

AquaNIS

information system on aquatic non-indigenous species (NIS)

of Europe and neighbouring regions

Data attributes and definitions applied in AquaNIS

1 INTRODUCTION

AquaNIS is implemented using the flexible module structure, meaning that new modules may be added if necessary. At present, there are four main modules (or data blocks): SPECIES, GEOGRAPHY, INTRODUCTION EVENTS, and IMPACTS (Figure 1).

The SPECIES block contains data on taxonomy, native origin, biological traits and other fixed information about NIS.

The GEOGRAPHY block contains geographical data organized in the hierarchical way to indicate native origin of NIS in the SPECIES block and recipient region/source region in the INTRODUCTION EVENTS block. The latter is used to store dynamic data on the first record of NIS in a recipient country or smaller location, pathways and vectors of introduction, population status, invaded habitat, impacts, etc. The “introduction event” means an introduction of a NIS into a particular country (or a smaller location as defined by a data contributor).

The IMPACT data block includes information at two levels related to NIS impacts: one contains the global level and the other one is the introduction event based on region-specific knowledge.

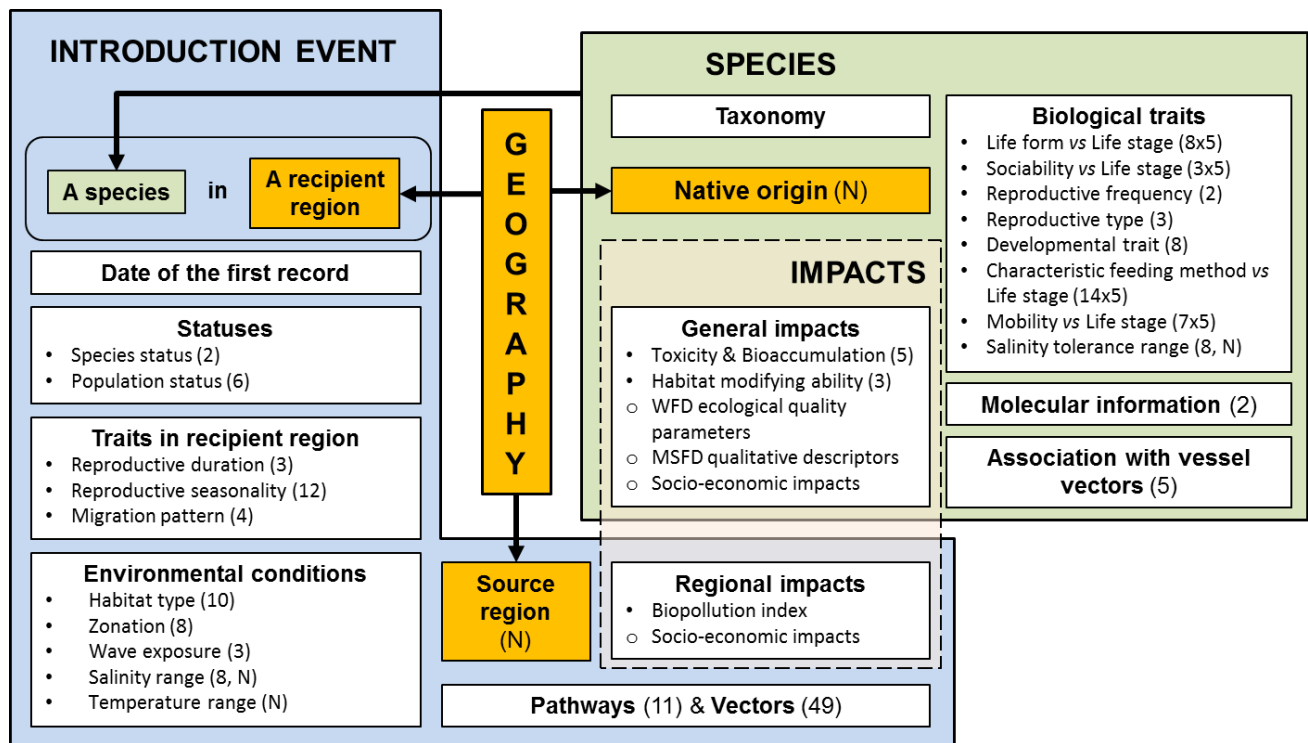


Figure 1. The module structure of AquaNIS.

2 DEFINITIONS: SPECIES DATA BLOCK



This is the information block where the descriptive information about a species is being stored.

