tall and the moss cover decreases. It is distinguished from meadows with less emphasis by the sparse occurrence of forest and heathland species and from meadows affected by manure by only minor elements of nitrogen-loving species.

Terrain and aerial photo characteristics: Can occur in all terrain positions. Meadows covered with trees and shrubs can be difficult to distinguish from forest and heath. FF: Color most often light to medium green (old grass gives a lighter color); shallow, drought-prone areas may turn light brown-green and fresher areas darker green. Juniper stands out clearly with a dark greenish-brown colour. Texture often very smooth; texture and color vary little within regions, but often between regions, controlled by possible wood layer dominance.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T32-7	T32-C-20	T32-D-8	T32-E-3
Basic types		T32-7	T32-7	T32-7.8	T32-6-12,17-21

Diagnostic species m =

abundance species (**m*** = dominant m.); v = common species (**v*** = constant v.); t = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); s = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.).

Achillea millefolium yarrow v Agrostis capillaris meadow sweet m*;v* Ajuga pyramidalis jonsokoll v;s+[HI-dle] Alchemilla glaucescens velvet marigold v;s+[HI-dle] Alchemilla wickrae skarmarkaope v;s+[HI-dle] Anthoxanthum odoratum yellow m;v* Bistorta vivipara harerug v Campanula rotundifolia bluebell v Centaurea jacea meadow sweet v Deschampsia cespitosa ssp. cespitosa silver pile v Festuca rubra red fescue m;v* Galium boreale white ant v;s+[HI-dle];s+[KA-fle] Galium verum yellow ant v;s*[KA-fle]	Helictotrichon pubescens downy oats v Hypericum maculatum St. John's wort v Hypochaeris maculata spotted pig's ear v Knautia arvensis red button v Leucanthemum vulgare v ;s+[HI-clb] Linum catharticum wild-lin v Lotus corniculatus tiriltongue v Luzula multiflora ground beetle v Pimpinella saxifraga _ Plantago lanceolata slime v;s+[HI-clb] Pilosella lactucella auricle v;s+[HI-clb] Pilosella officinarum v ;s+[HI-dle] Platanthera bifolia night violet v	Platanthera montana rough night violet v Polygala vulgaris large blue feather v Potentilla crantzii spotted wall v Primula veris marigold v;s+[-] HI-dle];s+[KA-fle] Ranunculus acris ground soleie v Rhinanthus minor small meadow call v Scorzoneroidea autumnalis follblom v Thalictrum alpinum mountain seed star v Thalictrum simplex vine seed star v Viola canina meadow violet v Viscaria vulgaris meadow tar flower v Plagiomnium cuspidatum stinging phage moss v Rhytidiodelphus squarrosus Meadow Wreath moss m Pasture fungus : ta[HIýcd]
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Distribution and regional distribution: Whole country, common (BN-LA, O3-C1).

Most important types of confusion: Other strongly/weakly calcareous and intermediate meadows (T32-C-3-5,9,10,13, 14,21), open shallow land (T2), heathland bed and heath (T16), meadow-like strong changed permanent land (T40).

Red list status (2018): Semi-natural meadow (VU;ý) and hayfield (CR;ý).

References and type parallels: Partially G7-G8 (VN). Partially D01, D04, D05, D08, D17 (DNHB-13).



T32-C-21 Weak calcareous meadow with a faint hint of fertilisation

NiN characteristics: Grassland systems: Semi natural meadow (T32), one basic type (8). Defined by LKM: KAy3 & HIy3 UFy1 & Klj1. LKM base steps: KAyfg & HIye & UFyab & Kljoa.

Physiognomy: Most often open meadows, in active use dominated by low-growing (partly also tall-growing) herbs and grasses, sometimes with scattered bushes and trees. Varying bottom layer coverage with some mosses. Regrowth stages with shrubs and/or trees.



Weakly calcareous meadow with a weak influence of fertiliser.
Ak: Nannestad: Ukkestad SØ. Photo: RH.

Ecological characteristic: Occurs on somewhat calcareous bedrock; most often on well-drained soils. Species composition partly with indifferent, partly with slightly lime-requiring herbs and grasses. Elements of nitrogen-tolerant species give a faint impression of fertilisation. Often grazed, but mowed designs can be found. Occurs primarily on the edge of inland or near sedges. Many areas are overgrown, which results in more litter, lower moss cover, often more tall vegetation and a change in species diversity. Distinguished from strongly lime-rich meadows by the absence of very lime-demanding species, from meadows with a clear headland by a greater proportion of nitrogen-sensitive species.

Terrain and aerial photo characteristics: Can occur in all terrain positions. Tree- and shrub-covered meadows can be difficult to distinguish from heathland and forest. FF: Color most often light to medium green (old grass gives a lighter color); shallow, drought-prone areas can become lighter and fresher areas darker green. Juniper stands out clearly with a dark greenish-brown colour. Texture often smooth, characteristic on tufted parts. Texture and color vary little but often between regions; controlled by any three-layer dominance.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T32-B-8	T32-C-21	T32-D-8	T32-E-3
Basic types	T32-8	T32-8	T32-8	T32-7-8	T32-6-12,17-21

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity type (t* = characteristic t., t# - gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.).

<i>Achillea millefolium</i> yarrow v	<i>Lathyrus pratensis</i> yellow flat pod v	<i>Rumex longifolius</i> haymole v
<i>Agrostis capillaris</i> meadowsweet v;s+[HI-elf]	<i>Lotus corniculatus</i> tirltongue v;s+[HI-elf]	<i>Sagina procumbens</i> tunsmåarve v
<i>Alchemilla micans</i> glossy marigold v	<i>Luzula multiflora</i> groundnut v;s+[HI-elf]	<i>Scorzoneroidea autumnalis</i> follblom v
<i>Alchemilla monticola</i> meadowsweet v	<i>Pimpinella saxifraga</i> v ;s+[HI-elf]	<i>Silene dioica</i> red jonsokblom v
<i>Alchemilla subcrenata</i> meadowsweet coat v	<i>Plantago major</i> plantain v	<i>Stellaria graminea</i> grass star flower v
<i>Carex leporina</i> harestar v	<i>Poa annua</i> tunrapp v	<i>Stellaria media</i> vassarve v;s+[HI-eld]
<i>Carum carvi</i> caraway v;s+[HI-elf]	<i>Ranunculus acris</i> ground sunflower m;v*	<i>Trifolium pratense</i> red clover v
<i>Cerastium fontanum</i> inherit v	<i>Ranunculus auricomus</i> agg. kidney oil owner v	<i>Trifolium repens</i> white clover m;v*
<i>Dactylis glomerata</i> dog grass v	<i>Ranunculus repens</i> creeping oil v;s+[HI-eld]	<i>Urtica dioica</i> stinging nettle v
<i>Deschampsia cespitosa</i> ssp. <i>cespitos</i> a silver pile , etc	<i>Rhinanthus minor</i> small meadow call v	<i>Vicia cracca</i> bird's vetch v
<i>Festuca rubra</i> red fescue etc	<i>Rumex acetosa</i> meadow sorrel m;v*:s+[HI-eld]	<i>Vicia sepium</i> hedge vetch v
<i>Ficaria verna</i> spring cabbage v		<i>Rhytidiodelphus squarrosum</i> engkransmo see m;v*
<i>Geranium sylvaticum</i> wood stork's beak etc		Pasture fungus: s*[HI-elf]

Distribution and regional distribution: The whole country, common BN-NB; in NB & LA mostly at centers, rarely in LA; O3-C1.

Most important types of confusion: Other weakly calcareous and intermediate meadows (T32-C-3-5,9,10,13,14,20), meadow-like strongly altered solid land (T40), meadow-like cultivated land (T41).

Red list status (2018): Semi-natural meadow (VU;ÿ) and hayfield (CR;ÿ).

References and type parallels: Partially G7-G8 (VN). Partially D01, D04, D05, D17 (DNHB-13).

T33-C-1 Lower semi-natural salt marsh

NiN characteristics: Fixed land systems: Semi natural salt marsh (T33), one basic type (1). Defined by LKM: TVýf. LKM basic level: TVýfgh.

Physiognomy: Low-growing, closed meadow-like vegetation dominated by salt-tolerant graminids and herbs.

Ecological characteristics: Includes clearly grazed salt meadows in the upper geolittoral (TVýfgh) and upper part of the middle geolittoral (TVýf). In protected, low-erosion areas, most often on fine material (silt and clay), sometimes on gravel. Regularly flooded by seawater at high tide. Well drained, without salt enrichment. Brackish water characteristics in places where fresh water is supplied. Conditioned by grazing and re-grows with tall graminids, especially roof pipes, when use ceases. Elements of salt-tolerant land plants distinguish the type from semi-natural meadows, while stronger elements of species typical of semi-natural meadows distinguish them from natural salt meadows (T12). Most of the larger salt meadows in southern Norway, which are dominated by low-growing species in protected places, are probably dependent on grazing. Semi-natural salt meadows are also found in the north, but grow back there more slowly when use ceases. Knowledge of past and present grazing use from older aerial photographs, locally known or other sources, combined with a clear element of species typical of semi-natural meadows, is often helpful in distinguishing T33 from natural salt meadows. Herbaceous type with several rare vascular plants, especially in south-east Norway.



Lower semi-natural salt meadow. Vf: Tjøme: Sørstegård.
Photo: HB.

Terrain and aerial photo characteristics: Almost flat to gently sloping, middle to inner parts of salt marsh.

Photo time in relation to water level affects visibility in aerial photographs. FF: Most often a dark green colour, but any dominance of certain grass species can give a light green or light brown colour. Texture often alternating with elements of brown seaweed embankments, lighter stones and gravel etc. Texture and color vary little within and between regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T33-1	T33-B-1	T33-C-1	T33-D-1	T33-E-1
Basic types		T33-1	T33-1	T33-1,2	T33-1,2

Diagnostic species m =

abundance species (**m*** = dominant m.); v = common species (**v*** = constant v.); t = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); s = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.).

<i>Achillea millefolium</i> yarrow v <i>Agrostis stolonifera</i> creeper v <i>Armeria maritima</i> forekoll v <i>Artemisia vulgaris</i> burot s*[TVýfle] <i>Carex distans</i> glisnestarr v <i>Carex extensa</i> sedge <i>Centaurium littorale</i> centaury <i>Centaurium pulchellum</i> dwarf golden <i>Festuca rubra</i> red fescue m* ;v* <i>Filipendula ulmaria</i> meadowweet v;s+[TVýfle] <i>Juncus gerardii</i> salt rush v	<i>Lotus corniculatus</i> tiriltongue v:s-[TVýfle] <i>Lysimachia maritima</i> beach creeper v <i>Odontites litoralis</i> beach red top v <i>Parnassia palustris</i> jäblom v <i>Phragmites australis</i> roof pipe v <i>Plantago major</i> plantain v <i>Plantago maritima</i> beach giant v <i>Poa pratensis</i> engrapp v <i>Polygonum aviculare</i> tungras v <i>Potentilla anserina</i> ssp. <i>anserina</i> goose wall v <i>Rhinanthus minor</i> small meadow call v	<i>Rumex crispus</i> krushaymol v <i>Sagina nodosa</i> budding heirloom v <i>Scorzoneraoides autumnalis</i> follobom v;s-[TVýfle] <i>Trifolium fragiferum</i> strawberry clover <i>Trifolium repens</i> white clover m ;v* <i>Triglochin maritima</i> spring onion v <i>Triglochin palustris</i> marsh onion v <i>Tripleurospermum maritimum</i> strandbal derbrå v <i>Vicia cracca</i> bird's vetch v*
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Distribution and regional distribution: BN-SB (MB-NB), O3-OC. Perhaps found along the entire coast, but most commonly from Østfold to Rogaland. Species-rich designs with a characteristic species composition in the south-east.

Main disturbance types: Lower and middle salt marsh (T12-C-1), upper and weak salt marsh (T12-C-2), semi-natural salt marsh in the supralittoral (T33-C-2).

Red list status (2018): Semi-natural salt marsh (EN;<).

References and type parallels: Partially U5, U7 (VN). Partially G05 (DNHB-13).

T33-C-2 Upper semi-natural salt marsh

NiN characteristics: Fixed land systems: Semi natural salt marsh (T33), one basic type (2). Defined by LKM: TVy2. LKM basic level: TVyijk.

Physiognomy: Low-growing, closed meadow-like vegetation dominated by salt-tolerant graminids and herbs.

Ecological characteristics: Includes semi-natural salt marsh in the supralittoral belt, in protected, low erosion-prone places, most often on fine material (silt and clay), but sometimes on gravel. Flooded by seawater at spring tides. Well drained, without salt enrichment.

Brackish water characteristics in places where fresh water is supplied. Conditioned by grazing (in some places mowed) and re-grows with tall graminids, especially roof pipes, when use ceases. Elements of salt-tolerant land plants distinguish from semi-natural meadows, while stronger elements of species typical of semi-natural meadows distinguish the type from natural salt meadows (T12). It is likely that most of the larger salt meadows in southern Norway, which are dominated by low-growing species in protected places, depend on grazing. However, semi-natural salt meadows are also found in the north, but grow back there more slowly when use ceases. Knowledge of past and present grazing use from older aerial photographs, locally known or other sources, combined with a clear element of species typical of semi-natural meadows, is often helpful in distinguishing T33 from natural salt meadows. Herbaceous type with several rare vascular plants, especially in south-east Norway. Fewer salt-tolerant species and more distinct elements of species from semi-natural meadows than in semi-natural salt meadows in the upper geolittoral.

Terrain and aerial photo characteristics: Gently sloping surfaces in inner parts of the salt marsh. Smooth structure. Photo time in relation to water level affects visibility in aerial photographs. FF: Most often dark green colour), but dominance of certain grass species can give a light green or light brown colour. Texture often alternating with elements of brown seaweed embankments, lighter stones and gravel etc. Texture and color vary little within and between regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T33-2	T33-B-2	T33-C-2	T33-D-1	T33-E-1
Basic types		T33-2	T33-2	T33-1, 2	T33-1, 2

Diagnostic species m =

abundance species (**m*** = dominant m.); v = common species (**v*** = constant v.); t = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); s = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.).

<i>Achillea millefolium</i> yarrow v*	<i>Lychnis flos-cuculi</i> cock's comb v	<i>Sagina nodosa</i> budding heirloom v
<i>Agrostis stolonifera</i> creeper v	<i>Ophioglossum vulgatum</i> worm tongue t*	<i>Scorzonerooides autumnalis</i> follblom v;s+
<i>Artemisia vulgaris</i> burro v;s+[TVyih]	<i>Parnassia palustris</i> jäblom v	[TVyih]
<i>Campanula rotundifolia</i> bluebell v	<i>Plantago major</i> plantain v	<i>Selinum carvifolia</i> mugwort s+[TVyih]
<i>Festuca rubra</i> red fescue etc	<i>Plantago maritima</i> beach giant v	<i>Sonchus arvensis</i> field gorse
<i>Filipendula ulmaria</i> meadowsweet v;s+[TVyih]	<i>Poa pratensis</i> engrapp v	<i>Trifolium repens</i> white clover m*;v*
<i>Galium palustre</i> marsh anemone v	<i>Polygonum aviculare</i> tungras v	<i>Tripleurospermum maritimum</i> strandbal derbrå v
<i>Juncus gerardii</i> salt rush v	<i>Rhinanthus minor</i> small meadow call v	
<i>Lotus corniculatus</i> tirltongue v;s+[TVyih]	<i>Rumex crispus</i> krushaymol v	<i>Vicia cracca</i> bird's vetch v*

Distribution and regional distribution: BN-SB (MB-NB), O3-OC. Perhaps found along the entire coast, but most commonly from Østfold to Rogaland. Species-rich designs with a characteristic species composition in the south-east.

Most important types of confusion: Beach meadow (T12-C-1, 2), semi-natural salt meadow in the upper geolittoral (T33-C-1), semi-natural meadow (T32).

Red list status (2018): Semi-natural salt marsh (EN;<).

References and type parallels: Partially U5, U7 (VN). Partially G05 (DNHB-13).



Horse pasture upper semi-natural salt meadow. Ex: Advise: Tomb.
Photo: RH.

T34-C-1 Lime-poor bakli heather

NiN characteristics: Mainland systems: Coastal heath (T34), one ground type (1). Defined by LKM: KA-y1 & UF-y1. LKM basic steps: KA-abc & UF-bc.

Physiognomy: Heath moors with a field layer of heather species and ferns. Well-developed bottom layer. Occurs on north- and east-facing, humid slopes (baklia). Physiognomy and dominance conditions are affected by time after the last heather cutting (cf. the heather cycle).

Ecological characteristic: Has been created through long-term extensive basic cultivation in the form of grazing and burning (possibly also mowing). The Bakli moors typically occur on north- and east-facing, often moist slopes, in some places in slightly rough and rocky and/or slightly rutted terrain. The species composition is characterized by a number of heather species, including heather, but these generally have lower coverage here than in calcareous and intermediate coastal heather moors. Several of the ferns in the bakli heaths (T34-C-1, 3) appear as focus species for, or distinguishing species from, other mapping units in coastal heaths. The bottom layer has mosses adapted to poor and humid conditions. Differs from intermediate bakli heath in that slightly more lime-demanding species are missing.

Terrain and aerial photo characteristics: Occurs in north- and east-facing terrain positions, preferably on moist slopes. Can be difficult to distinguish from intermediate bakli hedgerows. FF: Most often dark brown-green to reddish-brown in colour, but medium green in the case of dominance by ferns. Recently deforested areas grey-brown, with increasing brown-green color intensity as the heather regenerates. Texture often smooth, but with variation due to terrain (and shadow effects which often cause transitions in the lighting conditions). Texture and color vary little within and between regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T34-B-1	T34-C-1	T34-D-1	T34-E-1
Basic types	T34-1	T34-1	T34-1	T34-1	T34-1-3,11

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.).

<i>Anemone nemorosa</i> whitves v;s-[UFyld]	<i>Luzula sylvatica</i> large fry v*s*[UFyld]	<i>Vaccinium uliginosum</i> blockberry v*s+[UFyld]
<i>Avenella flexuosa</i> smyle v*s-[KAyld];s-[UFyld]	<i>Lycopodium clavatum</i> soft crow 's foot s-[KAyld];s-[UFyld]	<i>Breutelia chrysocoma</i> golden hair moss v;s*[UFyld]
<i>Blechnum spicant</i> bear 's comb v;s*[UFyld]	<i>Lysimachia europaea</i> forest star v	<i>Dicranum scoparium</i> rib sickle v
<i>Calluna vulgaris</i> heather v*	<i>Melampyrum pratense</i> stormarimjelle v;s+[UFyld]	<i>Hylocomium splendens</i> floor moss m;v*s-[UFyld]
<i>Chamaepericlymenum suecicum</i> scrub berry v;s+[UFyld]	<i>Oreopteris limbosperma</i> buttertail v;s*[UFyld]	<i>Hypnum jutlandicum</i> heiflette v*
<i>Dryopteris filix-mas</i> worm larvae s-[UFyld]	<i>Oxalis acetosella</i> cuckoo acid s*[UFyld]	<i>Pleurozium schreberi</i> pine moss v;s+[UFyld]
<i>Empetrum nigrum</i> cricket v;s+[UFyld]	<i>Potentilla erecta</i> carpet root v	<i>Rhytidadelphus loreus</i> coastal wreath moss v;s-[UFyld]
<i>Gymnocarpium dryopteris</i> bird 's tail s-[UFyld]	<i>Vaccinium myrtillus</i> blueberries m;v*s-[UFyld]	
<i>Juniperus communis</i> juniper v		



Lime-poor bakli-heath. Ro: Sokndal: Årosåsen. Photo: RH.

Distribution and regional distribution: Probably found in the entire range of coastal heather, but most common in Western Norway and Central Norway (BN-SB; O3-O2).

Main confusion types: T34-C-2-3, T2-C-1, T32-C-1 (especially in pioneer phase), T16-C-1, T31-C-1-2 (north), T4-C-1 (upon termination of claim).

Red list status (2018): Kystlynghei (EN;<).

References and type parallels: H4 (VN), D07 (DNHB-13).

T34-C-2 Calcareous coastal heaths

NiN characteristics: Upland systems: Coastal

heath (T34), three basic types (2,3,11). Defined by LKM: KA-y1 & UF-y2,3 & VM-y1,2. LKM base step: KA-abc & UF-defg.

Physiognomy: Heath heaths with a field layer of heather species, and with heather as a constant and dominant species. The physiognomy varies throughout the heather cycle. Graminids and herbs dominate after heather mowing, heather in the building and mature phase, while cryptogams are most prominent in the degenerating phase.



Lime-poor coastal heaths. Ho: Lindås: Lygra, Luro. Photo: RH.

Ecological characteristic: Has been created through long-term extensive basic cultivation in the form of grazing, burning and possibly mowing. The species composition is characterized by heather species, where heather is typically a constant and dominant abundant species. Occurs on raw humus and peaty soil, peat-like shallow humus layer over rock, weathered soil, moraines or coarse washed out sand. Differs from intermediate and lime-rich coastal heaths by being dominated by species adapted to low-lime conditions, and by the absence of lime-demanding species. In general, a rather species-poor mapping unit. Species diversity, especially of herbs and grasses, is highest after burning, in the pioneer and early construction phase.

Terrain and aerial photo characteristics: Occurs throughout the distribution area of coastal heather, in areas that are geologically poor in lime. FF: Most often dark brown-green to reddish-brown in colour, but medium green in the case of dominance by ferns. Recently deforested areas grey-brown, with increasing brown-green color intensity as the heather regenerates. Texture often uniform, but characteristic features of other natural types (eg T1 Bare rock) can give variation in color and texture. Texture and color vary little within and between regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T34-2-3,11	T34-B-2-3,11	T34-C-2	T34-D-2	T34-E-1
Basic types		T34-1-3,11	T34-2-3,11	T34-2-3,11	T34-1-3,11

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **tx-** gradt ent-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.).

<i>Agrostis canina</i> dog's knevein v <i>Agrostis capillaris</i> meadowsweet v* <i>Anthoxanthum odoratum</i> yellow v <i>Arctostaphylos uva-ursi</i> honeydew v <i>Avenella flexuosa</i> smile v* <i>Calluna vulgaris</i> heather m*;v* <i>Carex nigra</i> ssp. <i>nigra</i> cornstar v <i>Carex panicea</i> sorghum v <i>Carex pilulifera</i> sedge v;s-[UF-ydc] <i>Chamaepericlymenum suecicum</i> scrub berry v <i>Dactylorhiza maculata</i> ssp. <i>maculata</i> spotted marigold v	<i>Empetrum nigrum</i> kreling v <i>Erica tetralix</i> bell heather v <i>Lycopodium clavatum</i> soft crow 's foot v;s-[KA-ycl] <i>Potentilla erecta</i> carpet root v* <i>Rubus chamaemorus</i> molte v;s-[KA-ycl] <i>Salix repens</i> heivier v <i>Trichophorum cespitosum</i> bear 's beard v* <i>Vaccinium myrtillus</i> blueberry v* <i>Vaccinium uliginosum</i> blockberry v* <i>Vaccinium vitis-idaea</i> cranberry v	<i>Dicranum scoparium</i> rib sickle v* <i>Hylocomium splendens</i> floor moss v* <i>Hypnum jutlandicum</i> heiflette v* <i>Pleurozium schreberi</i> pine moss v* <i>Pseudoscleropodium purum</i> narremose s-[KA-ycl] <i>Racomitrium lanuginosum</i> heath gray moss v;s-[KA-ycl] <i>Rhytidadelphus loreus</i> _
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Distribution and regional distribution: Found throughout the distribution area of coastal heather (BN-SB, O3-O2).

Most important confusion types: T34-C-1, 3, 4, T2-C-1, T32-C-1, 11 (especially in pioneer phase), V1-C-5-6, V3-C1-2, T31-C-1-3 (north), T4-C-5, 9 (upon termination of claim).

Red list status (2018): Kystlynghei (EN;<).

References and type parallels: Partially H1, H2, H3 (VN), D07 (DNHB-13).

T34-C-3 Intermediate bakli-hi

NiN characteristics: Mainland systems: Coastal heath (T34), one ground type (4). Defined by LKM: KA-2 & UFy1. LKM basic level: KA-de & UF-bc.

Physiognomy: heather has a field layer of heather species and ferns. Well-developed bottom layer. Occurs on north and east-facing, moist slopes (baklia).

Ecological characteristic: Has been created through long-term extensive basic cultivation in the form of grazing and burning (possibly also mowing). The Bakli moors typically occur on north- and east-facing, often moist slopes, in some places in slightly rough and rocky and/or slightly rutted terrain. The species composition is characterized by a number of heather species, including heather, but these generally have lower coverage here than in calcareous and intermediate coastal heather moors. Several of the ferns in the bakli heaths (T34-C-1, 3) appear as focus species for, or distinguishing species from, other mapping units in coastal heaths. The bottom layer has mosses adapted to relatively low-lime conditions and a low risk of drying out. Differs from lime-poor bakli heath by the presence of several slightly calcareous species.

Terrain and aerial photo characteristics: Occurs in north- and east-facing terrain positions, preferably on moist slopes. Can be difficult to distinguish from lime-poor bakli heather. FF: Most often dark brown-green to reddish-brown in colour, but medium green in the case of dominance by ferns. Recently deforested areas grey-brown, with increasing brown-green color intensity as the heather regenerates. Texture often smooth, but with variation due to terrain. Texture and color vary little within and between regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T34-B-4	T34-C-3	T34-D-3	T34-E-2
Basic types	T34-4	T34-4	T34-4	T34-4	T34-4-6,12

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.).

<i>Anemone nemorosa</i> whitveis v;s-[KAydlc];s-[UFyld]	<i>Juniperus communis</i> juniper v <i>Luzula sylvatica</i> large fry s*[KAyelf];s*[UFyld]	<i>Vaccinium myrtillus</i> blueberry v;s+[KAyelf];s-[UFyld]
<i>Avenella flexuosa</i> smyle v;s-[KAyelf];s-[UFyld]	<i>Lycopodium clavatum</i> soft crow 's foot s*[KAyelf]	<i>Vaccinium uliginosum</i> blockberry v;s+[UFyld]
<i>Blechnum spicant</i> bear 's comb s*[KAyelf];s*[UFyld]	<i>Melampyrum pratense</i> storm marimjelle v;s*[KAyelf];s*[UFyld]	<i>Viola riviniana</i> forest violet s*[KAydlc];s*[UFyld]
<i>Calluna vulgaris</i> heather v*	<i>Oreopteris limbosperma</i> buttercup s*[KAyelf];s*[UFclc]	<i>Breutelia chrysocoma</i> golden hair moss v;s*[KAyelf];s*[UFyld]
<i>Chamaepericlymenum suecicum</i> scrub berry v';s*[KAyelf];s+[UFyld]	<i>Polygala serpyllifolia</i> blue feather s*[KAydlc]	<i>Dicranum scoparium</i> rib sickle v <i>Hylocomium splendens</i> floor moss m;v*;s-[UFyld]
<i>Digitalis purpurea</i> fox bell v;s*[UFyld]	<i>Potentilla erecta</i> carpet root v	<i>Hypnum jutlandicum</i> heiflette v*;s-[UFydlc]
<i>Dryopteris filix-mas</i> worm larvae s-[UFyld]	<i>Pteridium aquilinum</i> einstape s-[UFyld]	<i>Pleurozium schreberi</i> pine moss v;s+[UFyld]
<i>Erica tetralix</i> bell heather s+[KAyelf]	<i>Rhytidadelphus loreus</i> coastal wreath moss v;s*[KAyelf];s-[UFyld]	
<i>Gymnocarpium dryopteris</i> bird's -eye s-[KAydlc];s-[UFyld]		

Distribution and regional distribution: Probably found in the entire range of coastal heather, but most common in Western Norway and Central Norway (BN-SB; O3-O2).

Main confusion types: T34-C-1-2, 4, T2-C-3, T32-C-3 (especially in pioneer phase), T16-C-2, 5, T31-C-4, 13 (north), T4 -C-2 (upon termination of claim).

Red list status (2018): Kystlynghei (EN;<).

References and type parallels: H4 (VN), D07 (DNHB-13).



Intermediate bakli hi. Ho: Lindås: Lurekalven. Photo: PAA.

T34-C-4 Intermediate

coastal moors

NiN characteristics: Upland systems:

Coastal heath (T34), three basic types (5,6,12).
Defined by LKM: KAÿ2 & UFÿ2,3 & VMÿ2. LKM basic level: KA·de & UF·defg.

Physiognomy: Heath heaths with a field layer of heather species, and with heather as a constant and dominant species. The physiognomy varies throughout the lynx louse. Graminids and herbs predominate after heathering, heather in the building and mature phase, while cryptogams are most prominent in the degenerating phase. **Ecological**



Intermediate coastal heaths. Ho: Børmlø: Bremnes, Hiskjo.
Photo: RH.

characteristic: Has been created through long-term extensive basic cultivation in the form of grazing, burning and possibly mowing. The species composition is characterized by heather species, where heather is a constant and dominant abundant species. Occurs on weakly mineral-soil-mixed humus and peaty soil, peat-like shallow humus layer over rock, weakly mineral-soil-mixed humus and weathering soil, moraines or coarse washed-out sand. Differs from calcareous coastal heathers by having elements of some slightly calcareous species, from slightly calcareous coastal heathers by lacking more calcareous species. In general, a rather species-poor mapping unit. Species diversity, especially of herbs and grasses, is highest after burning, in the pioneer and early construction phase.

Terrain and aerial photo characteristics: Occurs throughout the distribution area of coastal heather, in areas that are geologically poor in lime, but also in somewhat more lime-rich areas. FF: Most often dark brown-green to reddish-brown in colour, but local dominance of ferns, grasses or cattails can give a purer green colour. Recently deforested areas grey-brown, with increasing brown-green color intensity as the heather regenerates. Texture often uniform, but characteristic features of other natural types (eg T1 Bare rock) can give variation in color and texture. Texture and color vary little within and between regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T34-B-5,6,12	T34-C-4	T34-D-4	T34-E-2
Basic types	T34-5,6,12	T34-5,6,12	T34-5-6,12	T34-5,6,12	T34-4-6,12

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity species (t* = characteristic t., t¤-gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.).

<i>Agrostis canina</i> dog's knee <i>Agrostis capillaris</i> meadowsweet v* <i>Anthoxanthum odoratum</i> yellow v <i>Arctostaphylos uva-ursi</i> honeydew v <i>Avenella flexuosa</i> smyle v;s-[KAÿelf] <i>Bistorta vivipara</i> harerug s*[KAÿeld] <i>Calluna vulgaris</i> heather m;v*s-[KAÿelf] <i>Carex pilulifera</i> sedge v;s-[KAÿelf] <i>Chamaepericlymenum suecicum</i> scrub berry v;s*[KAÿelf] <i>Dryopteris filix-mas</i> worm larvae v <i>Empetrum nigrum</i> krekling v <i>Erica tetralix</i> bell heather v;s*[KAÿelf] <i>Galium boreale</i> white ants s*[KAÿeld] <i>Galium saxatile</i> coastal ant v;s-[KÿAdlc]	<i>Gymnocarpium dryopteris</i> bird tail v;s-[KAÿdlc] <i>Hieracium vulgatum</i> agg. grazing weaver v;s+[KAÿdlc] <i>Juncus squarrosus</i> heisiv v;s*[KAelf] <i>Luzula multiflora</i> ground beetle v <i>Myrica gale</i> pors v <i>Pedicularis sylvatica</i> coastal blackthorn v;s*[KAÿdlc] <i>Pleurozium schreberi</i> furfumose v <i>Polygala serpyllifolia</i> blue feather s*[KAÿdlc] <i>Potentilla erecta</i> carpet root v <i>Pteridium aquilinum</i> eintape v	<i>Rubus chamaemorus</i> molte s+[KAÿelf] <i>Rubus saxatilis</i> teaberry s*[KAÿdlc] <i>Trichophorum cespitosum</i> bear 's beard v <i>Vaccinium myrtillus</i> blueberry v;s-[KAÿelf] <i>Vaccinium uliginosum</i> blockberry v <i>Viola riviniana</i> forest violet s*[KAÿdlc];s*[UFÿcl] <i>Dicranum scoparium</i> rib sickle v <i>Hylocomium splendens</i> floor moss v* <i>Hypnum jutlandicum</i> heiflette v* <i>Rhytidiodelphus loreus</i> coastal wreath moss v;s-[KAÿelf]
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Distribution and regional distribution: Found throughout the distribution area of coastal heather (BN-SB, O3-O2).

Main confusion types: T34-C-2, 3, 5, T2-C-3, T32-C-3, 13 (especially in pioneer phase), V1-C-6, T31-C-5 (up north), T4-C-6, 10, 14 (in case of overgrowth).

Red list status (2018): Kystlynghei (EN;<).

References and type parallels: Partially H1, H2, H3 (VN), D07 (DNHB-13).

T34-C-5 Slightly calcareous

coastal heath moors

NiN characteristics: Mainland systems: Coastal heath (T34), two basic types (7,8). Defined by LKM: KA-fg3 & UFy2,3. LKM basic steps: KA-fg & UF-defg.

Physiognomy: Coastal heather moors with a field layer of heather species and where heather is a common species, but with a significant element of graminids and herbs. The physiognomy varies throughout the heather cycle. Graminids and herbs dominate after heather cutting, heather increases in quantity in the building and mature phase, while cryptogams are most prominent in the degenerating phase.



Weakly calcareous coastal heath moors. NT: Leka: Årdalsanden.
Photo: RH.

Ecological characteristic: Has been created through long-term extensive basic cultivation in the form of grazing, burning and possibly mowing. Occurs on mineral soil-mixed humus and peaty soil, peat-like shallow humus over rock, weathering soil and the bogs; on relatively calcareous soil. The species composition is characterized by heather species, with heather as a common species, but has a significant element of graminids and herbs in the field layer. Differs from intermediate coastal heaths (T34-C-4) by having a greater proportion of lime-requiring species. Weakly calcareous heathers in the north (NT, NO) can have a significant element of alpine species.

Terrain and aerial photo characteristics: Occurs throughout the distribution area of coastal heather, preferably in areas with somewhat more calcareous rocks or loose masses. FF: Color most often brownish green to brownish yellow, dominance of grass and herbs gives a medium to light green colour. Recently deforested areas grey-brown, with increasing brown-green color intensity as the heather regenerates. Texture often smooth, but with characteristic features of other nature types that provide variation in color and texture. Texture and color vary little within regions and between regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T34-7,8	T34-B-7.8	T34-C-5	T34-D-5	T34-E-3
Basic types		T34-7.8	T34-7,8	T34-7,8	T34-7,8

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.).

<i>Agrostis canina</i> dog's kneiv v <i>Antennaria dioica</i> cat's foot v <i>Anthoxanthum odoratum</i> yellow v <i>Arctostaphylos uva-ursi</i> honeydew v <i>Botrychium lunaria</i> sea key s*[KA:fle] <i>Calluna vulgaris</i> heather m;*:s-[KA:glh] <i>Carex capillaris</i> s *[KA:glf] <i>Carex panicea</i> sorghum v <i>Carex pulicaris</i> fleabane s*[KA:fle] <i>Danthonia decumbens</i> knegras v	<i>Erigeron borealis</i> mountain ground star s*[KA:fle] <i>Galium saxatile</i> coastal ant v <i>Linum catharticum</i> wild flax s*[KA:glf] <i>Luzula campestris</i> ground beetle s*[KA:fle] <i>Melica nutans</i> hanging ax s *[KA:fle] <i>Nardus stricta</i> fin beard s*[KA:glh] <i>Ophioglossum vulgatum</i> worm tongue s*[KA:glf] <i>Orchis mascula</i> spring marigold s*[KA:glf] <i>Potentilla crantzii</i> spotted wall s*[KA:glf]	<i>Potentilla erecta</i> carpet root v <i>Pteridium aquilinum</i> eintape v <i>Salix reticulata</i> s *[KA:glf] <i>Saxifraga corymbosa</i> mountain lady s*[KA:fle] <i>Selaginella selaginoides</i> Dwarf Common s*[KA:fle] <i>Dicranum scoparium</i> rib sickle v <i>Hylocomium splendens</i> floor moss v;s+[KA:glh] <i>Hypnum jutlandicum</i> heiflette v
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Distribution and regional distribution: Found throughout the distribution area of coastal heather (BN-SB, O3-O2).

