Interreg
EUROPEAN UNION
Danube Transnational Programme
SaveGREEN

Local Cross-sectoral Operational Plans

Annex

Sectoral Impacts and General Threats or Pressures for Connectivity

Association Zarand

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Introduction

Different sectors may impact connectivity in different ways due to their induced changes in land use, land management or by the impact of specific activities, either at present (pressures) or in the foreseeable future (threats).

In a simple categorization, the main types of impacts are related with the reduced capacity of wildlife to move across landscape, either by affecting the structure of the landscape or by affecting the wildlife individuals directly.

The structural connectivity may be affected by barrier effects (physical features that block or impede the movement of individuals) or by the lack or degradation of natural features that favour the movement of individuals.

Functional connectivity may be affected by a wide range of factors that deter the free movement of individuals, such as perturbing factors (noise, light etc.) or induced mortality.

We are presenting a concise list of potential impacts that the main sectors may have on connectivity, as a first reference for the sectoral stakeholders who are not familiar with the concept.

Note: Not all sectors presented below are relevant at present for every pilot site and, therefore, may not be referred to within each of the CSOPs.

1. Transport and other Linear Infrastructure (TLI – roads, railways, navigable channels, waterways, canals, power lines, and pipelines)

Linear transport infrastructure has a major impact on connectivity mainly because of the barrier effect that it creates at landscape level (fragmentation).

The structural alterations of the landscape that create barriers for different species are:

- Land use changes;
- Embankments of roads and railways, channelized water banks, water culverts, on-the-ground pipelines;
- Fences along the motorways or high-speed railways;
- Anti-noise and anti-light panels;
- Traffic separators.

The quality of natural habitats may be impacted by:

- Alteration of the water systems;
- Chemical pollution (during construction, operation phases or accidental);
- Use of herbicides during the maintenance phase;
- Spread of invasive species (during the construction or operation phases);
- Creation of new marginal or verge habitats;
- New attractants – waste dumps, dead animals, light sources.

The disturbances could be represented by:

- Noise and light, visual.

Direct impacts could be represented by:

- Mortality due to traffic kills;
- Mortality during the construction and maintenance phases;
- Mortality by collision and electrocution due to the powerline or electric lines of the railways.

2. Water management

Water systems are important as they represent specific habitats (for aquatic and semi-aquatic species) and create important landscape features for other species (with a variety of functions – landscape features that should be crossed over or could provide guidance, shelter, or stepping stones). We are discussing the main impacts of the sectors on two categories – *water bodies* (rivers, streams, channels and lakes/reservoirs of different sizes) and other *wetlands*.

Water bodies

Structural interventions on water bodies could generate:

- Barriers for longitudinal movement (along the water course) – i.e. dams, sills;
- Barriers for transversal movement (across the water course) – i.e. channelization, intervention on banks;
- Alteration of original natural habitats – i.e. transformation into fisheries, touristic features, ...
- Alteration of natural features through intervention with the typical natural vegetation, beaches, islands;
- Alteration of water beds through extraction of gravel.

The quality of natural habitats could be impacted by:

- Alteration of water quality through pollution, eutrophication, suspended and floating particles, solid waste;
- Alteration of specific flora and fauna – introduction of allochthon and/or invasive species;
- Arson of vegetation.

The disturbances could be represented by:

- Noise and light pollution during management interventions or during water transport and fishing.

Direct impacts could be represented by:

- Intensive fishing or poaching.

Other Wetlands

Structural interventions on wetlands could generate:

- Disappearance of original natural habitats – i.e. transformation into agricultural land through desiccation or into water reservoirs through digging;
- Alteration of original natural habitats – i.e. transformed into fisheries, touristic features;
- Alteration of natural features – intervention with typical natural vegetation.

The quality of natural habitats could be impacted by:

- Alteration of water quality – pollution, eutrophication, solid waste;
- Alteration of specific flora and fauna – introduction of allochthon and/or invasive species;
- Intensive fishing ´or poaching;
- Arson of vegetation.

The disturbances could be represented by:

- Noise and light pollution during management interventions or during water transport and fishing.

Direct impacts could be represented by:

- Intensive fishing or poaching.

3. Agriculture (plant cultivation, husbandry, beekeeping)

Agriculture generates significant "agri-systems" as a result of its complex historical process of land use and land cultivation. The dynamic of agricultural practices may generate different anthropogenic or semi-natural habitats at landscape level that may be beneficial for some groups of species and detrimental for others.

