



NATURE-GIS USE CASE

Name of the use case:

Ailanthus altissima (Mill.) Swingle (Simaroubaceae) plant distribution monitoring at Velence mountains planned Protection Landscape Area (Hungary)

Submitter information

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Geographical area where the use case takes place:

Lake Velence catchments area – # 54-241 and 54-243 maps by the Hungarian EOTR Map System
(WGS-84 co-ordinates: 47° 12' 52" - 18° 32' 45", 47° 17' 07" - 18° 37' 30")

Describe the use case, write a scenario

The Lake Velence catchments area has a special natural feature. Due to its morphological and biological diversity it conserves significant natural heritage for Hungary. There are several protected areas on the study area, and still some areas with natural or close-to-nature ecological state, that are planned for protection on national or local level. In 1997 the Hungarian Nature Conservation started to develop the National Biodiversity Monitoring System (HBMS), as a national programme for observing biological diversity in Hungary, supervised by the Authority for Nature Conservation of the Ministry of Environment and Water. Since 1994, when the Convention on Biological Diversity (Rio de Janeiro 1992) was ratified in Hungary, and published in Act no. LXXXI of 1995, it is a legal obligation to monitor biological diversity for nature conservation purposes. After elaborating the methodology of the monitoring system, data collection has started and the programme has been running for five years.

Taking into account the extremely large number of species and many habitats, it is simply not feasible to monitor everything everywhere, and this would make no sense either. The following principles were taken into consideration when designing the Hungarian monitoring activities:

- monitoring of the state of protected and threatened natural values,
 - observation of indicators of the general state of the ecosystems in the country,
 - study of direct or indirect effects of certain human intervention or environmental factor.
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Monitoring and long-term observation of biodiversity is not only a requirement of the Convention on Biological Diversity, but it is also a priority task in Europe. Upon accession of Hungary to the European Union, the nature conservation acquis communautaire of the EU, including the so-called Wild Birds and the Habitats Directives, will also be implemented in Hungary. These directives list birds and other animal and plant species, as well as natural habitats of community interests that are in need of conservation measures at the community level. When selecting species and communities for inclusion in the HBMS, these natural values, as well as those of national importance, have been taken into consideration. The main characteristic of the terrestrial ecosystems could be indicated by the vegetation type them. In 1997 the researchers of the Vácrátót Institute of Ecology and Botany of the Hungarian Academy of Sciences developed a classification for the vegetation of Hungary called General National Habitat Classification System (G-NHCS).

A 25 square km large plot of the study area (called O5x5_089; 612555,69-215910,66, 617553,48-216035,64, 612680,76-210912,73, 617678,98-211337,84 by the Hungarian EO Projection System) was selected as a habitat type Monitoring site in Hungary. We mapped the O5x5_089 by the methodology of NHCS on the scale 1:25.000 to estimate it's ecological and nature conservational value.

The mapped area has significant conservation value, but on certain spots the natural ecosystem is endangered by the invasion of *Ailanthus altissima* plant species (tree with Chinese origin). We started to monitor the populations of invasive *Ailanthus altissima* plant species. Hungarian botanists have stockpiled a huge amount of data since the 1800's. Based on this knowledge, populations of rare (and later protected) species have been identified. The monitoring of plant species in addition to the protected ones also focuses on some rapidly dispersing, invasive alien species. The populations are sampled every second, third or fourth year, depending on the rarity or other characteristics of the given population. The most commonly used method is the population size estimation, which can be done by counting or by estimating the cover. Mapping of the range of certain species with a scattered distribution pattern in the country tracks changes in the number of populations. This method is suitable for documenting the sudden advance of invasive species with the supplementary mapping of sample populations. The HBMS has pursued such sampling for four years with the assessment of populations of a total of about 70 plant species until 2001. Of these 70 species the invasive ones are monitored every year along with habitat mapping, while threatened and protected species are surveyed every second or third year.

The result of the user case is planned to be transformed into an education scenario.

Determine which data participates:

Available background data:

Topographic data

- 1:50000 - DTA-50, DDM-10,
- 1:10000 – scanned maps, DEM, Orthophotos,
- 1:2000 & 1:4000 cadastral maps,
- 1:10000 - Protected area maps.

Land Registry Office data

- Property sheets

Available Nature-GIS data:

- land use map,
- habitat map,
- forest-type map,
- soil map,
- micro area map of *Ailanthus altissima* distribution.

Data outside Nature-GIS:

- classified data for internal use (distribution of protected plants),
- map of the Velence mountains planned Protected Landscape Area.

All the data are available in ArcVIEW shape files.

Describe the data model (text, sketch) and objects used (the Features Types)

- topological data model
 - points
 - lines
 - polygons
- attribute data
 - text – nominal data
 - classified data
 - images

The demo will demonstrate the invasion of Ailanthus altissima and highlight the possible endangered habitat/forest types.

The demo does not deal with the conservation management of the infected places due to the lack information.

Based upon your scenario define the client functionalities that will be required in the prototype:

- key generation for the data layers
- operations on the data layers (intersection, coding, converting 3D)
- operations on close and distant neighbours
- buffering
- patch analysis
- visibility studies

How would you build the demo:

Canvas (like shown at the meeting in Luxembourg):

- **Start by searching a place**
- **Compose the map**
- **Save context share/send (context = a set of layers, their portrayal style and a bounding box)**
- **Analyze**
- **Generate a report**
 - Searching the study area on the Lake Velence catchments area
 - Compose map on the distribution of Ailanthus altissima
 - Create 3d shapes by the DEM of the area
 - Create layouts
 - Analyse the Ailanthus altissima distribution by patch analysis
 - Analyse the Ailanthus distribution by infected habitat types, forest types, soil types using buffering method
 - Analyse the potentially endangered habitats in the neighbourhood and on the study area
 - Analyse the visibility of the infected areas
 - Generate report