Main confusion types: T34-C-4, 6, T2-C-5, T32-C-5, 15 (especially in pioneer phase), V1-C-7, T31-C-8 (north), T4-C-3 , 7, 11, (upon termination of claim).

Red list status (2018): Kystlynghei (EN;<).

References and type parallels: Partially H1-H3 (VN), D07 (DNHB-13).

T34-C-6 Highly calcareous coastal heaths

NiN characteristics: Mainland systems: Coastal heath (T34), two ground types (9,10). Defined by LKM: KA-4 & UFy2,3. LKM basic stage: KA-hi & UF-defg.

Physiognomy: Coastal heather with a field layer of heather species and where heather is a common species, with a large proportion of graminids and herbs. Physiognomy and dominance relationships vary throughout the heath cycle. Graminids and herbs dominate after heather fall, but are common and have a high proportion of cover throughout the cycle. Lightning species most important in the construction and mature phase. Bottom layer varies from sparse to well developed.



Highly calcareous coastal heaths. No: Bodø: Bliksvær. Photo: RH.

Ecological characteristic: Has been created through long-term extensive basic cultivation in the form of grazing, burning and possibly mowing. Occurs where there are base-rich rocks or loose masses. The species composition is characterized by heather species, graminids and herbs. Common heather is a common species, but dominates to a lesser extent than in the poorer coastal heathers. Differs from slightly calcareous coastal heaths by having greater diversity and coverage of calcareous species. Strongly calcareous heathers in the north (NT, NO) can have a significant element of alpine species.

Terrain and aerial photo characteristics: Occurs throughout the distribution area of coastal heather, preferably in areas with calcareous rocks. FF: Color most often brownish green to brownish yellow, but stronger elements of grass or herbs can give a purer green color. Recently deforested areas become grey-brown to yellow-brown with increasing brown-green when regenerating rushes or more green when regenerating grass. Texture often smooth, but with characteristic features of other nature types that provide variation in color and texture. Texture and color vary little within regions and between regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T34-9,10	T34-B-9,10	T34-C-6	T34-D-6	T34-E-4
Basic types		T34-9,10	T34-9,10	T34-9,10	T34-9,10

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity species (t* = characteristic t., t- gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.).

<i>Anthoxanthum odoratum</i> yellow v <i>Bartsia alpina</i> blacktop s-[KAyhlg] <i>Botrychium lunaria</i> sea key s-[KAyhlg] <i>Calluna vulgaris</i> heather v* <i>Carex capillaris</i> hair loss v;s+[KAyhlg] <i>Carex flacca</i> s+[KAyhlg] <i>Carex panicea</i> sorghum v <i>Carex pulicaris</i> fleabane s-[KAyhlg] <i>Drys octopetala</i> reindeer s+[KAyhlg] <i>Epipactis atrorubens</i> red flanger s*[KAyih]	<i>Erigeron borealis</i> mountain star s-[KAyhlg] <i>Linum catharticum</i> wild-lin s+[KAyhlg] <i>Lotus corniculatus</i> tirltongue v* <i>Melica nutans</i> hanging ax s-[KAyhlg] <i>Ophioglossum vulgatum</i> worm tongue s-[KAyhlg] <i>Orchis mascula</i> spring marigold s-[KAyhlg] <i>Potentilla crantzii</i> spotted wall v <i>Potentilla erecta</i> carpet root v*	<i>Primula scandinavica</i> mountain key flower <i>Saxifraga oppositifolia</i> red herring <i>Salix reticulata</i> s+[KAyhlg] <i>Selaginella selaginoides</i> dwarf dwarf s-[KAyhlg] <i>Thalictrum alpinum</i> mountain seed star s+[KAyhlg] <i>Viola biflora</i> mountain violet s-[KAyhlg] <i>Hypnum jutlandicum</i> heiflette v
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Distribution and regional distribution: Rare, seems to have the greatest occurrence in northern Norway, most frequently in the Salten area (NO).

Main confusion types: T34-C-5, T2-C-7, T32-C-7, 17 (especially in pioneer phase), V1-C-8, T31-C-10, 11 (north), T4-C-4 , 12 (on termination of claim).

Red list status (2018): Kystlynghei (EN;<).

References and type parallels: Partially H1-H3 (VN), D07 (DNHB-13).

T35-C-1 Strongly altered solid ground with soil cover

NiN characteristics: Firm ground systems: Loose highly modified firm ground (T35), one basic type (1). Defined by LKM: S1yA. LKM basic step: S1y0.

Physiognomy: Strongly changed solid land with soil cover includes various stages of succession from completely vegetation-free soil-covered surfaces and areas with only scattered pioneer species to more densely vegetated areas where both shrubs and trees have also established themselves.

Ecological characteristics: Strongly modified solid land with soil cover includes all solid land that, through extensive intervention, has been given a new loose mass cover of soil, so that rapid succession is possible. Has a top layer of soil that is colonized so quickly that a post-succession state can be expected to be reached within (100–)150 years. Landfills of soil masses that have not been graded and sown belong to this main type. Typical examples are areas where soil has been filled in connection with development or other construction activities, earth piles, soil-covered roadsides and similar "scrap land" areas. The vegetation is composed of naturally native species and disturbance-tolerant "weed species" and varies from place to place depending, among other things, on spread from the surrounding vegetation. Often has a strong influence of alien species, especially in urban areas in the south. Old ballast places can be included. There is no knowledge that makes it possible to systematize this variation in an appropriate basic type system, and therefore no table of diagnostic species has been inserted. Differentiated from other strongly altered solid land by substrate type. An early successional phase dominated by small pioneer mosses and vascular plants is typical on soil-covered land, but taller "weed species" are quickly established. The type can transition to forest when the post-succession state has been reached, i.e. when the species composition and ecological processes typical of woodland have been established.



Strongly changed solid land with soil cover. Ak: Bærum: Fornebu. Photo: HB.

Terrain and aerial photograph characteristics: Visibility in aerial photographs varies depending on the vegetation cover, but the type most often occurs in connection with roads, residential and industrial areas and similar built-up areas.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T35-1	T35-B-1	T35-C-1	T35-D-1	T35-E-1
Basic types		T35-1	T35-1	T35-1	T35-1

Distribution and regional distribution: BN-LA, O3-C1. All over the country, but less common in the mountains.

Most important types of confusion: Strongly modified solid ground with a cover of sand and gravel (T35-C-2), strongly modified solid ground with a cover of silt and clay (T35-C-3), various solid ground forest types (T4).

Red List Status (2018): NE

References and type parallels: I1-I3 (VN), D15 (DNHB13).

T35-C-2 Heavily modified solid fields with a cover of sand or gravel

NiN characteristics: Firm ground systems: Loose highly modified firm ground (T35), two basic types (2,3). Defined by LKM: S1yb,C. LKM basic step: S1ydefg.

Physiognomy: Strongly altered solid ground with a cover of sand or gravel includes various stages of succession from completely vegetation-free sand or gravel-covered surfaces and areas with only scattered pioneer species to denser vegetation-covered areas where both shrubs and trees have established themselves.

Ecological characteristics: Strongly modified permanent land with a sand, gravel or stone cover includes all permanent land which, through extensive intervention, has received a new predominantly inorganic loose mass cover of sand or gravel, so that rapid succession is possible. Has a predominantly inorganic top layer of sand or gravel that is colonized so quickly that a post-successional state can be expected to be reached within (100–)150 years. Areas of sand and gravel between rocks, which are expected to have rapid succession, are included here, while block dumps with slow succession belong to T39-C-1. Mass extraction areas and landfills that are not planned and seeded belong to this main type. Typical examples are gravel and sand roofs, car parks, road embankments, sand and gravel dumps, rock dumps and similar "junkyard" areas where sand, gravel and stone have been filled in in connection with development and other construction activities. The vegetation is composed of naturally native species and disturbance-tolerant "weed species" and varies from place to place depending, among other things, on spread from the surrounding vegetation. Often has a strong influence of alien species, especially in urban areas in the south. There is no knowledge that makes it possible to systematize this variation in an appropriate basic type system, and therefore no table of diagnostic species has been inserted. The type is distinguished from other strongly altered solid land by substrate type. An early successional phase dominated by small pioneer mosses and vascular plants is typical land, but taller "weed species" are usually established quickly. The type can transition to forest when the post-succession state has been reached, i.e. when the species composition and ecological processes typical of woodland have been established.



Strongly altered permanent fields with a cover of sand or gravel.
Op: Dovre: Avsjøen NW. Photo: HB.

Terrain and aerial photograph characteristics: Visibility in aerial photographs varies depending on the vegetation cover, but the type most often occurs in connection with roads, residential and industrial areas and similar built-up areas.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T35-B-2,3	T35-C-2	T35-D-2	T35-E-2
Basic types	T35-2,3	T35-2,3	T35-2,3	T35-2,3	T35-2,3

Distribution and regional distribution: BN-LA, O3-C1. All over the country, but less common in the mountains.

Most important types of confusion: Strongly modified solid land with soil cover (T35-C-1), strongly changed solid land with silt and clay cover (T35-C-3), block dumps (T39-C-1), various solid land forest types (T4).

Red List Status (2018): NE

References and type parallels: I1-I3 (VN), D14 and D15 (DNHB13).

T35-C-3 Strongly altered firm ground with a cover of silt and clay

NiN characteristics: Firm ground systems: Loose highly modified firm ground (T35), one basic type (4). Defined by LKM: S1yD. LKM basic step: S1yhi.

Physiognomy: Strongly altered solid land with a cover of silt and clay includes different stages of succession from completely vegetation-free silt and clay-covered surfaces and areas with only scattered pioneer species to denser vegetation-covered areas where both shrubs and trees have also established themselves.

Ecological characteristics: Strongly modified permanent land with silt and cover includes all permanent land which, through extensive intervention, has been given a new loose mass cover with silt and clay, so that rapid succession is possible. Has a top layer of silt and clay that is colonized so quickly that a post-successional state can be expected to be reached within (100–)150 years. Landfills of masses that are not planned and seeded belong to this main type. Typical examples are areas where silt and clay have been deposited in connection with dredging, development or other construction activities, clay piles and similar "scrap land" areas. The vegetation is composed of naturally native species and disturbance-tolerant "weed species" and varies from place to place depending, among other things, on spread from the surrounding vegetation. Often has a strong influence of alien species, especially in urban areas in the south. There is no knowledge that makes it possible to systematize this variation in an appropriate basic type system, and therefore no table of diagnostic species has been inserted.

Differentiated from other strongly altered solid land by substrate type. An early successional phase dominated by small pioneer mosses and vascular plants is typical on silt and clay-covered land, but taller "weed species" are quickly established. The type can transition to forest when the post-succession state has been reached, i.e. when the species composition and ecological processes typical of woodland have been established.

Terrain and aerial photograph characteristics: Visibility in aerial photographs varies depending on the vegetation cover, but the type most often occurs in connection with roads, residential and industrial areas and similar built-up areas.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T35-4	T35-B-4	T35-C-3	T35-D-3	T35-E-3
Basic types		T35-4	T35-4	T35-4	T35-4



Strongly changed solid ground with a cover of silt and clay.
Of: Whales: Vesterøy, N of Belleville. Photo: RH.

Distribution and regional distribution: BN-LA, O3-C1. All over the country, but less common in the mountains.

Most important types of confusion: Strongly modified permanent land with soil cover (T35-C-1), strongly modified permanent land with a cover of sand and gravel (T35-C-2), various permanent forest types (T4).

Red List Status (2018): NE

References and type parallels: I1-I3 (VN), D15 (DNHB13).

T36-C-1 Strongly altered former wetland

NiN characteristics: Solid land systems: Drained wetland and freshwater systems (T36), one basic type (1). Defined by LKM: HS*ÿA.

Physiognomy: Open ditches and drainage channels, often quite deep, with exposed peat. Varying coverage in the field and bottom layer, but usually residual populations of peat mosses in the bottom layer. Very often planted with trees, preferably spruce.

Ecological characteristics: Strongly altered former wetlands include irreversibly drained and thoroughly altered wetlands on former peatlands, such as open bogs and bog woodlands. Peat degradation and changes in the hydrological system are so extensive that the definition of a wetland system no longer applies and the area has become a strongly altered wetland system. Clear traces of former peat land are usually still found. After drainage of bogs, changes in the species composition occur relatively quickly and with bog and wetland species as a starting point.

Species composition will therefore contain residual populations of species associated with peatland and species established from surrounding permanent land vegetation, and will therefore vary from place to place, partly also based on lime content. There is no knowledge that makes it possible to systematize this variation in an appropriate basic type system, and therefore no table of diagnostic species has been inserted. Most often, these are drained bogs that have been planted with trees, and the type is often characterized by deep ditches, layers of wood and a mixture of bog and upland species.

Terrain and aerial photo characteristics: Mostly flat terrain. Characterized by ditches and drainage channels.

Planted areas can be difficult to distinguish from other forest on aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T36-1	T36-B-1	T36-C-1	T36-D-1	T36-E-1
Basic types		T36-1	T36-1	T36-1	T36-1

Distribution and regional distribution: BN-NB, O3-C1.

Most important types of confusion: Bog and swamp forest land (V2), plantation forest (T38-C-1).

Red List Status (2018): NE

References and type parallels: –



Strongly changed solid land with soil cover.
Ak: Bærum: Fornebu. Photo: HB.

T36-C-2 Dried river bed

NiN characteristics: Solid land systems: Drained wetland and freshwater systems (T36), one basic type (2). Defined by LKM: HS*ýB.

Physiognomy: Starts as open areas without vegetation cover after drying. Gradual increase in vegetation cover from scattered pioneer species, via an increasing field layer and finally with a closed tree layer.

Ecological characteristics: Dry river beds are areas that were formerly river beds, but are now dry in connection with hydropower development or other interventions. After drying, the area will be devoid of vegetation and characterized by the characteristics of the river bed, i.e. with varying substrate conditions from mudflats to rock-covered ground. Over time, there will be a gradual growth with native species from adjacent vegetation. The species composition will therefore vary with the soil characteristics and with the spread of native species from the vegetation in the surrounding areas. Often elements of disturbance-tolerant "weeds". There is no knowledge that makes it possible to systematize this variation in an appropriate basic type system, and therefore no table of diagnostic species has been inserted. Over time, the vegetation will develop towards a post-succession state that will vary according to the ecological conditions on the site.

Terrain and aerial photo characteristics: Located adjacent to rivers. Recently dry riverbeds are most often clearly seen in aerial photographs, while areas with established vegetation cover can have the same appearance as adjacent natural types.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T36-B-2	T36-C-2	T36-D-2	T36-E-2
Basic types	T36-2	T36-2	T36-2	T36-2	T36-2

Distribution and regional distribution: BN-LA, O3-C1.

Main types of confusion:

Red List Status (2018): NE

References and type parallels: –

T36-C-3 Dried lake bed

NiN characteristics: Solid land systems: Drained wetland and freshwater systems (T36), one basic type (3). Defined by LKM: HS*ÿC.

Physiognomy: Starts as open areas without vegetation cover after drying. Gradual increase in vegetation cover from scattered pioneer species, via an increasing field layer and finally with a closed tree layer.

Ecological characteristics: Dry lake beds are areas that were previously river beds, but are now dry in connection with hydropower development or other interventions. Immediately after drying, the area will be devoid of vegetation and characterized by the characteristics of the lake bed, i.e. with varying substrate conditions from mudflats to rock-covered ground. Over time, there will be a gradual growth with native species from adjacent vegetation. The species composition will therefore vary with the soil characteristics and with the spread of native species from the vegetation in the surrounding areas. Often elements of disturbance-tolerant "weeds". There is no knowledge that makes it possible to systematize this variation in an appropriate basic type system, and therefore no table of diagnostic species has been inserted. Over time, the vegetation will develop towards a post-succession state that will vary according to the ecological conditions on the site.

Terrain and aerial photo characteristics: Located adjacent to lakes. Recently dry lakebeds are most often clearly seen in aerial photographs as vegetation-free belts along the lakeshore, while areas with established vegetation cover can have the same appearance as adjacent natural types.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T36-B-3	T36-C-3	T36-D-3	T36-E-3
Basic types	T36-3	T36-3	T36-3	T36-3	T36-3

Distribution and regional distribution: BN-LA, O3-C1.

Main types of confusion:

Red List Status (2018): NE

References and type parallels: –



Dried lake bed. Op: Gjøvik: Snertingdal, Dokkfløyvatnet. Photo: RH.

T37-C-1 Slag heaps and landfills for solid chemical waste

NiN characteristics: Firm ground systems: New loose firm ground (T37), one base type (1). Defined by LKM: HS*ÿA.



Physiognomy: Varies from bare land to land with gradually increasing vegetation cover. Mostly scattered vegetation with no or only low cover in the shrub and tree layer. Low-dominant vegetation on slag heaps.

Slag heaps and landfills for solid chemical waste. Op: Sel: Rustgruven. Photo: HB.

Ecological characteristic: This type is characterized by solid land which, through various types of intervention or influence, has been given new cover by highly modified or synthetic substrates. Slag heaps are included here together with various landfills for solid chemical waste, and the land has characteristics that enable rapid succession in the natural type. The succession starts with bare ground and will be largely area-specific, driven by the properties of the substrates, surrounding natural types, location in the landscape, etc. There is no knowledge that makes it possible to systematize this variation in an appropriate basic type system. Slag heaps are characterized by species that tolerate high concentrations of heavy metals, most often iron or copper. Here, a special vegetation is developed, dominated by crustacean lichens, as well as some mosses and vascular plants. Mostly rust-colored lichen vegetation on iron-containing substrate.

Terrain and aerial photo characteristics: Slag heaps adjacent to mines. Occurrences without a layer of wood can be seen in aerial photographs as open areas with deviating structure and colour, often light brown or reddish brown.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T37-1	T37-B-1	T37-C-1	T37-D-1	T37-E-1
Basic types		T37-1	T37-1	T37-1	T37-1

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.).

Examples of lichens on slag heaps Acarospora sinopica rust crackclavate Lecanora epanora iron border lichen	<i>Lecidea inops</i> t* <i>Lecidea silacea</i> v <i>Rhizocarpon oederi</i> rust map lichen	<i>Stereocaulon leucophaeopsis</i> copper salt lichen t* <i>Stereocaulon thornense</i> crustose lichen <i>Tremolecia atrata</i> ridge lichen v
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Distribution and regional distribution: BN-LA, O3-C1.

Main types of confusion:

Red List Status (2018): NE

References and type parallels: D15 (DNHB13).

T37-C-2 Asphalt, loose concrete and the like

NiN characteristics: Firm ground systems: New loose firm ground (T37), one base type (2). Defined by LKM: HS*yB.

Physiognomy: Mostly bare ground or only scattered vegetation cover.

Ecological characteristic: The natural type consists of various synthetic or highly modified substrates, which are of such a nature that rapid succession can take place, i.e. that the post-succession state can be expected to be reached within (100–)150 years. Asphalt and loose concrete are therefore included in the nature type. Succession on highly modified and synthetic substrates starts with bare ground and will be largely area-specific, driven by the properties of the substrates, surrounding natural types, location in the landscape, etc. There is no knowledge that makes it possible to systematize this variation in an appropriate basic type system. Often there will be disturbance-tolerant species, "weeds" and similar species.

Terrain and aerial photo characteristics: Typical in cities and towns. Distinguished by shape, structure and color in aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T37-B-2	T37-C-2	T37-D-2	T37-E-2
Basic types	T37-2	T37-2	T37-2	T37-2	T37-2

Distribution and regional distribution: BN-MA, O3-C1.

Main types of confusion:

Red List Status (2018): NE

References and type parallels: –



Asphalt, loose concrete and the like. Asphalted pavement with yellow larch track. Os: Rodeløkka. Photo: HB.

T37-C-3 Waste landfill and similar

NiN characteristics: Firm ground systems: New loose firm ground (T37), one base type (3). Defined by LKM: HS*ÿC.

Physiognomy: Mostly bare ground with only scattered vegetation.

Ecological characteristics: This nature type includes landfills and various types of landfills for organic waste and similar places. Succession to the post-succession state is expected to be rapid, i.e. within (100–)150 years. Succession starts on bare ground and will be largely area-specific, driven by the properties of the substrates, surrounding habitat types, location in the landscape, etc. There is no knowledge that makes it possible to systematize this variation in an appropriate basic type system. Often there will be disturbance-tolerant species, "weeds" and similar species.

Terrain and aerial photo characteristics: Typically near cities, towns and industrial areas. Distinguished by shape, structure and color in aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T37-B-3	T37-C-3	T37-D-3	T37-E-3
Basic types	T37-3	T37-3	T37-3	T37-3	T37-3

Distribution and regional distribution: BN-NB, O3-C1.

Main types of confusion:

Red List Status (2018): NE

References and type parallels: –



Waste landfill and the like. Op: Øystre Slidre: Hegge, SW for Daleng. Photo: RH.

T38-C-1 Tree Plantation

NiN characteristics: Solid land systems: Tree plantation (T38), one basic type (1).

Physiognomy: Dense tree layer usually dominated by spruce, or planted conifers, often foreign species such as sitka spruce or similar.

Ecological characteristics: Tree plantations comprise wooded areas with "tree plantation character", i.e. land planted with trees of one and the same tree species, often foreign tree species, systematically in rows, preferably after land preparation. The planted trees must make up more than 90% of the number of trees, dead wood and overhangs from previous (natural) tree populations must be missing. Tree plantations are always single-layered and approximately the same age, and the tree layer can be so dense that undergrowth is more or less completely absent.

Measures such as fertilization and spraying are common, and contribute to the fact that the species composition in plantation forests reflects to a small extent natural environmental variation. Tree plantation is the forestry parallel to heavily altered agricultural land, with the production of trees as the sole purpose. Tree plantations are not characterized as woodland because they do not form integrated ecosystems. The land is often covered by dense conifer mats, and without vegetation or only with scattered mosses and vascular plants, such as *Avenella flexuosa* smyle, mat braid *Hypnum cupressiforme*, stump lace *Lophocolea heterophylla* and claw white moss *Sanionia uncinata*.

Tree plantation does not include fruit tree plantations. T44 Arable land and T45 Cultivated permanent meadow that is converted to targeted production of wood (energy forest, Christmas trees) must be classified as T38 from the time the forest population meets the definition of wooded land. Also, semi-natural agricultural land (T32, T33) that is reassigned to the production of wood with the intensity required to satisfy the definition of tree plantation must be classified as T38 from the time the forest population satisfies the definition of wooded land. A tree plantation that is no longer managed must be assigned to T38 until a post-succession state of woodland has been reached, that is, when the species composition and ecological processes typical of woodland have been established.



Tree plantation. Peace: The sun: Eikeberget. Photo: RH.

Terrain and aerial photo characteristics: Found in various types of terrain, from steep valley sides to flat ground. Distinct dark green color and uniform height of wood layer. Often sharp boundaries towards neighboring areas.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T38-1	T38-B-1	T38-C-1	T38-D-1	T38-E-1
Basic types		T38-1	T38-1	T38-1	T38-1

Distribution and regional distribution: BN-NB, O3-C1.

Main types of confusion: –

Red List Status (2018): NE

References and type parallels: I7 (VN).

T39-C-1 Block dumps

NiN characteristics: Firm ground systems: Hard highly modified firm ground (T39), two basic types (1,2). Defined by LKM: HS*ÿA & LAÿ1,2. LKM base steps: HS*ÿA & LAÿ0abcdef.

Physiognomy: Block-dominated, mostly bare ground or only with scattered vegetation cover.

Ecological characteristics: Block landfills are rock dumps created in connection with developments, road fills dominated by blocks and similar areas where stone blocks have been deposited. These are areas where colonies are seen late and will be without vegetation for a long time. The post-succession state is not expected to be reached within 150 years. Areas with boulders where succession is expected to be rapid, for example areas with organic material between the stones and/or soil, sand or gravel, belong to T35. Succession starts with bare ground and will largely be site-specific, and dependent on the properties of the substrate, such as lime content, surrounding nature types, location in the landscape, and similar conditions. There is no knowledge that makes it possible to systematize this variation in an appropriate basic type system, and therefore no list of diagnostic species is reproduced. Over a long period of time, stone blocks will be colonized by lichens and mosses, and eventually also scattered vascular plants between the blocks. Drought-tolerant vascular plants will establish themselves on top of the boulders, for example species such as Stinkhorn's bill *Geranium robertianum*, buttercup, *Hylotelephium maximum*, bitter rock button *Sedum acre* and small-leaved *Atocion rupestre*.



Block landfills. ST: Oppdal: S for Engan. Photo: RH.

Terrain and aerial photo characteristics: Most often in connection with development and industrial areas. Distinguished from surrounding vegetation based on deviating form, structure and colour.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T39-B-1,2	T39-C-1	T39-D-1	T39-E-1
Basic types	T39-1,2	T39-1,2	T39-1,2	T39-1,2	T39-1,2

Distribution and regional distribution: BN-LA, O3-C1.

Most important types of confusion: Strongly altered firm ground with loose soil cover (T-35)

Red List Status (2018): NE

References and type parallels: –

T39-C-2 Exposed solid rock

NiN characteristics: Firm ground systems: Hard highly modified firm ground (T39), two basic types (3,4). Defined by LKM: HS*ÿB & LAÿ1,2. LKM base step: HS*ÿB & LAÿ0abcdef.

Physiognomy: Mostly bare ground, or with elements of lichen and mosses.

Ecological characteristics: Exposed solid rock are areas with bare rock that have been exposed after extensive intervention. Typical occurrences are road cuts in mountains, quarries and similar places. The areas are colonized slowly and they are characterized by slow succession. The post-succession state is not expected to be reached within 150 years. This is mainly bare rock, but eventually lichens and mosses will be established. Succession starts with bare ground and will be largely area-specific, and dependent on the properties of the substrate, such as lime content, surrounding nature types, location in the landscape, and similar conditions. There is no knowledge that makes it possible to systematize this variation in an appropriate basic type system, and therefore no list of diagnostic species is reproduced. Areas with a thin loose mass cover and similar conditions that enable succession to proceed quickly belong to T35.

Terrain and aerial photo characteristics: Distinguished from surrounding vegetation based on shape, structure and colour. Steep surfaces difficult to see in aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T39-B-3,4	T39-C-2	T39-D-2	T39-E-2
Basic types	T39-3,4	T39-3,4	T39-3,4	T39-3,4	T39-3,4

Distribution and regional distribution: BN-LA, O3-C1.

Most important types of confusion: Strongly altered firm ground with loose soil cover (T-35)

Red List Status (2018): NE

References and type parallels: –



Exposed solid rock. Op: Lillehammer: along Rinda. Photo: HB

T39-C-3 Solid rock exposed by dry laying or draining

NiN characteristics: Firm ground systems: Hard heavily modified firm ground (T39), two basic types (5,6). Defined by LKM: HS*ÿC & LAÿ1,2. LKM base steps: HS*ÿC & LAÿ0abcdef

Physiognomy: Mostly bare rock or with scattered lichen and moss vegetation.

Ecological characteristics: Solid rock on a dry lake or river bed is usually found adjacent to a dry river bed (T36-C-2) or a dry lake bed (T36-C-3), but these nature types are characterized by finer substrate (clay to gravel) and are therefore colonized more quickly. Solid rock on a dry lake or river bed is characterized by slow succession and the post-succession state is not expected to be reached within 150 years. Succession starts with bare ground and will be largely area-specific, and dependent on the properties of the substrate, such as lime content, surrounding nature types, location in the landscape, and similar conditions. There is no knowledge that makes it possible to systematize this variation in an appropriate basic type system, and therefore no list of diagnostic species is reproduced. Over time, lichens and mosses will be able to establish themselves if the succession takes place unimpeded.



Solid rock exposed by dry laying or draining. SF: Luster: Styggevatnet east. Photo: RH.

Terrain and aerial photo characteristics: Occurs in connection with rivers or lakes. Most often seen clearly in aerial photographs as vegetation-free areas along lake or river banks, and can be distinguished by shape, structure and color in aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T39-B-5,6	T39-C-3	T39-D-3	T39-E-3
Basic types	T39-5,6	T39-5,6	T39-5,6	T39-5,6	T39-5,6

Distribution and regional distribution: BN-LA, O3-C1.

Main types of confusion:

Red List Status (2018): NE

References and type parallels: –

T39-C-4 Heavily modified or synthetic, predominantly inorganic solid substrates

NiN characteristics: Firm ground systems: Hard highly modified firm ground (T39), two basic types (7,8). Defined by LKM: HS*ýD & LAý1,2. LKM base steps: HS*ýD & LAý0abcdef.

Physiognomy: Synthetic surfaces with different shape and structure. Mostly without vegetation, only in cracks, etc.

Ecological characteristics: These are all types of highly modified and synthetic hard surfaces, such as metal surfaces, glass, reinforced concrete, etc. Typical occurrences are buildings, industrial facilities, facilities in connection with traffic and similar artificial areas. Such areas are characterized by slow succession and the post-succession state is not expected to be reached within 150 years. In many cases these are bare surfaces, but mosses, lichens and scattered vascular plants can be established over a long period of time. There is no knowledge that makes it possible to systematize this variation in an appropriate basic type system, and therefore no list of diagnostic species is reproduced.

Terrain and aerial photo characteristics: Typically near cities, towns and industrial areas. Distinguished by shape, structure and color in aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T39-7.8	T39-B-7,8	T39-C-4	T39-D-4	T39-E-4
Basic types		T39-7.8	T39-7.8	T39-7.8	T39-7.8

Distribution and regional distribution: BN-HA, O3-C1.

Main types of confusion:

Red List Status (2018): NE

References and type parallels: –



Highly modified or synthetic, predominantly inorganic solid substrates. Ak: Bærum: Høvikodden. Photo: HB.

T40-C-1 Meadow-like strongly altered solid ground

NiN characteristics: Grassland systems: Highly modified grassland similar to semi-natural meadow (T40), one ground type (1).

Physiognomy: Open meadow-like vegetation dominated by grasses and herbs. Scattered bushes and trees may occur.

Ecological characteristics: Strongly modified solid land with the feel of a semi-natural meadow includes land that combines the characteristics of "strongly modified land", in the form of planning, filling or the like, and an extensive maintenance regime.

The land has been used for quite some time as if it were a semi-natural meadow (mown or grazed, without or with very little fertilization, no spraying), and therefore has features in species composition and appearance that superficially resemble a semi-natural meadow, but the type does not originate in farmland. The species composition is similar to a semi-natural meadow, but often also has elements of ruderal species or forest species. Lack of stone fences, location far from agricultural land and species composition distinguish the type from a semi-natural meadow. The type includes filled and built-up roadsides and road cuttings that are mowed but not sprayed, grass-covered edge areas at airports, lawns that are tended as "flower meadows" and similar places. Unlike semi-natural meadows, the hay is not always removed, and cut trees and bushes are often left behind. Old aerial photos or other historical sources can be helpful in clarifying whether it is heavily altered or semi-natural land. The type can be rich in species and varies in species content depending on, among other things, moisture and lime content in the loose masses.

Terrain and aerial photo characteristics: Often roadsides, cottage plots, lawns and similar places.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T40-1	T40-B-1	T40-C-1	T40-D-1	T40-E-1
Basic types		T40-1	T40-1	T40-1	T40-1

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

Achillea millefolium yarrow v	Geranium sylvaticum wood stork beak v	Poa pratensis engrapp v*
Aegopodium podagraria gossip cabbage v	Geum rivale engbhumbleblom v	Poa trivialis markrapp v
Agrostis capillaris meadow sweet v	Pilosella officinarum hair fly v	Potentilla erecta carpet root v
Anemone nemorosa white veis v	Hypericum maculatum St. John's wort v	Prunella vulgaris blue collar v*
Anthoxanthum odoratum yellow v	Knautia arvensis red button v	Ranunculus acris ground soleie v
Anthriscus sylvestris dog biscuits v*	Lathyrus pratensis yellow flat pod v	Ranunculus repens creeping oil v*
Artemisia vulgaris burot v*	Leucanthemum vulgare collard v	Rhinanthus minor small meadow call v
Barbarea vulgaris winter cress v	Linaria vulgaris lincod v	Rumex acetosa meadow sorrel v
Campanula rotundifolia bluebell v	Lotus corniculatus tiriltongue v	Scorzoneroidea autumnalis follblom v
Centaurea jacea meadow sweet v	Luzula multiflora ground beetle v	Stellaria graminea grass star flower v
Cerastium fontanum inherit v	Melilotus albus white rock clover v	Taraxacum officinale agg. the weed lion down v*
Chamerion angustifolium geitrams v	Mentha arvensis field mint v	Trifolium medium wood clover v
Cirsium heterophyllum white-leaved thistle v	Myosotis arvensis akerforglemmei v	Trifolium pratense red clover v
Dactylis glomerata dog grass v*	Noccaea caerulescens spring moneywort v	Trifolium repens white clover v*
Dactylorhiza maculata ssp. fuchsii forest marihand v	Phleum pratense ssp. pratense engtimo tei v	Trollius europaeus ballblom v
Deschampsia cespitosa ssp. cespitosa silver pile v	Pimpinella saxifraga _	Tussilago farfara horse hoof v
Festuca rubra red fescue v*	Plantago lanceolata slimy giant v	Urtica dioica stinging nettle v
Filipendula ulmaria meadow sweet v	Plantago major plantain v*	Veronica chamaedrys two-bearded veronika v
Galium boreale white ant v	Platanthera montana rough night violet v	Vicia cracca bird's vetch v*
Galium mollugo large ants v	Poa annua tunrapp v*	Viola tricolor stepmother v
	Poa palustris marsh frog v	



Meadow-like strongly altered solid ground. No: Fauske:
Valnesfjord. Photo: RH.

Distribution and regional distribution: BN-NB, O3-C1.

Most important types of confusion: Open shallow land (T2), semi-natural meadow (T32).

Red List Status (2018): NE

References and type parallels: I2, partial (VN) or D03 (DNHB13).

T41-C-1 Meadow-like cultivated field

NiN characteristics: Solid land systems: Cultivated land similar to semi-natural meadow (T41), one basic type (1).

Physiognomy: Open meadow-like vegetation dominated by grasses and herbs.

Ecological characteristics: This is a former field or fertilized meadow that has for a long time been claimed as an extensively managed meadow (mown or grazed, without or with little fertilization, no spraying), and therefore superficially resembles a semi-natural meadow. The species composition has clear elements of species associated with cultivated land, such as sown species, field weeds and nitrophilous species, but also has common features with semi-natural meadow types. These can be former field patches surrounded by semi-natural meadows, or previously fertilized meadows that have not been fertilized for a long time, where semi-natural meadow species have established themselves. Variation within the type and transitions towards semi-natural meadows are insufficiently investigated. Probable variation in species composition according to lime content and soil moisture.

