Indicator - Predators in Norwegian Forests

Contents

Description

This indicator reflectes the population sizes (in terms of metabolic biomass) of the main large mammalian predators in Norwegian forests: wolves, bears, bold eagle, and lynx.

ECT-klasse	Geographic extant	Ecosystem	Time series	Last year
B1	Norway	Forets	Yes	2019

Wolf

Private username and password

```
myUser <- "anders.kolstad@nina.no"
myPwd  <- ""
```

Import data from the Norwegian Nature Index.

```
ulv <- NIcalc::importDatasetApi(
  username = myUser,
  password = myPwd,
  indic = "Ulv",
  year = c(1990,2000,2010,2014,2019))
```

Specify the entire land area of Norway as NIunits:

```
myNIunits <- c(allArea = T, parts = T, counties = F)
```

Include all BSunits (municipalities)

```
myPartOfTotal <- 0
```

Storing temp file to save time

```
ulv_assemeble <- NIcalc::assembleNiObject(
  inputData = ulv,
  predefNIunits = myNIunits,
  partOfTotal = myPartOfTotal,
  indexType = "thematic",
  part = "ecosystem",
  total = "terrestrial")
saveRDS(ulv_assemeble, "cache/ulv_assemble.rds")
```

```
ulv_assemeble <- readRDS("cache/ulv_assemble.rds")
```

Extract raw values for expected (i.e. predicted) number of individuals in 2019

```
(wolf2019 <- ulv_assemeble$indicatorValues$'2019')
```

```
##   ICunitId      ICunitName indId indName yearId yearName expectedValue
## 1     3793 Rovviltregion 8   209     Ulv      9     2019           0.0
## 2     3795 Rovviltregion 7   209     Ulv      9     2019           0.0
## 3     3796 Rovviltregion 6   209     Ulv      9     2019           2.8
## 4     3799 Rovviltregion 1   209     Ulv      9     2019           0.0
## 5     3803 Rovviltregion 2   209     Ulv      9     2019           0.5
## 6     3807 Rovviltregion 3   209     Ulv      9     2019           1.1
## 7     3809 Rovviltregion 4   209     Ulv      9     2019          20.3
## 8     3811 Rovviltregion 5   209     Ulv      9     2019          53.5
##   lowerQuantile upperQuantile customDistributionUUID distributionFamilyId
## 1           0.0           0.0                     NA                   NA
## 2           0.0           0.0                     NA                   NA
## 3           1.8           3.4                     NA                   NA
## 4           0.0           0.0                     NA                   NA
## 5           0.2           0.6                     NA                   NA
## 6           0.4           1.3                     NA                   NA
## 7          18.6          21.7                     NA                   NA
## 8          51.0          55.5                     NA                   NA
##   distributionFamilyName distParameter1 distParameter2 customDistribution
## 1          ZIExponential      1.0000000     1.57223995                 NA
## 2          ZIExponential      1.0000000     1.57223995                 NA
## 3              LogNormal      0.9095956     0.47274695                 NA
## 4          ZIExponential      1.0000000     1.57223995                 NA
## 5              LogNormal     -1.0601023     0.83473286                 NA
## 6              LogNormal     -0.3317111     0.90327082                 NA
## 7              LogNormal      3.0015211     0.11430431                 NA
## 8              LogNormal      3.9753094     0.06269794                 NA
##   scalingModelId scalingModel
```

```
## 1              1          Low
## 2              1          Low
## 3              1          Low
## 4              1          Low
## 5              1          Low
## 6              1          Low
## 7              1          Low
## 8              1          Low
```

There are eight values corresponding to the eight data regions.