Structural interventions on agricultural land could generate:

- Changes of habitats - i.e. arable land from grasslands or vice-versa;
- Barriers for some species through fencing or building water channels;
- Removing/alteration of natural features – hedgerows, verges, (groups of) trees, patches of natural vegetation (set-asides), small ponds, streams.

The quality of natural habitats could be impacted by:

- Uniformization of large crop areas (monocultures);
- Intensification of cultivation (fertilization, high degree of mechanization, multiple harvests per year, intensive grazing);
- Drainage of land;
- Herbicides, insecticides, pesticides, pollutants (nitrogen inputs);
- Invasive species;
- Hybrid plant species vs pollinator species;
- Arson of vegetation;
- Abandonment and successions of vegetation types - i.e. loss of biodiversity by abandoning traditional haymaking or grazing which impact plant species (i.e. orchids) and insects;
- Grazing with livestock;
- Pollination by domestic bees.

The disturbances could be represented by:

- Noise, light, chemical pollution;
- Fire/field burning;

- New attractants for wildlife (crops, orchards, livestock, livestock carcasses, beehives).

Direct impacts could be represented by:

- Direct killing by machineries;
- Fire/field burning;
- Retaliation due to conflicts with large carnivores;
- Diseases spread by husbandry (including dogs).

4. Forest management

Forest is an important habitat for a wide range of species. Marginal and insular habitats (rock formations, wet areas, grasslands, forest verges etc.) within forest ecosystems are important for biodiversity. Also, tree and shrub vegetation outside the forest ecosystems are critical for many species.

Most structural interventions on forest land are affecting the natural dynamic of the forest ecosystems and are also generating an impact on the quality of natural habitats:

- Changes of habitats (i.e. deforestation or afforestation of grasslands or other non-forested areas);
- Barriers for some species through fencing;
- Complete removal of mature stands (one-off or as the last stage of logging);
- Removing/alteration of natural features: complex vertical structures of arboretums, forest verges, (groups of) veteran trees, patches of "ageing islands", dead wood (standing/on the ground), small wet areas;
- Changes on the water system, including massive floods caused by deforestations.

The quality of natural habitats could also be impacted by:

- Simplification of tree species composition;
- Afforestation with allochthonous species;
- Invasive species;
- Insecticide use.

The disturbances could be represented by:

- Noise, light, chemical pollution;
- Increased accessibility (by forest roads) favours hunting, poaching, tourism, exploitation of secondary forest products.

Direct impacts could be represented by:

- Use of insecticides use;
- Fire;
- Direct killing by machinery, log removal (i.e. eggs, larvae of saproxylic species).

5. Game management, hunting

Game management and hunting may impact directly some mammal and bird species and indirectly others due to changes inflicted in natural habitats either by high densities of game species or by human intervention to favour the target game species and hunting activities.

Structural interventions on hunting areas could generate:

- Barriers for some species through fencing;
- Changes in natural habitats (i.e. caused by overgrazing and browsing of herbivores);
- Changes in the natural habitats caused by anthropogenic intervention (i.e. establishment of artificial feeding fields instead of natural clearings).

The disturbances could be represented by:

- Hunting activities (especially drive hunting);
- Disturbance of native species by target game species (i.e. fallow deer);
- New attractants represented by feeding fields, supplementary food, or carcasses.

Direct impacts could be represented by:

- Killing through hunting, poaching or carnivore/pest control;
- Diseases spread by target game species;
- Conflicts and negative attitude towards wildlife inducted to local farmers, hunters, tourists due to the impact of the target game species.

6. Mineral extraction

Mineral (rock quarries, gravel, peat or coal, oil, gas, metal and other minerals) extraction may represents a major intervention with the landscape and some may be related to the new transport projects (new rock quarries or gravel extraction sites may be opened or extended when a new transport infrastructure is planned in the area; new investment projects may become feasible when access is improved).

Structural interventions related to the extraction of mineral resources generate:

- Replacement/changes of natural habitats (especially for the on-surface extractions), sometimes of large areas;
- Impact on hydrological systems (intensive gravel extraction from main river beds may impact tributaries and the level of water tables)
- Barriers for some species through site fencing.

The quality of natural habitats could be impacted by:

- Massive changes on the local biodiversity;
- Noise, air, soil and water pollution, also through flooding;
- Creation of new habitats;
- Favouring og new or invasive species.

The disturbances could be represented by:

- Noise and light pollution.

Direct impacts could be represented by:

- Mortality caused by machineries;
- Mortality caused by pollution.