Terrain and aerial photo characteristics: In former inland areas, often close to farms. Smooth surface structure.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T41-1	T41-B-1	T41-C-1	T41-D-1	T41-E-1
Basic types		T41-1	T41-1	T41-1	T41-1

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Equisetum arvense</i> _	<i>Galium mollugo</i> large ants v	<i>Poa annua</i> tunrapp v
<i>Achillea millefolium</i> yarrow v	<i>Geranium sylvaticum</i> wood stork beak v	<i>Poa pratensis</i> engrapp v*
<i>Achillea ptarmica</i> nyserilik v	<i>Helictotrichon pubescens</i> downy oats v	<i>Poa trivialis</i> markrapp v
<i>Agrostis capillaris</i> meadowsweet v	<i>Hieracium umbellatum</i> screen hover v	<i>Potentilla erecta</i> carpet root v
<i>Alchemilla glabra</i> smooth marigold v	<i>Hypericum maculatum</i> St. John's wort v	<i>Prunella vulgaris</i> blåkoll v
<i>Alchemilla micans</i> glossy marigold v	<i>Knautia arvensis</i> red button v	<i>Ranunculus acris</i> ground soleie v
<i>Anthoxanthum odoratum</i> yellow v	<i>Lathyrus pratensis</i> yellow flat pod v	<i>Ranunculus repens</i> creeping oil v*
<i>Anthriscus sylvestris</i> dog biscuits v	<i>Lepidotheca suaveolens</i> turbalderbrå v	<i>Rumex acetosa</i> meadow sorrel v
<i>Artemisia vulgaris</i> burot v	<i>Leucanthemum vulgare</i> collard v	<i>Rumex longifolius</i> haymole v
<i>Campanula rotundifolia</i> bluebell v	<i>Linaria vulgaris</i> lincod v	<i>Scorzoneraoides autumnalis</i> follblom v
<i>Cardamine pratensis</i> meadow cress v	<i>Lotus corniculatus</i> tirlitonque v	<i>Silene vulgaris</i> engsmelle v
<i>Carex leporina</i> harestar v	<i>Luzula multiflora</i> ground beetle v	<i>Stellaria graminea</i> grass star flower v
<i>Carum carvi</i> caraway v	<i>Mentha arvensis</i> field mint v	<i>Taraxacum officinale</i> agg. the weed lion down v*
<i>Cerastium fontanum</i> inherit v*	<i>Myosotis arvensis</i> akerforglemmei v	<i>Trifolium pratense</i> red clover v
<i>Dactylis glomerata</i> dog grass v*	<i>Phalaris arundinacea</i> beach reed v	<i>Trifolium repens</i> white clover v*
<i>Deschampsia cespitosa</i> ssp. <i>cespitosa</i> silver pile v	<i>Phleum pratense</i> ssp. <i>pratense</i> engtimo tei v	<i>Trollius europaeus</i> ballblom v
<i>Epilobium ciliatum</i> American milkweed v	<i>Pimpinella saxifraga</i> _	<i>Veronica serpyllifolia</i> bleikveronika v
<i>Festuca rubra</i> red fescue v*	<i>Plantago lanceolata</i> slimy giant v	<i>Vicia cracca</i> bird's vetch v*
<i>Ficaria verna</i> spring cabbage v	<i>Plantago major</i> plantain v	<i>Vicia sepium</i> hedge vetch v
<i>Galeopsis tetrahit</i> kvassdå v	<i>Plantago media</i> down giant v	<i>Viola tricolor</i> stepmother v
<i>Galium boreale</i> white ant v		



Meadow-like cultivated land. SF: Luster: Fortun: Upper Ormelid. Photo: RH.

Distribution and regional distribution: BN-NB, O3-C1.

Main types of confusion: Semi-natural meadow (T32), cultivated permanent meadow (T45).

Red List Status (2018): NE

References and type parallels: G03 (VN).

T42-C-1 Flower beds and similar

NiN characteristics: Fixed field systems:

Flowerbeds and other frequently cultivated fields (T42), one basic type (1).

Physiognomy: Open field with planted species and weeds on bare soil.

Ecological characteristic: These are flower beds, flower beds, planted roadsides in buildings and similar places such as. The type includes bare soil, most often filled soil masses, which are spaded, fertilized, sprayed and planted with ornamental plants or shrubs, and is therefore highly modified land. Other vegetation is weeded away and consists of ruderat species ("weeds"). The type is therefore not characterized by species composition, but examples of some species are given in the table below.

Terrain and aerial photo characteristics: Found in built-up areas and as vegetation along roads in cities and towns. Most often in mosaic with other strongly changed ground.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T42-1	T42-B-1	T42-C-1	T42-D-1	T42-E-1
Basic types		T42-1	T42-1	T42-1	T42-1

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Achillea ptarmica</i> nyserillik v	<i>Epilobium ciliatum</i> American milkweed v*	<i>Ranunculus repens</i> krypsoleie v
<i>Aegopodium podagraria</i> gossip cabbage v*	<i>Galeopsis tetrahit</i> kvassdå v	<i>Spergula arvensis</i> linbendel v
<i>Alliaria petiolata</i> onion herb v	<i>Lamium purpureum</i> red tweed v	<i>Stellaria media</i> vassarve v
<i>Anthriscus sylvestris</i> dog biscuits v	<i>Lapsana communis</i> haremat v	<i>Taraxacum officinale</i> agg. the weed lion down v*
<i>Artemisia vulgaris</i> burot v*	<i>Lepidotheca suaveolens</i> tunbalderbrå v	<i>Thlaspi arvense</i> money herb
<i>Barbarea vulgaris</i> winter cress v	<i>Linaria vulgaris</i> lincod v	<i>Trifolium repens</i> white clover v
<i>Bunias orientalis</i> Russian cabbage v	<i>Melilotus albus</i> white rock clover v	<i>Tussilago farfara</i> horse hoof v
<i>Capsella bursa-pastoris</i> shepherd's bag v	<i>Persicaria maculosa</i> chickweed v	<i>Urtica dioica</i> stinging nettle v
<i>Campanula rapunculoides</i> weed bell v	<i>Plantago major</i> plantain v*	<i>Veronica serpyllifolia</i> bleikveronika v
<i>Cerastium fontanum</i> inherit v	<i>Poa annua</i> tunrapp v*	<i>Vicia cracca</i> bird's vetch v
<i>Chenopodium album</i> meldestok v	<i>Polygonum aviculare</i> tungras v	



Flower beds and the like. Oslo: Botanical garden, Tøyen.
Photo: HB.

Distribution and regional distribution: BN-NB, O3-C1.

Most important types of confusion: Lawns, parks and the like (T43)

Red List Status (2018): NE

References and type parallels: –

T43-C-1 Lawns, parks and the like

NiN characteristics: Fixed field systems: Lawns, parks and similar without semi-natural meadow character (T43), one basic type (1).

Physiognomy: Strongly altered land with grassy lawn areas with or without shrubs and trees.

Ecological characteristics: The type includes lawns, parks and other cultivated, planted areas with an intensive maintenance regime, such as frequent lawn mowing, fertilising, watering and spraying.

This is not agricultural land, but areas in built-up areas or in cemeteries and around memorials, grassy open air areas and similar places. The type is characterized by seeded or planted species. In addition, there is a varying species composition of "ugas", sedge vegetation and other ruderal species.

Examples of some such species are given in the table below.

Terrain and aerial photo characteristics: Planned areas in cities and towns or in cemeteries and around memorials. Most often in mosaic with other strongly changed ground.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T43-1	T43-B-1	T43-C-1	T43-D-1	T43-E-1
Basic types		T43-1	T43-1	T43-1	T43-1

Diagnostic species m =

abundance species (**m*** = dominant m.); v = common species (**v*** = constant v.); t = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); s = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Achillea ptarmica</i> nyserilik v	<i>Elytrigia repens</i> croak v*	<i>Ranunculus repens</i> krypsoleie v
<i>Aegopodium podagraria</i> gossip cabbage v*	<i>Epilobium ciliatum</i> American milkweed v*	<i>Solidago canadensis</i> Canada golden rice v
<i>Alliaria petiolata</i> onion herb v	<i>Festuca rubra</i> red fescue v	<i>Spergula arvensis</i> linbendel v
<i>Anthriscus sylvestris</i> dog biscuits v	<i>Gagea lutea</i> golden star v	<i>Stellaria media</i> vassarve v
<i>Artemisia vulgaris</i> burot v*	<i>Galeopsis tetrahit</i> kvassdå v	<i>Taraxacum officinale</i> agg. the weed lion down v*
<i>Barbarea vulgaris</i> winter cress v	<i>Lamium purpureum</i> red tweed v	<i>Thlaspi arvense</i> money herb v
<i>Bunias orientalis</i> Russian cabbage v	<i>Lepidotheca suaveolens</i> tunbalderbrå v	<i>Trifolium repens</i> white clover v
<i>Capsella bursa-pastoris</i> shepherd's bag v	<i>Linaria vulgaris</i> lincod v	<i>Tussilago farfara</i> horse hoof v
<i>Campanula rapunculoides</i> weed bell v	<i>Melilotus albus</i> white rock clover v	<i>Urtica dioica</i> stinging nettle v
<i>Ceratium fontanum</i> inherit v	<i>Persicaria maculosa</i> chickweed v	<i>Veronica serpyllifolia</i> bleikveronika v
<i>Chenopodium album</i> meldestok v	<i>Plantago major</i> plantain v*	<i>Vicia cracca</i> bird's vetch v
<i>Cirsium arvense</i> field thistle v	<i>Poa annua</i> tunrapp v*	
<i>Corydalis solida</i> larkspur v	<i>Poa pratensis</i> engrapp v	
<i>Dactylis glomerata</i> dog grass v*	<i>Polygonum aviculare</i> tungras v	

Distribution and regional distribution: BN-NB, O3-C1.

Most important types of confusion: Flower beds and similar (T42)

Red List Status (2018): NE

References and type parallels: –



Lawns, parks and the like. Oslo: Botanical garden, Tøyen.
Photo: HB.

T44-C-1 Arable

NiN characteristics: Fixed land systems: Arable (T44), one basic type (1).

Physiognomy: Uniform and characterized by grain or oil crops that are harvested annually.

Ecological characteristics: Arable is fully cultivated land that has been plowed and sown, fertilized and/or sprayed, where food or fodder crops are grown, preferably in monoculture.

Weed vegetation in fields is characterized by annual, nitrophilous species, species that tolerate severe disturbance in the form of ploughing, as well as fertilization and spraying.

Perennial species also enter field edges. Many are southern and warm-loving. Some examples are shown in the table below. In fallow fields, perennial, high-growing and nitrophilous ruderal species will eventually become established, typically species such as dogwood, thistle species, vetch, dogweed, goat's sedge, nettle, raspberry and similar species, and in the later stages of succession also shrubs and trees and with them eventually also forest species come in.

Terrain and aerial photograph characteristics: Large uniform and level surfaces with plowed land, which are evident in aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T44-1	T44-B-1	T44-C-1	T44-D-1	T44-E-1
Basic types		T44-1	T44-1	T44-1	T44-1

Diagnostic species m =

abundance species (**m*** = dominant m.); v = common species (**v*** = constant v.); t = center of gravity species (**t*** = characteristic t., **tt-** gradient-t.); s = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Avena sativa</i> oats m <i>Brassica napus</i> ssp. <i>oleifera</i> rape m <i>Hordeum vulgare</i> barley m <i>Secale cereale</i> rye m <i>Triticum aestivum</i> wheat m <i>Chenopodium album</i> meldestok v <i>Cirsium arvense</i> field thistle v* <i>Elytrigia repens</i> croak v <i>Epilobium ciliatum</i> American milkweed v <i>Erodium cicutarium</i> crane neck v <i>Erysimum cheiranthoides</i> field gold v <i>Euphorbia helioscopia</i> field wort milk v <i>Festuca rubra</i> red fescue v <i>Fumaria officinalis</i> earth smoke v <i>Galeopsis bifida</i> vrangdå v <i>Galeopsis speciosa</i> guldå v <i>Galeopsis tetrahit</i> kvassdå v	<i>Galium aparine</i> klengemaure v <i>Gnaphalium uliginosum</i> field graywort v <i>Lamium purpureum</i> red tweed v <i>Lepidotheca suaveolens</i> tunbalderbrå v <i>Linaria vulgaris</i> lincod v <i>Myosotis arvensis</i> akerforglemmei v <i>Persicaria hydropiper</i> water pepper v <i>Persicaria maculosa</i> chickweed v <i>Plantago major</i> plantain v <i>Poa annua</i> tunrapp v <i>Poa trivialis</i> markrapp v <i>Polygonum aviculare</i> tungras v <i>Ranunculus repens</i> krypsoleie v <i>Raphanus raphanistrum</i> ssp. <i>raphanis</i> trum horseradish v <i>Rumex longifolius</i> haymole v <i>Senecio vulgaris</i> field pig flower v	<i>Silene latifolia</i> white jonsokblom v <i>Sonchus arvensis</i> akerdylle v <i>Sonchus asper</i> stivdylle v <i>Sonchus oleraceus</i> haredylle v <i>Spergula arvensis</i> linbendel v <i>Stachys palustris</i> field pig's root v <i>Stellaria media</i> vassarve v <i>Taraxacum officinale</i> agg. the weed lion down v <i>Thlaspi arvense</i> money herb v <i>Tripleurospermum inodorum</i> balderbrå v* <i>Urtica dioica</i> stinging nettle v <i>Veronica agrestis</i> åkerveronika v <i>Veronica serpyllifolia</i> paleveronika v* <i>Viola arvensis</i> field mother flower v <i>Anthoceros agrestis</i> black needle <i>Tortula truncata</i> field moss v
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Distribution and regional distribution: BN-SB, O3-C1.

Main types of confusion: –

Red List Status (2018): NE

References and type parallels: I4 (VN).



Field. Ak: Nesodden: Solberg. Photo: HB.

T45-C-1 Cultivated permanent meadows with little intensive heath

NiN characteristics: Fixed land systems: Cultivated permanent meadow (T45), two basic types (1,2). Defined by LKM: Hlÿ1 & SPÿA,B. LKM base steps: Hlÿfg & SPÿ0a.



Physiognomy: Homogeneous meadow characterized by sown species for grass production.

Cultivated permanent meadows with little intensive grazing. SF: Leikanger: Grinde. Photo: RH.

Ecological characteristic: Cultivated permanent meadow with little intensive hedging includes infield areas that are used for the cultivation of grass crops over a longer period of time and that are not part of a regular rotation with cereals or other annual agricultural crops. These are areas that are used for fodder harvesting (hay or silage) and/or for grazing, and which are dominated by sown grass species. Distinguished from meadow-like cultivated land (T40) by being more intensively farmed, primarily more heavily fertilized and characterized by sown grass species and clover. In contrast to more intensively managed meadows (T45-C-2, T45-C-3), cultivated permanent meadows with a low intensive character can be unploughed or plowed at longer intervals, and the meadows are characterized by less fertilization and spraying. Weed vegetation with short-lived and nitrophilous species and perennial species in the meadow edge is included in the type. Examples can be found in the table below.

Terrain and aerial photo characteristics: Larger homogeneous surfaces, often in somewhat steep or hilly terrain.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		T45-B-1,2	T45-C-1	T45-D-1	T45-E-1
Basic types	T45-1,2	T45-1,2	T45-1,2	T45-1,2	T45-1,2

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **tx-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Achillea millefolium</i> yarrow v <i>Achillea ptarmica</i> nyserilik v <i>Alchemilla glabra</i> smooth marigold v <i>Alchemilla micans</i> glossy marigold v <i>Alchemilla subcrenata</i> meadowsweet coat v <i>Alopecurus pratensis</i> ssp. <i>pratensis</i> engreverrumpe v <i>Anthriscus sylvestris</i> dog biscuits v <i>Capsella bursa-pastoris</i> shepherd's bag v <i>Cardamine pratensis</i> meadow cress v <i>Carex leporina</i> harestarr v <i>Carum carvi</i> caraway v <i>Cerastium fontanum</i> inherit v <i>Cirsium arvense</i> field thistle v <i>Cirsium heterophyllum</i> white-leaved thistle v <i>Dactylis glomerata</i> dog grass v* <i>Deschampsia cespitosa</i> ssp. <i>cespitosa</i> silver pile v* <i>Elytrigia repens</i> kveke v <i>Epilobium ciliatum</i> American milkweed v <i>Festuca rubra</i> red fescue v* <i>Ficaria verna</i> spring cabbage v	<i>Filipendula ulmaria</i> meadowsweet v <i>Galium mollugo</i> large ants v <i>Geranium sylvaticum</i> wood stork beak v <i>Hypericum maculatum</i> St. John's wort v <i>Juncus conglomeratus</i> knapsiv v <i>Juncus effusus</i> lissiv v <i>Juncus filiformis</i> thread reed v <i>Lathyrus pratensis</i> yellow flat pod v <i>Lepidotheca suaveolens</i> tunbalderbrå v <i>Leucanthemum vulgare</i> collard v <i>Lotus corniculatus</i> tirlóngtongue v <i>Myosotis arvensis</i> akerforglemmei v <i>Phalaris arundinacea</i> beach reed v <i>Phleum pratense</i> ssp. <i>pratense</i> engtimo tei v*	<i>Ranunculus auricomus</i> agg. kidney oil owner v <i>Ranunculus repens</i> creeping oil v* <i>Rhinanthus minor</i> small meadow call v <i>Rumex acetosa</i> meadow sorrel v* <i>Rumex longifolius</i> haymole v <i>Schedonorus pratensis</i> meadow fescue v <i>Scorzonerae autumnalis</i> tollblom v <i>Silene vulgaris</i> engsmelle v <i>Stellaria graminea</i> grass star flower v <i>Stellaria media</i> vassarve v <i>Taraxacum officinale</i> agg. the weed lion down v*	<i>Trifolium hybridum</i> fodder clover v <i>Trifolium pratense</i> red clover v* <i>Trifolium repens</i> white clover v* <i>Tripleurospermum inodorum</i> balderbrå v <i>Urtica dioica</i> stinging nettle v <i>Veronica serpyllifolia</i> bleikveronika v <i>Vicia cracca</i> bird's vetch v* <i>Vicia sepium</i> hedge vetch v
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Distribution and regional distribution: BN-NB, O3-C1. Found throughout the country, but most commonly in MB and NB.

Most important types of confusion: Meadow-like cultivated land (T40), cultivated intensive mowed meadow (T45-C-2).

Red List Status (2018): NE

References and type parallels: I4 (VN).

T45-C-2 Cultivated intensive mowed meadow

NiN characteristics: Fixed land systems: Cultivated permanent meadow (T45), one basic type (3). Defined by LKM: Hlý2 & SPýB. LKM base steps: Hlýhi & SPýa.

Physiognomy: Homogeneous meadow characterized by sown species for grass production.

Ecological characteristics: Cultivated intensive hay meadows include infield areas that are used for the cultivation of grass crops over a longer period of time and that are not part of a regular rotation with cereals or other annual agricultural crops. These are areas that are used for fodder harvesting (hay or silage), and which are dominated by sown grass species. Distinguished from meadow-like cultivated land (T40) by being more intensively farmed, primarily more heavily fertilized and characterized by sown grass species and clover, and by being regularly ploughed. In contrast to cultivated highly intensive mowed meadows (T45-C-3), cultivated intensive mowed meadows are characterized by somewhat less fertilization and spraying, while cultivated permanent meadows with little intensive mowing (T45-C-1) often occur in steeper or more hilly terrain on unplowed areas. Weed vegetation with short-lived and nitrophilous species and perennial species in the meadow edge is included in the type. Examples can be found in the table below.

Terrain and aerial photo characteristics: Larger homogeneous surfaces, most often in relatively flat terrain.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T45-3	T45-B-3	T45-C-2	T45-D-2	T45-E-2
Basic types		T45-3	T45-3	T45-3,4	T45-3,4

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Achillea ptarmica</i> nyserillik v	<i>Lepidotheca suaveolens</i> tunbalderbrå v	<i>Senecio viscosus</i> sticky pig flower v
<i>Alchemilla subcrenata</i> meadowsweet coat v	<i>Linaria vulgaris</i> lincod v	<i>Senecio vulgaris</i> field pig flower v
<i>Alopecurus pratensis</i> ssp. <i>pratensis</i> enge verum p v	<i>Lolium perenne</i> ryegrass v	<i>Silene latifolia</i> white jonsokblom v
<i>Artemisia vulgaris</i> burot v	<i>Mentha arvensis</i> field mint v	<i>Sonchus arvensis</i> akerdylle v
<i>Capsella bursa-pastoris</i> shepherd's bag v	<i>Myosotis arvensis</i> alkerforglemmei v	<i>Sonchus oleraceus</i> haredylle v
<i>Cerastium fontanum</i> inherit v	<i>Phalaris arundinacea</i> beach reed v	<i>Spergula arvensis</i> linbendel v
<i>Chenopodium album</i> meldestok v	<i>Phleum pratense</i> ssp. <i>pratense</i> engtimotei m	<i>Stachys palustris</i> field pig's root v
<i>Cirsium arvense</i> field thistle v*	<i>Plantago major</i> plantain v	<i>Stellaria media</i> vassarve v
<i>Dactylis glomerata</i> dog grass v*	<i>Poa annua</i> tunrapp v	<i>Taraxacum officinale</i> agg. weed dandelions v*
<i>Elytrigia repens</i> croak v *	<i>Poa pratensis</i> engrapp v*	<i>Trifolium hybridum</i> fodder clover v
<i>Epilobium ciliatum</i> American milkweed v	<i>Poa trivialis</i> markrapp v	<i>Trifolium repens</i> white clover v
<i>Festuca rubra</i> red fescue v*	<i>Prunella vulgaris</i> blåkoll v	<i>Tripleurospermum inodorum</i> balderbrå v
<i>Galeopsis bifida</i> vrangdå v	<i>Ranunculus acris</i> ground soleie v	<i>Urtica dioica</i> stinging nettle v
<i>Galeopsis speciosa</i> gulå v	<i>Ranunculus repens</i> krypsoleie v	<i>Veronica serpyllifolia</i> bleikveronika v
<i>Galeopsis tetrahit</i> kvassdå v	<i>Rumex acetosa</i> meadow sorrel v	<i>Vicia cracca</i> bird's vetch v
<i>Gnaphalium uliginosum</i> field graywort v	<i>Rumex longifolius</i> haymole v	<i>Viola arvensis</i> field mother flower v
<i>Lathyrus pratensis</i> yellow flat pod v	<i>Schedonorus pratensis</i> meadow fescue v	

Distribution and regional distribution: BN-NB, O3-C1. Found throughout the country, but most commonly in MB and NB.

Most important types of confusion: meadow-like cultivated land (T40), cultivated permanent meadows with a low intensity of heathering (T45-C-1), cultivated very intensive mowed meadow (T45-C-3).

Red List Status (2018): NE

References and type parallels: I4 (VN).



Cultivated intensive hay meadow. He: Folldal: by Brennoddan. Photo: HB.

T45-C-3 Cultivated very intensive hay meadow

NiN characteristics: Fixed land systems: Cultivated permanent meadow (T45), one basic type (4). Defined by LKM: Hlÿ3 & SPÿB. LKM base steps: Hlÿj & SPÿa.

Physiognomy: Homogeneous meadow characterized by sown species for grass production.

Ecological characteristics: Cultivated very intensive hay meadows include infield areas that are used for the cultivation of grass crops over a longer period of time and that are not part of a regular rotation with cereals or other annual agricultural crops. These are areas that are used for fodder harvesting (hay or silage), and which are regularly ploughed, fertilized and often also sprayed and dominated by sown grass species. Distinguished from meadow-like cultivated land (T40), cultivated permanent meadow with little intensive heath (T45-C-1) and cultivated intensive mowed meadow (T45-C-2) by being more intensively managed. Weed vegetation, which has common features with fields, contains short-lived and nitrophilous species, as well as perennial species at the edge of the meadow. Examples can be found in the table below.

Terrain and aerial photo characteristics: Larger homogeneous surfaces in relatively flat terrain.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	T45-4	T45-B-4	T45-C-3	T45-D-2	T45-E-2
Basic types		T45-4	T45-4	T45-3,4	T45-3,4

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Alopecurus pratensis</i> ssp. <i>pratensis</i> engreverrumpe m <i>Artemisia vulgaris</i> burot v <i>Bromopsis inermis</i> leaf fax v <i>Capsella bursa-pastoris</i> shepherd's bag v <i>Chenopodium album</i> meldestok v <i>Cirsium arvense</i> field thistle v* <i>Dactylis glomerata</i> dog grass v <i>Elytrigia repens</i> croak v <i>Epilobium ciliatum</i> American milkweed v <i>Erysimum cheiranthoides</i> field gold v <i>Euphorbia helioscopia</i> field wart milk v <i>Festuca rubra</i> red fescue v <i>Fumaria officinalis</i> earth smoke v <i>Galeopsis bifida</i> vrangdå v <i>Galeopsis speciosa</i> guldå v <i>Galeopsis tetrahit</i> kvassdå v <i>Galium aparine</i> klengemaure v <i>Gnaphalium uliginosum</i> field graywort v <i>Lepidotheca suaveolens</i> tunbalderbrå v	<i>Linaria vulgaris</i> lincod v <i>Lolium perenne</i> ryegrass v <i>Mentha arvensis</i> field mint v <i>Myosotis arvensis</i> akerforglemmei v <i>Persicaria hydropiper</i> water pepper v <i>Persicaria maculosa</i> chickweed v <i>Phalaris arundinacea</i> beach reed v <i>Phleum pratense</i> ssp. <i>pratense</i> engtimo tei m <i>Plantago major</i> plantain v <i>Poa annua</i> tunrapp v <i>Poa pratensis</i> engrapp v <i>Poa trivialis</i> markrapp v <i>Polygonum aviculare</i> tungras v <i>Prunella vulgaris</i> blåkoll v <i>Ranunculus acris</i> ground soleie v <i>Ranunculus repens</i> krypsoleie v <i>Rumex acetosa</i> meadow sorrel v <i>Rumex longifolius</i> haymole v	<i>Schedonorus pratensis</i> meadow fescue v <i>Senecio viscosus</i> sticky pig flower v <i>Senecio vulgaris</i> field pig flower v <i>Silene latifolia</i> white jonsokblom v <i>Sonchus arvensis</i> akerdylle v <i>Sonchus oleraceus</i> haredylle v <i>Spergula arvensis</i> linbendel v <i>Stachys palustris</i> field pig's root v <i>Stellaria media</i> vassarve v <i>Taraxacum officinale</i> agg. the weed lion down v* <i>Trifolium hybridum</i> fodder clover v <i>Tripleurospermum inodorum</i> balderbrå v <i>Urtica dioica</i> stinging nettle v <i>Veronica serpyllifolia</i> paleveronika v* <i>Viola arvensis</i> field mother flower v <i>Tortula truncata</i> field moss v
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Distribution and regional distribution: BN-NB, O3-C1. Found throughout the country, but most commonly in MB and NB.

Most important types of confusion: Meadow-like cultivated land (T40), cultivated permanent meadows with little intensive heather character (T45-C-1), cultivated intensive mowed meadow (T45-C-2).

Red List Status (2018): NE

References and type parallels: I4 (VN).

V1-C-1 Very and fairly calcareous bog surfaces

NiN characteristics: Wetland systems: Open soil water bog (V1), five basic types (1–5). Defined by LKM: KAյ1 & TVյ1-5 & MFյ2. LKM basic steps: KAյab & TV-cdefghijk & MFյef.

Physiognomy: Bog where the field layer is species-poor and dominated by graminids. Larger or smaller elements of woody growth (shrubs and trees), primarily at tuft level. The bottom layer is well developed and dominated by peat bogs.



White ant as dominant in very low-lime peatland soft mat. AA:
Gjerstad: Solhomfjell. Photo: RH.

Ecological characteristic: Bog with a weak soil water supply or that is supplied with very low-calcium soil water. Species composition with few vascular plants, mainly graminids. Considerable species diversity of mosses, mainly peat mosses. Occurs primarily in areas with low-calcium rocks. Gradual transition towards precipitation bog (V3-C-1); V1-C-1 is distinguished from precipitation bogs by scattered occurrences of soil water indicators (indicated by 'KAյal0' in the table below).

Terrain and aerial photo characteristics: Occurs primarily in flat terrain or in depressions in bogs. Color varies from brown to dark green in aerial photos depending on the time of year the photo was taken. Mostly open areas with a smooth texture. Can be difficult to distinguish from other open areas, especially on the coast and up towards the mountains. Texture and color vary little within regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	KAյ1 & TVյ1-5	V1-B-1,2	V1-C-1	V1-D-1	V1-E-1
Basic types		V1-1-5	V1-1-5	V1-1-9,21-24	V1-1-9,21-24

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity species (t* = characteristic t., t- gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.). Note that 's*[KA·al0]' indicates terrestrial water indicators, i.e. separating species between V1-C-1 and V3-C-1. '?' indicates uncertainty about whether the species indicates a permanent water influence also on V.

<i>Andromeda polifolia</i> white heather v*	<i>Rubus chamaemorus</i> molte v	<i>Sphagnum medium</i> meat-peat moss v*
<i>Calluna vulgaris</i> heather v*	<i>Scheuchzeria palustris</i> reed flower s*[KA·al0]	<i>Sphagnum majus</i> peat moss
<i>Carex lasiocarpa</i> sedge s *[KA·al0]	<i>Trichophorum cespitosum</i> bear 's beard v*;s+	v;*[VTյ0lc]
<i>Carex pauciflora</i> sweltstarr v; s*VT·0lc]	[MFյeld]	<i>Sphagnum rubellum</i> red peat moss
<i>Carex rostrata</i> bottle sedge v; s*[KA·al0]	<i>Cladopodiella fluitans</i> marsh nutmeg v*;s+	m;v*;s+[MFյeld]
<i>Drosera anglica</i> narrow sun dog v; s-[MFյeld]	[MFյeld]	<i>Sphagnum papillosum</i> wort peat moss
<i>Drosera rotundifolia</i> round sun egg v*	<i>Racomitrium lanuginosum</i> heath gray moss	m*;v*;s*[VTյ0lc];s+[MFյeld]
<i>Empetrum nigrum</i> krekling v	v[S,V,M,N]	<i>Sphagnum pulchrum</i> peat moss
<i>Erica tetralix</i> bell heather s*[VTյ0lc]	<i>Rhynchospora alba</i> white ant v; s-[KA·al-	s*[VTյ0lc]
<i>Eriophorum angustifolium</i> duskmyrull v; s*[VTյ0lc]	blc];s*[MFյeld]	<i>Sphagnum tenellum</i> dwarf peat moss
<i>Eriophorum vaginatum</i> peat moss roll m*;v*	<i>Sphagnum balticum</i> peat moss v*;s+	v*;s+[MFյeld]
<i>Narthecium ossifragum</i> rome s*[KA·al0]	[MFյeld]	<i>Straminergon stramineum</i> grass moss
<i>Oxycoccus palustris</i> cranberry v*	<i>Sphagnum compactum</i> stiff peat moss	v; s*[KA·al0]
	s*[KA·al0]	<i>Sphagnum lindbergii</i> sphagnum moss
		s*[KA·al0]

Distribution and regional distribution: Occurs throughout the country in BN-LA; O3-C1, but in BN the original area is greatly reduced.

Most important types of confusion: Slightly calcareous and weakly intermediate bog surfaces (V1-C-2), Very calcareous bog edge (V1-C-5), Calcareous bog and swamp forest (V2-C-1), Precipitation mire (V3).

Red list status (2018): Open groundwater bog (LC;<) and permafrost bog (LC Svalbard;<).

References and type parallels: Parts of K2-4 (VN). Parts of V6[4-6] (NiN v1).

V1-C-2 Slightly calcareous and slightly intermediate bog surfaces

NiN characteristics: Wetland systems: Open soil water bog (V1), four basic types (6–9). Defined by LKM: KAjy2 & TVjy1-4 & MFjy2. LKM base step: KAjcd & TV·cdefghij & MFjef.

Physiognomy: Bog where the field layer is dominated by graminids. Larger or smaller elements of woody growth, primarily at tuft level. Shrub layer can be well developed or lacking. Scattered occurrences of pine, birch or spruce trees may occur. The bottom layer is well developed and dominated by peat mosses. **Ecological characteristics:**

Bog with a supply of minerals from low-calcium soil water. The species composition consists of relatively few species of vascular plants, mainly graminids. Herbs play little role. There is a large species diversity of mosses, mainly peat mosses. Greater occurrence and species diversity of clear soil water indicators distinguish V1-C-1. Occurs primarily in areas with low-calcium rocks or low-calcium mineral soil; in the south and in the lowland Østafjells, preferably in flat terrain, in the rest of the country also in sloping terrain (hill marsh).



Steeply sloping, firm mat-dominated slightly calcareous ground bog. No: Saltdal: Matmålsshaugen SW. Photo: RH.

Terrain and aerial photo characteristics: Occurs in flat terrain, in depressions and on gentle slopes. FF: Color varies from brown to dark green depending on the time of year the photo was taken. Mostly open areas with a smooth texture. Can be difficult to distinguish from other open areas, especially on the coast and up towards the mountains. Texture and color vary little within regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V1-6-9	V1-B-3,4	V1-C-2	V1-D-1	V1-E-1
Basic types		V1-6-9	V1-6-9	V1-1-9,21-24	V1-1-9,21-24

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity type (t* = characteristic t., t±- gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.).

Andromeda polifolia white heather v*	Juncus filiformis thread reed s-[KA-clb]	Sphagnum annulatum agg. whip peat moss s*[KA-clb]
Calluna vulgaris heather v	Menyanthes trifoliata bay leaf v;s*[KA-clb]	Sphagnum balticum peat moss v;s+[KA-dl e];s+[MFjeld]
Carex lasiocarpa thread sedge v	Molinia caerulea blue top v	Sphagnum fallax agg. peat moss v
Carex nigra ssp. nigra sedge v;s+[KA-cl b]	Myrica gale pores v;s+[KA-clb]	Sphagnum medium meat-peat moss v*
Carex panicea sedge s *[KA-clb]	Oxycoccus palustris cranberry v*	Sphagnum papillosum wort peat moss m*,v*s+[MFjeld]
Carex rostrata bottle gourd v*	Rhynchospora alba white ant v;s-[KA-j blc];s*[MFjeld]	Sphagnum rubellum red peat moss v;s+[M Fjel d]
Carex pauciflora sweetstarr v*	Trichophorum cespitosum bear 's beard v*s+[MFjeld]	Sphagnum tenellum dwarf peat moss v;s*[KA-dle];s+[MFjeld]
Drosera anglica narrow sun dog v;s+[MFjeld]	Racomitrium lanuginosum heather gray moss s*[KA-dle]	Straminergon stramineum grass moss v
Drosera intermedia dike sun dog s*[KA-clb]	Oxycoccus microcarpus small cranberry s*[KA-dle]	
Drosera rotundifolia round sun egg v*	Bazzania trilobata large style s*[KA-dle]	
Eriophorum angustifolium duskmyrull v*	Cladopodiella fluitans marsh nutmeg v;s+[KA-dle];s+[MFjeld]	
Eriophorum vaginatum peat bog roll m*v;s-[KA-dle]		

Distribution and regional distribution: Occurs throughout the country in BN-LA; O3-C1, but in BN the original area is greatly reduced.

Most important types of confusion: Very low-calcareous peatland (V1-C-1), Intermediate peatland (V1-C-3), Slightly low-calcareous bog edge (V1-C-6), Low-calcareous semi-natural bog (V9-C-1).

Red list status (2018): Open groundwater bog (LC;<) and permafrost bog (LC Svalbard;<).

References and type parallels: Parts of K2-4 (VN). Parts of V6[4-6] (NiN v1).

V1-C-3 Strongly intermediate and slightly calcareous bog surfaces

NiN characteristics: Wetland systems: Open soil bog (V1), four basic types (10–13). Defined by LKM: KA·y3 & TV·y1-4 & MF·y2. LKM base step: KA·ef & TV·cdefghij & MF·yef.

Physiognomy: Bog with a field layer dominated by graminids with elements of herbs. A shrub layer (scrub) can occur on larger, continuous tufted areas. Bottom layer dominated by peat mosses, with elements of other leaf mosses. **Ecological characteristics:** Bog

with a supply of KA·yef minerals from groundwater with a higher pH than in V1-C-2. Both species typical of low-lime bog and species typical of high-lime bog occur, and the species diversity in the field layer is greater than in V1-C 2, especially of graminids. There are also elements of herbs, while woody plants play a small role. In the lowlands, the type often occurs in connection with intermediate sources and more diffuse groundwater outcrops and seeps from surrounding solid ground or in layers and drifts on high bog complexes.

Terrain and aerial photo characteristics: Smaller areas in the lowlands, mainly on flat terrain or in depressions. Covers larger areas in higher elevations; there also on gentle slopes. FF: Color varies from brown to dark green depending on the time of year the photo was taken. Mostly open areas with a smooth texture. On the coast and up towards the mountains, it can be difficult to distinguish the type from other open areas on aerial photographs. Texture and color vary little within regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		V1-B-5, 6	V1-C-3	V1-D-2	V1-E-2
Basic types	V1-10-13	V1-10-13	V1-10-13	V1-10-13,25,26,30	V-10-13,25,26,30

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity species (t* = characteristic t., t# - gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.).