Then we can get the same for year 2010.

```
wolf2010 <- ulv_assemeble$indicatorValues$'2010'
```

Reference values

We get the reference values in the same way as the expected values. The reference values are based on expert opinion, and is constant for all years.

```
(ref <- ulv_assemeble$referenceValues)
```

```
##   ICunitId      ICunitName indId indName yearId       yearName expectedValue
## 1     3793 Rovviltregion 8   209     Ulv      0 Referanseverdi           528
## 2     3795 Rovviltregion 7   209     Ulv      0 Referanseverdi           248
## 3     3796 Rovviltregion 6   209     Ulv      0 Referanseverdi           412
## 4     3799 Rovviltregion 1   209     Ulv      0 Referanseverdi           287
## 5     3803 Rovviltregion 2   209     Ulv      0 Referanseverdi           287
## 6     3807 Rovviltregion 3   209     Ulv      0 Referanseverdi           163
## 7     3809 Rovviltregion 4   209     Ulv      0 Referanseverdi            44
## 8     3811 Rovviltregion 5   209     Ulv      0 Referanseverdi           202
##   lowerQuantile upperQuantile customDistributionUUID distributionFamilyId
## 1           509           546                     NA                    3
## 2           237           259                     NA                    3
## 3           396           426                     NA                    3
## 4           275           299                     NA                    3
## 5           275           299                     NA                    3
## 6           153           171                     NA                    3
## 7            36            51                     NA                    3
## 8           191           211                     NA                    3
##   distributionFamilyName distParameter1 distParameter2 customDistribution
## 1              LogNormal       6.267603     0.05201855                 NA
## 2            TruncNormal     248.000000    16.30862440                 NA
## 3              LogNormal       6.018471     0.05413959                 NA
## 4            TruncNormal     287.000000    17.79122662                 NA
## 5            TruncNormal     287.000000    17.79122662                 NA
## 6              LogNormal       5.087485     0.08247645                 NA
## 7                  Gamma      44.013234     0.25565576                 NA
## 8              LogNormal       5.303225     0.07383999                 NA
```

Map values to polygons

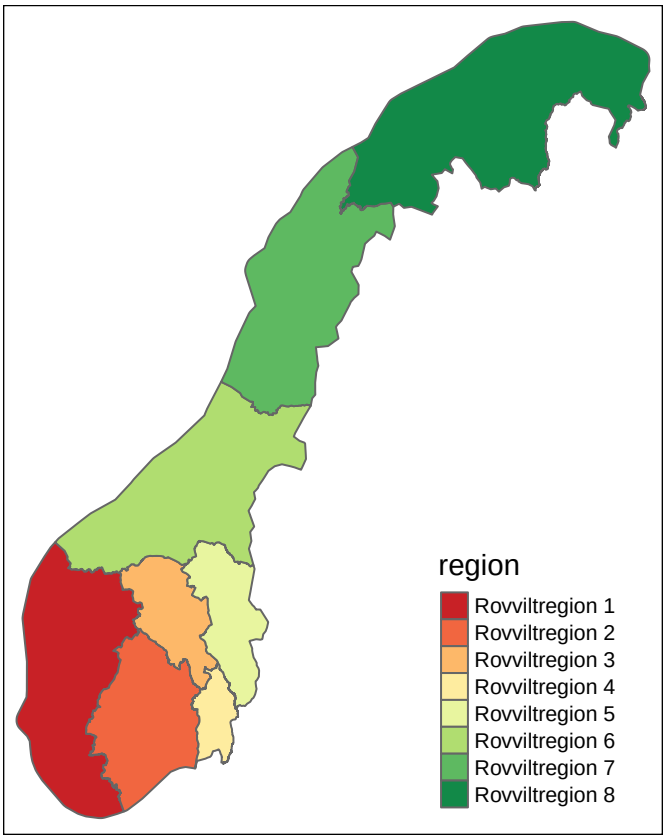
To make these spatially explicit we need the map of the data regions.