2.1 Taxonomy (synchronised on WoRMS – World Register of Marine Species)

| | |
|--------------|--|
| Phylum | |
| Class | |
| Order | |
| Family | |
| Genus | |
| Species name | |
| Authority | |

| | |
|-------------------|---|
| Synonyms | Valid synonyms of a species (not all of them). |
| Sub-species level | A geographical subset of a species showing discrete differences in morphology, coloration or other features when compared with other members of the species. Subspecies may also differ in their habitat or behavior, but they can interbreed. Often the lowest taxonomic level within a classification system. |

2.2 Native origin

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|---|
| The region the species originates from (see GEOGRAPHY block). |
|---|

2.3 Association with vessel vectors

| | |
|---|---|
| Actual evidence of being found in samples in a particular vector from any world region. | |
| Anchor and anchor chains | Organisms found on anchors, anchor chain or within attached sediments, including anchor chain lockers. |
| Ballast water | Ballast water means water with its suspended matter taken on board a ship to control trim, list, draught, stability or stresses of the ship. |
| Biofouling | <p>Biofouling means the accumulation of aquatic organisms such as micro-organisms, plants, and animals on surfaces and structures immersed in or exposed to the aquatic environment. Biofouling can include microfouling and macrofouling.</p> <ul style="list-style-type: none"> • Macrofouling means large, distinct multicellular organisms visible to the human eye such as barnacles, tubeworms, or fronds of algae. • Microfouling means microscopic organisms including bacteria and diatoms and the slimy substances that they produce. Biofouling comprised of only microfouling is commonly referred to as a slime layer. |
| Sea chest | The sea chests are cavities (an opening with protection grid) at the bottom side of the ships' hull (an opening for pumping in and out water for, e.g., ballasting, firefighting) where aquatic organisms may settle and be transported. |
| Tank sediments | Matter settled out of ballast water within a ship. |

2.4 Life form

| | |
|---------------|---|
| Neuston | Organisms that live on (epineuston) or under (hyponeuston) the surface film of water bodies. |
| Zoobenthos | Animals living on or in the seabed. |
| Phytobenthos | Algae and higher plants living on or in the seabed. |
| Zooplankton | Animals living in the water column, unable to maintain their position independent of water movements. |
| Phytoplankton | Microscopic plankton algae and cyanobacteria. |

| | |
|--------------------------|---|
| Benthopelagos | Synonyms: <i>hyperbenthic</i> , <i>benthopelagic</i> , <i>nektobenthic</i> , <i>demersal</i> . An organism living at, in or near the bottom of the sea, but having the ability to swim. |
| Nekton | Actively swimming aquatic organisms able to move independently of water currents. |
| Ectoparasite | Parasites that live on or inside the skin, but not inside the body, feed from the skin, or suck blood |
| Endoparasite | Parasites that live in the tissues or internal organs of the "host" |
| Symbiont (non-parasitic) | An organism living mutually with another species without harming it. Association of two species (symbionts) may be mutually beneficial. |

2.5 Sociability / Life stage

| | |
|------------|---|
| Colonial | Descriptive of organisms produced asexually which remain associated with each other; in many animals, retaining tissue contact with other polyps or zooids as a result of incomplete budding. |
| Gregarious | Organisms living in groups or communities, growing in clusters. |
| Solitary | Living alone, not gregarious. |

2.6 Reproductive frequency

| | |
|-------------|--|
| Iteroparous | Organisms breeding more than once in their lifetime. |
| Semelparous | Organisms breeding once in their lifetime. |

2.7 Reproductive type

| | |
|--------------------|---|
| Asexual | Budding, Fission, Fragmentation, including parthenogenesis. A form of asexual multiplication in which: <ul style="list-style-type: none"> a) a new individual begins life as an outgrowth from the body of the parent. It may then separate to lead an independent existence or remain connected or otherwise associated to form a colonial organism; b) the ovum develops into a new individual without fertilization; c) division of the body into two or more parts each or all of which can grow into new individuals is involved. |
| Self-fertilization | Selfing or autogamy. The union of a male and female gamete produced by the same individual. |
| Sexual | Permanent hermaphrodite, Protandrous hermaphrodite, Protogynous hermaphrodite, Gonochoristic. Capable of producing both ova and spermatozoa either at the same time. A condition of hermaphroditism in plants and animals where male gametes mature and are shed before female gametes mature or vice versa. Having separate sexes. |