<i>Andromeda polifolia</i> white heather v*	<i>Myrica gale</i> pors v	<i>Sarmentypnum sarmentosum</i> blood neck moss s+[KA·eld]
<i>Carex chordorrhiza</i> string sedge v;s+[KA·eld]	<i>Oxycoccus palustris</i> large cranberry v	<i>Sphagnum compactum</i> sphagnum moss s+[KA·flg]
<i>Carex dioica</i> særbuskarr v;s*[KA·eld]	<i>Pedicularis palustris</i> anthill s+[KA·eld]	<i>Sphagnum medium</i> meat-peat moss s+ [KA·flg]
<i>Carex lasiocarpa</i> wire sedge v *	<i>Pinguicula vulgaris</i> s+[KA·eld]	<i>Sphagnum papillosum</i> wort peat moss v;s+ [MF·yeld]
<i>Carex livida</i> blystarr s+[KA·eld]	<i>Trichophorum alpinum</i> sveltlull s+[KA·eld]	<i>Sphagnum subfulvum</i> peat moss s+[KA·el d]
<i>Carex nigra</i> ssp. <i>nigra</i> cornstar v	<i>Trichophorum cespitosum</i> bear 's beard v*;s+ [MF·yeld]	<i>Sphagnum subsecundum</i> hook peat moss v;s*[KA·eld]
<i>Carex panicea</i> sorghum v	<i>Aneura pinguis</i> fat moss s+[KA·eld]	<i>Sphagnum teres</i> pasture peat moss v;s+[KA·eld]
<i>Carex rostrata</i> bottle gourd v*	<i>Dicranum bonjeanii</i> shaggy s+[KA·eld]	<i>Sphagnum warnstorffii</i> rose peat moss v;s+ [KA·eld]
<i>Eriophorum angustifolium</i> duskmyrull v*	<i>Loeskypnum badium</i> brass moss s-[KA·el d]	
<i>Euphrasia wettsteinii</i> small- eyed thrush s+[KA·eld]	<i>Paludella squarrosa</i> piperensermoss s+ [KA·eld]	
<i>Juncus stygius</i> s +[KA·eld]		
<i>Menyanthes trifoliata</i> buckleaf v		
<i>Molinia caerulea</i> blue top v		



Intermediate, soft mat-dominated bog in LA. Op: Lom:
Dugurdskampen. Photo: RH.

Distribution and regional distribution: Occurs throughout the country in BN-LA, O3-C1, but with a center of gravity in MB-LA and with small occurrences in BN.

Most important types of confusion: Slightly calcareous bog surface (V1-C-2), Calcareous bog surface (V1-C-4), Intermediate bog edge and spring bog (V1-C-7), Intermediate bog and swamp forest (V2-C-2), Semi -natural bog (V9).

Red list status (2018): Open groundwater bog (LC;<), permafrost bog (LC Svalbard;<) and rich open southern groundwater bog (EN;y).

References and type parallels: Parts of L2-4 (VN). Parts of A05 (DNHB-13). V6[7-9] (NiN v1).

V1-C-4 Fairly to extremely calcareous bog surfaces

NiN characteristics: Wetland systems: Open soil

bog (V1), seven basic types (14–20).

Defined by LKM: KAÿ4,5 & TVÿ 1-4 & MFÿ2.

LKM base step: KAÿghi & TV·cdefghij & MFÿef.

Physiognomy: Bog with a field layer dominated by graminids and herbs. A shrub layer (scrub) can occur on larger, continuous tufted areas.

Bottom layer dominated by brown

mosses. **Ecological characteristic:** Bog with a supply

of minerals from groundwater with a pH >6. Occurs

primarily in areas with base-rich soil. In the lowlands, often in connection with rich springs or in layers and draughts of high bog complexes. Can form large parts of bog complexes in higher elevations, preferably on ground bogs.

Usually great species diversity in the field layer, both of graminids and herbs. Brown mosses such as marsh star moss, red sedge moss and large sedge moss dominate in the bottom layer.

Terrain and aerial photo characteristics: Occurs in the lowlands as small, fragmented areas, mainly on flat terrain or in depressions. Larger deposits in higher elevations, preferably on sloping terrain. FF: Color varies from brown to dark green depending on the time of year the photo was taken. Texture usually smooth, but grounded parts can have an uneven texture. On the coast and towards the mountains it is sometimes difficult to distinguish from other open areas on aerial photographs. Texture and color vary little within regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V1-14-20	V1-B-7, 8, 9	V1-C-4	V1-D-3	V1-E-3
Basic types		V1-14-20	V1-14-20	V1-14-20,27-29,31,32	V1-14-20,27-29,31,32

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity type (t* = characteristic t., tÿ- gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.).

<i>Bartsia alpina</i> blacktop v;s+[KA·glf] <i>Carex atrofusca</i> soot tarr v;s*[KA·glf] <i>Carex dioica</i> særburstarr v <i>Carex flava</i> sturgeon v;s+[KA·glf] <i>Carex hostiana</i> meadowsweet s*[KA·glf] <i>Carex lasiocarpa</i> thread sedge v <i>Carex nigra</i> ssp. <i>nigra</i> cornstar v <i>Carex panicea</i> sorghum v <i>Carex rostrata</i> bottle sedge v <i>Dactylorhiza incarnata</i> meadow marigold v;s*[KA·glf] <i>Dactylorhiza majalis</i> ssp. <i>lapponica</i> lappmarihand t* <i>Eleocharis quinqueflora</i> small sivaks s*[KA·glf] <i>Equisetum palustre</i> myrsnelle v <i>Equisetum variegatum</i> mountain fescue t*	<i>Eriophorum angustifolium</i> duskmyrull v <i>Eriophorum latifolium</i> breimyrull v;s+[KA·glf] <i>Euphrasia wettsteinii</i> small-eyed thrush v <i>Molinia caerulea</i> blue top v <i>Parnassia palustris</i> jáblom v* <i>Pedicularis oederi</i> golden mullet v;s*[KA·glf;MB,NB,LA] <i>Pinguicula vulgaris</i> sedge grass v <i>Potentilla erecta</i> carpet root v <i>Selaginella selaginoides</i> dvergjamne v <i>Thalictrum alpinum</i> mountain seed star v;s+[KA·glf] <i>Tofieldia pusilla</i> bear sting v;s+[KA·glf] <i>Trichophorum alpinum</i> svæltull v <i>Triglochin palustris</i> marsh onion s*[KA·glf] <i>Aneura pinguis</i> fat moss v	<i>Bryum pseudotriquetrum</i> bekkevrangmo see v;s*[KA·glf] <i>Campylium stellatum</i> m *,v*,s+[KA·glf] <i>Drepanocladus trifarium</i> navargulmose s*[KA·glf] <i>Fissidens adianthoides</i> saw pocket moss t* <i>Gymnolea borealis</i> brundymose s+[KA·glf] <i>Scorpidium revolvens</i> red mackerel moss m;,v*,s-[KA·glf] <i>Scorpidium scorpioides</i> largemouth moss v;s+[KA·glf] <i>Sphagnum warnstorffii</i> rose peat moss v;s+[KA·glf] <i>Tomentypnum nitens</i> golden moss v;s*[KA·glf]
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Fairly to extremely calcareous bog surface. Bu: Lier:
Pig red ant. Photo: HB.

Distribution and regional distribution: Occurs throughout the country BN-LA, O3-C1, most commonly in MB-LA.

Small deposits in BN. Rare in Southern Norway and Southwest Norway due to small areas with base-rich soil.

Most important types of confusion: Intermediate bog surface (V1-C-3), Calcareous bog edge and spring bog (V1-C-8), Calcareous bog and swamp forest (V2-C-2), Semi-natural bog (V9).

Red list status (2018): Open groundwater bog (LC;<), permafrost bog (LC Svalbard;<) and rich open southern groundwater bog (EN;ÿ).

References and type parallels: M2-4 (VN). Parts of A05 (DNHB-13). V6[10-15] (NiN v1).

V1-C-5 Very and fairly calcareous bog edges

NiN characteristics: Wetland systems: Open soil bog

(V1), two basic types (21,22). Defined by LKM: KAÿ1 & TVÿ1-5 & MF-1. LKM basic steps: KAÿab & TV·cdefghijk & MF·cd.

Physiognomy: Bog where the field layer is dominated by graminids and woody plants. Usually tuft-dominated, with scattered trees and shrubs of pine and birch. The bottom layer is well developed and dominated by peat bogs.



Ecological characteristic: Bog close to solid ground or Dwarf birch-dominated, very sparsely wooded, tussock -dominated due to peat with a weak soil water supply or as a very low-lime bog edge. Of Marker Langrasta V is supplied with very low-calcium soil Water. Species composition Photo: RH.

with few vascular plants, mainly graminids and heather species. Large species diversity of mosses, mainly peat mosses. Significant proportion of permanent land species (species that characterize forest and/or heath). Occurs primarily in areas with (very) limestone-poor rocks. Gradual transition towards rain bog (V3-C-1); V1-C-1 is distinguished from precipitation bogs by scattered occurrences of soil water indicators (indicated by 'KAÿal0' in the table below).

Terrain and aerial photo characteristics: Occurs primarily in flat terrain or in depressions, often as a layer of high bog. FF: Open areas, often with a smooth texture. Color often dark green to dark brown, but patches of grass or peat moss can produce lighter parts. Sometimes difficult to distinguish from other open areas, especially on the coast and up towards the mountains. Texture and color vary little within regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2.500	1:5,000	1:10,000	1:20,000
Code	V1-21-22	V1-B-10, 11	V1-C-5	V1-D-1	V1-E-1
Basic types		V1-21-22	V1-21-22	V1-1-9, 21-24	V1-1-9, 21-24

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity species (t* = characteristic t., t¤- gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.). Note that 's*[KA·al0]' indicates terrestrial water indicators, i.e. separating species between V1-C-1 and V3-C-1. '?' indicates uncertainty about whether the species indicates a permanent water influence also on V.

<i>Andromeda polifolia</i> white heather v <i>Betula pubescens</i> birch v;s+[MF-dle] <i>Betula nana</i> ssp. <i>nana</i> dwarf birch v <i>Calluna vulgaris</i> heather m;v* <i>Carex globularis</i> spruce s*[KA·al0];s+[MF-dle] <i>Chamaepericlymenum suecicum</i> scrub berry v;s+[MF-dle] <i>Empetrum nigrum</i> krekling v <i>Eriophorum angustifolium</i> duskmyrull s*[KA·al0] <i>Eriophorum vaginatum</i> peat bog roll v <i>Lysimachia europaea</i> forest star v;s*[KA·al0];s+[MF-dle]	<i>Melampyrum pratense</i> stormarimjelle v;s*[KA·al0];s+[MF-dle] <i>Oxycoccus palustris</i> large cranberry v <i>Pinus sylvestris</i> pine v <i>Rubus chamaemorus</i> molte etc <i>Vaccinium myrtillus</i> blueberry v;s+[MF-dle] <i>Vaccinium uliginosum</i> blockberry v*s-[MF-dle] <i>Vaccinium vitis-idaea</i> lingonberry v*s-[M F-dle] <i>Aulacomnium palustre</i> peat moss v;s+[MF-dle]	<i>Pleurozium schreberi</i> furumose v*;s-[MF-dle] <i>Sphagnum angustifolium</i> club peat moss m;v* <i>Sphagnum capillifolium</i> pine peat moss v;s+[MF-dle] <i>Sphagnum girgensohnii</i> spruce peat moss s*[KA·al0];s+[MF-dle] <i>Sphagnum magellanicum</i> meat-peat moss v* <i>Sphagnum russowii</i> tvaretormose v;s*[KA·al0];s+[MF-dle]
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Distribution and regional distribution: Occurs throughout the country in BN-LA, O3-C1, but sparse in BN.

Most important types of confusion: Very calcareous bog surface (V1-C-1), Slightly calcareous bog edge (V1-C-6), Calcareous bog and swamp forest (V2-C-1), Precipitation mire (V3), Calcareous boreal fresh heath (T31-C-1), Calcareous coastal heath (T34-C-2).

Red list status (2018): Open groundwater bog (LC;<) and permafrost bog (LC Svalbard;<).

References and type parallels: Parts of K1 (VN). Parts of V7[2] (NiN v1).

V1-C-6 Slightly calcareous and slightly intermediate bog edges

NiN characteristics: Wetland systems: Open soil water bog (V1), two basic types (23–24). Defined by LKM: KAy2 & TVy1-4 & MF·1. LKM base step: KAycd & TV·cdefghij & MF·cd.

Physiognomy: Bog with a field layer dominated by graminids and woody plants. Larger or smaller elements of woody growth, primarily at tuft level. Shrub layer can be well developed or lacking. Scattered occurrences of pine, birch or spruce may occur. The bottom layer is well developed and dominated by peat mosses.

Ecological characteristic: Bog near solid ground or on shallow peat with a supply of minerals from low-calcium soil water. Species composition with relatively few vascular plants, mainly graminids and heather species. Herbs play little role. Large species diversity of mosses, mainly peat mosses. Significant proportion of permanent land species (species that characterize forest and/or heath). Greater occurrence and species diversity of clear soil water indicators distinguish V1-C-5. Occurs primarily in areas with low-calcium rocks or low-calcium mineral soil; in the south and in the lowland Østafjells, preferably in flat terrain, in the rest of the country also in sloping terrain (hill marsh).

Terrain and aerial photo characteristics: Occurs in flat terrain, in depressions and on gentle slopes, often as a layer of high bog. FF: Color often dark green to dark brown, but grass or peat moss elements can produce lighter parts. Can be difficult to distinguish from other open areas, especially on the coast and up towards the mountains. Open areas have smooth texture; texture and color vary little within regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		V1-B-12, 13	V1-C-6	V1-D-1	V1-E-1
Basic types	V1-23-24	V1-23-24	V1-23-24	V1-1-9, 21-24	V1-1-9, 21-24

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **tx**- gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.).

<i>Andromeda polifolia</i> white heather v <i>Betula nana</i> ssp. <i>nana</i> dwarf birch v <i>Betula pubescens</i> birch v;s+[MF-dle] <i>Calluna vulgaris</i> heather v <i>Carex nigra</i> ssp. <i>nigra</i> sedge v;s+[KA-cl b] <i>Carex rostrata</i> bottle sedge v;s+[KA-clb] <i>Chamaepericlymenum suecicum</i> scrub berry v;s+[MF-dle] <i>Empetrum nigrum</i> kreling v <i>Eriophorum angustifolium</i> duskmyrull v <i>Juncus filiformis</i> reed s-[KA-clb];s+[M F-dle] <i>Lysimachia europaea</i> forest star v;s+[M F-dle]	<i>Melampyrum pratense</i> stormarimjelle v;s+[MF-dle] <i>Pinus sylvestris</i> pine v <i>Rubus chamaemorus</i> molte v <i>Vaccinium myrtillus</i> blueberry v;s+[MF-dle] <i>Vaccinium uliginosum</i> blockberry v;s-[M F-dle] <i>Vaccinium vitis-idaea</i> cranberry v <i>Aulacomnium palustre</i> peat moss v;s-[MF-dle] <i>Pleurozium schreberi</i> furmose v;s-[MF-dle] <i>Sphagnum angustifolium</i> club peat moss m;v*	<i>Sphagnum capillifolium</i> pine peat moss v;s+[MF-dle] <i>Sphagnum central</i> scrub-peat moss s*[KA-cl b] <i>Sphagnum flexuosum</i> silk peat moss s*[KA-clb] <i>Sphagnum girgensohnii</i> spruce peat moss s+[MF-dle] <i>Sphagnum magellanicum</i> meat-peat moss v <i>Sphagnum russowii</i> tvaretormose v;s+[MF-dle] <i>Sphagnum strictum</i> heather moss v;s+[M F-dle];v
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Distribution and regional distribution: Occurs throughout the country in BN-LA, O3-C1 but there are very few occurrences left in BN.

Most important types of confusion: Slightly calcareous bog surface (V1-C-1), Very calcareous bog edge (V1-C-5), Intermediate bog edge (V1-C-7), Calcareous bog and swamp forest (V2-C-1), Precipitation mire (V3), Calcareous boreal fresh heath (T31-C-1), Calcareous coastal heath (T34-C-2).

Red list status (2018): Open groundwater bog (LC;<) and permafrost bog (LC Svalbard;<).

References and type parallels: Parts of K1 (VN) and V7[2] (NiN v1).



A little lime-poor and slightly intermediate bog edge. Op: Øystre Slidre: Gravfjellet. Photo: RH.

V1-C-7 Strongly intermediate and slightly calcareous bog edges

NiN characteristics: Wetland systems: Open soil water bog (V1), three basic types (25–26,30).

Defined by LKM: KAÿ3 & TVÿ1-4 & MFÿ1 & Klÿ1,2.

LKM basis steps: KAÿef & TV·cdefghij & MFÿcd & Klÿ0abc.

Physiognomy: Bog with a field layer dominated by graminids with elements of herbs. Scattered trees and thickets of birch, spruce, alder or willow species. Bottom layer dominated by peat mosses, with elements of other

leaf mosses. **Ecological characteristic:** Bog near solid ground or springs, or on shallow peat, which is supplied with minerals from ground water and spring water with a pH of 5-6. High species diversity, especially of graminids, with a significant element of terrestrial species (species that characterize forest and/or heath) and of herbs; woody vegetation plays little role. Large species diversity of mosses, mainly peat mosses, but also elements of other leaf mosses. In the lowlands, the mapping unit often occurs near intermediate sources and more diffuse groundwater outcrops, e.g. separate from the surrounding solid ground or in layers and drifts on the high marsh complex.

Terrain and aerial photo characteristics: Covers small areas in the lowlands, mainly on flat terrain or in depressions. Larger deposits in higher ground, there also on gentle slopes. FF: Mostly medium green, with a texture that varies with the amount of bushes and source influence. Texture and color vary somewhat within regions. Close to the coast and up towards the mountains, it can be difficult to distinguish the type from other open areas on aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		V1-B-14,15,19	V1-C-7	V1-D-2	V1-E-2
Basic types	V1-25,26,30	V1-25,26,30	V1-25,26,30	V1-10-3,25,26,30	V1-10-3,25,26,30

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.).

<i>Andromeda polifolia</i> white heather v	<i>Melampyrum pratense</i> stormarimjelle s+ [MF-dle]	<i>Sphagnum angustifolium</i> club peat moss v*
<i>Betula nana</i> ssp. <i>nana</i> dwarf birch v	<i>Menyanthes trifoliata</i> buckleaf v	<i>Sphagnum central</i> scrub-peat moss v
<i>Betula pubescens</i> birch v;s+[MF-dle]	<i>Molinia caerulea</i> blue top v	<i>Sphagnum contortum</i> vrifornose s*[KA-el d]
<i>Carex dioica</i> særbuskarr v;s*[KA-eld]	<i>Myrica gale</i> pors v	<i>Sphagnum magellanicum</i> meat-peat moss s+ [KA-flg]
<i>Carex echinata</i> v ;s+[KA-flg]	<i>Pinguicula vulgaris</i> s +[KA-eld]	<i>Sphagnum papillosum</i> wort peat moss v
<i>Carex nigra</i> ssp. <i>nigra</i> cornstar v	<i>Potentilla erecta</i> carpet root v;s-[KA-eld]	<i>Sphagnum platyphyllum</i> skeitor moss s+ [KA-eld]
<i>Carex panicea</i> sorghum v	<i>Aulacomnium palustre</i> peat moss v;s- [MF-dle]	<i>Sphagnum subsecundum</i> hook peat moss v;s*[KA-eld]
<i>Carex rostrata</i> bottle sedge v	<i>Dicranum bonjeanii</i> shaggy s+[KA-eld]	<i>Sphagnum strictum</i> heather moss v;s+[M F-dle;V]
<i>Eriophorum angustifolium</i> duskmyrull v	<i>Sarmentypnum sarmentosum</i> blood neck moss s+[KA-eld]	
<i>Euphrasia wettsteinii</i> small- eyed thrush s+[KA-eld]		
<i>Juncus filiformis</i> reed s-[KA-dle];s+[M F-dle]		
<i>Lysimachia europaea</i> forest star v;s+[M F-dle]		



Intermediate, willow-dominated spring mire. No: Saltdal: Matmålshaugen SW. Photo: RH.

Distribution and regional distribution: Occurs throughout the country BN-LA, O3-C1, but with a center of gravity in MB-LA and with small occurrences in BN.

Most important types of confusion: Intermediate bog surface (V1-C-3), Slightly calcareous bog edge (V1-C-6), Calcareous bog edge and spring bog (V1-C-8), Intermediate bog and swamp forest (V2-C-2), Semi -natural bog (V9).

Red list status (2018): Open groundwater bog (LC;<), permafrost bog (LC Svalbard;<), rich open southern groundwater bog (EN;ÿ) and calcareous permafrost bog edge (CR Svalbard;ÿ).

References and type parallels: Parts of L1(VN), A05 (DNHB-13) and V7[3] (NiN v1).

V1-C-8 Fairly to extremely calcareous bog edges

NiN characteristics: Wetland systems: Open soil water bog (V1), four basic types (27–29,31).
 Defined by LKM: KAÿ4,5 & TVÿ1-4 & MFÿ1 & Klÿ1,2.
 LKM basis steps: KAÿghi & TV·cdefghij & MFÿcd & Klÿ0abc.

Physiognomy: Bog with a field layer dominated by graminids and herbs. Scattered trees and thickets mainly of spruce, birch or willow species. Bottom layer dominated by brown mosses (leaf mosses other than peat mosses).



Fairly to extremely calcareous bog edge. Op: Dovre:
 Grimsdal: S for Kattugleholi. Photo: RH.

Ecological characteristics: Bogs near solid ground or springs, or on shallow peat, which are supplied with minerals from ground water and spring water with a pH >6. Usually great species diversity in the field layer, both of graminids and herbs. Brown mosses such as marsh star moss, red sedge moss and large sedge moss dominate in the bottom layer. Large proportion of permanent land species (e.g. from forest or heath). Occurs primarily in base-rich soil. In the lowlands, often in connection with rich springs or in layers and draughts of high bog complexes. Can form large parts of bog complexes in higher elevations, preferably on ground bogs.

Terrain and aerial photo characteristics: Covers small areas in the lowlands, where mainly on flat terrain or in depressions. Larger deposits in higher elevations, preferably on sloping terrain. FF: Mostly medium green color and smooth texture that varies with the elements of bushes and trees. Texture and color vary somewhat within regions. On the coast and up towards the mountains, it can be difficult to distinguish the type from other open areas on aerial photographs.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		V1-B-16,17,18,20	V1-C-8	V1-D-3	V1-E-3
Basic types	V1-27-29,31	V1-27-29,31	V1-27-29,31	V1-14-20,27-29,31	V1-14-20,27-29,31

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity type (t* = characteristic t., t¤- gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.).

<i>Angelica sylvestris</i> gorse v;s+[MF-dle] <i>Betula pubescens</i> birch v;s+[MF-dle] <i>Bartsia alpina</i> blacktop v;s+[KA-glf] <i>Bistorta vivipara</i> harerug v;s+[MF-dle] <i>Carex dioica</i> særbuskarr v <i>Carex flava</i> jaundice v;s+KA-glf <i>Carex hostiana</i> engstarr t* <i>Carex lasiocarpa</i> thread sedge v <i>Carex nigra</i> ssp. <i>nigra</i> cornstar v <i>Carex panicea</i> sorghum v <i>Carex rostrata</i> bottle sedge v <i>Cirsium heterophyllum</i> white-leaved thistle v;s+[MF-dle] <i>Crepis paludosa</i> Marshhawk v;s+[MF-dle]	<i>Epilobium palustre</i> marsh milkweed s+[MF-dle] <i>Equisetum variegatum</i> mountain fescue v <i>Eriophorum angustifolium</i> duskmyrull v <i>Eriophorum latifolium</i> breimyrull v;s*[KA-glf] <i>Euphrasia wettsteinii</i> small-eyed thrush v <i>Filipendula ulmaria</i> meadowsweet v;s+[MF-dle] <i>Molinia caerulea</i> blue top v <i>Pedicularis oederi</i> _ hlg <i>Pinguicula vulgaris</i> sedge grass v <i>Potentilla erecta</i> carpet root v <i>Thalictrum alpinum</i> mountain seed star v;s+[KA-glf] <i>Tofieldia pusilla</i> bear sting v;s+[KA-glf]	<i>Bryum pseudotriquetrum</i> brook vrang moss v;s*[KA-glf] <i>Campylium stellatum</i> m *;v*s+[KA-glf] <i>Cinclidium stygium</i> s*[KA-glf] <i>Dicranum bonjeanii</i> piusksigd v <i>Plagiomnium elatum</i> s*[KA-glf];s+[MF-dle] <i>Sphagnum subsecundum</i> sphagnum peat moss v <i>Sphagnum warnstorffii</i> rose peat moss v;s+[KA-glf] <i>Tomentypnum nitens</i> golden moss v;s*[KA-glf]
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Distribution and regional distribution: Occurs throughout the country BN-LA, O3-C1, most commonly in MB-LA. Small deposits in BN. Rare in Southern Norway and Southwest Norway due to small areas with base-rich soil.

Most important types of confusion: Intermediate bog edge and spring bog (V1-C-7), Calcareous bog surface (V1-C-4), Calcareous bog and swamp forest (V2-C-2), Semi-natural bog (V9).

Red list status (2018): Open groundwater bog (LC;<), permafrost bog (LC Svalbard;<), rich open southern groundwater bog (EN;ÿ) and calcareous permafrost bog edge (CR Svalbard;ÿ).

References and type parallels: Parts of M1 (VN), A05 (DNHB-13) and V7[4-5] (NiN v1).

V1-C-9 Salt-affected marsh edge

NiN characteristics: Wetland systems: Open soil water bog (V1), one ground type (1). Defined by LKM: KAÿ4 & TVÿ1,2 & MFÿ1 & SAÿ2. LKM base step: KAÿgh & TV·cdef & MFÿcd & SAÿbcd.

Physiognomy: Field layer dominated by graminids and herbs. Scattered bushes may occur. Bottom layer dominated by brown mosses, but also elements of peat bogs.



Salt affected bog edge. No: Bodø: Bliksvær. Photo: RH.

Ecological characteristics: Salt-affected bog edges are relatively rich minerogenic bogs characterized by elements of salt-tolerant species. The bog type occurs, among other things, in transitions between salt meadows and wetlands, and is mainly found in northern Norway, especially Troms and Finnmark. The type occurs in soft mats and lower firm mats and is distinguished primarily on the basis of the presence of salt-tolerant species and most often drift line in excess of pure bog vegetation. Species composition a mixture of bog species on minerogenic bogs and salt-tolerant species. Therefore, similarities with salt meadow, but distinguished from this by having peat formation and a clear element of bog plants. Rarely flooded and salt content is washed out and is therefore low.

Terrain and aerial photo characteristics: Mainly flat or gently sloping terrain adjacent to salt meadows.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V1-32	V1-B-21	V1-C-9	V1-D-3	V5-E-3
Basic types		V1-32	V1-32	V1-14-20,27-29,31	V1-14-20,27-29,31

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **tn**- gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Equisetum palustre</i> myrsnelle v <i>Blysmopsis rufa</i> rustsivaks v <i>Calamagrostis neglecta</i> _ <i>Carex xsalina</i> spring sedge <i>Carex glareosa</i> gravel sedge <i>Carex mackenziei</i> pool sedge <i>Carex nigra</i> ssp. <i>nigra</i> cornstar v <i>Carex rariflora</i> snipestarr v <i>Comarum palustre</i> marsh hat v <i>Eleocharis quinqueflora</i> small sivaks v <i>Eleocharis uniglumis</i> feather sivaks v <i>Epilobium palustre</i> marsh milkweed v <i>Eriophorum angustifolium</i> duskmyrull v	<i>Euphrasia wettsteinii</i> small-eyed thrush v <i>Festuca rubra</i> red fescue v <i>Galium trifidum</i> dwarf ant <i>Juncus filiformis</i> thread reed v <i>Menyanthes trifoliata</i> buckleaf v <i>Montia fontana</i> springwort v <i>Parnassia palustris</i> jáblom v <i>Pedicularis palustris</i> anthill v <i>Plantago maritima</i> beach giant <i>Potentilla anserina</i> ssp. <i>anserina</i> goose walls <i>Potentilla anserina</i> ssp. <i>groenlandica</i> eskimo wall <i>Salix hastata</i> bleached heifers v	<i>Salix lapponum</i> lappvier v <i>Stellaria crassifolia</i> star flower <i>Stellaria humifusa</i> Arctic star flower <i>Triglochin maritima</i> spring onion <i>Triglochin palustris</i> marsh onion v <i>Viola palustris</i> marsh violet v <i>Campylium stellatum</i> marsh star moss v <i>Paludella squarrosa</i> piperensemose v <i>Sarmentypnum exannulatum</i> agg. vrangnökmosse v <i>Scorpidium revolvens</i> red mackerel moss v <i>Straminergon stramineum</i> grass moss v
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Distribution and regional distribution: MB-NB and ASHTZ, O1-OC.

Most important alteration types: Strongly intermediate and slightly calcareous bog edges (V1-C-7), rather to extremely calcareous bog edges (V1-C-8).

Red list status (2018): Open groundwater bog (LC;<), permafrost bog (LC;<), rich open southern groundwater bog (EN;ÿ) and salt-affected bog edge (EN Svalbard;=).

References and type parallels: U9c (VN).

V2-C-1 Lime-poor and slightly intermediate marsh and swamp forest lands

NiN characteristics: Wetland systems: Marsh and swamp forest land (V2), two basic types (1,2). Defined by LKM: KAj1 & TVj1,2 & LKM base steps: KAjabcd & TV·cdefghijk.

Physiognomy: Wood layer dominated by pine, birch and/or spruce. The shrub layer may be well developed or absent. The field layer is often tall and dominated by graminids, with greater or lesser elements of woody growth. The bottom layer is well developed and dominated by peat bogs.



Lime-poor and weak intermediate bog and swamp forest. Op: Øystre Slidre: Gravfjellet. Photo: RH.

Ecological characteristics: Wooded bog and other wet woodland on peat with or without elements of humus-rich soil; are supplied with minerals from low-calcium groundwater. The mapping unit occurs primarily in areas with calcareous rocks or calcareous mineral soils, along the edge of bogs and on moist surfaces and in depressions in forest terrain; in higher-lying areas also in sloping terrain.

The species composition consists of relatively few species of vascular plants, mainly graminids, with elements of heather species. Herbs play little role. There is a large species diversity of mosses, mainly peat mosses. Many species in common with V1-C-6.

Terrain and aerial photo characteristics: Occurs in flat terrain, in depressions and on gentle slopes. On aerial photographs, the type often appears as areas of sparse forest at the edge of marshes or in forest terrain. FF: The color is controlled by the dominance conditions in the wood layer; most often light green when pine dominates and medium green when birch dominates. Variation in the wood layer also gives rise to variation in texture. Tuft formation often visible in open areas on aerial photos. Texture and color vary somewhat within regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		V2-B-1.2	V2-C-1	V2-D-1	V2-E-1
Basic types	V2-1,2	V2-1.2	V2-1-2	V2: 1-2	V2: 1-2

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.).

<i>Betula pubescens</i> birch m;v* <i>Dactylorhiza maculata</i> ssp. <i>maculata</i> spotted marigold v <i>Carex canescens</i> cataract v <i>Carex echinata</i> star star v <i>Carex nigra</i> ssp. <i>nigra</i> cornstar v <i>Carex rostrata</i> bottle sedge v <i>Equisetum sylvaticum</i> sedge v <i>Juncus filiformis</i> thread reed v <i>Lysimachia europaea</i> forest star v* <i>Picea abies</i> fir m;v*	<i>Pinus sylvestris</i> pine m*;v* <i>Rubus chamaemorus</i> molte v <i>Salix glauca</i> ssp. <i>glauca</i> silver willow v[MB,NB] <i>Salix lapponum</i> lappvier v[MB,NB] <i>Viola palustris</i> marsh violet v*[BN,SB,MB] <i>Vaccinium vitis-idaea</i> cranberry v* <i>Hylocomium splendens</i> floor moss v <i>Polytrichum commune</i> large bear moss m;v*	<i>Sphagnum girgensohnii</i> spruce peat moss etc <i>Sphagnum magellanicum</i> meat-peat moss v <i>Sphagnum palustre</i> swamp peat moss v[BN,SB] <i>Sphagnum quinquefarium</i> heather peat moss v;s*[KA-dle] <i>Sphagnum russowii</i> taretormose m;v;s*[KA-dle]
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Distribution and regional distribution: Occurs throughout the country In BN-NB, O3-C1, but less common in BN.

Most important types of confusion: Slightly calcareous bog edge (V1-C-6), Intermediate bog edge (V1-C-7), Intermediate bog and swamp forest (V2-C-2).

Red list status (2018): Bog and swamp forest land (LC;<).

References and type parallels: Parts of K1 (VN). Parts of V7[2] (NiN v1).

V2-C-2 Strongly intermediate and slightly calcareous bog and swamp forest fields

NiN characteristics: Wetland systems: Bog and swamp forest land (V2), three basic types (3,4,7).

Defined by LKM: KA^y2 & TV^y1,2 & Kl^y1,2. LKM base step: KA^yef & TV^ycdefghijk & Kl^y0abc.

Physiognomy: Wood layer dominated by spruce, birch, willow species and/or willow species. The shrub layer may be well developed or absent. The field layer is dominated by graminids with elements of herbs. The bottom layer is dominated by peat mosses, with elements of other leaf mosses.



Strong intermediate and slightly calcareous bog and swamp forest.

Op: Etnedal: Teimyrberget. Photo: RH.

Ecological characteristics: Wooded bog and other wet forest land on peat, often a significant amount of humus-containing mineral soil ('swamp soil'), which receives a supply of minerals from groundwater with a higher pH than in V2-C-1, or which is affected by flood water or spring water. Often occurs at the edge of larger bogs, adjacent to intermediate springs, by lakes or in other areas with periodically high water levels. In the lowlands, the mapping unit covers small areas, in higher areas it can cover significant areas due to peat. The species composition is dominated by marsh species with elements of species with a center of gravity near or in fresh water and on dry land. There is greater species diversity in the field layer than in V2-C-1, especially of graminids. Elements of herbs and woody plants (weed species) are common. There is a large species diversity of mosses, mainly peat mosses, but with elements of other leaf mosses (including forest mosses).

Terrain and aerial photo characteristics: Occurs in flat terrain, in depressions and on gentle slopes. On aerial photographs, the type often appears as areas of sparse forest at the edge of marshes or in forest terrain. FF: The color is controlled by the dominance conditions in the wood layer; most often light green when pine dominates and medium green when birch dominates. Variation in the wood layer also gives rise to variation in texture. Tuft formation often visible in open areas on aerial photos. Texture and color vary somewhat within regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		V2-B-3,4,7	V2-C-2	V2-D-2	V2-E-2
Basic types	V2-3,4,7	V2-3,4,7	V2-3,4,7	V2-3,4,7	V2-3,4,7

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity species (t* = characteristic t., t^y - gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.).

<i>Alnus glutinosa</i> svartvar v[BN,SB] <i>Alnus incana</i> alder v <i>Betula pubescens</i> birch m;v* <i>Calamagrostis phragmitoides</i> forest roe vein v <i>Carex canescens</i> cataract v <i>Carex echinata</i> star star v <i>Carex nigra</i> ssp. <i>nigra</i> cornstar v <i>Carex rostrata</i> bottle sedge v <i>Equisetum sylvaticum</i> sedge v <i>Galium palustre</i> marsh ant v;s+[KA-eld] <i>Molinia caerulea</i> bluetop v;s-[KA-eld] <i>Lysimachia europaea</i> forest star v*	<i>Phegopteris connectilis</i> hanging wing v;s+[KA-eld] <i>Picea abies</i> fir m*[Ø,M];v*[Ø,M] <i>Salix lappponum</i> lappvier v[MB,NB] <i>Salix myrsinifolia</i> ssp. <i>myrsinifolia</i> black willow v <i>Salix pentandra</i> istervier v;s*[KA-eld] <i>Viola epipsila</i> large marsh violet v <i>Viola palustris</i> marsh violet v*[BN,SB,MB] <i>Hylomium splendens</i> floor moss v <i>Polytrichum commune</i> large bear moss m;v*	<i>Sphagnum angustifolium</i> club peat moss v <i>Sphagnum central</i> scrub-peat moss v;s+[KA-eld] <i>Sphagnum girgensohnii</i> spruce peat moss etc <i>Sphagnum squarrosum</i> split peat moss v;s+[KA-eld] <i>Sphagnum teres</i> pasture peat moss v;s+[KA-eld] <i>Sphagnum warnstorffii</i> rose peat moss v;s*[KA-fle]
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Distribution and regional distribution: Occurs throughout the country in BN-NB, O3-C1, but less common in BN.

Most important types of confusion: Calcareous bog edge (V1-C-6), Calcareous bog edge (V1-C-8), Calcareous bog and swamp forest (V2-C-1), Calcareous bog and swamp forest (V2-C-3).

Red list status (2018): Rich black swamp forest (VU;^y), rich spruce swamp forest (EN;^y) and source noble deciduous forest (VU;^y).

