



LITHUANIAN
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ACTION A4

SCENARIO OF AN ECOLOGICAL NETWORK

LIFE+ Nature project LIFE09NAT/LT/00581

“Development of Pilot Ecological Network through Nature Frame Areas in Southern Lithuania”

1. Introduction to ecological network

The inexorable human use of natural resources has an increasing negative impact on nature, its components and functionality resulting in habitat degradation, destruction and fragmentation as well as in a continuous loss of biological diversity. Protected areas remain as isolated units, situated in a radically changed habitat, probably leading to viability problems over the long term. Therefore the strengthening of ecological coherence and resilience is necessary for the biodiversity conservation and sustainable development. The CBD programme of work on protected areas emphasizes the importance of establishing protected areas in a mosaic of terrestrial and aquatic habitats to facilitate maintenance of ecological processes. Specific activities of the work programme are related to “connecting habitats” e.g. buffer zones around protected areas, corridors and stepping stones.

The ecological network is a model for protecting biological diversity with regard to the negative affecting human use of natural resources. Ecosystems and species threatened by fragmented habitats can be connected with ecological networks, which makes genetic exchange between populations easier and increases the viability of threatened populations.

The ecological network models are mainly based on the ecological theory, primarily MacArthur and Wilson’s equilibrium theory of island biogeography and meta population theory. Main conclusions of these theories are that fragmented and reduced habitats of populations raise their vulnerability and limits their opportunities for dispersal, migration and genetic exchange. Nowadays the ecological coherence at the landscape scale is taken into consideration in conservation approaches.

Most of the models of ecological networks have two main aims

1. to maintain the ecosystem functions in order to protect species and habitats
2. to promote the sustainable use of natural resources in order to reduce the impacts of human activities on biodiversity and/or to increase the biodiversity value of managed landscapes.

Necessary activities of/for ecological networks are:

- to have a focus on conserving biodiversity at the landscape, ecosystem or regional scale
- to maintain or strengthen ecological coherence, primarily through providing for connectivity in fragmented ecosystems
- to ensure that critical areas are buffered from the effects of potentially damaging external activities
- to restore degraded ecosystems where appropriate
- to promote the sustainable use of natural resources in areas of importance to biodiversity conservation

Ecological networks consist of different components/ areas with specific functions depending on their ecological value and their natural conservation potential. These components are:

- core areas, where the conservation of biodiversity, including habitats, is the key function
- buffer zones, which are adjacent to and protect the network from damaging impacts arising from human activities (such as nutrient enrichment from fertiliser drift)
- movement routes/ corridors, which allow species to travel between core areas
- sustainable-use areas with sustainable use of natural resources maintaining most of the ecosystem services

In principle, three types of landscape corridor can be distinguished:

- a linear corridor (such as a hedgerow, forest strip or river)
- “stepping stones”, that is, an array of small patches of habitat that individuals use during movement for shelter, feeding and resting
- various forms of interlinked landscape matrices/ “permeable areas” (with some semi-natural features and/or a sufficiently low intensity of land use) that allow individuals to survive during movement between habitat patches

Ecological networks can positively influence the conditions for the survival of species populations in the fragmented natural areas and human dominated landscapes in Europe because connected isolated habitat patches can increase the viability of local populations. In addition, they allow a suitable and sustainable use of natural resources through the interconnectivity of their physical elements with the landscape and existing social/institutional structures.

Therefore the following activities for creating ecological networks should be taken into consideration:

- protecting remaining semi-natural habitat features, increasing the size of small habitat patches, and maximising habitat condition through appropriate measures and management
- reductions in land use intensity and protecting remaining semi-natural habitat features (through agri-environment schemes) may maintain functional connectivity across landscapes for many species
- the inability of some species to migrate to suitable habitat, leading to local or even national extinction as a result of climate change. For a minority of such species, it could be possible to implement translocation activities to suitable habitat.

The development of ecological networks is a part of European policy (Bern convention, the Habitats Directive, Natura 2000). The networks must ensure complete functionality of Natura 2000 sites and fulfil the requirements described in Article 17 of the Habitats Directive.

2. Situation in Lithuania

Although 50-60 % of whole territory in Lithuania is covered by nature frame, it does not ensure connectivity of the wildlife. The frame covers many natural structures of the landscape such as rivers, lakes, forests etc., being mainly orientated towards a general landscape planning but does not reflect the needs of protected species (Annex IV target species) nor include protected areas within the frame. Therefore the most important sites remain uncovered by the frame. The current frame ensures activity restrictions and gives recommendations aimed on preserving existing landscape structures and increase the natural value of the area, but it not even does not specify how these goals should be achieved and furthermore the foreseen regulations on activities do not fit the needs of the species.

For example, if a natural element is designated as forest, afforestation measures may destroy the nesting sites of reptile species like *Emys orbicularis* and *Lacerta agilis*. This shows the necessity to develop a new ecological network concept offering a way of integrating biodiversity conservation with the usage of land and exploitation of natural resources. In order to create such ecological network in Lithuania areas have to be established in which continued functioning of ecological processes and the viability of species populations within a wider landscape of semi-natural and managed lands are ensured.

3. Scenario of ecological network in Lithuania based on protected reptile species

Umbrella species are species selected for making conservation related decisions, typically because protecting these species indirectly protects the many other species that make up the ecological community of its habitat. The European pond turtle is suitable as umbrella species because the protection of this species and its habitats supports indirectly other amphibian and reptile species having similar habitat requirements.