Importing data regions

```
rovviltregioner <- sf::st_read("../../data/supportingData/rovviltregioner/rovviltregioner.shp")
```

```
## Reading layer ‘rovviltregioner’ from data source
##   ‘C:\Users\anders.kolstad\Documents\Github\ECA_NF22\data\supportingData\rovviltregioner\rovviltregi
##   using driver ‘ESRI Shapefile’
## Simple feature collection with 8 features and 1 field
## Geometry type: POLYGON
## Dimension:     XY
## Bounding box:  xmin: -99551.17 ymin: 6426048 xmax: 1121938 ymax: 7962743
## Projected CRS: ETRS89 / UTM zone 33N
```

```
tm_shape(rovviltregioner)+
  tm_polygons(col = "region",
              palette = "RdYlGn")
```




```
crs(rovviltregioner)
```

```
## Coordinate Reference System:
```

```
## Deprecated Proj.4 representation:
##  +proj=utm +zone=33 +ellps=GRS80 +towgs84=0,0,0,0,0,0,0 +units=m
## +no_defs
## WKT2 2019 representation:
## PROJCRS["ETRS89 / UTM zone 33N",
##     BASEGEOGCRS["ETRS89",
##         DATUM["European Terrestrial Reference System 1989",
##             ELLIPSOID["GRS 1980",6378137,298.257222101,
##                 LENGTHUNIT["metre",1]]],
##         PRIMEM["Greenwich",0,
##             ANGLEUNIT["degree",0.0174532925199433]],
##         ID["EPSG",4258]],
##     CONVERSION["UTM zone 33N",
##         METHOD["Transverse Mercator",
##             ID["EPSG",9807]],
##         PARAMETER["Latitude of natural origin",0,
##             ANGLEUNIT["degree",0.0174532925199433],
##             ID["EPSG",8801]],
##         PARAMETER["Longitude of natural origin",15,
##             ANGLEUNIT["degree",0.0174532925199433],
##             ID["EPSG",8802]],
##         PARAMETER["Scale factor at natural origin",0.9996,
##             SCALEUNIT["unity",1],
##             ID["EPSG",8805]],
##         PARAMETER["False easting",500000,
##             LENGTHUNIT["metre",1],
##             ID["EPSG",8806]],
##         PARAMETER["False northing",0,
##             LENGTHUNIT["metre",1],
##             ID["EPSG",8807]]],
##     CS[Cartesian,2],
##         AXIS["(E)",east,
##             ORDER[1],
##             LENGTHUNIT["metre",1]],
##         AXIS["(N)",north,
##             ORDER[2],
##             LENGTHUNIT["metre",1]],
##     USAGE[
##         SCOPE["Engineering survey, topographic mapping."],
##         AREA["Europe between 12Â°E and 18Â°E: Austria; Denmark - offshore and offshore; Germany - ons
##         BBOX[46.4,12,84.01,18.01]],
##     ID["EPSG",25833]]
```

This needs to be converted to PROJ.7

```
forestPredadors2019 <- rovviltregioner
forestPredadors2010 <- rovviltregioner
```

```
forestPredadors2019$value     <- wolf2019$expectedValue[match(forestPredadors2019$region, wolf2019$ICuni
forestPredadors2010$value     <- wolf2010$expectedValue[match(forestPredadors2010$region, wolf2010$ICuni

forestPredadors2019$reference <- ref$expectedValue[match(forestPredadors2019$region, ref$ICunitName)]
forestPredadors2010$reference <- ref$expectedValue[match(forestPredadors2010$region, ref$ICunitName)]
```