References and type parallels: Parts of L1 (VN), A05 (DNHB-13) and V7[3,6] (NiN v1).

V2-C-3 Fair to extremely calcareous bog and swamp woodlands

NiN characteristics: Wetland systems: Bog and swamp forest land (V2), three basic types (5,6,8). Defined by LKM: Aý & TVý1,2 & Klý1,2. LKM basis steps: KAýghi & TV-cdefghijk & KI-0abc.

Physiognomy: More or less slippery wood layer of spruce, birch, gray alder, black alder or willow species. Shrub layer well developed or many laughs. The field layer is tall and dominated by herbs. The bottom layer is often poorly developed and dominated by brown mosses and sphagnum moss species. **Ecological characteristic:** Wooded bog and other wet woodland with weak or no peat accumulation.

The soil may contain peat, but is most often a humus-rich "swamp soil". Minerals are supplied from calcareous ground water or spring water. Large variation in lime content, moisture conditions, water supply and peat accumulation. The range of species and species diversity is large, and the species composition can vary greatly from place to place. Both bog species and terrestrial species are included. Herbs and graminids dominate. Occurs primarily in areas with calcareous soil, often adjacent to calcareous springs, at the edge of larger bogs, by lakes and in other areas with periodically high water levels.

Covers small areas in the lowlands; in higher elevations, the type can cover significant areas due to peat.

Terrain and aerial photo characteristics: Occurs in flat terrain, in depressions and on gentle slopes. FF: The color is controlled by the dominance conditions in the wood layer; most often dark green when spruce dominates and medium green when birch dominates; greener when peat bogs dominate. Variation in the wood layer gives rise to variation in texture. Texture and color vary somewhat within regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V2-5,6,8	V2-B-5,6,8	V2-C-3	V2-D-3	V2-E-3
Basic types		V2-5,6,8	V2-5,6,8	V2-5,6,8	V2-5,6,8

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.).

<i>Alnus glutinosa</i> svarter v[BN,SB]	<i>Filipendula ulmaria</i> meadow herb v;s-[KA:gff]	<i>Calliergonella cuspidata</i> marsh bramble v;s*[KA:gff]
<i>Alnus incana</i> alder v*	<i>Galium palustre</i> marsh anemone v	<i>Climaciumpendulae</i> palm moss v;s+
<i>Anemone nemorosa</i> whitveis v	<i>Geum rivale</i> meadow bumblebee v;s+[KA:gff]	[KA:gff]
<i>Athyrium filix-femina</i> skogburkne v	<i>Lysimachia europaea</i> forest star v	<i>Pellia</i> spp. spring mosses s+[KA:gff]
<i>Betula pubescens</i> birch v	<i>Phegopteris connectilis</i> hanging wing v	<i>Plagiomnium</i> spp. mosses v*
<i>Calamagrostis phragmitoides</i> forest roe vein v	<i>Picea abies</i> fir m;v*	<i>Pseudobryum cincinnoides</i> giant moss v;s+[KA:gff]
<i>Caltha palustris</i> brook flower v	<i>Salix glauca</i> ssp. <i>glauca</i> silver willow v[MB,NB]	<i>Rhizomnium punctatum</i> brook round moss v;s+
<i>Carex buxbaumii</i> club star s+[KA:gff]	<i>Salix lapponum</i> lappvier v[MB,NB]	[KA:gff]
<i>Carex elongata</i> langstarr v[BN,SB,M B];s+[KA:gff]	<i>Salix myrsinifolia</i> ssp. <i>myrsinifolia</i> black willow v	<i>Sphagnum squarrosum</i> split peat moss v
<i>Cirsium heterophyllum</i> white-leaved thistle v	<i>Salix myrsinifolia</i> myrtle vine v;s+[KA:gff]	<i>Sphagnum teres</i> pasture turf moss v
<i>Crepis paludosa</i> Marshhawk v;s+[KA:gff]	<i>Salix pentandra</i> istervier v	<i>Sphagnum warnstorffii</i> rose peat moss v
<i>Equisetum sylvaticum</i> sedge v	<i>Viola palustris</i> marsh violet v	
	<i>Calliergon cordifolium</i> sedge moss v;s-[KA:gff]	



Strong intermediate and slightly calcareous bog and swamp forest. Op: Etmedal: Teimyrberget. Photo: RH.

Distribution and regional distribution: Occurs throughout the country In BN-NB, O3-C1, but sparingly in BN. Rare in Southern Norway and Southwest Norway due to small areas with base-rich soil.

Most important types of confusion: Intermediate bog edge (V1-C-7), Calcareous bog edge (V1-C-8), Intermediate bog and swamp forest (V2-C-2).

Red list status (2018): Rich black swamp forest (VU;ý), rich spruce swamp forest (EN;ý) and source noble deciduous forest (VU;ý).

References and type parallels: Parts of M1 (VN), A05 (DNHB-13) and V7[4,5,7] (NiN v1).

V3-C-1 Ombrotrophic peatlands

NiN characteristics: Wetland systems:

Precipitation mire (V3), six basic types (1–5.7). Defined by LKM: TVy1-5 & MFy2 & VIy1,2. LKM basic level: TV-cdefghijk & VI-a.

Physiognomy: Bog with a very species-poor field layer and, in tufts, with a significant element of woody growth. The bottom layer is well developed and dominated by peat bogs. A shrub layer is missing, but pine can form a tree layer.

Ecological characteristics: On nutrient-poor, deep peat where the surface layer gets all its mineral nutrition from the rainfall. Usually occurs in flat or gently sloping terrain on raised bogs, oceanic precipitation bogs and flat bogs. Species composition with few vascular plants, mainly graminids, but heather species dominate the tufts. Differs from groundwater bog (V1) by the lack of species that indicate groundwater.



Ombrotrophic peatland. No: Sortland: Lahaugmyran. Photo: RH

Terrain and aerial photo characteristics: Occurs primarily in flat terrain or in depressions.

FF: Color usually brown to dark green; light brown with a high proportion of grass or light peat bogs. Tones provide a characteristic change in texture. Texture and color vary little within and between regions. On aerial photos, the type appears with characteristic structures on high marshes, but on the coast as open areas with a uniform structure that can be difficult to distinguish from other open areas.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		V3-B-1,2	V3-C-1	V3-D-1	V3-E-1
Basic types	V3-1-5,7	V3-1-5,7	V3-1-5,7	V3-1-5,7	V3-1-7

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.).

<i>Andromeda polifolia</i> white heather v	<i>Rubus chamaemorus</i> molte v*	<i>Sphagnum fuscum</i> rust peat moss m*;v*
<i>Calluna vulgaris</i> heather m*;v*	<i>Trichophorum cespitosum</i> bear's beard v	<i>Sphagnum medium</i> meat-peat moss m;v*
<i>Drosera rotundifolia</i> round sun egg v	<i>Cetraria islandica</i> islandslav v	<i>Sphagnum rubellum</i> red peat moss m*,v*
<i>Eriophorum vaginatum</i> peat bog roll v*	<i>Cladonia</i> spp. lichen m;v*	<i>Sphagnum tenellum</i> dwarf peat moss m;v*
<i>Oxycoccus palustris</i> large cranberry v	<i>Racomitrium lanuginosum</i> heather gray moss v[V,M]	
<i>Pinus sylvestris</i> pine m;v*	<i>Sphagnum balticum</i> peat moss m;v*	
<i>Rhynchospora alba</i> white ant v;s*[M Fjeld]		

Distribution and regional distribution: Occurs throughout the country in BN-NB, O3-C1, but mostly in SB-MB, O3-OC.

Most important types of confusion: Very calcareous bog surface (V1-C-2), Very calcareous bog edge (V1-C-5), Precipitation bog edge (V3-C-2).

Red list status (2018): Nedbørsmyr (NT;<).

References and type parallels: J2-4, part of J1 (VN). Parts of A04, 7 and 8 (DNHB-13), V6[1-3] (NiN v1).

V3-C-2 Ombrotrophic bog edge

NiN characteristics: Wetland systems: Precipitation mire (V3), one basic type (6). Defined by LKM: TVy5 & MFy1. LKM basic level: TV-k & MF-cd.

Physiognomy: Bog with a very species-poor field layer that is often dominated by woody vegetation. The bottom layer is well developed and dominated by peat bogs. The shrub layer is sparse or absent, but pine (with the exception of birch) can form an open tree layer of low or small trees.

Ecological characteristics: On nutrient-poor peat where the surface layer gets all its mineral nutrition from the rainfall. The mapping unit occurs on high bogs, flat bogs and oceanic precipitation bogs, and the pals on palsmyr are also made up of precipitation bogs. Species composition with few vascular plants, mainly heather species and graminids. Differs from Ombrorof bog flat. No: Sortland: ground water marsh (V1) in the absence of species that indicate ground water Lahaugmyran. Photo: RH (see diagnostic species for V1-C-1 and V1-C-5). Woodland on rainfall bogs (canopy cover over 10% of trees at least 5 m high or growth-limited trees at least 2 m high) is included in the ombrotrophic bog edge.



Terrain and aerial photo characteristics: Occurs primarily in flat terrain or in depressions, but also in steeper terrain on the coast. FF: Usually brown to dark green in colour, which varies if pine or birch dominates the wood layer. Tues provide a characteristic change in texture. Texture and color vary little within and between regions. In the aerial photograph, the type appears at the edge of a raised bog with its characteristic structures. On the coast in open areas with a uniform structure, it can be difficult to distinguish the type from other open areas.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V3-6	V3-B-3	V3-C-2	V3-D-2	V3-E-1
Basic types		V3-6	V3-6	V3-6	V3-1-7

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity type (t* = characteristic t., t- graden-t); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.).

<i>Andromeda polifolia</i> white heather v*	<i>Pinus sylvestris</i> pine m;v*	<i>Sphagnum angustifolium</i> club peat moss v*
<i>Betula nana</i> ssp. <i>nana</i> dwarf birch v	<i>Rhododendron tomentosum</i> finn markspors v[Tr,Fi]	<i>Sphagnum balticum</i> peat moss v*
<i>Betula pubescens</i> birch v	<i>Rubus chamaemorus</i> molte v*	<i>Sphagnum cuspidatum</i> peat moss v
<i>Calluna vulgaris</i> heather m*;v*	<i>Vaccinium vitis-idaea</i> cranberry v	<i>Sphagnum magellanicum</i> meat-peat moss v*
<i>Chamaepericlymenum suecicum</i> scrub berry v[V,M]	<i>Cladonia</i> spp. lichen v*	<i>Sphagnum rubellum</i> red peat moss v
<i>Empetrum nigrum</i> kreling v	<i>Cladopodiella fluitans</i> marsh nutmeg v*	<i>Sphagnum tenellum</i> dwarf peat moss v;t
<i>Eriophorum vaginatum</i> peat moss roll m*;v*	<i>Pleurozium schreberi</i> pine moss v*	
<i>Oxycoccus palustris</i> cranberry v*		

Distribution and regional distribution: Occurs throughout the country in BN-NB, O3-C1, but mostly in SB-MB, O3-OC.

Most important types of confusion: Very calcareous bog surface (V1-C-2), Very calcareous bog edge (V1-C-5), Precipitation bog surface (V3-C-2), Calcareous boreal fresh heath (T31-C-1), Calcareous coastal heather (T34 -C-2).

Red list status (2018): Nedbørsmyr (NT;<).

References and type parallels: Part of J1 (VN). Parts of A04, 7 and 8 (DNHB-13), V7[1] (NiN v1).

V4-C-1 Slightly calcareous and slightly intermediate weak source

NiN characteristics: Wetland systems: Cold source (V4), one basic type (1). Defined by LKM: KAj1 & Klj1 & KTj1. LKM base steps: KAjcd & Kljde & KTja.

Physiognomy: Moss-dominated vegetation with or without peat formation which, close to the source, is clearly distinct from the surrounding vegetation. Slippery field layer, mainly of graminids (marsh and sedge), but also willow and heather species are included. The proportion of species common to other lime-poor vegetation increases towards the edge of the source.

Ecological characteristics: Springs (springs/groundwater outcrops) in areas with acidic rocks and loose masses. Water flow and water temperature vary throughout the year. Usually covers very small areas and acts as islands in the landscape surrounded by other lime-poor vegetation. Very species-poor, where the source/spring edge itself is characterized by peat moss species. Some of the exclusive spring species such as spring milkweed, spring mosses and sedges are missing or occur sparingly.

Terrain and aerial photo characteristics: Occurs most commonly in depressions in the terrain, preferably at the foot of slopes or hills. Difficult to identify from aerial photographs, but in open terrain sources with abundant water flow often appear as small areas/points with a different color on both FF and IR.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V4-1	V4-B-1	V4-C-1	V4-D-1	V4-E-1
Basic types		V4-1	V4-1	V4-1-3	V4-1-3

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Carex echinata</i> star star v <i>Eriophorum angustifolium</i> duskmyrull v <i>Juncus filiformis</i> thread reed v <i>Narthecium ossifragum</i> rome v <i>Salix aurita</i> earweed v	<i>Vaccinium uliginosum</i> blackberry v <i>Anthelia juratzkana</i> krypsnemesis v <i>Sarmentypnum sarmentosum</i> blood neck moss v* <i>Scapania uliginosa</i> t*m*s+[Kljdlc]	<i>Sphagnum compactum</i> peat moss v <i>Sphagnum lindbergii</i> peat moss v <i>Sphagnum riparium</i> scartorvmoss m <i>Straminergon stramineum</i> grass moss v
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Distribution and regional distribution: Poorly mapped, but probably occurs scattered to rare across the country in areas with acidic rocks.

Most important types of confusion: Slightly calcareous bog edge (V1-C-6), Intermediate bog edge and spring bog (V1-C-7), Strongly intermediate and slightly calcareous sources (V4-C-2).

Red list status (2018): Cold source (LC mainland and Svalbard;<) and southern cold source (VU;j).

References and type parallels: N1a(-b) (VN). Parts of A06 (DNHB13). V3[1] (NiN v1).



Slightly low in lime and slightly intermediate weak source. Op: Lom: S for Stetinden. Photo: RH.

V4-C-2 Strongly intermediate and slightly calcareous springs

NiN characteristics: Wetland systems: Cold source (V4), two basic types (2,3). Defined by LKM: KAÿ2 & Klÿ1,2 & KTÿ1. LKM basic steps: KAÿef & Klÿ der & KTÿa.

Physiognomy: Shallow springs on mineral soil or with weak peat formation. Moss-dominated vegetation that stands out from the surrounding vegetation near the source. The field layer varies, from absent to very lush. Here, graminids are most common, but herbs, heather and willows are also included and increase towards the edge of the spring.



Strong intermediate and slightly calcareous source. Op: Dovre: Grimsdalen: S for S Kattugleholi. Photo: RH.

Ecological characteristics: Sources (springs/groundwater outcrops) where water flow and water temperature are usually stable throughout the year or may vary. Usually covers very small areas and acts as islands in the landscape, often in the contact zone solid land/bog edge to intermediate and medium-rich bog. The spring itself is characterized by a carpet of mosses dominated by spring bryophytes and/or spring mosses. Otherwise, there is a very large variation in species composition. Many species are common with intermediate bog and other poor to intermediate vegetation.

Terrain and aerial photo characteristics: Occurs most commonly in depressions in the terrain, preferably at the foot of slopes or hills. Difficult to identify from aerial photos, but in open terrain the type often appears as small areas/points with a different color on both FF and IR.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V4-2,3	V4-B-2	V4-C-2	V4-D-1	V4-E-1
Basic types		V4-2,3	V4-2,3	V4-1-3	V4-1-3

Diagnostic species m =

abundance species (**m*** = dominant m.); v = common species (**v*** = constant v.); t = center of gravity species (**t*** = characteristic t., **tr-** gradient-t.); s = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Alchemilla glabra</i> smooth marigold v <i>Cardamine amara</i> watercress v[BN-MB] <i>Carex echinata</i> star star v <i>Carex nigra</i> ssp. <i>nigra</i> cornstar v <i>Chrysosplenium alternifolium</i> Maygull v <i>Comarum palustre</i> marsh hatt v <i>Deschampsia cespitosa</i> ssp. <i>cespitosa</i> silver pile v <i>Epilobium hornemannii</i> milkweed v;t*s+[Klÿ dlc] <i>Epilobium lactiflorum</i> white milk v <i>Epilobium palustre</i> marsh milkweed v <i>Eriophorum angustifolium</i> duskmyrull v <i>Galium palustre</i> marsh anemone v	<i>Micranthes stellaris</i> Starfish v;s+[Klÿdlc] <i>Salix aurita</i> earweed v <i>Salix myrsinifolia</i> ssp. <i>myrsinifolia</i> black willow v <i>Salix pentandra</i> istvier v <i>Salix phyllicifolia</i> green willow v <i>Stellaria uliginosa</i> brook star flower v[BN-MB]	<i>Tussilago farfara</i> horse hoof v <i>Vaccinium uliginosum</i> blockberry v <i>Brachythecium rivulare</i> marshland moss v <i>Chiloscyphus pallescens</i> pale blonde v <i>Dichodontium palustre</i> spring herring moss v;s+[Klÿdlc]	<i>Harpanthus flotovianus</i> licksalmose v <i>Paludella squarrosa</i> piperensemose v <i>Pellia</i> spp. spring mosses v <i>Philonotis</i> spp. spring moss m;s*[Klÿdlc] <i>Plagiomnium ellipticum</i> swamp fagermose v <i>Sarmentypnum exannulatum</i> agg. vrangnökkömose m <i>Sarmentypnum sarmentosum</i> bloodstem moss v <i>Scapania irrigua</i> swamp leaf moss v <i>Scapania uliginosa</i> m;s-[Klÿdlc]	<i>Sphagnum warnstorffii</i> rose peat moss v <i>Straminergon stramineum</i> grass moss v
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Distribution and regional distribution: Poorly mapped, but probably occurs scattered throughout the country.

Most important types of confusion: Intermediate bog edge and spring mire (V1-C-7), Slightly calcareous and slightly intermediate weak spring (V4-C-1), Fairly to extremely calcareous springs (V4-C-3), Strongly intermediate and slightly calcareous peatland springs (V4 -C-4).

Red list status (2018): Cold source (LC mainland and Svalbard;<) and southern cold source (VU;ü).

References and type parallels: N1b-d (VN). Parts of A06 (DNHB13). V3[1], V4[1-(2)] (NiN v1).

V4-C-3 Fair to extremely calcareous springs

NiN characteristics: Wetland systems: Cold source (V4), two basic types (4,5). Defined by LKM: KAÿ3 & Klÿ1,2 & KTÿ1. LKM basic steps: KAÿghi & Klÿde¤ & KTÿa.

Physiognomy: Shallow springs on mineral soil or with weak peat formation. Moss-dominated vegetation that stands out from the surrounding vegetation near the source. The field layer varies, from absent to very lush. Graminids are most common, but also a significant number of herbs and willows can be included and increase towards the source edge. **Ecological**

characteristics: Sources (springs/groundwater outcrops) where water flow and water temperature are usually stable throughout the year or may vary. Usually covers very small areas and appears as islands in the landscape, often in the contact zone of solid land/marsh edge, usually in connection with calcareous forest types and rich bogs. The spring center itself is characterized by moss mats where tuff mosses and spring mosses often dominate. Otherwise, there is a great deal of variation in species composition, both when it comes to mosses and vascular plants, and many species are shared with calcareous mires and other rich vegetation. The table below contains only a selection of the species that can occur relatively commonly in the type.

Terrain and aerial photo characteristics: Occurs most commonly in depressions in the terrain, preferably at the foot of slopes or hills. Difficult to identify from aerial photos, but in open terrain the type often appears as small areas/points with a different color on both FF and IR.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		V4-B-3	V4-C-3	V4-D-2	V4-E-2
Basic types	V4-4.5	V4-4.5	V4-4.5	V4-4.5	V4-4.5

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Alchemilla glomerulans</i> spring ladybug v	<i>Salix myrsinifolia</i> ssp. <i>myrsinifolia</i> black willow v	<i>Cratoneuron filicinum</i> chalk moss v
<i>Bartsia alpina</i> black top v	<i>Salix pentandra</i> istervier v	<i>Fissidens adianthoides</i> saw pocket moss v
<i>Bistorta vivipara</i> harerug v	<i>Saussurea alpina</i> mountain thistle v	<i>Leiocolea bantriensis</i> spring tab t*s-[Klÿeld];s-[KAÿfle]
<i>Carex atrofusca</i> sootstarr v	<i>Saxifraga aizoides</i> yellow perch t*s-[KAÿhlg]	<i>Meesia triquetra</i> screw swan moss v
<i>Carex capillaris</i> hair loss v	<i>Thalictrum alpinum</i> mountain seed star v	<i>Palustriella</i> spp. tuff mosses m;t*s-[Klÿdcl]
<i>Carex vaginata</i> slirestarr v	<i>Tofieldia pusilla</i> bear bite v	<i>Pellia</i> spp. spring mosses v
<i>Chrysosplenium alternifolium</i> Maygull v	<i>Tussilago farfara</i> horse hoof v	<i>Philonotis calcarea</i> lime spring moss t*
<i>Crepis paludosa</i> swamp hawk v	<i>Aneura pinguis</i> fat moss v	<i>Philonotis</i> spp. spring moss m;s-[Klÿdcl]
<i>Epilobium alsinifolium</i> spring milk v;s+[Klÿel d]	<i>Brachythecium rivulare</i> marshland moss v	<i>Plagiomnium elatum</i> calcareous moss v
<i>Epilobium palustre</i> marsh milkweed v	<i>Bryum pseudotriquetrum</i>	<i>Pohlia wahlenbergii</i> cold nod v;s+[Klÿeld]
<i>Equisetum arvense</i> _	see m	<i>Scapania undulata</i> brook web leaf moss v
<i>Equisetum variegatum</i> mountain fescue v	<i>Bryum weigelii</i> kildervrangmose v;s+[Klÿeld]	<i>Scorpidium revolvens</i> red mackerel moss m
<i>Filipendula ulmaria</i> meadowsweet v	<i>Calliergonella cuspidata</i> swamp prickly moss v	<i>Tritomania polita</i> brook hogweed v
<i>Juncus castaneus</i> chestnut rush v;s-[KAÿglf]	<i>Campylium stellatum</i> marsh star moss m	
<i>Juncus triglumis</i> triple reed v	<i>Chiloscyphus pallescens</i> pale blonde v	
<i>Pinguicula vulgaris</i> sedge grass v		



Fair to extremely calcareous springs. Op: Sør-Fron: Svanvollen. Photo: HB.

Distribution and regional distribution: Poorly mapped, but probably occurs scattered throughout the country in areas with rich bedrock.

Most important types of confusion: Calcareous bog edge and source mire (V1-C-8), Strongly intermediate and slightly calcareous sources (V4-C-2), Strongly intermediate and slightly calcareous peatland sources (V4-C-4), Fairly to extremely calcareous peatland sources (V4 -C-5).

Red list status (2018): Cold source (LC mainland and Svalbard;<) and southern cold source (VU;ÿ).

References and type parallels: N2a,c,d (VN). Parts of A06 (DNHB13). V3[2-3], V4[2-3] (NiN v1).

V4-C-4 Strongly intermediate and slightly calcareous peatland sources

NiN characteristics: Wetland systems: Cold source (V4), two basic types (6,7). Defined by LKM: KA \ddot{y} 2 & Kl \ddot{y} 1,2 & KT \ddot{y} 2. LKM basic steps: KA \ddot{y} ef & Kl \ddot{y} de \ddot{a} & KT \ddot{y} b.

Physiognomy: Deep springs with clear peat formation. Moss-dominated vegetation. The field layer varies, from absent to very lush. Graminids are most common, relatively few herbs are included but increase towards the source edge.



Strongly intermediate and slightly calcareous peatland sources.
Op: Øystre Slidre: Gravfjellet. Photo: RH.

Ecological characteristics: Sources (springs/groundwater outcrops) where water flow and water temperature are usually stable throughout the year or may vary. Usually covers very small areas and appears as islands in the landscape, often in the contact zone of solid land/marsh edge against intermediate and medium-rich bog. The spring itself is characterized by a carpet of mosses dominated by species such as blanket spring moss and sedge (in higher elevations). Greater occurrence of peat bogs differentiates against VC-2. Burdock and milkweed are the most common vascular plants. Otherwise, there is great variation in species composition and many species are shared with intermediate mires.

Terrain and aerial photo characteristics: Occurs most commonly in depressions in the terrain, preferably at the foot of slopes or hills. Difficult to identify from aerial photos, but in open terrain the type often appears as small areas/points with a different color on both FF and IR.

Mapping rules, map technical specifications and scale adjustments: -

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		V4-B-4	V4-C-4	V4-D-3	V4-E-3
Basic types	V4-6,7	V4-6,7	V4-6,7	V4-6,7	V4-6,7

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Caltha palustris</i> brook flower v	<i>Montia fontana</i> spring herb m;v;s-[Kl \ddot{y} edc]	<i>Pohlia wahlenbergii</i> kaldnikke m;s-[Kl \ddot{y} dc]
<i>Carex nigra</i> ssp. <i>nigra</i> cornstar v	<i>Veronica beccabunga</i> beckeveronika v	<i>Sarmentypnum exannulatum</i> agg.
<i>Comarum palustre</i> marsh hat v	<i>Bryum weigelii</i> kildervrangmose v;s+[Kl \ddot{y} eld]	vrangnökkämose m
<i>Deschampsia cespitosa</i> ssp. <i>cespitos</i> a silver pile v	<i>Dichodontium palustre</i> spring herring moss v;s+[Kl \ddot{y} dc]	<i>Sarmentypnum sarmentosum</i> bloodstem moss v
<i>Epilobium alsinifolium</i> spring milk v;s+[Kl \ddot{y} eld]	<i>Odontoschisma elongatum</i> bog moss v	<i>Scapania uliginosa</i> m;s-[Kl \ddot{y} dc]
<i>Epilobium hornemannii</i> milkweed t*:s+[Kl \ddot{y} dc]	<i>Pellia</i> spp. spring mosses v	<i>Sphagnum auriculatum</i> horn peat moss v
<i>Epilobium lactiflorum</i> white milk v	<i>Philonotis fontana</i> carpet spring moss m;v;s+[Kl \ddot{y} dc]	<i>Sphagnum warnstorffii</i> rose peat moss v
<i>Eriophorum angustifolium</i> duskmyrull v		

Distribution and regional distribution: Poorly mapped, but probably occurs scattered throughout the country.

Most important types of confusion: Intermediate bog edge and source mire (V1-C-7), Strongly intermediate and slightly calcareous sources (V4-C-2), Fairly to extremely calcareous peatland sources (V4-C-5).

Red list status (2018): Cold source (LC mainland and Svalbard;<) and southern cold source (VU; \ddot{y}).

References and type parallels: N1b-d (VN). Parts of A06 (DNHB13). V4[4-(5)] (NiN v1).

V4-C-5 Fair to extremely calcareous peatland sources

NiN characteristics: Wetland systems: Cold source (V4), two basic types (8,9). Defined by LKM: KAy3 & Klj1,2 & KTj2. LKM basic steps: KAyghi & Kljde & KTjy.

Physiognomy: Deep springs with clear peat formation. Moss-dominated vegetation that close to the source of the spring clearly differs from the surrounding vegetation. The field layer varies, from absent to very lush. Graminids are most common, but a significant number of herbs can be included and increase towards the source edge. Weevils can form thickets along the

edge. **Ecological characteristics:** Sources (springs/groundwater outcrops) where water flow and water temperature are usually stable throughout the year or may vary. Usually covers very small areas and acts as islands in the landscape, often in the contact zone solid land/bog edge, often in connection with calcareous forest types and rich mires. The spring center itself is characterized by a carpet of mosses where tuff mosses and spring mosses predominate. Vascular plants shared with lime bog are included. Otherwise, there is a great deal of variation in species composition both when it comes to mosses and vascular plants. The table below only contains a selection of the species that can occur relatively commonly in the type.

Terrain and aerial photo characteristics: Occurs most commonly in depressions in the terrain, preferably at the foot of slopes or hills. Difficult to identify from aerial photos, but in open terrain the type often appears as small areas/points with a different color on both FF and IR.

Mapping rules, map technical specifications and scale adjustments: -

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		V4-B-5	V4-C-5	V4-D-4	V4-E-4
Basic types	V4-8,9	V4-8,9	V4-8,9	V4-8,9	V4-8,9

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity type (t* = characteristic t., t- gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.)

<i>Alchemilla glomerulans</i> spring ladybug v <i>Bistorta vivipara</i> harerug v <i>Caltha palustris</i> brook flower m <i>Carex nigra</i> ssp. <i>nigra</i> cornstar v <i>Carex vaginata</i> slirestarr v <i>Crepis paludosa</i> hawk's beard v <i>Deschampsia cespitosa</i> ssp. <i>cespitosa</i> silver pile v <i>Epilobium alsinifolium</i> spring milk t*;s+[Kljeld] <i>Equisetum arvense</i> _ <i>Equisetum palustre</i> myrsnelle v <i>Filipendula ulmaria</i> meadowsweet v <i>Petasites frigidus</i> mountain plague v <i>Pinguicula vulgaris</i> sedge grass v	<i>Salix phylicifolia</i> green willow v <i>Saussurea alpina</i> mountain thistle v <i>Thalictrum alpinum</i> mountain seed star v <i>Valeriana sambucifolia</i> root v <i>Aneura pinguis</i> fat moss v <i>Bryum pseudotriquetrum</i> brookwort moss m <i>Bryum weigelii</i> kildervrangmose v;s+[Kljeld] <i>Campylidium stellatum</i> marsh star moss v <i>Cinclidium stygium</i> myrgittermose v <i>Cratoneuron filicinum</i> chalk moss v <i>Fissidens adianthoides</i> saw pocket moss v <i>Jungermannia exsertifolia</i> moss m;t*;s-[Kljel] c]	<i>Leiocolea bantriensis</i> source tab s-[Kljeld] <i>Meesia triquetra</i> screw swan moss v <i>Palustriella</i> spp. tuff mosses m;t*;s-[Kljeld] <i>Pellia</i> spp. spring mosses v <i>Philonotis calcarea</i> lime spring moss t* <i>Philonotis</i> spp. spring moss m;s-[Kljeld] <i>Plagiomnium elatum</i> calcareous moss v <i>Pohlia wahlenbergii</i> cold nod v;s+[Kljeld] <i>Pseudobryum cinctidioides</i> giant moss v <i>Scapania undulata</i> brook web leaf moss v <i>Scorpidium revolvens</i> red mackerel moss m <i>Tritomaria polita</i> brook hogweed v
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Distribution and regional distribution: Poorly mapped, but probably occurs scattered throughout the country in areas with rich bedrock.

Most important types of confusion: Calcareous bog edge and spring mire (V1-C-8), Fairly to extremely calcareous springs (V4-C-3), Strongly intermediate and slightly calcareous peatland springs (V4-C-4).

Red list status (2018): Cold source (LC mainland and Svalbard;<) and southern cold source (VU;ü).

References and type parallels: N2b (VN). Parts of A06 (DNHB13). V4[5-6] (NiN v1).



Fair to extremely calcareous peatland sources. Op: Lom: Dumdalen.
Photo: RH.

V5-C-1 Weak heat source

NiN characteristics: Wetland systems: Warm source (V5), one basic type (1). Defined by LKM: JVÿ1. LKM basic step: JVÿa.

Physiognomy: Characteristic convex or more rarely terraced sinter forms consisting of lime deposits. Most often completely devoid of vegetation, or with mosses in the spring water.

Ecological characteristics: Only a small number of hot springs have been registered in Norway in two smaller areas at the Bockfjord in Svalbard. Hot springs are characterized by hot spring water that is brought up to the earth's surface.

The spring water is calcareous and lime is therefore precipitated as lime tuff, which gives the springs a special geomorphology (sinter terraces). In the area around the hot springs, the vegetation is affected by the heated water and several heat-demanding species can occur in the area around the springs. Differs from a clear heat source by being less influenced by geothermal heat (temperature increase 2–10 °C).

Terrain and aerial photo characteristics: Located on sloping terrain. Terraces with limestone tuff and green moss-dominated vegetation contrast with the surrounding tundra vegetation.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V5-1	V5-B-1	V5-C-1	V5-D-1	V5-E-1
Basic types		V5-1	V5-1	V5-1	V5-1

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Arenaria humifusa</i> Dwarf garve v <i>Bistorta vivipara</i> harerug v <i>Botrychium boreale</i> mountain marine key v <i>Botrychium lunaria</i> sea key v <i>Carex capillaris</i> hair loss v	<i>Carex maritima</i> bow starr v <i>Euphrasia wettsteinii</i> small-eyed thrush v <i>Festuca rubra</i> ssp. <i>richardsonii</i> mountain red's wing v <i>Puccinellia palibinii</i> spring salt grass v	<i>Salix polaris</i> polarvær v <i>Sibbaldia procumbens</i> three-finger herb v <i>Tofieldia pusilla</i> bear bite v <i>Pohlia wahlenbergii</i> kaldnikke v
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Distribution and regional distribution: MATZ.

Most important types of confusion: Clear heat source (V5-C-2).

Red list status (2018): Warm source (CR;<).

References and type parallels:



Weak heat source. Svalbard: The Jotun sources. Photo: GA.

V5-C-2 Clear heat source

NiN characteristics: Wetland systems: Warm source (V5), one basic type (2). Defined by LKM: JVý2. LKM basic step: JVýb.

Physiognomy: Open springs with hot spring water. Characteristic terrace-shaped sinters are common. A few base-demanding and drought-tolerant vascular plant species.

Ecological characteristics: Only a small number of hot springs have been registered in Norway in two smaller areas at the Bockfjord in Svalbard. Hot springs are characterized by hot spring water that is brought up to the earth's surface and has a significantly higher annual average temperature than the average temperature in the surrounding upper soil layer. The spring water is calcareous and lime is therefore precipitated as lime tuff, which gives the springs a special geomorphology with terrace-shaped sinters. In sinters that no longer have spring water, there is a very basic and high risk of drying out. A few vascular plants and mosses may become established over time. The geothermal conditions provide favorable ecological conditions, especially directly upstream of the sources. This means that a number of species with heat requirements can grow here. This area has little or no contact with the spring water itself. Differs from a weak heat source by being more geothermally influenced (temperature increase 10–25 °C).



Clear heat source. Svalbard: Trollkildene. Photo: GA.

Terrain and aerial photo characteristics: Located on sloping terrain. Terraces with limestone tuff and green moss-dominated vegetation contrast with the surrounding tundra vegetation.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V5-2	V5-B-2	V5-C-2	V5-D-2	V5-E-2
Basic types		V5-2	V5-2	V5-2	V5-2

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Arenaria humifusa</i> dwarf tansy <i>Carex capillaris</i> ssp. <i>fuscidula</i> polar hair stare <i>Carex maritima</i> bow starr v	<i>Puccinellia palibinii</i> spring salt grass <i>Sibbaldia procumbens</i> three-finger herb v	<i>Didymodon tophaceus</i> tongue curl moss v <i>Pohlia wahlenbergii</i> kaldnikke v <i>Chara canescens</i> hair wreath
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Distribution and regional distribution: MATZ.

Main types of confusion: clear heat source (V5-C-2).

Red list status (2018): Warm source (CR;<).

References and type parallels:

V6-C-1 Lime-poor and intermediate moderate wet snow bed

NiN characteristic: Wetland systems: Wet snow bed and snow bed source (V6 one basic type (1). Defined by LKM: SVý1 & KAý1 & Klý1. LKM base step: SVýab & KAýcdef & Klýbc.

Physiognomy: Permanently wet ground. Open field layer with grasses and herbs. Moss-dominated bottom layer and patches of bare rock and gravel. Often unstable soil due to soil flow.



Lime-poor and intermediate-moderate wet snow bed. Op: Dovre: Kattugleholi. Photo: RH.

Ecological characteristics: Lime-poor and intermediate-moderate wet snow beds are snow beds on more or less permanently waterlogged ground in the mountains. The type is found below large snowdrifts and is supplied with meltwater from these throughout much of the growing season. In the low alpine it is typically found in concave depressions in the terrain, but higher up it can cover larger areas also in flat or sloping terrain. Moderate snow beds melt relatively early in the season (5-20 day growth season reduction) and are characterized, among other things, by a lack of heather species. Distinguishes from late wet snow beds, which melt out later in the growing season and are characterized by the lack of many vascular plants and that soil flow is more common. Distinguished from calcareous wet snow beds by occurrence on calcareous ground and lack of calcareous species. The constant supply of meltwater and long-term snow cover results in a species composition with a strong element of both snowbed species and species typical of bogs and springs. Permanent water saturation differentiates from snow beds on solid ground. Relatively fast decomposition due to the abundant supply of fresh meltwater, together with the washing away of organic material, results in a low content of organic material and therefore no peat formation.