7. Other Development sectors i.e. Real estate, Energy production (hydro, solar, wind), Tourism, Waste management, and other Various infrastructure

A series of other sectors have impacts on landscape connectivity as they generate changes in land use, diverse barriers and disturbances. It should be noted that a "snowball effect" is very common – even an initial sustainable investment could lead to a series of developments that may have significant impact on the environment in the end (i.e. the promotion of a tourist attraction in a relatively natural area may generate interest and pressure on extending or building new infrastructure – accommodation facilities, parking lots, ski slopes etc.).

Structural interventions related to other various development sectors generate:

- Replacement/changes of natural habitats;
- Impact on the hydrological systems (catchments, adductions, channelization);
- Barriers for some species through fencing.

The quality of natural habitats could be impacted by:

- Diverse pollutants;
- Favouring of allochthonous or invasive species;
- Creation of new habitats.

The disturbances could be represented by:

- Diverse pollution;
- Habituation of individuals from certain species.

Direct impacts could be represented by:

- Diverse mortality causes.

8. Enabling, supporting, regulation and law enforcement sectors

A series of sectors have the role to accomplish the integration of biodiversity requirements with other sectoral plans or activities, at different levels – from policy and strategy to local implementation.

The most relevant sector in this respect is **Environment** which should safeguard connectivity (as one of its objectives) by protecting species, habitats and corridors in and outside protected areas. It also should enable harmonization of different other sectors through setting the biodiversity-related sectoral objectives and by imposing the avoid-mitigate-compensate approach at project level, as part of environmental assessment processes and procedures.

Other relevant sectors are **Spatial planning** (which should implement a coherent system of regulations adapted to biodiversity requirements at land use planning level) and the institutions from the **Law enforcement** sector.

9. General pressures and threats to connectivity, per main sectors of interest

As part of the process of stakeholder identification, a series of current general pressures and foreseeable threats to connectivity were analysed at the project level, in order to highlight the main sectors of interest.

Table 1. ***Main sectors of interests, linked with pressures (current impacts) or threats (future impacts) on connectivity***

PRESSURES / THREATS	MAIN SECTORS OF INTEREST
1.Increased barrier effect of *new* Transport and other Linear Infrastructure (TLI) projects (roads, railways, navigable channels, waterways, canals, power lines, and pipelines)	**TRANSPORT (various),** SPATIAL PLANNING, ENVIRONMENT
2. Barrier effect of the *existing* Transport and other Linear Infrastructure (TLI) (including increasing barrier effect caused by structural interventions: maintenance or upgrading) within the same category/class of roads, railways, navigable channels, waterways, canals, power lines, and pipelines)	**TRANSPORT (various)**, ENVIRONMENT
3.Wildlife mortalities associated with operation of transport linear infrastructure	**TRANSPORT (various)**, ENVIRONMENT
4. Reduced landscape permeability caused by changes in land use (towards a less-permeable land use category)	**AGRICULTURE, FOREST MANAGEMENT, WATER MANAGEMENT, MINERAL EXTRACTION, DEVELOPMENT**,

	ENERGY PRODUCTION[1]**,** ENVIRONMENT, SPATIAL PLANNING
5a. Reduced landscape permeability caused by land management – *through fencing*	**AGRICULTURE,** **FOREST MANAGEMENT,** **GAME MANAGEMENT,** **DEVELOPMENT,** ENERGY PRODUCTION[1], ENVIRONMENT, SPATIAL PLANNING
5b. Reduced landscape permeability caused by land management – *through changes in vegetation or crop type/category*	**AGRICULTURE,** **FOREST MANAGEMENT,** **WATER MANAGEMENT,** ENVIRONMENT, SPATIAL PLANNING
5c. Reduced landscape permeability caused by land management – *through degradation of natural habitats*	**AGRICULTURE,** **FOREST MANAGEMENT,** **WATER MANAGEMENT,** **TRANSPORT (various),** **MINERAL EXTRACTION,** **DEVELOPMENT,**

[1] Solar panels, wind farms

	ENVIRONMENT, LAW ENFORCEMENT
6a. Reduced landscape permeability caused by <u>other anthropogenic activities</u> – game management	**GAME MANAGEMENT**, ENVIRONMENT, LAW ENFORCEMENT
6b. Reduced landscape permeability caused by <u>other anthropogenic activities</u> – human-wildlife conflicts	**GAME MANAGEMENT,** **AGRICULTURE,** **DEVELOPMENT,** **WASTE MANAGEMENT,** **FOREST MANAGEMENT,** TOURISM, TRANSPORT (various), ENVIRONMENT, LAW ENFORCEMENT
7. <u>Lack of coherent monitoring at landscape level and adaptation of solutions</u>	**ALL**
8. <u>Reduced support from stakeholders</u> at landscape level for an integrated ecosystemic approach	**ALL**