2.8 Developmental trait

| | |
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| Brooding | The incubation of eggs either inside or outside the body. Eggs may be brooded to a variety of developmental stages. Males or females may be responsible for brooding. |
| Direct development | A life cycle lacking a larval stage. |
| Spawning | The release of gametes into the water. |
| Lecithotrophy | Development at the expense of internal resources (i.e. yolk) provided by the female. |
| Parental care | Any form of parental behaviour that is likely to increase the fitness of offspring. |
| Planktotrophy | Feeding on plankton. |
| Resting stages | The quiescent stage in the life cycle (dormancy, diapause). |
| Viviparous | Producing live offspring from within parental body. |

2.9 Characteristic feeding method

| | |
|------------------------------|---|
| Chemoautotroph | An organism that obtains metabolic energy by oxidation of inorganic substrates such as sulphur, nitrogen or iron. |
| Deposit feeder – Sub-surface | Synonym: <i>detritivore</i> . An organism feeding on fragmented particulate organic matter in the substratum. |
| Deposit feeder – Surface | Synonym: <i>detritivore</i> . An organism feeding on fragmented particulate organic matter from the surface of the substratum. |
| Grazer | An organism feeding on plants (higher aquatic plants, benthic algae and phytoplankton) and/or sessile animals organisms. |
| Herbivore | An organism feeding on plants (higher aquatic plants, benthic algae and phytoplankton). |
| Mixotroph | An organism both autotrophic and heterotrophic. |
| Omnivore | An organism feeding on mixed diet of plant and animal material. |
| Parasite | Feeding on the tissues, blood or other substances of a host. |
| Photoautotroph | An organism that obtains metabolic energy from light by photosynthesis (e.g. seaweeds, phytoplankton). |
| Planktotroph | An organism feeding on plankton. |
| Predator | An organism that feeds by preying on other organisms, killing them for food. |
| Scavenger | An organism feeding on dead and decaying organic material. |
| Suspension feeder – Active | An organism feeding on particulate organic matter, including plankton, suspended in the water column, collecting it actively by sweeping or pumping (creating feeding currents). |
| Suspension feeder – Passive | An organism feeding on particulate organic matter, including plankton, suspended in the water column, utilizing the natural flow to bring particles in contact with feeding structures. |

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| Symbiont contribution | Where some dietary component(s) are provided by symbiotic organisms (e.g. <i>Anemonia</i> with zooxanthellae). |
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2.10 Mobility

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| Boring | An organism capable of penetrating a solid substrate by mechanical scraping or chemical dissolution. |
| Burrowing | An organism capable of digging in sediment. |
| Crawling | An organism moving slowly along on the substrate. |
| Drifting | An organism whose movement is dependent on wind or water currents. |
| Permanent attachment | Non-motile; permanently attached at the base. Also includes permanent attachment to a host. |
| Swimming | An organism capable of moving through the water by means of fins, limbs or appendages. |
| Temporary attachment | Temporary / sporadic attachment. Attached to a substratum but capable of movement across (or through) it (e.g. <i>Actinia</i>). Also includes temporary attachment to a host. |

2.11 Salinity tolerance range

| | |
|--|------------|
| The exact salinity range if known (psu), else salinity zone(s) according to the Venice system: | |
| 1. Limnetic | [<0.5psu] |
| 2. β -Oligohaline | [0.5-3psu] |
| 3. α -Oligohaline | [3-5psu] |
| 4. β -Mesohaline | [5-10psu] |
| 5. α -Mesohaline | [10-18psu] |
| 6. Polymixohaline | [18-30psu] |
| 7. Euhaline | [30-40psu] |
| 8. Hypersaline | [>40psu] |

2.12 Molecular information

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|--------------------------|
| Available, Not available |
|--------------------------|

2.13 Habitat modifying ability potential

| | |
|-------------------------------|--|
| Autogenic ecosystem engineers | Organisms which change the environment via their own physical structures (i.e. their living and dead tissues) such as corals, oysters, kelps, sea grasses, etc. |
| Allogenic ecosystem engineers | Organisms which modify the environment by causing physical state changes in biotic and abiotic materials that, directly or indirectly, modulate the availability of resources to other species (e.g. excavating deep burrows which other organisms co-occupy, damming the water flow, etc.). |

| | |
|------------------|---|
| Keystone species | A keystone species is crucial in maintaining the organization and diversity of its ecological community, by determining the types and numbers of other species. |
|------------------|---|