The LIFE-project is creating corridors between the protected areas and Natura 2000 sites and improves the situation of the target species in the project area as well as the spatial resistance of the project areas for animal migration. Therefore, the project investigates target species' distribution and abundance in the project areas as well as classification of land-use elements and management schemes as basis for the drawing of the ecological network. The network will be developed simultaneously with the action plans as it will be supported by the data and expert recommendations on the habitat restoration and future management measures.

Components of an ecological network in Lithuania based on the requirements of the umbrella species *Emys orbicularis*:

Core areas

Core areas are habitats inhabited by local populations of *Emys orbicularis* consisting of different habitat components for fulfilling the requirements during the whole year e.g. natural and/ or nature-related water bodies for feeding, resting, hiding, mating and hibernation as well as open sunny slopes for nesting.

Water bodies with standing and slow running water are suitable: temporary and permanent ponds (meadow and forest ponds, extensively used cattle ponds), bogs, swamps, mires, shallow zones of lakes, puddles, seasonal flooded meadows and forests e.g. in floodplains, oxbows, shallow areas at river banks, streams, rivulets, (melioration) ditches, channels, etc..

Core areas/ suitable habitats for a populations of *Emys orbicularis* with conservation status/ > 50 individuals should have a total water surface of > 1 ha in spring and early summer. Water bodies should be located in distances < 500 m to each other.

Open sunny slopes with southern exposition and sandy soil are suitable as nesting areas e.g. sandy dry grasslands, edges of forests, clearings, etc..

Core areas/ populations of *Emys orbicularis* should have > 10 different places for nesting (several sites can belong to one nesting area). Nesting sites should be situated in distances > 100 m to the next water body and not close to forest and meadow paths and roads or arable land.

Distances between 2 core areas are most suitable with < 2 km but due to the situation of the landscape and human effects distances with < 5 km are possible if the core areas are well linked with water bodies in between.

Threats in core areas:

- Overgrowth threatens open areas and increase vegetation density and shading which can destroy basking sites in ponds and nesting sites as well as impede migrations for pond changes and nesting, etc.. Areas between habitat components for turtles should not be too dense covered with lower and higher structures (too dense meadows with overgrowth, development of forests in former open areas, etc.).
- Where buffer zones are missing human activities can affect negatively the areas.
- In areas with increasing traffic and future road constructions turtle populations/ habitats will be affected by fragmentation. Therefore turtle migrations for pond changes and nesting should be considered in further regional planning activities e.g. new road constructions outside the turtle core area or creation of compensation areas with new water bodies and/or nesting sites on one side of the road (main part of core area).

Corridors

Three types of landscape corridor are suitable for *Emys orbicularis*:

- linear corridor e.g. shallow areas at river banks, streams, rivulets, (melioration) ditches, channels, etc.
- stepping stones e.g. natural and artificial ponds/ forest and meadow ponds as well as farm and fish ponds, bogs, swamps, mires, lakes, seasonal flooded areas e.g. in floodplains, etc.
- various forms of interlinked landscape matrices/ "permeable areas" (with some semi-natural features and/or a sufficiently low intensity of land use) that allow individuals to survive during movement between habitat patches e.g. apart from natural water bodies additionally artificial/ farm and fish ponds, melioration ditches, extensively used meadows, clearings, etc. can be useful for short-term survival.

Important is that the landscape is kept open for better migration within and between habitats of local populations for improving the connectivity possibilities between local populations.

"Turtle" corridors don't need all components for a whole year round habitat but must have water bodies for shorter and longer stays. Suitable turtle core areas/ local populations have to be connected with digging of new water bodies as well restoration of dried out wetlands (different water bodies in distances < 500 m to each other, maximum distance 2 km) in the corridors, having some structures in the terrestrial habitat in drier areas e.g. shrubs, bushes, hedges, small forest patches as hiding sites during overland migration and as shading places during overland migration on hot days.

Threats in corridors:

- Overgrowth threatens open areas and increase vegetation density which can impede migratory behaviour, etc.. Corridors between core areas should not be too dense covered with lower and higher structures (too dense meadows with overgrowth, development of forests in former open areas, etc.).
- Where buffer zones are missing human activities can affect negatively the areas.
- In areas with increasing traffic and future road constructions corridors between core areas/ local turtle populations as well as the genetic exchange between local populations will be negatively affected. Hence, the necessary individual exchange should be considered in further regional planning activities e.g. road constructions in other areas or with tunnels.

Buffer zones

Buffer zones around core areas and corridors linking core areas are necessary with small human impact and sustainable land use e.g. small scale farming with extensive land use.

Further activities especially for buffer zones and corridors:

- Involving local people in management of buffer zones and corridors e.g. keeping the landscape open with cattle grazing and hay cutting as well as keeping water bodies open e.g. with tree cutting for firewood and clean (no waste disposal, washing activities, etc., no use of fertilisers, pesticides and other agrochemicals in arable land close to ponds).
- Finding agreements with land users with agricultural and forestry practices that all activities will be done with regard to turtle needs and threats.
- Additionally, supporting local farmers in getting compensation/ funds/ agri-environmental schemes for nature-friendly land use practices.