7.19 Species distribution

Definition:

(INSPIRE, 2007) Geographical distribution of occurrence of animal and plant species aggregated by grid, region, administrative unit or other analytical unit.

Description:

Pan-European, national or local mapping initiatives, resulting in spatial data for species in terrestrial and marine environments, e.g. for birds, insects, mammals, amphibians, reptiles, fish or vascular plants.

Clarification:

- The definition in INSPIRE Directive proposal does not include individual observations or other point based data, but focuses on aggregated versions of data about geographical distribution of species. Aggregation can be at any level of resolution, e.g. in geographical grid systems divided into 100x100 meter grid or 50x50km grid cells. Possibly also point-based observations and isolines generation between observations should be accepted and included in INSPIRE. Possibly these can be defined as options in the "other analytical unit". Aggregation may also be interpreted not only as space-based aggregation, but time-based aggregation as well.
- Only species are mentioned in the INSPIRE definition. But earlier INSPIRE documents (INPIRE IMS, 2003) mentions both species or species grouped e.g. to families.

Scope, use examples:

Different initiatives aim to get a full coverage of up to date species distribution data at a Pan-European scale, for a major set of mammals, birds, mammals and reptiles, vascular plants, together with similar data for a selection of other organisms important as indicators on environmental quality of air, inland waters, marine environment, soil, habitats.

Digital data sets can be used for conservation and statistical analysis, as the base of research in ecology and biodiversity, applied to the conservation and management of nature. In biodiversity assessment it is essential to have information on species distribution, quantities, development through time. Needed for Natura 2000. Is being documented in sciences and used for identifying biotic diversity within biotic regions or countries, both geographical distribution, changes over time, combination of species in communities and co-variance with environmental factors and ecological qualities. It is being used for planning of protection and management of biodiversity in natural, semi-natural and artificial environments. Users are both governments, professional environmental organisations, but also the practical land and resource managers such as farmers or fishermen. It is of high relevance to commercial exploitation of economic natural resources such as animals and plants living in natural and semi-natural environments, e.g. fisheries of specific species, both in marine and inland waters, hunting, forestry and sea weed harvesting.

The EU's principal instruments for nature conservation are the Birds Directive (1979) and the Habitats Directive (1992). Both Directives are leading to the establishment of the Natura 2000 network of sites.

Variety of different classification systems and levels of detail in mapping.

- Taxonomic references shall respect to the GBIF taxonomic reference. Different EU regulation should refer to this system, but existing EU directives refer to different taxonomic systems.
- Scale: An indication of common mapping scales: from 1: 5000 to 1: 10.000.000
- Community policies: 6EAP, Habitats and Birds Directive, CAP, Fisheries policies etc.

- Initiatives: NATURA2000, OSPAR convention, GBIF, Flora Europaea etc.

Example data:

- **Bird species distribution data:** Distribution of species by grid. Data sets on 440 different breeding birds in Europe have been compiled. Each breeding bird is classified according to its breeding status within 50 km grid squares. European Ornithological Atlas Committee. Mapping the breeding distribution of those European species, obtained through field work.

  Attribute information: presence and absence of each species, possible/probable/conformed/breeding, estimate of number of pairs in square, census period, square identity, survey completeness, altitude, observers, and comments.
  Coverage: Pan-European

- **Plant species distribution data:** A data set containing information upon the presence of plant species in grid squares across Europe.
  Attribute information: species found in each 50 km square, native occurrence, introduction, status unknown, probably extinct, record uncertain
  Coverage: Pan-European. It has taken 25 years to map 20 % of European Vascular plants. By 1999 there were plans of how to speed up the process.

- **Amphibian and reptile species distribution:** Species distribution in 50 km grid squares.
  Attribute information: coded latin name, date of sightings, regular presence of siting, the presence of the species.
  Coverage: Pan-European. Complete for Western Europe, incomplete for East. Europe (?)

- **Fauna Europaea:** A database containing information upon the presence of fauna species in particular states in Europe. Data collected in the most European countries and published in form of web site with the mapping capabilities. Fauna Europaea references differ regulation 865/2006 which is legally binding and founded on the international CITES agreement.
  Coverage: Pan-European

Important feature types and attributes:

Grid cell or area
- Classification system
- Family, scientific name, vernacular name
- Species, scientific name, vernacular name
- Verification date of presence in grid cell/ area
- Period present throughout the year in grid cell or area, (e.g. by start-end dates, listing months, season)
- Function: A sites function for a species, (e.g. migratory, breeding, resting or mating locality)
- Status: threatened, extinct, etc. (IUCN-category)
- Reference to source

Observation point
- Classification system
- Family, scientific name, vernacular name
- Species, scientific name, vernacular name
- Verification date of presence at location
- Period?
- Function?
- Status: threatened, extinct, etc. (IUCN-category)

- Reference to source
- Observation method

Classification/Nomenclature:

- EUNIS. http://eunis.eea.eu.int/
- GBIF, species in general,
- CITES convention,
- FAO system for classification of fishery resources, 3letter code :HER= herring, CAP= ….
- Coding-System for Status has to be defined. The coding system for different species (groups) differs from each other. IUCN classification system for status may be considered.

Links and overlaps with other themes:

- Geographical grid systems
- Habitats and Biotopes
- Biogeographical regions
- Protected sites: Species may sometimes only be registered within certain locations such as protected sites.

Reference documents:

Atlas Flora Europaea: http://www.fmnh.helsinki.fi/english/botany/afe/
http://www.biologie.uni-hamburg.de/b-online/ibc99/IDB/afe.html

Atlas of amphibians and reptiles in Europe: http://www.mnhn.fr/publication/spn/cpn29.html

Common European Chorological Grid Reference System (CGRS) :
http://dataservice.eea.eu.int/dataservice/metadetails.asp?id=625

Eunis: species: http://eunis.eea.eu.int/species.jsp

Eunis taxonomy: http://eunis.eea.eu.int/species-taxonomic-browser.jsp

EuroMed, Fauna Europae, at: http://www.euromed.org.uk/

European Reference grids. Proceedings and recommendations. Proposal for a European Grid Coding System. IES/JRC. http://eusoils.jrc.it/projects/alpsis/Docs/ref_grid_sh_proc_draft.pdf

Fauna Europea data base, at: http://www.faunaeur.org/

Global Biodiversity Information Facility www.gbif.org

LÖBF: OSIRIS-Datenmodell (Germany)

Natura 2000 Interpretation manual.

NATURA 2000: Identification & GIS Classification of Flora Habitants in Significant Reservation Areas: Greece

NATURE-GIS Guidelines: Data Infrastructure for Protected Areas. Editor: Ioannis Kannellopoulos (EC – JRC) with the support of GISIG and the contribution of the NATURE-GIS Partners.

Norwegian feature catalogue contain specification and UML model for biological diversity. URL: http://www.statkart.no/sosi/UMLfullmodell/Bioma/Bioma.htm