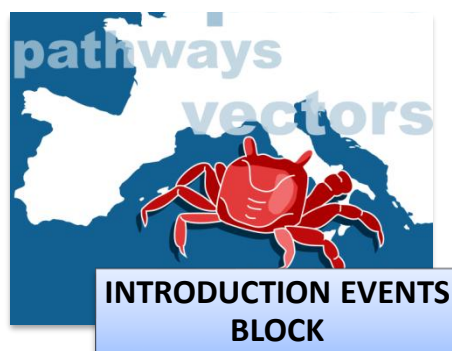
2.14 Toxicity

| | |
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| Poisonous | An organism capable of producing poison that gains entry to another organism body via the gastrointestinal tract, the respiratory tract, or via absorption through intact body layers. |
| Venomous | An organism capable of producing poison, usually injected through another organism intact skin by bite or sting. |
| Not relevant | Neither poisonous nor venomous. |

2.15 Bioaccumulation

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| Natural toxins | An organism that accumulates toxins naturally produced by other organisms, such as phytotoxins, in its tissue. |
| Anthropogenic chemical compounds | An organism that accumulates human-produced chemicals, such as pharmaceuticals, heavy metals, pesticides, dioxins, in its tissues. |
| Unknown | Lack of documented evidence, so far. |

3 DEFINITIONS: INTRODUCTION EVENTS DATA BLOCK



This is the information block where information about a species introduction event in a particular country/country region is being stored.

3.1 Recipient region

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| The country/region for which introduction is recorded (see GEOGRAPHY block). |
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3.2 Date of the first record to the recipient country/country region or smaller location

The date of the first documented record of the species occurrence in a country/country region.

Date fields usage example:

| Date to be specified | Date From | Date To |
|----------------------|-----------|---------|
| Exact 1985 | 1985 | 1985 |
| 18th century | 1701 | 1800 |
| before 1700 | | 1700 |
| after 2001 | 2001 | |

3.3 Pathway / Vector

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| Pathway | A pathway is the route a NIS takes to enter or spread through a non-native ecosystem (e.g. vessels). Each pathway may have a number of vectors. |
| Vector | A vector is a transfer mechanism and is the physical means by which species are transported from one geographic region to another. More than one vector within a pathway may be involved in a transfer of species. |

Pathways and vectors included:

| Pathway | Vector |
|--------------------|--|
| Aquarium trade | <ul style="list-style-type: none"> • Intentional organism release • Transported water • Waste discharge |
| Culture activities | <ul style="list-style-type: none"> • Aquaculture equipment • Associated water & packaging material • Intercontinental stock movement • Regional stock movement • Unintentional release & escapees |
| Leisure activities | <ul style="list-style-type: none"> • Angling catch • Cultural releases • Live bait • Live souvenirs • Sport equipment • Stocking for angling • Waste discharge |
| Live food trade | <ul style="list-style-type: none"> • Intentional organism release • Transported water • Waste discharge |
| Management | <ul style="list-style-type: none"> • Biological habitat management • Construction equipment |

| | |
|--|---|
| | <ul style="list-style-type: none"> • Construction materials • Release for biological control |
| Natural spread from neighbouring countries | <ul style="list-style-type: none"> • Other natural vectors • Water currents |
| Other canals | <ul style="list-style-type: none"> • Canal de Midi (linking the Bay of Biscay with the Mediterranean Sea) • Kiel Canal (linking the North Sea with the Baltic) • Northern waterway (linking the Baltic with the Ponto-Caspian region through Volga river canal system) • Rhone waterway (linking the North Sea with the Mediterranean) • Southern waterway (linking the North Sea with the Black Sea through Danube river canal system) • Central waterway (linking the Baltic Sea with the Black Sea through the Dnieper river canal system) • Other waterways • Irrigation canals |
| Research and education | <ul style="list-style-type: none"> • Gear movement • Intentional releases • Unintentional release & escapees • Waste discharge |
| Suez Canal | |
| Vessels | <ul style="list-style-type: none"> • Anchor and anchor chain • Ballast tank sediments • Ballast water • Ship's hull • Sea chest • Others |
| Wild fisheries | <ul style="list-style-type: none"> • Discard of by-catch • Fishing gear • Live bait release • Live packaging material • Processed live material • Stock movements • Transported water |