Terrain and aerial photo characteristics: Flat terrain or sloping surfaces and depressions in the terrain, most often below snow banks.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V6-1	V6-B-1	V6-C-1	V6-D-1	V6-E-1
Basic types		V6-1	V6-1	V6-1,3,7	V6-1,3,7

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Carex bigelowii</i> stivstarr v <i>Carex lachenalii</i> ryegrass v;s+[SVýdle] <i>Cerastium cerastoides</i> glacial heritage v;s+[SVýdle] <i>Deschampsia alpina</i> mountain pile v;s+[SVýdle] <i>Eriophorum scheuchzeri</i> snow marsh roll v <i>Juncus biglumis</i> twin rush v;s+[SVýdle] <i>Omalotheca norvegica</i> seder graywort v	<i>Omalotheca supina</i> dwarf graywort v <i>Phleum alpinum</i> mountain timotei v <i>Sagina saginoides</i> settersarve v <i>Salix herbacea</i> mouse ear v;s-[SVýdle] <i>Sibbaldia procumbens</i> trefoil v ;s+[SVýdle] <i>Taraxacum crocea</i> agg. mountain lion teeth v <i>Veronica alpina</i> snow veronica v;s+[SVýdle]	<i>Anthelia juratzkana</i> krypsnemosis v <i>Pleurocladula albescens</i> bremose v <i>Pohlia drummondii</i> red-bud nick v <i>Polytrichastrum alpinum</i> mountain binnemoss v <i>Sanionia uncinata</i> claw white moss v <i>Cetrariella delisei</i> snow sharp v <i>Cladonia ecmocyna</i> snow awl v
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Distribution and regional distribution: LA-HA, O3-C1. Most common in the upper part of the low-alpine and mid-alpine zone, only scattered in the high alpine. Most common in oceanic mountains.

Most important types of confusion: Calcareous and intermediate late wet snow beds (V6-C-3), calcareous and intermediate moderate snow beds (T7-C-1-3), source-influenced intermediate snow beds (T7-C-12).

Red list status (2018): Wet snow deposit and source of snow deposit (VU mainland, LC Svalbard;<).

References and type parallels: T8 (VN).

V6-C-2 Calcareous moderate wet snow bed

NiN characteristics: Wetland systems: Wet snow bed and snow bed source (V6), one basic type (2). Defined by LKM: SVý1 & KAý2 & Klý1. LKM base steps: SVýab & KAýghi & Klýbc.

Physiognomy: Permanently wet ground. Open and species-rich field layer with grasses and herbs. Moss-dominated bottom layer. Often patches of bare rock and gravel and unstable soil due to soil flow.

Ecological characteristics: Calcareous moderately wet snow beds are snow beds on more or less permanently waterlogged land in the mountains. The type is found below large snowdrifts and is supplied with meltwater from these throughout much of the growing season. In the low alpine it is found in concave depressions in the terrain, but higher up it can cover larger areas also in flat or sloping terrain. Moderate snow beds melt relatively early in the season (5-20 day growth season reduction) and are characterized, among other things, by a lack of heather species.

Distinguishes from late wet snow beds, which melt out later in the growing season and are characterized by the lack of many vascular plants and that soil flow is more common. Distinguished from lime-poor wet snow beds by occurrence on calcareous ground and presence of lime-requiring species. The constant supply of meltwater and long-term snow cover results in a species composition with a strong element of both snowbed species and species typical of bogs and springs.

Permanent water saturation differentiates from snow beds on solid ground. Relatively fast decomposition due to the abundant supply of fresh meltwater, together with the washing away of organic material, results in a low content of organic material and therefore no peat formation.

Terrain and aerial photo characteristics: Flat terrain or sloping surfaces and depressions in the terrain, often below snow banks.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V6-2	V6-B-2	V6-C-2	V6-D-2	V6-E-2
Basic types		V6-2	V6-2	V6-2,4,8	V6-2,4,8

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **tm-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Bartsia alpina</i> black top v <i>Bistorta vivipara</i> harerug v;s-[KAýglf] <i>Carex bigelowii</i> stivstarr v <i>Carex lachenalii</i> ryegrass v;s+[SVýdle] <i>Cerastium cerastoides</i> glacial heritage v;s+[SVýdle] <i>Deschampsia alpina</i> mountain pile v;s+[SVýdle] <i>Equisetum arvense</i> _ <i>Erigeron uniflorus</i> snow hill star v <i>Eriophorum scheuchzeri</i> snow marsh roll v <i>Juncus biglumis</i> twin rush v;s+[SVýdle] <i>Koenigia islandica</i> dwarf sorrel v;s-[SVýdle] <i>Micranthes stellaris</i> star trout v	<i>Minuartia biflora</i> tuerve s-[KAýglf] <i>Omalotheca supina</i> dwarf graywort v <i>Oxyria digyna</i> mountain sorrel v;s*[SVýdle] <i>Poa alpina</i> mountain thrush v;s+[KAýglf] <i>Ranunculus nivalis</i> snow sunbed v;s+[KAýglf] <i>Sagina nivalis</i> s*[KAýglf] <i>Salix polaris</i> polarvier v;s+[KAýglf] <i>Saxifraga aizoides</i> yellow perch v;s+[KAýglf] <i>Saxifraga cernua</i> bud herring v;s+[KAýglf] <i>Sibbaldia procumbens</i> trefoil v;s+[SVýdle] <i>Veronica alpina</i> snow veronika v;s+[SVýdle]	<i>Anthelia juratzkana</i> krypsnemosis v <i>Bryum pseudotriquetrum</i> see v <i>Philonotis fontana</i> carpet spring moss v <i>Pleurocladula albescens</i> bremose v <i>Pohlia drummondii</i> red-bud nick v <i>Polytrichastrum alpinum</i> mountain binnemoss v <i>Preissia quadrata</i> v;s+[KAýglf] <i>Sarmentypnum sarmentosum</i> bloodstem moss v <i>Scorpidium revolvens</i> red moss v;s-[KAýglf] <i>Cetrariella delisei</i> snow sharp v
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Distribution and regional distribution: LA-HA, O3-C1. Most common in the upper part of the low-alpine and mid-alpine zone, only scattered in the high alpine. Most common in oceanic mountains.

Most important alteration types: Calcareous late wet snow beds (V6-C-4), calcareous moderate snow beds (T7-C-6 and T7-C-8), source-influenced calcareous snow beds (T7-C-13 and T7-C-14).

Red list status (2018): Wet snow deposit and source of snow deposit (VU mainland, LC Svalbard;<).

References and type parallels: T9 (VN), C01 (DNHB13).

V6-C-3 Lime-poor and intermediate late wet snow bed

NiN characteristics: Wetland systems: Wet snow bed and snow bed source (V6), one basic type (3). Defined by LKM: SVý2 & KAý1 & Klý1. LKM base steps: SVýcd & KAýcdef & Klýbc.

Physiognomy: Permanently wet ground. Field layer only with scattered grasses and herbs. Moss-dominated bottom layer. Unstable soil with soil flow common. Preferably a lot of bare rock and gravel.



Lime-poor and intermediate late wet snow bed. Op: Lom: Tverrbyttjønn NE. Photo: RH.

Ecological characteristics: Lime-poor and intermediate late wet snow beds are snow beds on more or less permanently waterlogged ground in the mountains. The type is found below large snowdrifts and is supplied with meltwater from these throughout much of the growing season. In the low alpine it is found in concave depressions in the terrain, but higher up it can cover larger areas also in flat or sloping terrain. Their snow beds melt relatively late in the season (15-30 day growth season reduction) and are otherwise characterized by the lack of many vascular plants and that soil flow is very common. Distinguished from calcareous wet snow beds by occurrence on calcareous ground and lack of calcareous species. The constant supply of meltwater and long-term snow cover results in a species composition with a strong element of both snowbed species and species typical of bogs and springs. Permanent water saturation differentiates from snow beds on solid ground. Relatively fast decomposition due to the abundant supply of fresh meltwater, together with the washing away of organic material, results in a low content of organic material and therefore no peat formation.

Terrain and aerial photo characteristics: Flat terrain or sloping surfaces and depressions in the terrain, often below snow banks.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		V6-B-3	V6-C-3	V6-D-1	V6-E-1
Basic types	V6-3	V6-3	V6-3	V6-1,3,7	V6-1,3,7

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Carex lachenalii</i> ryegrass v;s+[SVýdle] <i>Carex rufina</i> sedge t';s+[SVýdle] <i>Cerastium cerastoides</i> glacial heritage v;s+[SVýdle] <i>Deschampsia alpina</i> mountain pile v;s+[SVýdle] <i>Epilobium anagallidifolium</i> dwarf milkweed v <i>Eriophorum scheuchzeri</i> snow marsh roll v;s*[SVýdle] <i>Juncus biglumis</i> twin rush v;s-[SVýdle] <i>Koenigia islandica</i> dwarf sorrel v;s+[SVýdle]	<i>Micranthes stellaris</i> star trout v;s*[SVýdle] <i>Omalotheca supina</i> dwarf graywort v <i>Oxyria digyna</i> mountain sorrel v;s*[SVýdle] <i>Phleum alpinum</i> mountain timotei v <i>Ranunculus glacialis</i> issolei v <i>Sagina saginoides</i> settersarve v <i>Salix herbacea</i> mouse ear v;s-[SVýdle] <i>Sibbaldia procumbens</i> trefoil v ;s+[SVýdle] <i>Veronica alpina</i> snow veronika v;s+[SVýdle]	<i>Anthelia julacea</i> creeping snow moss v <i>Anthelia juratzkana</i> krypsnemosis v <i>Kiaeria starkei</i> snow frost moss v <i>Marsupella brevissima</i> snowhutremose v <i>Pohlia drummondii</i> red-bud nick v <i>Pohlia wahlenbergii</i> kaldnikke v <i>Polytrichastrum sexangulare</i> snowdrop moss v <i>Sarmentypnum exannulatum</i> agg. twisted key moss v <i>Sarmentypnum sarmentosum</i> bloodstem moss v
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Distribution and regional distribution: LA-HA, O3-C1. Most common in the upper part of the low-alpine and mid-alpine zone, only scattered in the high alpine. Most common in oceanic mountains.

Most important types of confusion: Calcareous and intermediate moderate wet snow bed (V6-C-1), calcareous and intermediate late spring snow bed (V6-C-7), weakly calcareous and intermediate late snow bed (T7-C-4).

Red list status (2018): Wet snow deposit and source of snow deposit (VU mainland, LC Svalbard;<).

References and type parallels: T8 (VN).

V6-C-4 Calcareous late wet snow bed

NiN characteristics: Wetland systems: Wet snow bed and snow bed source (V6), one basic type (4). Defined by LKM: SVý2 & KAý2 & Klý1. LKM base steps: SVýcd & KAýghi & Klýbc.

Physiognomy: Permanently wet ground. Field layer with scattered grasses and herbs. Moss-dominated bottom layer. Unstable soil with soil flow common. Preferably a lot of bare rock and gravel.

Ecological characteristics: Calcareous late wet snow beds are snow beds on more or less permanently waterlogged land in the mountains. The type is found below large snowdrifts and is supplied with meltwater from these throughout much of the growing season. In the low alpine it is found in concave depressions in the terrain, but higher up it can cover larger areas also in flat or sloping terrain. Their snow beds melt relatively late in the season (15-30 day growth season reduction) and are otherwise characterized by the lack of many vascular plants and that soil flow is very common. Distinguished from lime-poor wet snow beds by occurrence on calcareous ground and presence of lime-requiring species. The constant supply of meltwater and long-term snow cover results in a species composition with a strong element of both snowbed species and species typical of bogs and springs. Permanent water saturation differentiates from snow beds on solid ground. Relatively fast decomposition due to the abundant supply of fresh meltwater, together with the washing away of organic material, results in a low content of organic material and therefore no peat formation.



Calcareous late wet snow bed. ST: Oppdal: between S and M Knutshø. Photo: RH.

Terrain and aerial photo characteristics: Flat terrain or sloping surfaces and depressions in the terrain, often below snow banks.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V6-4	V6-B-4	V6-C-4	V6-D-2	V6-E-2
Basic types		V6-4	V6-4	V6-2,4,8	V6-2,4,8

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity type (t* = characteristic t., t± - gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.)

Arabis alpina mountain ash flower v;s+[KAýglf]	Oxyria digyna mountain sorrel v;s*[SVýdle]	Sibbaldia procumbens trefoil v ;s+[SVýdle]
Bistorta vivipara harerug v;s-[KAýglf]	Phippsia algida snow grass s*[KAýglf]	Silene acaulis fjellsmelle v;s-[KAýglf]
Carex lachenalii ryegrass v;s+[SVýdle]	Phippsia concinna spurge snow grass s*[KAýglf]	Taraxacum crocea agg. mountain lion tooth v;s+[KAýglf]
Cerastium cerastoides glacial heritage v;s+[SVýdle]	Poa alpina mountain thrush v;s+[KAýglf]	Veronica alpina snow veronica v;s+[SVýdle]
Cerastium nigrescens snow heritage v;s*[KAýglf]	Ranunculus nivalis snow sunbed v;s-[KAýglf]	Anthelia juratzkana krypsnemosis v
Deschampsia alpina mountain pile v;s+[SVýdle]	Ranunculus pygmaeus dwarf sunflower v;s+[KAýglf]	Distichium capillaceum cushion plane moss v;s-[KAýglf]
Draba alpina gullrblom s*[KAýglf]	Sagina nivalis s*[KAýglf]	Pohlia drummondii red-bud nick v
Equisetum arvense _	Sagina saginoides settersarve v	Pohlia wahlenbergii kaldnikke v
Juncus biglumis twin rush v;s+[SVýdle]	Salix polaris polarvier v;s+[KAýglf]	Polytrichastrum sexangulare snowdrop moss v
Koenigia islandica dwarf sorrel v;s+[SVýdle]	Saxifraga aizoides yellow perch v;s+[KAýglf]	Preissia quadrata v ;s+[KAýglf]
Micranthes tenuis brook trout v;s*[KAýglf]	Saxifraga cernua bud herring v;s+[KAýglf]	Scorpidium revolvens red moss v;s-[KAýglf]
Minuartia biflora tuerve v;s-[KAýglf]	Saxifraga oppositifolia red herring v;s*[KAýglf]	
Omalotheca supina dwarf graywort v	Saxifraga rivularis brook trout v;s+[KAýglf]	

Distribution and regional distribution: LA-HA, O3-C1. Most common in the upper part of the low-alpine and mid-alpine zone, only scattered in the high alpine. Most common in oceanic mountains.

Main alteration types: Calcareous moderate wet snowbed (V6-C-2), calcareous late spring snowbed (V6-C 8), calcareous late snowbed (T7-C-7 and T7-C-9).

Red list status (2018): Wet snow deposit and source of snow deposit (VU mainland, LC Svalbard;<).

References and type parallels: T9 (VN), C01 (DNHB13).

V6-C-5 Lime-poor

and intermediate extreme wet snow bed

NiN characteristics: Wetland systems: Wet snow bed and snow bed source (V6), one basic type (5). Defined by LKM: SVjy3 & KAjy1 & Kljy1. LKM base steps: SVjyef & KAjydef & Kljbc.

Physiognomy: Permanently wet ground. Vascular plants are missing. Moss-dominated bottom layer. Landslides almost always occur and bare rock and gravel cover large areas.



Lime-poor and intermediate extreme-wet snow beds. Op: Lom: along Juvasshytteveien. Photo: RH.

Ecological characteristics: Lime-poor and intermediate extreme wet snow beds are snow beds on more or less permanently waterlogged ground in the mountains. The type is found below large snowdrifts and is supplied with meltwater from these throughout much of the growing season. In the low alpine it is found in concave depressions in the terrain, but higher up it can cover larger areas also in flat or sloping terrain. Extreme snow beds melt very late in the season (25-40 day growth season reduction) and are characterized by a lack of vascular plants and that soil flow is almost always present. Distinguished from calcareous wet snow beds by occurrence on calcareous ground and lack of calcareous species. The constant supply of meltwater and long-term snow cover results in a species composition with a strong element of both snowbed species and species typical of bogs and springs. Permanent water saturation differentiates from snow beds on solid ground. Relatively fast decomposition due to the abundant supply of fresh meltwater, together with the washing away of organic material, results in a low content of organic material and therefore no peat formation.

Terrain and aerial photo characteristics: Flat terrain or sloping surfaces and depressions in the terrain, often below snow banks.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V6-5	V6-B-5	V6-C-5	V6-D-3	V6-E-3
Basic types		V6-5	V6-5	V6-5,6,9	V6-5,6,9

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Carex lachenalii</i> grouse starr v <i>Deschampsia alpina</i> mountain pile v <i>Micranthes stellaris</i> star trout v <i>Omalotheca supina</i> dwarf graywort v <i>Anthelia julacea</i> creeping snow moss v <i>Anthelia juratzkana</i> krypsnemosis v <i>Blindia acuta</i> red sigmoid v <i>Cephalozia ambigua</i> snow glefmosis v <i>Conostomum tetragonum</i> helmet moss v	<i>Gymnocolea inflata</i> turvdymose v <i>Kiaeria starkei</i> snow frost moss v <i>Lophozia sudetica</i> red tab v <i>Oligotrichum hercynicum</i> gravel moss v <i>Philonotis fontana</i> carpet spring moss v <i>Pleurocladula albescens</i> bremose v <i>Pohlia drummondii</i> red-bud nick v <i>Pohlia wahlenbergii</i> kaldnikke v	<i>Polytrichastrum sexangulare</i> snowdrop moss v <i>Racomitrium sudeticum</i> seder gray moss v <i>Sarmenypnum exannulatum</i> agg. vrangnokkmosse v <i>Sarmenypnum sarmentosum</i> bloodstem moss v <i>Solorina crocea</i> saffron lichen v
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Distribution and regional distribution: LA-HA, O3-C1. Most common in the upper part of the low-alpine and mid-alpine zone, only scattered in the high alpine. Most common in oceanic mountains.

Most important types of confusion: Lime-poor and intermediate late wet snow bed (V6-C-3), extreme source snow bed (V6-C-9), intermediate extreme snow bed (T7-C-5).

Red list status (2018): Wet snow deposit and source of snow deposit (VU mainland, LC Svalbard;<).

References and type parallels: T8 (VN).

V6-C-6 Calcareous extreme

wet snow bed

NiN characteristics: Wetland systems: Wet snow bed and snow bed source (V6), one basic type (6). Defined by LKM: SVý3 & KAý2 & Klý1. LKM base steps: SVýef & KAýghi & Klýbc.



Calcareous extreme wet snow bed. ST: Oppdal: between S and M Knutshø. Photo: RH.

Physiognomy: Permanently wet ground. Vascular plants are missing. Moss-dominated bottom layer. Soil flow almost always present and bare rock and gravel cover large areas.

Ecological characteristics: Calcareous extreme wet snow beds are snow beds on more or less permanently irrigated land in the mountains. The type is found below large snowdrifts and is supplied with meltwater from these throughout much of the growing season. In the low alpine it is found in concave depressions in the terrain, but higher up it can cover larger areas also in flat or sloping terrain. Extreme snow beds melt very late in the season (25-40 day growth season reduction) and are characterized by a lack of vascular plants and that soil flow is almost always present. Distinguished from lime-poor wet snow beds by occurrence on calcareous ground and presence of lime-requiring species. The constant supply of meltwater and long-term snow cover results in a species composition with a strong element of both snowbed species and species typical of bogs and springs. Permanent water saturation differentiates from snow beds on solid ground. Relatively fast decomposition due to the abundant supply of fresh meltwater, together with the washing away of organic material, results in a low content of organic material and therefore no peat formation.

Terrain and aerial photo characteristics: Flat terrain or sloping surfaces and depressions in the terrain, often below snow banks.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V6-6	V6-B-6	V6-C-6	V6-D-3	V6-E-3
Basic types		V6-6	V6-6	V6-5,6,9	V6-5,6,9

Diagnostic species m =

abundance species (**m*** = dominant m.); v = common species (**v*** = constant v.); t = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); s = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Cerastium cerastoides</i> glacier heritage v <i>Phipsia algida</i> snow grass s*[KAýglf] <i>Anthelia juratzkana</i> krypsnemosis v <i>Blepharostoma trichophyllum</i> barbed wire moss v <i>Blindia acuta</i> red sigmoid v <i>Bryum pseudotriquetrum</i> see v <i>Distichium capillaceum</i> cushion plane moss v;s-[KAýglf]	<i>Oligotrichum hercynicum</i> gravel moss v <i>Peltolepis quadrata</i> dark -laying moss v <i>Philonotis fontana</i> carpet spring moss v <i>Pleurocladula albescens</i> bremose v <i>Pohlia drummondii</i> red-bud nick v <i>Pohlia wahlenbergii</i> kaldnikke v <i>Polytrichastrum alpinum</i> mountain binnemoss v <i>Preissia quadrata</i> v ;s-[KAýglf]	<i>Sarmentypnum exannulatum</i> agg. vrangnökkmose v <i>Sarmentypnum sarmentosum</i> bloodstem moss v <i>Sauteria alpina</i> crater moss v <i>Scorpidium revolvens</i> red moss v;s-[KAýglf] <i>Tayloria lingulata</i> peat moss v <i>Tritomaria polita</i> brook hogweed v
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Distribution and regional distribution: LA-HA, O3-C1. Most common in the upper part of the low-alpine and mid-alpine zone, only scattered in the high alpine. Most common in oceanic mountains.

Most important types of confusion: Calcareous late wet snow bed (V6-C-4), extreme source snow bed (V6-C-9), calcareous extreme snow bed (T7-C-10).

Red list status (2018): Wet snow deposit and source of snow deposit (VU mainland, LC Svalbard;<).

References and type parallels: T9 (VN), C01 (DNHB13).

V6-C-7 Calcareous and intermediate late source snow bed

NiN characteristics: Wetland systems: Wet snow bed and snow bed source (V6), one basic type (7). Defined by LKM: SVy2 & KAj1 & Klj2. LKM base steps: SVycd & KAjcd & Kljde.

Physiognomy: Permanently wet ground. Field layer only with scattered grasses and herbs. Moss-dominated bottom layer. Unstable soil with normal soil flow and lots of bare rock and gravel. **Ecological characteristics:** Lime-poor and

intermediate late spring snow beds are snow beds on permanently waterlogged land in the mountains. The type is found below large snowdrifts and is supplied with meltwater from these throughout much of the growing season.

Seine spring snow beds are supplied with water with weak to fairly strong spring properties, i.e. a permanent supply of fresh, oxygen-rich water with a uniform temperature and chemical composition. In the low alpine, the nature type is often found in concave depressions in the terrain, but higher up it can cover larger areas also in flat or sloping terrain. Their snow beds melt relatively late in the season (15-30 day growth season reduction) and are otherwise characterized by the lack of many vascular plants and that soil flow is very common. Distinguished from calcareous wet snow beds by occurrence on calcareous ground and lack of calcareous species. The constant supply of fresh spring water and long-term snow cover results in a species composition with a strong element of both snow bed species and species typical of springs. Permanent water saturation differentiates from snow beds on solid ground. Relatively fast decomposition due to the abundant supply of fresh meltwater, together with the washing away of organic material, results in a low content of organic material and therefore no peat formation.

Terrain and aerial photo characteristics: Flat terrain or sloping surfaces and depressions in the terrain, often below snow banks.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V6-7	V6-B-7	V6-C-7	V6-D-1	V6-E-1
Basic types		V6-7	V6-7	V6-1,3,7	V6-1,3,7

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **tx-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Carex lachenalii</i> ryegrass v;s+[SVydle] [SVydle] <i>Cerastium cerastoides</i> glacier v;s+ <i>Deschampsia alpina</i> mountain pile v;s+[SVydle] <i>Epilobium anagallidifolium</i> dwarf milkweed t* <i>Epilobium hornemannii</i> milkweed v <i>Equisetum arvense</i> _ <i>Eriophorum angustifolium</i> duskmyrull v <i>Eriophorum scheuchzeri</i> snow marsh roll v;s*[SVydle]	<i>Juncus biglumis</i> twin rush v;s+[SVydle] <i>Koenigia islandica</i> dwarf sorrel v;s+[SVydle] <i>Micranthes stellaris</i> star trout v;s*[SVydl e] <i>Omalotheca supina</i> dwarf graywort v <i>Oxyria digyna</i> mountain sorrel v;s*[SVydle] <i>Phleum alpinum</i> mountain timotei v <i>Poa alpina</i> fjellrapp v <i>Salix herbacea</i> mouse ear v;s-[SVydle] <i>Veronica alpina</i> snow veronica v;s+[SVydle] <i>Anthelia juratzkana</i> krypsnemosia v <i>Kiaeria starkei</i> snow frost moss v	<i>Philonotis fontana</i> carpet spring moss v <i>Pohlia drummondii</i> red-bud nick v <i>Pohlia wahlenbergii</i> kaldnikke v <i>Polytrichastrum sexangulare</i> snowdrop moss v <i>Racomitrium sudeticum</i> seder gray moss v <i>Sarmenypnum exannulatum</i> agg. vrangnökmose v <i>Sarmenypnum sarmentosum</i> bloodstem moss v <i>Scapania uliginosa</i> spring-leaved moss v <i>Scapania hyperborea</i> brown leaf moss v
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Distribution and regional distribution: LA-MA, O3-C1. Most common in the upper part of the low-alpine and mid-alpine zone.

Most common in oceanic mountains.

Most important types of confusion: Lime-poor and intermediate late wet snow bed (V6-C-3), extreme spring snow bed (V6-C-9), source-influenced intermediate moderate snow bed (T7-C-12).

Red list status (2018): Wet snow deposit and source of snow deposit (VU mainland, LC Svalbard;<).

References and type parallels: T8 (VN).



Calcareous and intermediate late spring snow bed. Op: Vang: east of Tyinosen. Photo: HB.

V6-C-8 Calcareous late spring snow bed

NiN characteristics: Wetland systems: Wet snow bed and snow bed source (V6), one basic type (8). Defined by LKM: SVý2 & KAý2 & Klý2. LKM base steps: SVýcd & KAýghi & Klýde.

Physiognomy: Permanently wet ground. Field layer only with scattered grasses and herbs. Moss-dominated bottom layer. Unstable soil with normal soil flow and lots of bare rock and gravel. **Ecological characteristics:** Calcareous late

source snow beds are snow beds on permanently watered ground in the mountains. The type is found below large snowdrifts and is supplied with meltwater from these throughout much of the growing season. Seine spring snow beds are supplied with water with weak to fairly strong spring properties, i.e. a permanent supply of fresh, oxygen-rich water with a uniform temperature and chemical composition. In the low alpine, the nature type is often found in concave depressions in the terrain, but higher up it can cover larger areas also in flat or sloping terrain. Their snow beds melt relatively late in the season (15-30 day growth season reduction) and are otherwise characterized by the lack of many vascular plants and that soil flow is very common. Distinguished from lime-poor wet snow beds by occurrence on calcareous ground and presence of lime-requiring species. The constant supply of fresh spring water and long-term snow cover results in a species composition with a strong element of both snow bed species and species typical of springs. Permanent water saturation differentiates from snow beds on solid ground. Relatively fast decomposition due to the abundant supply of fresh meltwater, together with the washing away of organic material, results in a low content of organic material and therefore no peat formation.

Terrain and aerial photo characteristics: Flat terrain or sloping surfaces and depressions in the terrain, often below snow banks.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V6-8	V6-B-8	V6-C-8	V6-D-2	V6-E-2
Basic types		V6-8	V6-8	V6-2,4,8	V6-2,4,8

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Arabis alpina</i> mountain ash flower v;s+[KAýglf] <i>Bistorta vivipara</i> harerug v;s-[KAýglf] <i>Carex lachenalii</i> ryegrass v;s+[SVýdle] <i>Cerastium cerastoides</i> glacial heritage v;s-[SVýdle] <i>Cerastium nigrescens</i> snow heritage v;s*[KAýglf] <i>Deschampsia alpina</i> mountain pile v;s+[SVýdle] <i>Epilobium anagallidifolium</i> dwarf milkweed t* <i>Epilobium hornemannii</i> milkweed v <i>Equisetum arvense</i> _ <i>Juncus biglumis</i> twin rush v;s+[SVýdle]	<i>Koenigia islandica</i> dwarf sorrel v;s+[SVýdle] <i>Micranthes tenuis</i> brook trout v;s*[KAýglf] <i>Minuartia biflora</i> tuerve v <i>Oxyria digyna</i> mountain sorrel v;s*[SVýdle] <i>Phippsia algida</i> snow grass t*s*[KAýglf] <i>Phippsia concinna</i> sprig snow grass t*s*[KAýglf] <i>Poa alpina</i> mountain thrush v;s+[KAýglf] <i>Ranunculus nivalis</i> snow sunbed v <i>Salix polaris</i> polarvier <i>Saxifraga aizoides</i> yellow perch v;s+[KAýglf] <i>Saxifraga oppositifolia</i> red herring v;s*[KAýglf]	<i>Saxifraga rivularis</i> brook trout s+[KAýglf] <i>Veronica alpina</i> snow veronica v;s+[SVýdle] <i>Anthelia juratzkana</i> krypsnemosis v <i>Distichium capillaceum</i> cushion plane moss v <i>Philonotis fontana</i> carpet spring moss v <i>Pohlia drummondii</i> red-bud nick v <i>Pohlia wahlenbergii</i> kaldnikke v <i>Preissia quadrata</i> v;s+[KAýglf] <i>Sarmentypnum sarmentosum</i> bloodstem moss v <i>Scorpidium revolvens</i> red moss v;s-[KAýglf]
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Distribution and regional distribution: LA-MA, O3-C1. Most common in the upper part of the low-alpine and mid-alpine zone.

Most common in oceanic mountains.

Most important types of confusion: Calcareous late wet snow bed (V6-C-4), extreme spring snow bed (V6-C-9), spring-influenced weakly calcareous and strongly calcareous moderate snow bed (T7-C-13,14).

Red list status (2018): Wet snow deposit and source of snow deposit (VU mainland, LC Svalbard;<).

References and type parallels: T9 (VN), C01 (DNHB13).



Calcareous late spring snow bed. ST: Oppdal: M. Knutshø.
Photo: RH.

V6-C-9 Extreme source snow bed

NiN characteristics: Wetland systems: Wet snow bed and snow bed source (V6), one basic type (9). Defined by LKM: SVj3 & KAj1,2 & Klj2. LKM base steps: SVjef & KAjcdefghi & Kljde.

Physiognomy: Permanently wet ground. Vascular plants are missing. Moss-dominated bottom layer. Soil flow almost always present and bare rock and gravel cover large areas.

Ecological characteristics: Extreme source snow beds are snow beds on permanently watered ground in the mountains. The type is found below large snowdrifts and is supplied with meltwater from these throughout much of the growing season.

Extreme spring snow beds are supplied with water with weak to fairly strong spring properties, i.e. a permanent supply of fresh, oxygen-rich water with a uniform temperature and chemical composition. In the low alpine, the nature type is often found in concave depressions in the terrain, but higher up it can cover larger areas also in flat or sloping terrain. Extreme snow beds melt very late in the season (25-40 day growth season reduction) and are characterized by a lack of vascular plants and that soil flow is almost always present. With increasing snow cover duration and increasing source water influence, the importance of lime content for the variation in species composition decreases, and extreme spring snow beds include both lime-poor and lime-rich types. The constant supply of fresh spring water and long-term snow cover results in a species composition with a strong element of both snow bed species and species typical of springs. Permanent water saturation differentiates from snow beds on solid ground.

Relatively fast decomposition due to the abundant supply of fresh meltwater, together with the washing away of organic material, results in a low content of organic material and therefore no peat formation.

Terrain and aerial photo characteristics: Flat terrain or sloping surfaces and depressions in the terrain, often below snow banks.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V6-9	V6-B-9	V6-C-9	V6-D-3	V6-E-3
Basic types		V6-9	V6-9	V6-5,6,9	V6-5,6,9

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **tx** - gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Bryum cryophilum</i> rose moss v <i>Bryum weigelii</i> kildervrangmose v	<i>Dichodontium palustre</i> spring herring remose v <i>Philonotis fontana</i> carpet spring moss v	<i>Pohlia drummondii</i> red-bud nick v <i>Pohlia wahlenbergii</i> kaldnikke v
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Distribution and regional distribution: LA-MA, O3-C1. Most common in the upper part of the low-alpine and mid-alpine zone, only scattered in the high alpine. Most common in oceanic mountains.

Main types of confusion: Insert name for mapping unit with code in brackets.

Red list status (2018): Wet snow deposit and source of snow deposit (VU mainland, LC Svalbard;<).

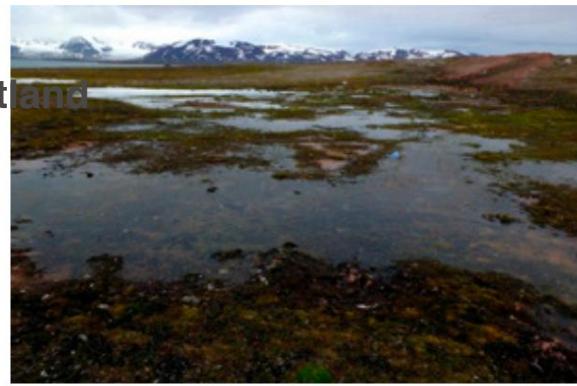
References and type parallels:

V7-C-1 Lime-poor and intermediate permafrost wetland

NiN characteristics: Wetland systems: Arctic permafrost wetland (V7), one ground type (1). Defined by LKM: KAÿ1. LKM base step: KAÿcdef.

Physiognomy: Moss-dominated vegetation with a few vascular plants. Stagnant water.

Ecological characteristics: Lime-poor and intermediate permafrost wetlands are wetland systems in the mid-Arctic tundra zone on Svalbard that are conditioned by permafrost. The type is found on flat surfaces and in depressions in the terrain, where stagnant water collects and remains in or just above the moss layer for most of the summer. The permafrost layer then lies as an impermeable floor 30–40 cm below the ground surface and excludes drainage downwards into the ground. The combination of stagnant water and icy ground with a temperature of around 0 °C throughout the summer creates a very cold environment and limits the species selection to a few species that can withstand both water coverage and occasional freezing in ice. Lime-poor and intermediate permafrost wetlands are most extensive on the sedimentary rocks on Spitsbergen and Edgeøya. Very base-demanding species are most often missing.



Lime-poor and intermediate permafrost wetlands. Svalbard: Reindeer Fly. Photo: GA.

Terrain and aerial photo characteristics: Found in depressions and flat lower-lying areas with stagnant water in the landscape. Often as small depressions or pond-like structures in the landscape or as a table along small, shallow lakes.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V7-1	V7-B-1	V7-C-1	V7-D-1	V7-E-1
Basic types		V7-1	V7-1	V7-1	V7-1

Diagnostic species m =
abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Equisetum arvense</i> ssp. <i>alpine polar</i> snowshoe	<i>Eriophorum scheuchzeri</i> snow marsh roll v <i>Pleuropogon sabinei</i> sabine grass	<i>Sarmentypnum exannulatum</i> agg. vrangnökkmose v
<i>Arctophila fulva</i> hanging grass	<i>Calliergon richardsonii</i> swamp iron moss v	<i>Sarmentypnum sarmentosum</i> blood nut moss v
<i>Cardamine nymanii</i> watercress t*	<i>Cinclidium latifolium</i> fagergittermose v	<i>Sarmentypnum tundrae</i> chinchnut moss v
<i>Carex subspathacea</i> Arctic sea sedge t*		
<i>Dupontia fisheri</i> tundra grass v*		

Distribution and regional distribution: MATZ.

Main types of confusion: Calcareous permafrost wetland (V7-C-2).

Red List status (2018): Permafrost freshwater swamp (NT;<).

References and type parallels:

V7-C-2 Calcareous permafrost wetland

NiN characteristics: Wetland systems: Arctic permafrost wetland (V7), one ground type (2). Defined by LKM: KAy2. LKM base step: KAyghi.