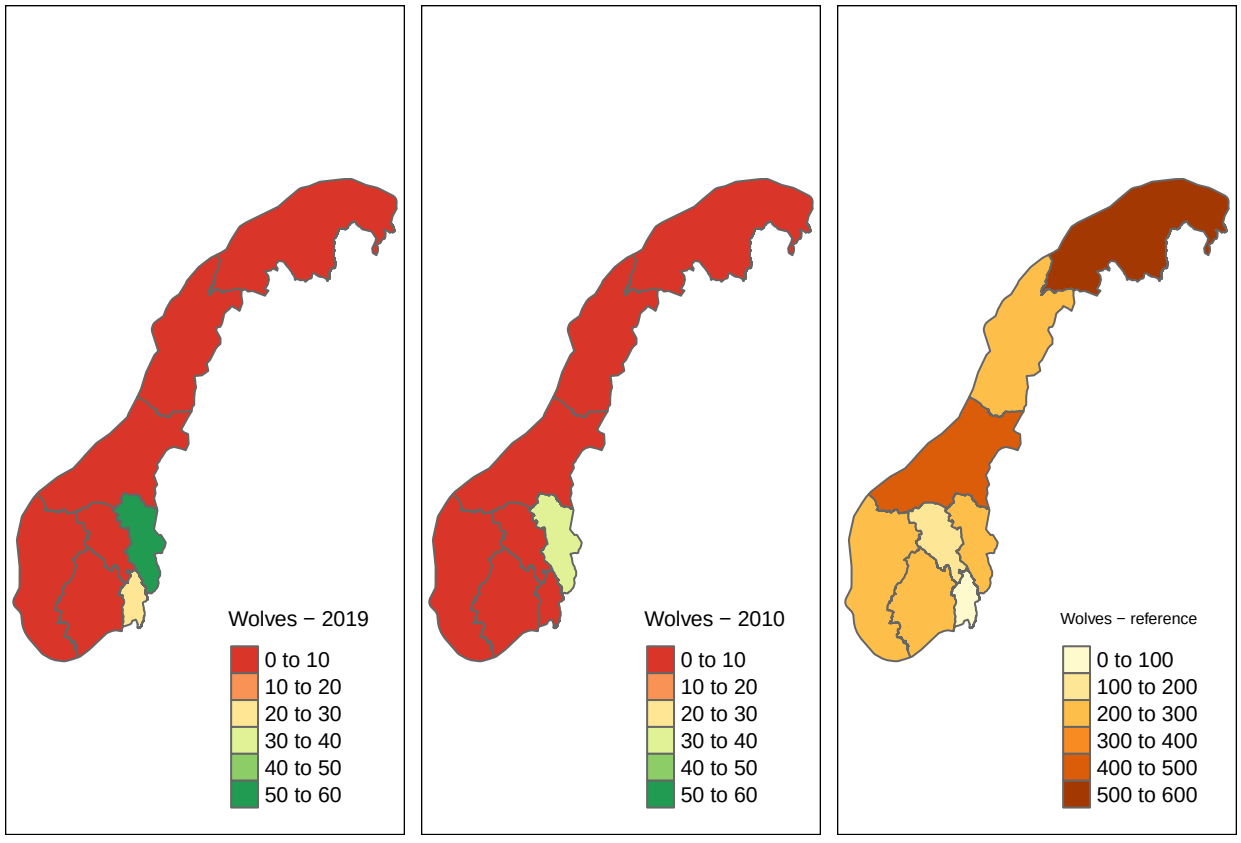
```
values <- tm_shape(forestPredadors2019)+
  tm_polygons(
    title = "Wolves - 2019",
    col = "value",
    palette = "RdYlGn",
    breaks = c(0, 10, 20, 30, 40, 50, 60))

values2 <- tm_shape(forestPredadors2010)+
  tm_polygons(
    title = "Wolves - 2010",
    col = "value",
    palette = "RdYlGn",
    breaks = c(0, 10, 20, 30, 40, 50, 60))

refs <- tm_shape(forestPredadors2019)+
  tm_polygons(
    title = "Wolves - reference",
    col = "reference")

tmap_arrange(values, values2, refs)
```

```
## Some legend labels were too wide. These labels have been resized to 0.66, 0.66, 0.66, 0.66, 0.66. In
```



Export

We will keep the original shape format for as long as possible, but this will later become rasterized.

```
sf::st_write(forestPredadors2019, "../../data/variables/forestPredators2019.shp")
sf::st_write(forestPredadors2010, "../../data/variables/forestPredators2010.shp")
```