3.4 Pathway / Vector – Levels of certainty:

| Level | Criteria | Examples |
|-----------------|--|---|
| Direct evidence | The species was actually found associated with the specific vector(s) of a pathway at the time of introduction to a particular | Documented evidence of an introduction: release to the wild for stocking or biological control; escape/release of live food; import of cultured species and documented findings of their associate organisms, parasites and diseases on transmission; appearance of organisms by hull |

| | | |
|-------------|--|---|
| | locality within a country/country region. | fouling, ballast water discharge sampling or other ship vectors documented upon an arrival with appropriate scientific methods. |
| Very likely | The species appears for the first time in a locality where a single pathway/vector(s) is known to operate and where there is no other explanation that can be argued for its presence except by this likely pathway/vector(s). | A highly localized distribution of a species in an area adjacent to an isolated port or other locality where the only pathway is vessels and its vector(s) (ballast water, hull fouling, etc). This often involves geographically discontinuous distributions. It may be a continuous spread as in case of introduction by canals or by natural means. The conclusion is deduced from the analysis of the introduction event and species distribution patterns. |
| Possible | The species cannot be convincingly ascribed to a single pathway, but is known to be introduced by this pathway(s) elsewhere. | There may be more than one pathway involved in the introduction within a country/country region. Arrival of a species known to have taken place elsewhere by the same pathway(s) which operates in an area. A conclusion is made by expert judgment based on pathways currently or historically present. |
| Unknown | Invasion of a given alien species cannot be clearly explained. | Where no rational explanation for the appearance of a species in a given country/region. |

3.5 Source region

The area the species was introduced from to the recipient country/country region. Depending on the information availability may be ascribed to a particular locality (e.g. port), a country, a LME or a larger Ocean region.

CAUTION: in many cases the source area will be not the same as the area of native origin which is defined in the SPECIES block of the database.

3.6 Zonation

| | |
|---|--|
| Ecological zone(s) occupied by a species throughout its life cycle. | |
| Benthic | |
| • Bathyal | Synonym: <i>continental slope</i> . The seafloor between the edge of the continental shelf and abyssal plain (200-4000 m). |
| • Littoral (benthic) | Synonym: <i>intertidal</i> . The shore between the high and low water marks. |
| • Sublittoral beyond photic zone | Synonym: <i>lower circalittoral</i> . The lower part of the continental shelf, where photosynthesis cannot take place. |
| • Sublittoral within photic zone | Synonyms: <i>subtidal</i> , <i>infralittoral</i> . The shallow part of sublittoral where photosynthesis can occur. |
| • Supralittoral | Synonyms: <i>splash zone</i> , <i>spray zone</i> , <i>supratidal zone</i> . The area above the spring high tide line, subject spray or splash. |
| Pelagic | |

| | |
|----------------------|--|
| • Littoral (pelagic) | Water mass within littoral zone. |
| • Neritic | Water mass above the continental shelf. |
| • Offshore | Synonym: <i>oceanic</i> . Water mass beyond the continental shelf. |

3.7 Habitat type

| | |
|-----------------------------|--|
| Estuary | River mouth, transition zone between riverine and marine environments, subject to influences from both. |
| Lagoon | Shallow, enclosed water body separated from the sea by barrier islands, narrow spit or reefs. |
| Sheltered coastal area | Coastal area partly surrounded by land (e.g., bay, inlet, fjord). |
| Open coast | A coast not sheltered from the sea. |
| Offshore | Areas located at least 50 nautical miles from the shore. |
| Strait/Sound | Channels between the mainland and an island or between two islands which are open at both ends to the open coast (it does not refer to similar features or narrows within marine inlets). |
| Ports* | A location on a coast or shore containing one or more harbours where ships can dock and transfer people or cargo to or from land. |
| Port vicinity* | The area near a port where ballast water operations may occur, including areas where vessels may conduct ballast water discharge or uptake operations when approaching a port or leaving it, e.g., port approaches, anchorage areas and designated ballast water exchange areas. The dimension is port specific. |
| Marina | A specially designed harbour for pleasure craft and small boats. |
| Aquaculture sites | Areas set out for the purpose of farming aquatic organisms. |
| Marine Protected Area (MPA) | Defined marine area where natural resources are given greater protection than the surrounding waters. Different categories exist depending on the level of protection afforded by legislation. |

* If „port“ or „port vicinity“ is selected as a habitat type, the name of the port should be selected from the pre-defined list or entered as a new record. Additionally, AquaNIS will require: 1) indicating the date of the first record of a NIS into the particular port/port vicinity, 2) entering data on NIS population status (including abundance in the particular port/port vicinity when known) in the particular port/port vicinity, and 3) temperature and salinity range for the port/port vicinity.