Physiognomy: Moss-dominated vegetation with a few vascular plants. Stagnant water.

Ecological characteristics: Calcareous permafrost wetlands are wetland systems in the mid-Arctic tundra zone on Svalbard that are conditioned by permafrost. The type is found on flat surfaces and in depressions in the terrain, where stagnant water collects and remains in or just above the moss layer for most of the summer. The permafrost layer then lies as an impermeable floor 30–40 cm below the ground surface and excludes drainage downwards into the ground. The combination of stagnant water and icy ground with a temperature of around 0 °C throughout the summer creates a very cold environment and limits the species selection to a few species that can withstand both water coverage and occasional freezing in ice. Calcareous permafrost wetlands are found on calcareous soils as opposed to calcareous permafrost wetlands.

Terrain and aerial photo characteristics: Found in depressions and flat lower-lying areas with stagnant water in the landscape. Often as small depressions or pond-like structures in the landscape or as a table along small, shallow lakes.



Calcareous permafrost wetland. Svalbard: Sassendalen.
Photo: GA.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V7-2	V7-B-2	V7-C-2	V7-D-2	V7-E-2
Basic types		V7-2	V7-2	V7-2	V7-2

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **t+**- gradt ent-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Equisetum arvense</i> ssp. <i>alpestre</i> polarsnel le v	<i>Bryum pseudotriquetrum</i> brook vrang moss v;s-[KA:gfl]	<i>Pseudocalliergon brevifolium</i> polargulmo see v
<i>Arctophila fulva</i> hanging grass	<i>Calliergon richardsonii</i> swamp iron moss v	<i>Sarmentypnum tundrae</i> chinchnut moss v
<i>Carex subspathacea</i> Arctic sea sedge	<i>Cinclidium latifolium</i> fagergittermose v	<i>Scorpidium cossonii</i> brown moss v;s+[KA:gfl]
<i>Dupontia fisheri</i> tundra grass v*	<i>Cinclidium stygium</i> myrgittermoss v;s+[KA:gfl]	<i>Scorpidium scorpioides</i> largemouth moss v;s+[KA:gfl]
<i>Eriophorum scheuchzeri</i> snow marsh roll v	<i>Drepanocladus trifarium</i> navargulmose v;s+[KA:gfl]	
<i>Pleuropogon sabinei</i> sabine grass	<i>Meesia uliginosa</i> nervous swan moss v;s+[KA:gfl]	
<i>Cardamine nymanii</i> watercress		
<i>Aneura pinguis</i> fat moss v;s-[KA:gfl]		

Distribution and regional distribution: MATZ.

Most important types of confusion: Lime-poor and intermediate permafrost wetlands (V7-C-1).

Red List status (2018): Permafrost freshwater swamp (NT;<).

References and type parallels:

V8-C-1 Lime-poor and intermediate beach and swamp forest land

NiN characteristics: Wetland systems: Riparian swamp forest land (V8), one ground type (1). Defined by LKM: KAÿ1 & SAÿ1. LKM base steps: KAÿcde & SAÿ0a.

Physiognomy: Swamp forest with a dense tree layer of alder species or scrub forest of large willow species. The field layer is dense in places and dominated by herbs and sedge species. Lynx species and other poor forest species on tussocks. Bottom layer varies from almost absent to well developed.



Lime-poor and intermediate beach and swamp forest land. Ak: Wool cases: Hovin, Svenskestutjernet. Photo: RH.

Ecological characteristics: Lush deciduous forests by lakes and ponds and other places with high, relatively stagnant water. Often as a zone between freshwater vegetation (marshes etc.) and permanent forest or cultivated land. Svartor dominates the tree layer in the lowlands of south-east Norway, otherwise gray alder and various willow species are the most important species in the tree layer. Great bear moss and peat bogs are most common in the bottom layer; elements of pond bogs.

Terrain and aerial photo characteristics: In flat terrain by lakes and ponds. FF: Dense wood layer gives light to normal green color and typical deciduous forest texture. Occasionally a reflection from an open water surface. Texture and color often consistent within regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V8-1	V8-B-1	V8-C-1	V8-D-1	V8-E-1
Basic types		V8-1	V8-1	V8-1	V8-1

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Alnus glutinosa</i> svartor m*[BN-SB]	<i>Picea abies</i> fir v	<i>Polytrichum commune</i> large bear moss m;s*[SAÿa lb];s*[KAÿelf]
<i>Alnus incana</i> alder v[SB-MB]	<i>Salix aurita</i> earweed v;s+[SAÿalb]	<i>Sphagnum girgensohnii</i> spruce peat moss v
<i>Carex vesicaria</i> senna grass v	<i>Salix cinerea</i> gray willow v;s+[SAÿalb]	<i>Sphagnum palustre</i> swamp peat moss v
<i>Comarum palustre</i> marsh hatt v	<i>Salix myrsinifolia</i> ssp. <i>myrsinifolia</i> black willow v	<i>Sphagnum squarrosum</i> split peat moss v
<i>Frangula alnus</i> troll 's hedge v	<i>Sorbus aucuparia</i> roe v	
<i>Galium palustre</i> marmaure m	<i>Viola palustris</i> marsh violet m	
<i>Lysimachia europaea</i> forest star v		
<i>Peucedanum palustre</i> milkweed v		

Distribution and regional distribution: Poorly researched, but probably found scattered in the lowlands of southern Norway. Shrub designs in higher and northern areas. Covers small areas, BN-SB(-NB), O3-OC(C1).

Most important types of confusion: Intermediate marsh and swamp forest (V2-C-2), calcareous beach and swamp forest land (V8-C-2).

Red list status (2018): Strandswamp woodland (LC;<).

References and type parallels: E1b, E2bc + parts of E3 (VN). Included in V7[2-3,6].

V8-C-2 Calcareous beach and swamp forest land

NiN characteristics: Wetland systems: Riparian swamp woodland (V8), one ground type (2). Defined by LKM: KAý2 & SAý1. LKM base steps: KAýfgh & SAýOa.

Physiognomy: Dense tree layer of alder species or thicket of large willow species. Often tufted and with water accumulations between trees and tufts. The field layer is dense in places and dominated by tall herbs. Bottom layer varies from almost absent to well developed.



Calcareous beach and swamp forest land. Øf: Moss: Jeløy, Ø for Kolabotn. Photo: RH.

Ecological characteristics: Lush deciduous forests by lakes and ponds and other places with high, relatively stagnant water. Often as a zone between freshwater vegetation (marshes etc.) and permanent forest or cultivated land. Svartror dominates the tree layer in the lowlands in south-eastern Norway, otherwise gray alder and large willow species are the most important species in the tree layer. Tall herbs dominate in the field layer. Meadow wort, hop flower, outlaw, marsh ant and sword lily are common species. Pond mosses and bog mosses are most common in the bottom layer.

Terrain and aerial photo characteristics: In flat terrain by lakes and ponds. FF: Dense wood layer gives light to normal green color and typical deciduous forest texture. Occasionally a reflection from an open water surface. Texture and color often consistent within regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V8-2	V8-B-2	V8-C-2	V8-D-2	V8-E-2
Basic types		V8-2	V8-2	V8-2	V8-2

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **tx-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

Athyrium filix-femina sogburkne s+[KAýfle] e] Alnus glutinosa svartror m Angelica sylvestris slurp v;s+[KAýfle] Caltha palustris brook flower m Deschampsia cespitosa ssp. cespitosa silver pile v;s-[KAýfle] Equisetum arvense horsetail v;s-[KAýfle] Equisetum fluviatile river rush s*[SAýa lb] Filipendula ulmaria meadowsweet m;s+[KAýfle]	Frangula alnus troll 's hedge v Galium palustre marmaure m Geum rivale meadow bumblebee v;s*[KAýfle] Lycopus europaeus klourt v;s*[KAýfle] Lysimachia europaea forest star v Lysimachia vulgaris outlaw v;s+[KAýfle] Lythrum salicaria cat's tail v Peucedanum palustre milkweed v Phragmites australis roof pipe v Picea abies fir v Ranunculus repens creeping oil v;s*[KAýfle] Salix cinerea gray willow m*;v;s+[SAýalb]	Salix pentandra istervier v Scutellaria galericulata shield bearer v;s+ [KAýfle] Sorbus aucuparia roe v Viola palustris marsh violet v Calliergon cordifolium sedge moss v Calliergonella cuspidata marsh bramble v;s*[KAýfle] Climaciumpendula palm moss m;s+[KAýfle] Plagiomnium elatum calcareous moss v;s*[KAýfle]
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Distribution and regional distribution: Poorly researched, but probably found commonly scattered in areas with rich rock types. BN-NB, O3-OC.

Most important types of confusion: Calcareous marsh and swamp forest (V2-C-3), intermediate beach and swamp forest land (V8-C-1), salt-affected beach and swamp forest land (V8-C-3).

Red list status (2018): Strand swamp woodland (LC;<) and rich willow strand forest (VU;>).

References and type parallels: Parts of E6, and included in E2 and E4 (VN). Parts of E06 (DNHB13).

Included in V7[4-5,7].

V8-C-3 Salt-affected coastal and swamp forest land

NiN characteristics: Wetland systems: Riparian swamp forest land (V8), one ground type (3). Defined by LKM: KAÿ2 & SAÿ2. LKM base steps: KAÿfgh & SAÿbcd.

Physiognomy: Well-developed wood layer of svartor. Lush field layer of nutrient- and moisture-demanding species. Old trees with plinths. Often a water table between the tufts and sod. Poorly developed bottom layer.

Ecological characteristics: Edge forest along sheltered sea beaches, most often in well-sheltered bays and inlets. On marine loose masses with direct connection to salt water or brackish water. Some seaweed deposits towards the shore provide good access to nutrients. Svartor dominates in the wood layer. Tall and nutrient-demanding herbs dominate in the field layer. Meadow wort, hops, outlaw and marsh ant, sword lily are common species. The type is characterized by claws and elements of nitrophilous species, e.g. field pig's root and nettle. Elements of ferns and large sedge species such as sedge and sedge.

Terrain and aerial photo characteristics: In flat terrain near the screen coves and bays. FF: Dense wood layer gives light to normal green color and typical deciduous forest texture. Texture and color often consistent within regions.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V8-3	V8-B-3	V8-C-3	V8-D-3	V8-E-3
Basic types		V8-3	V8-3	V8-3	V8-3

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Alnus glutinosa</i> svartor m*	<i>Galium aparine</i> klengemaure v	<i>Prunus padus</i> hegg v
<i>Angelica sylvestris</i> gorse v;s*[KAÿfle]	<i>Geum rivale</i> meadow bumblebee v;s*[KAÿfle]	<i>Ranunculus repens</i> creeping oil v;s*[KAÿfle]
<i>Caltha palustris</i> brook flower m	<i>Humulus lupulus</i> hop m	<i>Scutellaria galericulata</i> shield bearer v
<i>Cardamine amara</i> watercress v;s*[KAÿfle]	<i>Iris pseudacorus</i> sword lily	<i>Solanum dulcamara</i> creeper v
<i>Cirsium palustre</i> thistle s+[SAÿbla]	<i>Lycopus europaeus</i> klourt t*:s*[KAÿfle]	<i>Sorbus aucuparia</i> roe v
<i>Deschampsia cespitosa</i> ssp. <i>cespitosa</i> silver pile v;s-[KAÿfle]	<i>Lysimachia europaea</i> forest star v	<i>Stachys palustris</i> field pig's root v
<i>Equisetum arvense</i> horsetail v;s-[KAÿfle]	<i>Lysimachia vulgaris</i> outlaw m;s+[KAÿfle]	<i>Urtica dioica</i> stinging nettle v
<i>Filipendula ulmaria</i> meadowsweet m;s+[KAÿfle]	<i>Lythrum salicaria</i> cat's tail v	<i>Valeriana sambucifolia</i> root m;s+[KAÿfle]
<i>Frangula alnus</i> troll 's hedge v	<i>Peucedanum palustre</i> milkweed v	<i>Calliergon cordifolium</i> sedge moss v
<i>Galeopsis bifida</i> vrangdå v;s+[SAÿbla]	<i>Phalaris arundinacea</i> reed s+[SAÿbla]	<i>Mnium hornum</i> coastal thorn moss v
	<i>Phragmites australis</i> roof pipe v	

Distribution and regional distribution: Scattered along the coast of south-east Norway, but occurs sporadically north to Nordmøre (these are poorly researched). BN-SB, O3-O1.

Most important types of confusion: Calcareous marsh and swamp forest (V2-C-3), calcareous beach and swamp forest land (V8-C-2).

Red list status (2018): Coastal swamp forest (LC;<) and salt-affected blackthorn coastal forest (NT;>).

References and type parallels: Parts of E6 (VN). Parts of E06 (DNHB13). S2[2] (NiNv1).

V9-C-1 Low-calcium semi-natural

swamp

NiN characteristics: Wetland systems: Semi natural bog (V1), one basic type (1). Defined by LKM: KAý1. LKM base step: KAýbcd.

Physiognomy: Open groundwater bog with a relatively smooth surface without, or with weak, bog structures and dominated by solid mats. The species are relatively evenly distributed. Field layer dominated by graminids. Bogs that are in use lack woody growth, but shrubs and trees come in from the edges when use ceases. Well-developed bottom layer with a predominance of carpet-forming mosses.



Lime-poor semi-natural bog. Bu: Nes: Svangtjernmyra.
Photo: HB.

Ecological characteristic: Bog that is supplied with minerals from low-calcium groundwater that has been used for mowing or grazing for a long time, and which primarily occurs in areas with low-calcium rocks or low-calcium mineral soil. The field layer consists of relatively few species of vascular plants, mainly graminids. Herbs play little role. The use of low-lime bog types for mowing and grazing has been limited because field layer production is mostly low.

The mapping unit therefore mainly occurs in connection with larger mowed marsh areas with higher production or as smaller parts of larger open field landscapes. Most of the areas that belonged to low-calc semi-natural bog have now lost their semi-natural character and must then be classified as V1.

V9-C-1 differs only slightly from V1-C-2 in terms of species composition. V9 with a mowed feel is characterized by a smooth mat surface without tufts and dominated by grass; V9 with grazing features has a trampled bottom layer with elements of species promoted by grazing (see diagnostic species for T32).

Terrain and aerial photo characteristics: Occurs in flat terrain, in depressions and on gentle slopes. FF: Color most often yellowish brown or dark green, depending on the time of year the photo was taken. Texture very even, but overgrowth with scrub gives texture variation and often a medium green colour. Color and texture vary little within and between regions. The mapping unit appears as open areas with a uniform structure, and can be difficult to distinguish from other open areas, especially on the coast and up towards the mountains.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V9-1	V9-B-1	V9-C-1	V9-D-1	V9-E-1
Basic types		V9-1	V9-1	V9-1	V9-1

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **t±** - gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.).

<i>Carex echinata</i> star star v; s*[KA-clb] <i>Carex lasiocarpa</i> wire sedge v; s*[KA-clb] <i>Carex nigra</i> ssp. <i>nigra</i> cornflower v* <i>Carex panicea</i> sedge s *[KA-clb] <i>Carex rostrata</i> bottle sedge v <i>Carex pauciflora</i> sveltstarr v <i>Eriophorum angustifolium</i> duskmyrull v* <i>Juncus filiformis</i> thread reed v	<i>Potentilla erecta</i> carpet root v <i>Trichophorum cespitosum</i> bear's beard v* <i>Aulacomnium palustre</i> peat moss v* <i>Cladopodiella fluitans</i> s+[KA-dle] <i>Dicranum leioneuron</i> ax sickle	<i>Sphagnum compactum</i> sphagnum moss s+[KA-dle] <i>Sphagnum papillosum</i> wort peat moss v <i>Sphagnum tenellum</i> dwarf peat moss v; s*[KA-clb] <i>Straminergon stramineum</i> grass moss v <i>Warnstorffia fluitans</i> water snail moss s+[KA-dle]
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Distribution and regional distribution: Occurs scattered throughout the country in BN-LA, O3-C1, but with a center of gravity in the inner and middle parts of the country.

Most important types of confusion: Slightly calcareous bog surface (V1-C-2), Slightly calcareous bog edge (V1-C-6), Intermediate semi-natural bog (V9-C-2).

Red list status (2018): Semi-natural bog (EN;<) and southern mowed bog (CR;ý).

References and type parallels: Parts of K1-4 (VN), D02 (DNHB-13) and V6[4-6] and V7[2] (NiN v1).

V9-C-2 Intermediate semi natural bog

NiN characteristics: Wetland systems: Semi natural bog (V1), one basic type (2). Defined by LKM: KAÿ2. LKM basic step: KAÿef.

Physiognomy: Open groundwater bog with a relatively smooth surface without or with weak bog structures, dominated by fixed mats. The species are relatively evenly distributed. Field layer dominated by graminids. Bogs that are in use lack woody growth, but shrubs and trees come in from the edges when use ceases. Well-developed bottom layer with a predominance of carpet-forming mosses.



Intermediate semi-natural, gently sloping bog. Ak:
Nittdal: Slättemyra. Photo: RH.

Ecological characteristics: Bog which is supplied with minerals from groundwater with a higher pH than in V9-C 1 and which has been used for mowing or grazing for a long time. V9-C-2 occurs primarily in connection with intermediate sources and more diffuse groundwater outcrops and seeps from surrounding solid ground, often on ground bogs and places with thin peat. Greater species diversity and production in the field layer than in V9-C-1, and a certain element of herbs. Both species from lime-poor mires and from lime-rich mires occur. The use of intermediate bogs for mowing and grazing was widespread over large parts of the country, and V9-C-2 has covered significant areas in higher elevations. Most of these areas have now lost their semi-natural character and must then be classified as V1. V9-C-2 differs only slightly from V1-C-3 in terms of species composition. V9 with a mowed feel is characterized by a smooth mat surface without tufts and dominated by grass; V9 with grazing features has a trampled bottom layer with elements of species promoted by grazing (see diagnostic species for T32).

Terrain and aerial photo characteristics: Occurs in flat terrain, in depressions and on gentle slopes. FF: Color most often yellowish brown or dark green, depending on the time of year the photo was taken. Texture very even, but overgrowth with scrub gives texture variation and often a medium green colour. Color and texture vary little within and between regions. The mapping unit appears as open areas with a uniform structure, and can be difficult to distinguish from other open areas, especially on the coast and up towards the mountains.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V9-2	V9-B-2	V9-C-2	V9-D-2	V9-E-2
Basic types		V9-2	V9-2	V9-2	V9-2

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **tn-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.).

Carex demissa green sedge v;s+[KA-eld] Carex dioica særbusstarr v;s*[KA-eld] Carex echinata star star v Carex lasiocarpa wire sedge v* Carex nigra ssp. nigra cornflower v* Carex panicea cornstarr v Carex pauciflora sweltstarr v;s+[KA-flg] Carex rostrata bottle gourd v* Eriophorum angustifolium duskmyrull v*	Euphrasia wettsteinii small-eyed thrush s+[KA-eld] Molinia caerulea blue top v* Pedicularis palustris anthill v;s+[KA-eld] Pinguecula vulgaris s+[KA-eld] Potentilla erecta carpet root v Trichophorum cespitosum bear's beard v* Trichophorum alpinum sveltlull v;s+[KA-eld] Aneura pinguis fat moss s+[KA-eld]	Dicranum bonjeanii shaggy s+[KA-eld] Loeskypnum badium brass moss s-[KA-eld] Sphagnum angustifolium club peat moss v Sphagnum teres pasture peat moss v;s+[KA-eld] Sphagnum warnstorffii rose peat moss v;s+[KA-eld]
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Distribution and regional distribution: Occurs throughout the country in BN-LA, O3-C1, but with a center of gravity in the interior and middle parts of the country.

Most important types of confusion: Intermediate bog surface (V1-C-3), Intermediate bog edge (V1-C-7), Calcareous semi-natural bog (V9-C-3).

Red list status (2018): Semi-natural bog (EN;<) and southern mowed bog (CR;ÿ).

References and type parallels: Parts of L1-4 (VN), D02 (DNHB-13) and V6[7-9] and V7[3] (NiN v1).

V9-C-3 Calcareous semi-natural bog

NiN characteristics: Wetland systems: Semi natural bog (V1), one basic type (3). Defined by LKM: KA-3. LKM base step: KA-3.

Physiognomy: Open groundwater bog with a relatively smooth surface without, or with weak, bog structures and dominated by fixed mats. The species are relatively evenly distributed. Field layer dominated by graminids and herbs. Bogs that are in use lack woody growth, but shrubs and trees come in from the edges when use ceases. Well-developed bottom layer dominated by brown mosses and other carpet-forming mosses.



Calcareous hay bog. NT: Rørvik: Litvatnet V. Photo: HB.

Ecological characteristics: Bog which is supplied

with minerals from calcareous soil water ($\text{pH} > 6$) and which has been used for mowing or grazing for a long time.

V9-C-3 occurs primarily in areas with calcareous soil, e.g. in connection with rich sources.

Usually high production and great species diversity in the field and bottom layer. The use of calcareous bogs for mowing and grazing was widespread over large parts of the country, and the type covered considerable areas in higher elevations. These areas have now largely lost their semi-natural character and must therefore be classified as V1.

Terrain and aerial photo characteristics: Occurs in flat terrain, in depressions and on gentle slopes. FF: Color most often yellowish brown or dark green, depending on the time of year the photo was taken. Texture very even, but overgrowth with scrub gives variation in the texture and often a medium green colour. Color and texture vary little within and between regions. On aerial photographs, the type appears as open areas with a uniform structure, and can be difficult to distinguish from other open areas, especially up towards the mountain.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V9-3	V9-B-3	V9-C-3	V9-D-3	V9-E-3
Basic types		V9-3	V9-3	V9-3	V9-3

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.).

<i>Bistorta vivipara</i> harerug v <i>Carex dioica</i> særbuskastarr v* <i>Carex flava</i> jaundice v* <i>Carex lasiocarpa</i> wire sedge v * <i>Carex nigra</i> ssp. <i>nigra</i> cornstar v <i>Carex panicea</i> corn sedge v * <i>Carex rostrata</i> bottle sedge v <i>Dactylorhiza incarnata</i> meadow marigold v;s*[KA-glf] <i>Equisetum palustre</i> myrsnelle v <i>Equisetum variegatum</i> mountain fescue v <i>Eriophorum angustifolium</i> duskmyrull v* <i>Eriophorum latifolium</i> breimyrull v;t* <i>Euphrasia wettsteinii</i> small-eyed thrush v <i>Molinia caerulea</i> blue top v	<i>Parnassia palustris</i> jäblom v <i>Pedicularis oederi</i> golden mullet v;s*[KA-glf] <i>Pedicularis palustris</i> anthill v <i>Potentilla erecta</i> carpet root v <i>Scorzoneroidea autumnalis</i> foal flower v;s+[KA-glf] <i>Selaginella selaginoides</i> dvergjamne v <i>Thalictrum alpinum</i> mountain seed star v;s+[KA-glf] <i>Tofieldia pusilla</i> bear sting v;s+[KA-glf] <i>Trichophorum alpinum</i> svæltull v <i>Trichophorum cespitosum</i> bear 's beard v*	<i>Triglochin palustris</i> marsh onion v;s*[KA-glf] <i>Aneura pinguis</i> fat moss v <i>Campylium stellatum</i> marsh star moss m*,v*,t* <i>Bryum pseudotriquetrum</i> bekkevrangmo see v;s*[KA-glf] <i>Drepanocladus trifarium</i> navargulmose s*[KA-glf] <i>Gymnocolea borealis</i> brundymose v;t* <i>Scorpidium</i> spp. _ <i>Sphagnum teres</i> pasture turf moss v <i>Sphagnum warnstorffii</i> rose peat moss etc
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Distribution and regional distribution: Occurs throughout the country in BN-LA, O3-C1, but with a center of gravity in the interior and middle parts of the country.

Most important types of confusion: Calcareous bog surface (V1-C-4), Calcareous bog edge (V1-C-8), Intermediate semi-natural bog (V9-C-2).

Red list status (2018): Semi-natural bog (EN;<) and southern mowed bog (CR;ü).

References and type parallels: Parts of M1-4 (VN), D02 (DNHB-13) and V6[10-15] and V7[4-5] (NiN v1).

V10-C-1 Intermediate wet meadow

NiN characteristics: Wetland systems: Semi natural wetland (V10), one basic type (1). Defined by LKM: KAy1 & Klj1. LKM base step: KAycde & Klj0a.

Physiognomy: Meadows with relatively dense and tall vegetation dominated by herbs and graminids. Bottom layer missing or sparse. Occurs most often in the flood zone along streams, rivers and lakes. Scattered bushes and trees may occur.



Intermediate wet meadow. MR: Ulstein: NE of Ytreflø. Photo: RH.

Ecological characteristic: Includes semi-natural land with a constantly high groundwater table, so that the wetland definition is met. Regular supply of river or lake water (with mineral material) provides high soil moisture and relatively nutrient-rich conditions. In contrast to calcareous wet meadows, there is a clear lack of calcareous species. Differs from semi-natural bog in that peat is not formed and in that the bottom layer is poorly developed. Distinguished from other semi-natural meadows by the constantly high groundwater level and presence of species that are adapted to constantly wet conditions. Primarily used for grazing, but was also mowed. Grazed wet meadows and overgrown mowed wet meadows are characterized by strong tuft formation and soft soil.

Terrain and aerial photo characteristics: Flat or gently sloping terrain, preferably adjacent to rivers or streams. Mostly dark green colour. Texture and color usually relatively uniform, but tufts are common and give a characteristic texture.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V10-1	V10-B-1	V10-C-1	V10-D-1	V10-E-1
Basic types		V10-1	V10-1	V10-1	V10-1

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity type (**t*** = characteristic t., **tr-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Agrostis canina</i> dog's knevein v <i>Alopecurus geniculatus</i> knee-ear butt v <i>Angelica sylvestris</i> sloke v <i>Calamagrostis canescens</i> water pipe sedge v <i>Caltha palustris</i> brook flower v <i>Cardamine pratensis</i> meadow cress v <i>Carex canescens</i> cataract v <i>Carex echinata</i> star star v <i>Carex nigra</i> ssp. <i>junccea</i> pole star v* <i>Carex nigra</i> ssp. <i>nigra</i> cornstar v <i>Carex rostrata</i> bottle sedge v <i>Carex vaginata</i> slirestarr v <i>Cirsium heterophyllum</i> white-leaved thistle v	<i>Cirsium palustre</i> thistle v <i>Comarum palustre</i> marsh hat v <i>Corallorrhiza trifida</i> coral root v <i>Deschampsia cespitosa</i> ssp. <i>cespitosa</i> silver pile v <i>Equisetum fluviatile</i> watercress v <i>Filipendula ulmaria</i> meadowsweet v <i>Galium palustre</i> marsh anemone v <i>Gentiana pneumonanthe</i> bellflower <i>Geum rivale</i> engblommeblom v <i>Glyceria fluitans</i> manna sweet grass v <i>Juncus articulatus</i> rush v <i>Juncus conglomeratus</i> knapsiv v <i>Juncus effusus</i> lissiv v <i>Juncus filiformis</i> thread reed v*	<i>Lysimachia thyrsiflora</i> golden tassel v <i>Lysimachia vulgaris</i> outlaw v <i>Mentha arvensis</i> field mint v <i>Menyanthes trifoliata</i> buckleaf v <i>Molinia caerulea</i> blue top v <i>Myosotis laxa</i> swampforglemmegei v <i>Peucedanum palustre</i> milkweed v <i>Phalaris arundinacea</i> beach reed v <i>Poa trivialis</i> markrapp v <i>Ranunculus repens</i> krypsoleie v <i>Stellaria palustris</i> marsh star flower <i>Valeriana sambucifolia</i> root v <i>Viola palustris</i> marsh violet v
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Distribution and regional distribution: BN-NB, O3-C1. The whole country.

Most important types of confusion: Calcareous or spring -affected wet meadow (V10-C2,3), semi-natural bog (V10), moist meadows (T32), helophyte-freshwater swamp (L4).

Red list status (2018): Semi-natural wet meadow (DD;<).

References and type parallels: G2, G12 (VN), D01, D04, D09 (DNHB13).

V10-C-2 Calcareous wet meadow

NiN characteristics: Wetland systems: Semi natural wetland (V10), one basic type (2). Defined by LKM: KAÿ2 & Klÿ1. LKM base step: KAÿfgh & Klÿ0a.

Physiognomy: Meadows with relatively dense and tall vegetation dominated by herbs and graminids. Bottom layer missing or sparse. Occurs most often in the flood zone along streams, rivers and lakes. Scattered bushes and trees may occur.

Ecological characteristic: Includes semi-natural land with a constantly high groundwater table, so that the wetland definition is met. Regular supply of river or lake water (with mineral material) provides high soil moisture and nutrient-rich conditions. Distinguished from intermediate wet meadow by presence of lime-requiring species. Differs from semi-natural bog in that peat is not formed and in that the bottom layer is poorly developed. Distinguished from other semi-natural meadows by the constantly high groundwater level and presence of species that are adapted to constantly wet conditions. Primarily used for grazing, but was also mowed. Grazed wet meadows and overgrown mowed wet meadows are characterized by strong tuft formation and soft soil. High productivity means rapid overgrowth.

Terrain and aerial photo characteristics: Flat or gently sloping terrain, preferably adjacent to rivers or streams. Mostly dark green colour. Texture and color usually relatively uniform, but tufts are common and give a characteristic texture.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V10-2	V10-B-2	V10-C-2	V10-D-2	V10-E-2
Basic types		V10-2	V10-2	V10-2.3	V10-2.3

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity type (t* = characteristic t., t#- gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.)

Angelica sylvestris sloke v Caltha palustris brook flower s-[KA-fle] Cardamine amara watercress s-[KA-fle] Cardamine pratensis meadow cress v Carex cespitosa tuestarr v Carex flava s +[KA-fle] Carex hostiana meadowsweet s*[KA-fle] Carex nigra ssp. juncea stolpestarr v Carex nigra ssp. nigra cornstar v Carex pulicaris fleabane v Carex vesicaria sedge grass s-[KA-fle] Cirsium heterophyllum white-leaved thistle v Cirsium oleraceum cabbage thistle v Cirsium palustre thistle v Corallorrhiza trifida coral root v Crepis paludosa Marsh hawk 's beard s*[KA-fle]	Dactylorhiza incarnata meadow marigold s*[KA-fle] Deschampsia cespitosa ssp. cespitosa silver pile v Filipendula ulmaria meadowsweet s-[KA-fle] Galium palustre marsh anemone v Galium uliginosum swamp ant v Geum rivale engblomleblom v Glyceria fluitans manna sweet grass v Hierochloë odorata marigras v Iris pseudacorus sword lily v Juncus articulatus rush v Lysimachia thyrsiflora golden tassel v Lysimachia vulgaris outlaw v Mentha arvensis field mint v Molinia caerulea blue top v Lychnis flos-cuculi cock's comb v Myosotis laxa swampforglemmegei v	Myosotis scorpioides meadow forget-me-not v Parnassia palustris jablom s+[KA-fle] Peucedanum palustre milkweed v Poa trivialis markrapp v Ranunculus repens krypsoleie v Saussurea alpina mountain thistle v Stellaria palustris marsh star flower Triglochin palustris marsh onion Valeriana sambucifolia root v Veronica beccabunga beckeveronika s- [KA-fle] Viola epipsila large marsh violet s-[KA-fle] Brachythecium rutabulum storlundmose v Campylium stellatum s +[KA-fle]
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Distribution and regional distribution: BN-NB, O3-C1. The whole country.

Most important types of confusion: Intermediate or source -influenced wet meadow (V10-C2,3), semi-natural bog (V10), moist meadows (T32), helophyte-freshwater swamp (L4).

Red list status (2018): Semi-natural wet meadow (DD;<).

References and type parallels: G12 (VN), D01, D04, D09 (DNHB13).



Calcareous wet meadow. Ak: Eidsvoll: Celebration, Ø for Almelia.
Photo: RH.

V10-C-3 Wet meadow affected by spring water

NiN characteristics: Wetland systems: Semi-natural wetland (V10), one basic type (3). Defined by LKM: KAý1,2 & Klý2.

LKM base steps: KAýcdefgh & Klýbc.

Physiognomy: Meadows most often with relatively dense and tall vegetation dominated by herbs and graminids. Bottom layer missing or sparse. Scattered bushes and trees may occur.

Ecological characteristic: Includes semi-natural land with a constantly high groundwater table, so that the wetland definition is met. In addition to uniform and high soil moisture, it is also characterized by spring water supply, i.e. supply of fresh, oxygen-rich groundwater with a stable temperature and stable chemical content. The element of spring water species distinguishes this type from other wet meadows. Differs from semi-natural bog in that peat is not formed and in that the bottom layer is poorly developed. Distinguished from other semi-natural meadows by the constantly high groundwater level and presence of species that are adapted to constantly wet conditions. Primarily used for grazing, but was also mowed. Grazed wet meadows and overgrown mowed wet meadows are characterized by tuft formation and that the soil is soft. High nutrient richness and high productivity result in rapid overgrowth.

Terrain and aerial photo characteristics: Flat or sloping terrain with spring water influence. Mostly dark green colour. Texture and color usually relatively uniform, but tufts are common and give a characteristic texture.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code		V10-B-3	V10-C-3	V10-D-2	V10-E-2
Basic types	V10-3	V10-3	V10-3	V10-2.3	V10-2.3

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **ta-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Agrostis canina</i> dog's kneve v <i>Alchemilla glabra</i> smooth marigold v <i>Alchemilla glomerulans</i> spring ladybug s-[Kl·bl a] <i>Angelica sylvestris</i> slope v <i>Caltha palustris</i> brook flower v <i>Cardamine amara</i> watercress v <i>Cardamine pratensis</i> meadow cress v <i>Carex nigra</i> ssp. <i>nigra</i> cornstar v <i>Chrysosplenium alternifolium</i> maygull s-[Kl·bl a] <i>Cirsium heterophyllum</i> white-leaved thistle v <i>Cirsium palustre</i> thistle v <i>Crepis paludosa</i> swamp hawk v <i>Deschampsia cespitosa</i> ssp. <i>cespitosa</i> silver pile v	<i>Equisetum sylvaticum</i> sedge s-[Kl·bla] <i>Filipendula ulmaria</i> meadowsweet v <i>Galium palustre</i> marsh anemone v <i>Galium uliginosum</i> swamp ant v <i>Geum rivale</i> meadow bumblebee s-[Kl·bla] <i>Glyceria fluitans</i> manna sweet grass v <i>Juncus articulatus</i> rush v <i>Molinia caerulea</i> blue top v <i>Montia fontana</i> spring herb s-[Kl·bla] <i>Parnassia palustris</i> jåblom v <i>Poa trivialis</i> markrapp v <i>Prunella vulgaris</i> blåkoll v <i>Ranunculus repens</i> creeping oil s-[Kl·bla] <i>Stellaria uliginosa</i> brook star flower s-[Kl·bla]	<i>Valeriana sambucifolia</i> root s-[Kl·bla] <i>Viola epipsila</i> large marsh violet v <i>Viola palustris</i> marsh violet v <i>Brachythecium rivulare</i> marshland moss s-[Kl·bl a] <i>Brachythecium rutabulum</i> storlundmose v <i>Calliergonella cuspidata</i> s-[Kl·bla] <i>Climaciumpendulum</i> palm moss s-[Kl·bl a] <i>Plagiomnium elatum</i> calcareous moss s-[Kl·bla]
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Distribution and regional distribution: BN-NB, O3-C1. The whole country.

Main types of confusion: Intermediate or calcareous wet meadow (V10-C2,3), semi-natural bog (V10), moist meadows (T32), helophyte-freshwater swamp (L4).

Red list status (2018): Semi-natural wet meadow (DD;<).

References and type parallels: G12 (VN), D01, D04, D09 (DNHB13).



Floodplain forest land affected by spring water on fine material. Ak: Bærum: Hamang. Photo: RH.

V11-C-1 Lime-poor peat roof

NiN characteristics: Wetland systems: Peat roofs (V11), one basic type (1). Defined by LKM: KAý1. LKM basis step: KAýabcd.

Physiognomy: Varies from bare peat in new peat roofs to species-poor bog vegetation in older peat roofs, characterized by graminids and with peat mosses in the bottom layer.