3.8 Wave exposure

| | |
|--------------|--|
| Exposed | Open coastline facing prevailing wind and receiving both wind-driven waves and swell. |
| Semi exposed | Generally open coasts facing away from prevailing winds or sheltered by offshore reefs/structures. |
| Sheltered | Coasts with a restricted fetch (<20 km) and lacking persistent swell. |

3.9 Salinity range

The exact salinity range if known (psu), else salinity zone(s) according to the Venice system:

1. Limnetic [<0.5 psu]
2. β -Oligohaline [0.5-3psu]
3. α -Oligohaline [3-5psu]
4. β -Mesohaline [5-10psu]
5. α -Mesohaline [10-18psu]
6. Polymixohaline [18-30psu]
7. Euhaline [30-40psu]
8. Hypersaline [>40 psu]

3.10 Temperature range (Min, Max)

Indicate min. and max. annual temperature range in the area where a species is known to maintain an established (reproducing) population.

3.11 Reproductive duration

| | |
|--------|---|
| Long | Breeds in one or more discrete periods, each longer than three months. |
| Medium | Breeds in one or more discrete periods, each longer than a week and less than three months. |
| Short | Breeds in one or more discrete periods within a week. |

3.12 Reproductive seasonality

Select months for a species known to reproduce in the invaded site.

3.13 Migration pattern

| | |
|--------------|--|
| Diurnal | Movements between alternative habitats over day and night, e.g. vertical migration. |
| Life-time | One time migration between different habitats during the life cycle, e.g. anadromus migration. |
| Not relevant | No evidence of any life history cycle stages to migrate. |
| Seasonal | Movements between alternative habitats during a specific time of a year (e.g., spawning and feeding migrations). |

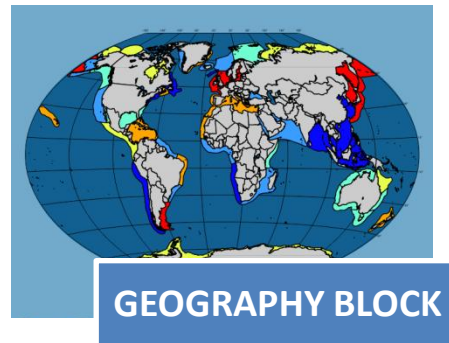
3.14 Population status

| | |
|--------------------------|---|
| Extinct/no recent record | There are old records where a species was recorded but have not been seen in the same region since. |
| Rare/single record | There are only casual observations or a single record of a species' presence available. |
| Common | A species with successfully reproducing populations in an open ecosystem, which are unlikely to be eliminated by man or natural causes. Not dominating native communities. |
| Abundant | A species with successfully reproducing populations in an open ecosystem, which are unlikely to be eliminated by man or natural causes. Locally dominating native communities. |
| Very abundant | A species with successfully reproducing populations in an open ecosystem, which are unlikely to be eliminated by man or natural causes. Largely dominating native communities. |
| Outbreak | A species undergoing pulse-like, short-term (days to few months) exponential population growth during which they have an adverse effect on one or more of the following: biological diversity, ecosystem functioning, socio-economic values and human health. |

3.15 Species status

| | |
|--|---|
| Non-indigenous species | Non-indigenous species (synonyms: <i>alien</i> , <i>exotic</i> , <i>non-native</i> , <i>allochthonous</i> , <i>introduced</i>) are species, subspecies or lower taxa (such as a variety, form) introduced outside of their natural range (past or present) and outside of their natural dispersal potential by a human-mediated vector. Secondary introductions can be transported by human-mediated or natural vectors. Natural shifts in distribution ranges (e.g. due to climate change or dispersal by ocean currents) do not qualify a species as a NIS |
| Cryptogenic | Cryptogenic species are such species which cannot be reliably demonstrated as being either introduced or native. In some cases the true origin of a species remains obscure because of either insufficient taxonomic knowledge or due to a lack of records from the time they became introduced, or for other reasons. |
| Range expanding species (planned) | Species have been gradually expanding their range in recent decades from a neighboring region where they are native. This expansion is likely due to changing environmental conditions, such as poleward extensions, with no clear human involvement. |

4 DEFINITIONS: GEOGRAPHY DATA BLOCK



This is the information block which contains geographical data organized in the hierarchical way (Fig. 3). Geographical data is used for both SPECIES (native origin) and INTRODUCTION EVENTS (recipient region, source region) blocks.

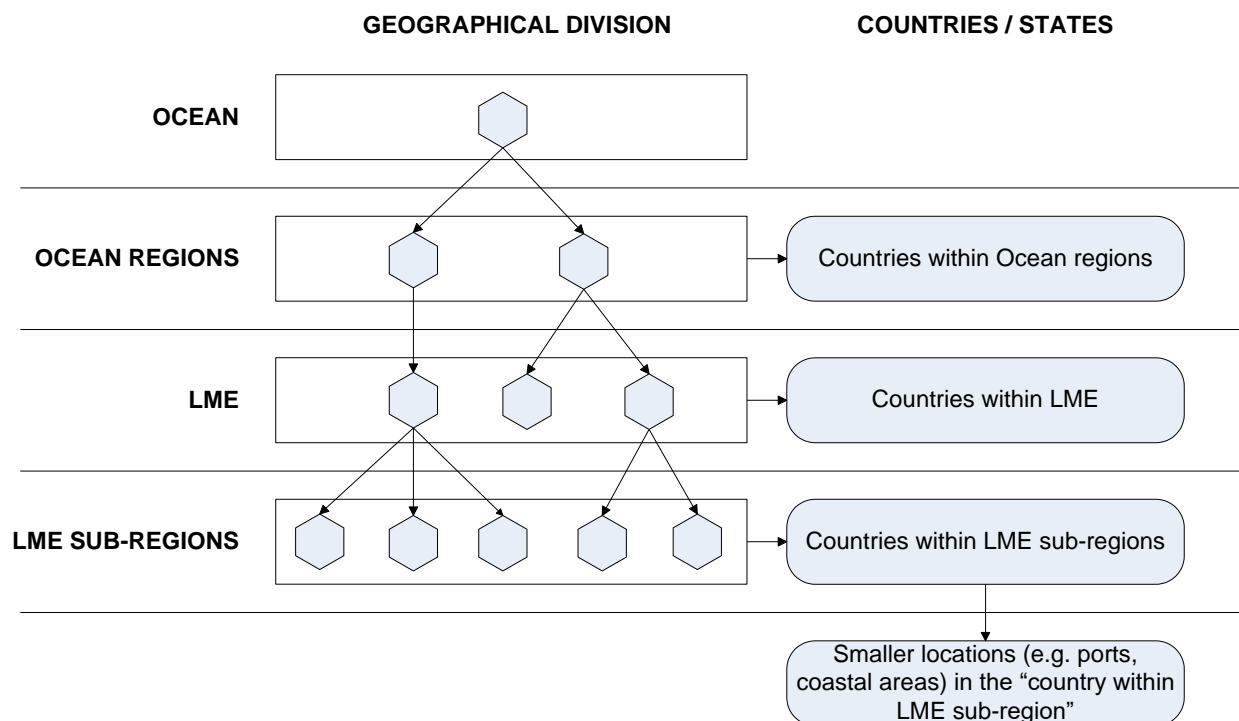


Figure 3. The principal scheme of the GEOGRAPHY block

4.1 Geographical divisions

| | |
|---------------|---|
| Ocean | Arctic, Atlantic, Indian, Pacific, Southern |
| Ocean region* | Arctic ocean: Arctic Eurasian coast; Arctic American cost; Arctic High seas Atlantic ocean: E Tropical Atlantic; NE Atlantic; NW Atlantic; SE Atlantic; SW Atlantic; W Tropical Atlantic |

| | |
|----------------|--|
| | <p>Indian ocean: E Indian Ocean; W Indian Ocean</p> <p>Pacific ocean: C Tropical Pacific; E Tropical Pacific; NE Pacific; NW Pacific; SE Pacific; SW Pacific; W Tropical Pacific</p> <p>Southern ocean (so far not divided into regions)</p> |
| LME | <p>Large Marine Ecosystems (LMEs) are extensive areas of ocean space of approximately 200,000 km² or greater, characterized by distinct hydrographic regimes, submarine topography, productivity, and trophically dependent populations, adjacent to the continents in coastal waters where primary productivity is generally higher than in open ocean areas (<i>sensu</i> Sherman1 1991; Sherman and Alexander, 1986).</p> <p>In total there are 64 LMEs (Large Marine Ecosystems of the World, http://www.lme.noaa.gov/), but additionally the following LMEs were identified to insure better geographical coverage: 30A. Agulhas Current (tropical); 30B. Agulhas Current (temperate); A1. Polynesia, A2. Caspian Sea; A3. Macaronesia; A4. Melanesia; A5. Micronesia.</p> <p>The European LMEs include: Barents Sea (LME 20), Norwegian Sea (LME 21), North Sea (LME 22), Baltic Sea (LME 23), Celtic-Biscay Shelf (LME 24), Iberian coast (LME 25), Mediterranean Sea (LME 26), Black Sea (LME 62) and Caspian Sea (as an additional LME # A2).</p> |
| LME Sub-region | <p>Relatively large, geographically well-defined sea area within an LME (e.g. Adriatic Sea within the LME 26 Mediterranean Sea).</p> |