Ecological characteristics: Lime-poor peat roofs are poor open soil water bogs or rain bogs where the upper peat layers have been harvested, e.g. for peat litter production or for use as fuel, so that bare peat is exposed. Lime-poor peat roofs occur on original rainfall beds and in poor groundwater bogs, and are distinguished from lime-rich peat roofs by the lack of lime-requiring species. Establishment of species in peat roofs is characterized by rapid succession, but the order of species' immigration is quite random. Systematic differences in species composition related to LKM, which are important for variation in species composition in wetland systems, will be established eventually, but will be relatively small until well into the course of succession. Therefore, no lists of diagnostic species have been included, but over time species from rainfall bogs, poor groundwater bogs or poor bog and swamp forest land will be established. Eventually, vegetation in old turf roofs will become more and more similar to such vegetation. The boundary between the types is set where the species composition and environmental conditions are not observably different between the former peat roof and the surrounding intact peatland.

Terrain and aerial photo characteristics: Generally flat terrain. New turf roofs are clearly visible in the terrain and in aerial photographs based on their regular shape, bare turf and brown colour. Older sod roofs can be difficult to see.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V11-1	V11-B-1	V11-C-1	V11-D-1	V11-E-1
Basic types		V11-1	V11-1	V11-1	V11-1

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **tx-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Betula pubescens</i> birch m;v* <i>Calluna vulgaris</i> heather m;v* <i>Carex canescens</i> cataract v <i>Carex nigra</i> ssp. <i>nigra</i> cornstar v <i>Chamaepericlymenum suecicum</i> scrub berry v <i>Empetrum nigrum</i> kreling v <i>Equisetum sylvaticum</i> sedge v <i>Eriophorum vaginatum</i> peat bog roll v <i>Lysimachia europaea</i> forest star v* <i>Melampyrum pratense</i> stormarimjelle v	<i>Picea abies</i> fir m;v* <i>Pinus sylvestris</i> pine m*;v* <i>Rubus chamaemorus</i> molte v <i>Salix lapponum</i> lappvier v[MB,NB] <i>Viola palustris</i> marsh violet v*[BN,SB,MB] <i>Vaccinium uliginosum</i> blockberry v* <i>Vaccinium vitis-idaea</i> cranberry v* <i>Hylocomium splendens</i> floor moss v <i>Polytrichum commune</i> large bear moss m;v*	<i>Sphagnum girgensohnii</i> spruce peat moss etc <i>Sphagnum magellanicum</i> meat-peat moss v <i>Sphagnum palustre</i> swamp peat moss v[BN,SB] <i>Sphagnum quinquefarium</i> heather peat moss v;s*[KA:dle] <i>Sphagnum russowii</i> tvarerormose m;v;s*[KA:dle]
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Distribution and regional distribution: BN-NB, 03-C1.

Most important types of confusion: Lime-rich peat roof (V11-C-2), very and rather low-lime bog surfaces (V1-C-1), slightly calcareous and weakly intermediate bog surfaces (V1-C-2), very and fairly calcareous bog edges (V1-C-5), slightly calcareous and weakly intermediate bog edges (V1-C-6), calcareous and weakly intermediate bog and swamp forest lands (V2-C-1), strongly intermediate slightly calcareous bog and swamp forest lands (V2-C-2), ombrotrophic bog surfaces (V3-C-1), ombrotrophic bog edge (V3-C-2).

Red List Status (2018): NE

References and type parallels: –



Lime-poor turf roof. NT: Fosnes: Jøa peat museum.

V11-C-2 Calcareous peat roof

NiN characteristic: NiN characteristic: Wetland systems: Peat roof (V11), one base type (2). Defined by LKM: KAy2. LKM base step: KAyefghi.

Physiognomy: Varies from bare turf in new turf roofs to species-rich bog vegetation in older turf roofs, characterized by graminids and herbs. Bottom layer dominated by peat mosses, with elements of other leaf mosses. Increasing elements of brown leaf mosses with increasing richness.

Ecological characteristic: Calcareous peat roofs are rich, open groundwater bogs where the upper layers of peat have been harvested, e.g. for peat litter production or for use as fuel, so that bare peat is exposed. Lime-rich peat roofs occur on originally lime-rich peat bogs, and are distinguished from lime-poor peat roofs by the presence of lime-requiring species. Establishment of species in peat roofs is characterized by rapid succession, but the order of species' immigration is quite random. Systematic differences in species composition related to LKM, which are important for variation in species composition in wetland systems, will be established eventually, but will be relatively small until well into the course of succession. Therefore, no lists of diagnostic species have been included, but over time species from rich groundwater bog or rich bog and swamp forest land will be established. Eventually, vegetation in old turf roofs will become more and more similar to such vegetation. The boundary between the types is set where the species composition and environmental conditions are not observably different between the former peat roof and the surrounding intact peatland.

Terrain and aerial photo characteristics: Generally flat terrain. New turf roofs are clearly visible in the terrain and in aerial photographs based on their regular shape, bare turf and brown colour. Older sod roofs can be difficult to see.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V11-2	V11-B-2	V11-C-2	V11-D-2	V11-E-2
Basic types		V11-2	V11-2	V11-2	V11-2

Distribution and regional distribution: BN-NB, 03-C1.

Most important types of disturbance: Low-calcareous peat roof (T11-C-1), strongly intermediate and slightly calcareous bog surfaces (V1-C-3), fairly to extremely calcareous bog surfaces (V1-C-4), strongly intermediate and slightly calcareous bog edges (V1-C-7), rather to extremely calcareous bog edges (V1-C-8), rather to extremely calcareous bog and swamp forest fields (V2-C-3).

Red List Status (2018): NE

References and type parallels: –

V12-C-1 Ditched low-calcareous peat bog

NiN characteristics: Wetland systems: Ditched peatland (V12), one basic type (1). Defined by LKM: VTÿA & KAÿ1. LKM base steps: VTÿ0 & KAÿabcd.

Physiognomy: Bog with clear ditches, most often with a wood layer dominated by pine, birch and/or spruce, but can also be without a wood layer. Field layer dominated by graminids and heather vegetation. The bottom layer is well developed and dominated by peat mosses.

Ecological characteristics: Ditched peatland includes irreversibly drained wetland systems on peatland, primarily open bogs, but also springs, where the drainage has led to a significant change in species composition and a greater similarity to another main wetland type than that which existed on the site before the intervention was made, for example from a ditched bog surface in the direction of bog and swamp forest land. The changes in species composition on ditched mires occur gradually as the mire dries out and decomposition of peat begins. Ditched bogs will nevertheless for a long time retain a distinct impression of former peatland, both through the presence of deep, converted peat soil, ditches and, in part, through the fact that part of the wetland's species composition still survives as residual populations. Eventually, bush and tree cover will increase, and could form strips of forest along the ditches. Over time, the system can change so much that it can no longer be characterized as a wetland. Ditched low-calcareous peat bogs are distinguished from ditched calcareous peat bogs by the lack of strongly intermediate and lime-demanding species, and from ditched precipitation bogs by the presence of groundwater indicators. Ditched low-calcareous peat bogs are often planted, or ditched for cultivation.

Terrain and aerial photo characteristics: Most often found in flat terrain. Large ditches in open bogs are often clearly visible in aerial photographs, but can be difficult to see if the bog is covered with forest.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V12-1	V12-B-1	V12-C-1	V12-D-1	V12-E-1
Basic types		V12-1	V12-1	V12-1	V12-1

Diagnostic species m =

abundance species (**m*** = dominant m.); **v** = common species (**v*** = constant v.); **t** = center of gravity species (**t*** = characteristic t., **tx-** gradient-t.); **s** = distinction (**s*** = absolute s., **s+** = strong relative s., **s-** = weak relative s.)

<i>Betula pubescens</i> birch m;v*	<i>Picea abies</i> fir m;v*	<i>Sphagnum giganteum</i> spruce peat moss etc
<i>Calluna vulgaris</i> heather m;v*	<i>Pinus sylvestris</i> pine m*;v*	<i>Sphagnum magellanicum</i> meat-peat moss v
<i>Carex canescens</i> cataract v	<i>Rubus chamaemorus</i> molte v	<i>Sphagnum palustre</i> swamp peat moss v[BN,SB]
<i>Carex nigra</i> ssp. <i>nigra</i> cornstar v	<i>Salix lapponum</i> lappvier v[MB,NB]	<i>Sphagnum quinquefarium</i> heather peat moss v;s*[KA-dle]
<i>Chamaepericlymenum suecicum</i> scrub berry v	<i>Viola palustris</i> marsh violet v*[BN,SB,MB]	<i>Sphagnum russowii</i> tvaretormose m;v;s*[KA-dle]
<i>Empetrum nigrum</i> kreklings v	<i>Vaccinium uliginosum</i> blackberry v*	
<i>Equisetum sylvaticum</i> sedge v	<i>Vaccinium vitis-idaea</i> cranberry v*	
<i>Eriophorum vaginatum</i> peat bog roll v	<i>Hylocomium splendens</i> floor moss v	
<i>Lysimachia europaea</i> forest star v*	<i>Polytrichum commune</i> large bear moss m;v*	
<i>Melampyrum pratense</i> stormarimjelle v		

Distribution and regional distribution: BN-NB, O3-C1.

Most important types of disturbance: Very calcareous to slightly intermediate peat bogs and bog edges (V1-C-1, V1-C-2, V1-C-5, V1-C-6), lime-poor and slightly intermediate marsh and swamp forest lands (V2-C-1), ditched calcareous groundwater marsh (V12-C-2), ditched precipitation bog (V12-C-3)

Red List Status (2018): NE

References and type parallels: –



Ditched low-calcareous peat bog. NT: Fosnes: east of Halsen. Photo: HB.

V12-C-2 Ditched calcareous groundwater bog

NiN characteristics: Wetland systems: Ditched peatland (V12), one soil type (2). Defined by LKM: VTÿA & KAÿ2. LKM base step: VTÿ0 & KAÿefgh.

Physiognomy: Bog with clear ditches, most often with a layer of wood dominated by pine, birch and/or spruce, preferably in an edge along the ditches, but can also be open. Field layer dominated by graminids and herbs. The bottom layer varies, from peat mosses to brown mosses, and may not be well developed.

Ecological characteristics: Ditched peatland includes irreversibly drained wetland systems on peatland, primarily open bogs, but also springs, where the drainage has led to a significant change in species composition and a greater similarity to another main wetland type than that which existed on the site before the intervention was made, for example from ditched bog surface in the direction of bog and swamp forest land. The changes in species composition on ditched mires occur gradually as the mire dries out and decomposition of peat begins. Ditched bogs will nevertheless for a long time retain a distinct impression of former peatland, both through the presence of deep, converted peat soil, ditches and, in part, through the fact that part of the wetland's species composition still survives as residual populations. Eventually, bush and tree cover will increase, and could form strips of forest along the ditches. Over time, the system can change so much that it can no longer be characterized as a wetland. Ditched calcareous peat bogs are distinguished from ditched rainfall bogs and ditched calcareous peat bogs by the presence of highly intermediate and lime-demanding species. Ditched calcareous groundwater bogs are often planted, or ditched for cultivation.

Terrain and aerial photo characteristics: Most often found in flat terrain. Large ditches in open bogs are often clearly visible in aerial photographs, but can be difficult to see if the bog is covered with forest.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V12-2	V12-B-2	V12-C-2	V12-D-2	V12-E-2
Basic types		V12-2	V12-2	V12-2	V12-2

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity species (t* = characteristic t., t# - gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.)

<i>Alnus incana</i> alder v <i>Alnus glutinosa</i> svartor v[BN,SB] <i>Angelica sylvestris</i> gorse v;s+[MF-dle] <i>Betula pubescens</i> birch v;s-[MF-dle] <i>Bistorta vivipara</i> harerug v;s+[MF-dle] <i>Carex dioica</i> særbustarr v <i>Carex flava</i> jaundice v;s+KA-glf <i>Carex nigra</i> ssp. <i>nigra</i> cornstar v <i>Carex panicea</i> sorghum v <i>Cirsium heterophyllum</i> white-leaved thistle v;s+[MF-dle] <i>Crepis paludosa</i> Marshhawk v;s+[MF-dle]	<i>Epilobium palustre</i> marsh milkweed v;s+[MF-dle] <i>Equisetum sylvaticum</i> sedge v <i>Eriophorum angustifolium</i> duskmyrull v <i>Eriophorum latifolium</i> breimyrull v;s*[KA-glf] <i>Filipendula ulmaria</i> meadowsweet v;s+[MF-dle] <i>Molinia caerulea</i> blue top v <i>Picea abies</i> fir v* <i>Pinus sylvestris</i> pine v <i>Pinguicula vulgaris</i> sedge grass v <i>Potentilla erecta</i> carpet root v <i>Thalictrum alpinum</i> mountain seed star v;s*[KA-hlg] <i>Viola palustris</i> marsh violet v	<i>Bryum pseudotriquetrum</i> bekkevrangmo see v;s*[KA-glf] <i>Calliergonella cuspidata</i> marsh moss v <i>Campylium stellatum</i> m *;v*s+[KA-glf] <i>Climaciumpendroides</i> palm moss v <i>Plagiomnium elatum</i> s*[KA-glf];s+[MF-dle] <i>Sphagnum squarrosum</i> split peat moss v <i>Sphagnum warnstorffii</i> rose peat moss v;s+[KA-glf] <i>Tomentypnum nitens</i> golden moss v;s*[KA-glf]
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Distribution and regional distribution: BN-NB, O3-C1.

Most important types of confusion: Strong intermediate to extremely calcareous peat bogs and bog edges (V1-C-3, V1-C-4, V1-C-7, V1-C-8), intermediate and calcareous bog and swamp forest land (V2-C-2,3), ditched calcareous groundwater bog (V12-C-1)

Red List Status (2018): NE

References and type parallels: –



Ditched calcareous groundwater bog. Bu: Upper Oak: Brattås. Photo: RH.

V12-C-3 Ditched rainfall marsh

NiN characteristics: Wetland systems: Ditched peatland (V12), one soil type (3). Defined by LKM: VTÿB. LKM base step: VTÿc.

Physiognomy: Bog with clear ditches, most often with a layer of wood dominated by pine, preferably in an edge along the ditches, but can also be open. Field layer dominated by graminids and heather vegetation. The bottom layer is well developed and dominated by peat mosses.

Ecological characteristics: Ditched peatland includes irreversibly drained wetland systems on peatland, primarily open bogs, but also springs, where the drainage has led to a significant change in species composition and a greater similarity to another main wetland type than that which existed on the site before the intervention was made, for example from a ditched bog surface in the direction of bog and swamp forest land. The changes in species composition on ditched mires occur gradually as the mire dries out and decomposition of peat begins. Ditched bogs will nevertheless for a long time retain a distinct impression of former peatland, both through the presence of deep, converted peat soil, ditches and, in part, through the fact that part of the wetland's species composition still survives as residual populations. Eventually, bush and tree cover will increase, and could form strips of forest along the ditches. Over time, the system can change so much that it can no longer be characterized as a wetland. Ditched rainfall mire and is distinguished from ditched low-lime soil water mire by the lack of soil water indicators. Ditched rain bogs are often planted, or ditched for cultivation.

Terrain and aerial photo characteristics: Most often found in flat terrain. Large ditches in open bogs are often clearly visible in aerial photographs, but can be difficult to see if the bog is covered with forest.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V12-3	V12-B-3	V12-C-3	V12-D-3	V12-E-3
Basic types		V12-3	V12-3	V12-3	V12-3

Diagnostic species m =

abundance species (m* = dominant m.); v = common species (v* = constant v.); t = center of gravity species (t* = characteristic t., tÿ- gradient-t.); s = distinction (s* = absolute s., s+ = strong relative s., s- = weak relative s.)

<i>Andromeda polifolia</i> white heather v*	<i>Oxycoccus palustris</i> cranberry v*	<i>Pleurozium schreberi</i> pine moss v*
<i>Betula nana</i> ssp. <i>nana</i> dwarf birch v	<i>Picea abies</i> fir	<i>Sphagnum angustifolium</i> club peat moss v*
<i>Betula pubescens</i> birch v	<i>Pinus sylvestris</i> pine m;v*	<i>Sphagnum girgensohnii</i> spruce peat moss v
<i>Calluna vulgaris</i> heather m*;v*	<i>Rubus chamaemorus</i> molte v*	<i>Sphagnum magellanicum</i> meat-peat moss v*
<i>Chamaepericlymenum suecicum</i> scrub berry v[V,M]	<i>Trichophorum cespitosum</i> bear 's beard v	<i>Sphagnum russowii</i> taretormose v
<i>Empetrum nigrum</i> kreling v	<i>Vaccinium vitis-idaea</i> cranberry v	<i>Cladonia</i> spp. lichen v*
<i>Eriophorum vaginatum</i> peat bog roll v*		

Distribution and regional distribution: BN-NB, O3-C1.

Most important types of confusion: Precipitation marsh surface (V3-C-1) precipitation marsh edge (V3-C-2).

Red List Status (2018): NE

References and type parallels: –



Ditched precipitation marsh NT: Fosnes: Salsnes. Photo: HB.

V13-C-1 New wetlands originating in strongly altered terrestrial systems

NiN characteristics: Wetland systems: New wetland (V13), two basic types (1,2). Defined by LKM: HS*ÿA & IOÿ1,2. LKM base steps: HS*ÿA & IOÿ0ab α .

Physiognomy: Wetland created after intervention. Gradual increase in wetland vegetation dominated by graminids or herbs, and with varying coverage of peat mosses (peat accumulation) or other mosses.

Ecological characteristics: New wetland originating in strongly altered permanent land systems includes wetland systems that have arisen through irreversible encroachment on land that was not previously a wetland. The type can occur when the groundwater level in an area changes, for example during road construction or similar interventions, and subsequent swamping due to stagnant water. Wetland vegetation is gradually established from highly altered land with varying vegetation cover, but the accumulation of species is unpredictable and varies with the ecological conditions on the site and other wetland vegetation in the vicinity. New wetlands both with and without peat accumulation (dominated by peat bogs in the bottom layer) are included in the mapping unit. The starting point is different types of heavily altered land and this distinguishes the type from other new wetland types. There is little knowledge of variation in species composition and therefore no table of diagnostic species has been included.

Terrain and aerial photo characteristics: Flat terrain, usually small areas.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V13-1,2	V13-B-1.2	V13-C-1	V13-D-1	V13-E-1
Basic types		V13-1.2	V13-1,2	V13-1,2	V13-1,2

Distribution and regional distribution: BN-NB, O3-C1.

Main types of confusion:

Red List Status (2018): NE

References and type parallels: –

V13-C-2 New wetlands originating in agricultural land on solid land

NiN characteristics: Wetland systems: New wetland (V13), two basic types (3,4). Defined by LKM: HS*ÿB & IOÿ1,2. LKM base step: HS*ÿB & IOÿ0ab.

Physiognomy: Wetland created on former agricultural land. Gradual increase in wetland vegetation dominated by graminids or herbs, and with varying coverage of peat mosses (peat accumulation) or other mosses.



New wetlands originating in agricultural land on solid land.
ST: Malvik: Vennasaga-Solhaugen. Photo: RH.

Ecological characteristics: New wetland originating in agricultural land includes wetland systems that have arisen through irreversible encroachment on former agricultural land. The type is formed after the groundwater level on former agricultural land has been changed, for example by drainage of former wetlands no longer being maintained and the drainage system collapsing. This leads to swamping due to stagnant water. Wetland vegetation is gradually established from agricultural land, but the accumulation of species is unpredictable and varies with the ecological conditions on the site and other wetland vegetation in the vicinity. New wetlands both with and without peat accumulation (dominated by peat bogs in the bottom layer) are included in the mapping unit. The starting point is former agricultural land and this distinguishes the type from other new wetland types. There is little knowledge of variation in species composition and therefore no table of diagnostic species has been included.

Terrain and aerial photo characteristics: Flat terrain in agricultural landscapes, usually small areas.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2.500	1:5.000	1:10.000	1:20.000
Code		V13-B-3.4	V13-C-2	V13-D-2	V13-E-2
Basic types	V13-3,4	V13-3.4	V13-3,4	V13-3,4	V13-3,4

Distribution and regional distribution: BN-NB, O3-C1.

Main types of confusion:

Red List Status (2018): NE

References and type parallels: –

V13-C-3 New wetlands originating in dammed woodland

NiN characteristics: Wetland systems: New wetland (V13), two basic types (5,6). Defined by LKM: HS*ÿC & IOÿ1,2. LKM base step: HS*ÿC & IOÿ0ab¤.

Physiognomy: Wetland formed on former woodland. Gradual increase in wetland vegetation dominated by graminids or herbs, and with varying coverage of peat mosses (peat accumulation) or other mosses.

Ecological characteristics: New wetlands originating in dammed woodland are wetlands that have been formed after encroachment on woodland. It has arisen after the groundwater level on former forest land has been permanently changed, for example by encroachment or by another type of change that entails a change in drainage conditions. Beaver damming can also cause the formation of new wetlands. This leads to swamping due to stagnant water. Wetland vegetation is eventually established from woodland, but the accumulation of species is unpredictable and varies with the ecological conditions on the site and other wetland vegetation in the vicinity. New wetlands both with and without peat accumulation (dominated by peat bogs in the bottom layer) are included in the mapping unit. The starting point is former woodland and this distinguishes the type from other new wetland types. There is little knowledge of variation in species composition and therefore no table of diagnostic species has been included.

Terrain and aerial photo characteristics: Flat terrain in a forest landscape, usually small areas.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V13-5.6	V13-B-5.6	V13-C-3	V13-D-3	V13-E-3
Basic types		V13-5.6	V13-5.6	V13-5.6	V13-5.6

Distribution and regional distribution: BN-NB, O3-C1.

Main types of confusion:

Red list status (2018): NE

References and type parallels: –

V13-C-4 New wetlands originating in freshwater bottoms

NiN characteristics: Wetland systems: New wetland (V13), two basic types (7,8). Defined by LKM: HS*ýD & IOý1,2. LKM base step: HS*ýD & IOý0ab¤.

Physiognomy: Wetland formed from a former freshwater bed. Gradual increase in wetland vegetation dominated by graminids or herbs, and with varying coverage of peat mosses (peat accumulation) or other mosses.

Ecological characteristics: New wetlands originating in former freshwater beds are wetlands that have been formed after encroachment on rivers or lakes. It has arisen after the groundwater level on a former freshwater bed has been permanently changed, for example by permanent damming or draining of lakes, or after riverbeds have dried up with subsequent swamping due to stagnant water. Wetland vegetation is gradually established from the freshwater bed, but the accumulation of species is unpredictable and varies with the ecological conditions on the site and other wetland vegetation in the vicinity. New wetlands both with and without peat accumulation (dominated by peat bogs in the bottom layer) are included in the mapping unit. The starting point is a former freshwater bed and this distinguishes the type from other new wetland types. There is little knowledge of variation in species composition and therefore no table of diagnostic species has been included.

Terrain and aerial photo characteristics: Flat terrain adjacent to rivers or lakes. Usually covers small areas.

Mapping rules, map technical specifications and scale adjustments:

Measuring scale	1:500	1:2,500	1:5,000	1:10,000	1:20,000
Code	V13-7,8	V13-B-7,8	V13-C-4	V13-D-4	V13-E-4
Basic types		V13-7,8	V13-7,8	V13-7,8	V13-7,8

Distribution and regional distribution: BN-NB, O3-C1.

Main types of confusion:

Red list status (2018): NE

References and type parallels: –

I1-C-1 Snow- and ice-covered solid ground

NiN characteristics: Snow and ice systems: Snow and ice covered solid ground (I1), one ground type (1).

Physiognomy: Areas with permanent snow or ice cover of variable thickness. Varies from large glaciers to smaller but permanent fonn, where peripheral parts melt during the summer season.

Most common in sloping terrain, most often north-facing slopes in the high mountains.

Ecological characteristic: Snow- and ice-covered solid land includes solid land areas that are covered by snow and/or ice, i.e. glaciers and permanent snowdrifts. Glaciers form where, over time, more snow is added in the winter than what melts in the summer. Only a few specially adapted species live on and in permanent snow and ice, among other snow algae such as e.g. red snow *Chlamydomonas nivalis*. Some insect species with great cold tolerance stay on ice and snow for periods, but no known animal completes its entire life cycle in or on snow and ice. The duration of snow and/or ice cover must be, or have been and still be expected to be 6 years or more for an area unit to be classified as I1 Snow- and ice-covered solid land.



Snow- and ice-covered solid ground. Op: Lom: Styggebreen with Galdhøpiggen in the background. Photo: HB.

Terrain and aerial photography characteristics: Clearly seen in aerial photographs as white areas.

Mapping rules, map technical specifications and scale adjustments:

Codes and scale adaptations have not yet been prepared for the type.

Distribution and regional distribution: MB-HA, O3-C1. Largest distribution in cold, rainfall-rich areas.

Main types of confusion: –

Red list status (2018): Snow and ice (NT;=).

References and type parallels: –

OTHER PROVIDED INFORMATION

Key to, and brief description of, strongly altered land types (T35–T45)

The 11 main types T35–T45, which include greatly altered permanent land systems, are primarily a result of the set of criteria underlying the main type division, which states that nature belonging to 18 different combinations of properties must be allocated to different main types. 6 of these property combinations include heavily altered land. In addition, a distinction is made at the main type level between permanent permanent land and permanent land that is frequently cultivated. It provides the basis for the following key to the 11 strongly changed main land types.

- | | |
|--|---|
| <p>1 Strongly changed solid land without a claim, i.e. which is not worked regularly (by ploughing, mowing etc.) 2</p> <p>1 Strongly changed land with a strong character</p> <p>2 (1) <i>Arranged for rapid succession</i>, i.e. dominated by gravel or finer substrates, soil or peat.</p> | 3 |
|--|---|

This category encompasses such great variation in natural conditions that it is divided into four main types with very different origins, substrates and species composition.

T35 Heavily altered solid land with a loose mass cover [Loose heavily altered solid land] includes 'scrap land' of all kinds, i.e. all areas that have been filled with fine masses (gravel-laid timber dumps, parking lots, roadside fills, etc.) [3 mapping units; T35-C-1 Strongly altered solid land with soil cover; T35-C-2 Strongly altered solid soils with a cover of sand or gravel; T35-C-3 Strongly altered solid ground with a cover of silt and clay]



T35-C-1: Soil-covered 'junkyard' behind vacated house. Fi: Vardø.



Scrapyard (T35-C-2): Realized road bend which is now used as a storage area for timber etc. No: Hemnes: Finneidfjorden.



T35-C-3: Storage area for 'mud' after dredging the wedge; planned and now overgrown with a mixture of weed species and species typical of salt meadows. Øf: Whales: Vesterøy.

T36 New solid land on former wetland and freshwater bed [Dried wetland and freshwater systems] primarily includes regulatory zones along rivers and lakes. [3 mapping units; T36-C-1 Severely altered former wetland; T36-C-2 Dried river bed; T36-C-3 Dried lake bed]



T36-C-1 Older production forest on ditched wetland (marsh forest land?). Bu: Hole: Ringkollen.



T36-C-2 River bed laid dry after watercourse development.
SF: Luster: Jostedalen; At Fåbergstølgrandane.



T36-C-3 Drained, drained regulated lake. Op: Gjøvik:
Snertingdal, Dokkfløyvatnet.

T37 New solid land on highly modified and synthetic substrates, in rapid succession. [New loose solid land] includes landfill sites, paved sites and roads, etc. [3 mapping units:

T37-C-1 Slag heaps and landfills for solid chemical waste;
T37-C-2 Asphalt. loose concrete etc.; T37-C-3 Waste landfill
etc



T37-C-1. Slag heaps at Folldal works. Hey: Folldal.

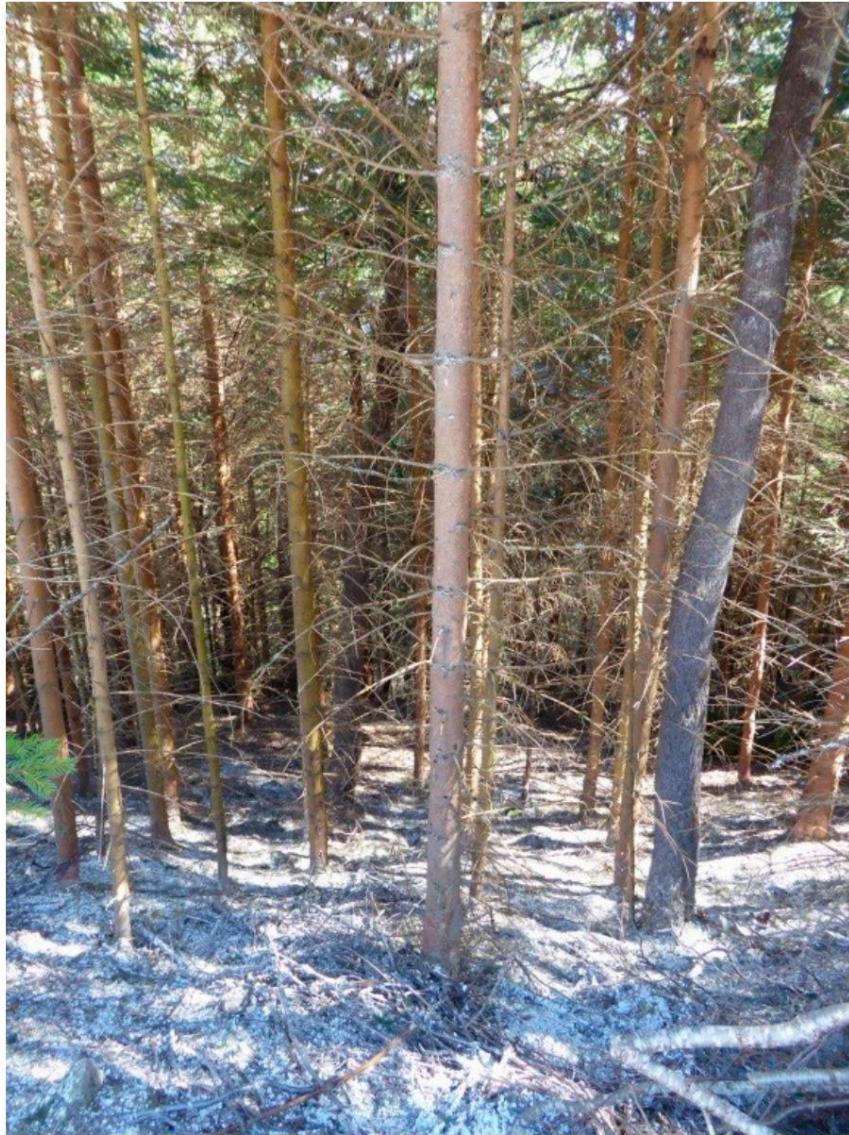


T37-C-2 Asphalted road. Asphalt is a 'semi-solid' substrate that disintegrates relatively quickly and gives rise to rapid succession. Ro: Klepp: Bore: Hodne.



Entrance to public waste disposal site. In the past, waste was emptied into large landfills (rubbish landfills). Now this is no longer allowed. It is such landfills that make up T37-C-3.

T38 Tree plantation includes wooded land that has been so dense over a long period of time (i.e. has such a high density), or where the land has been so heavily cultivated, that it does not function as a woodland system. Typically, this is densely planted former arable land (e.g. Christmas tree plantations), or former woodland that has been planted with spruce or foreign conifer species and which has developed such a thick layer of litter and such sparse undergrowth that the species composition does not provide evidence for placement along important LKM in woodland or reason to assume that the system functions as a woodland ecosystem.



Dense plantation forest (T38-C-1).

- 2 In slow succession, i.e. which is dominated by stone, blocks or bare rock without soil on or between, so that the succession to a soil-covered system is expected to take more than (100–)200 years.
T39 Hard heavily altered and new solid ground in slow succession [Hard heavily altered solid ground] [4 mapping units: T39-C-1 block dumps; T39-C-2 Exposed solid rock; T39-C-3 Solid rock exposed by dry laying or draining; T39-C-4 Highly modified or synthetic, predominantly inorganic solid substrates (incl. buildings)].
- 3 (2) Strongly altered solid land with a semi-natural character includes land with a species composition and a superficial character reminiscent of T32 semi-natural meadow (that is, with a significant element of species that characterize semi-natural meadows), but which does not have a (cultural) history such as pasture or hayfield.
- 3 Heavily altered permanent land with an intensively claimed character includes non-integral ecosystems that have been ploughed, fertilized, sown etc., and which have a species composition that clearly bears the stamp of this.
- 4 (3) Not adapted for agricultural production. This category includes filled-in, unsprayed roadsides that have been mowed (modern-day 'mowed land') over such a long time that the species composition has become more or less similar to that found in semi-natural meadows. Also lawns, parks, airport areas etc. which are mowed over a long period of time but not fertilised, and which have acquired a flora rich in meadow species and poor in nitrophilous species, belong here.



T39-C-1. Steinrøys on the edge of a field. Op: Vågå: Nordherad: Byre.



T39-C-2. Road cutting. SF: Luster: Joranger.



T39-C-3. Exposed solid rock when regulating mountain water. SF: Luster: Jostedalen: Styggevassdammen.



Buildings are part of the mapping unit T39-C-4. The picture shows a closed bowling alley. Fi: Vardø.

T40 Strongly altered solid land with a semi-natural meadow feel [Roadsides, lawns, parks and the like with a semi-natural meadow feel]

- 4 Agricultural land; includes areas that have previously been filled in, plowed up, etc., but which, after many years of mowing and/or grazing without fertilization or ploughing, have acquired a species composition that is more or less similar to that found in semi-natural meadows.

T 41 Cultivated land with semi-natural meadow character [Cultivated land with semi-natural meadow character]

- | | |
|--|---|
| 5 (3) Not adapted for agricultural production | 6 |
| 5 Agricultural land | 7 |
| 6 (5) Frequently cultivated land; that is, marks that are annual or often enough that one does not develop vegetation dominated by perennial species, is processed in ways with the same effect as plowed arable land. | |

T42 Heavily altered, frequently cultivated solid land with intensively raised character [Flower beds and other frequently cultivated land]

- 6 Permanent land; that is, land that is cultivated so rarely [typically less often than every (6–)10–15 years] that the vegetation is dominated by perennial grasses and herbs



T40-C-1: Unsprayed, beaten roadside with herbaceous flora. No: Fauske: Valnesfjord.



Formerly probably plowed 'route' dominated by dog biscuits in a meadow which otherwise has a semi-natural character (T41-C-1). Op: Sel: Brue



T42-C-1: Flower bed by the cottage. Vf: Larvik: Brunlanes.

T43 Heavily altered, permanent land with an intensive grassy character [Lawns, parks and the like without a semi-natural meadow character]

7 (5) Frequently cultivated land; agricultural land that is ploughed, possibly also sprayed, fertilized and seeded annually or often enough that a vegetation dominated by perennial species does not develop

T44 Arable

7 Permanent land; that is, land that is cultivated so rarely [typically less often than every (6–)10–15 years] that the vegetation is dominated by perennial grasses and herbs.



T43-C-1. Large plan that is cut by self-moving cliffs. Øf: Whales: Vesterøy.



T44-C-1. Rapeseed fields. Øf: Råde: Åven.

T45 Cultivated permanent meadow

[3 mapping units:

T45-C-1 Cultivated permanent meadows with little intensive heat;

T45-C-2 Cultivated permanent meadows with fairly intensive heath;

T45-C-3 Cultivated permanent meadows with very intensive heather character]



T45-C-1. Steep inland grazed by goats. SF: Aurland: Undredal.



T45-C-2, Fairly intensively cultivated permanent meadow dominated by meadow fescue. Op: Vågå: Nordherad: Byre.



T45-C-3. Heavily fertilized cultivated permanent meadow. Ro: Hå: Varhaug: S f Holmavatn.

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The Species Data Bank is a professionally independent agency with its own board, subordinate to the Ministry of Climate and the Environment. Our main task is to convey up-to-date and easily accessible information about species and nature types. Through the acquisition, systematization and dissemination of knowledge, we build bridges between science and society.

We publish the Norwegian Red List for species and the Red List for habitat types, as well as risk assessments of alien species with the Alien Species List. Through the Arts Project, we contribute to building up knowledge about species in Norway, with a particular emphasis on those species about which little is known today. We are responsible for the Species Observations reporting system and offer documented information about Norwegian nature, in collaboration with a number of data providers. The Species Data Bank is also responsible for the type and description system Nature in Norway (NiN), which is to be used as the basis for all nature type mapping in the country, and for mapping guidance related to NiN.