* Additional large biogeographical provinces may be combined using several LMEs, for example:

- Indo-Pacific, which includes the LMEs of the Tropical part of the Indian Ocean and West Pacific (LME 30A, 31, 32, 33, 34, 45; 35, 36, 37, 38, 39, 40),
- Ponto-Caspian region (as LME 62. Black Sea + A2. Caspian Sea).

The geographical division allows to retrieve information according to Ocean, Ocean region, LME or LME Sub-region.

4.2 Countries/states division

The list of countries is adopted from the UN Population Division's quinquennial estimates and projections (<http://www.un.org/esa/population/>). All European and neighbouring countries, for which introductions are being recorded in the database, are related to relevant LMEs or LME Sub-regions. Such combination (“country + LME” or “country + LME sub-region”) generates the list of country areas (country coasts) within a LME (or a LME sub-region). For example, country “Italy” and LME sub-region “Adriatic Sea” identifies the coast of “Italy within Adriatic sea”. For purposes of more detailed analysis, a division in smaller geographical units is foreseen, e.g. “Italy within Adriatic sea” may be divided into: “Italy within Adriatic sea – Venice Lagoon”, or “Italy within Adriatic sea – Veneto”, or “Italy within Adriatic sea – Puglia”, etc.

The most important LMEs to be analysed within the VECTORS project are listed below:

- North Sea (LME 22)
 - Geographic limit: east = Baltic, north = boundary of LME 21 and 22, south-west = British Channel

- LME 22 sub-regions: no sub-regions
- Baltic Sea (LME 23)
 - Geographic limit: HELCOM Baltic definition (= limit to North Sea, i.e. the Skagerrak excluded which results in Sweden having a North Sea coastline)
 - LME 23 sub-regions: as in Baltic Alien Species Database (<http://www.corpi.ku.lt/nemo/mainnemo.html>)
- Celtic-Biscay Shelf (LME 24)
 - Geographic limit: the area of the North-East Atlantic Ocean including the Celtic Sea, the English Channel and the French coast of the Bay of Biscay. The southern and western boundaries are delimited by the continental shelf, which drops away sharply. The eastern boundary is the borderline to the North Sea: the border between Belgium and the Netherlands to Dover. Three countries, Ireland, UK, and France border this LME.
 - LME 24 sub-regions: 1) Celtic Sea (coasts of Ireland and UK), 2) British Channel (coasts of UK and France), the Bay of Biscay (coast of France). In order to simplify the geographical structure of the database, the area near Brest coast south of Porspoder is included into the Bay of Biscay.
- Iberian coast (LME 25)
 - Geographic limit: a continental shelf region of the NE Atlantic Ocean lying between approximately 36° N (Gulf of Cadiz) and 44° N (Cantabrian Sea) and bordered by Spain (Atlantic coast and the coast of the Bay of Biscay) and Portugal (Atlantic coast).
- Mediterranean Sea (LME 26)
 - Geographic limit: west = Gibraltar Strait, north east = Dardanelles Strait (i.e. Marmara and Black Seas excluded)
 - Divisions: 3, western, eastern Mediterranean Sea and Adriatic Sea.
 Western Mediterranean (inclusive of Spain, France, west coast of Italy from Ventimiglia to Scilla, plus north coast of Sicily from Cariddi to Marsala, Algier and Morocco- and islands within that). Eastern Mediterranean (south-east coast of Sicily from Marsala to Cariddi, south coast of Italy from Scilla to Otranto, Tunisia, Malta, Libya, Egypt, Gaza, Israel, Lebanon, Syria, Turkey, Cyprus, Greece - and islands within that). Adriatic Sea (eastern coast of Italy, from Otranto to Trieste, Slovenia, Croatia, Bosnia-Herzegovina, Montenegro, Albania)