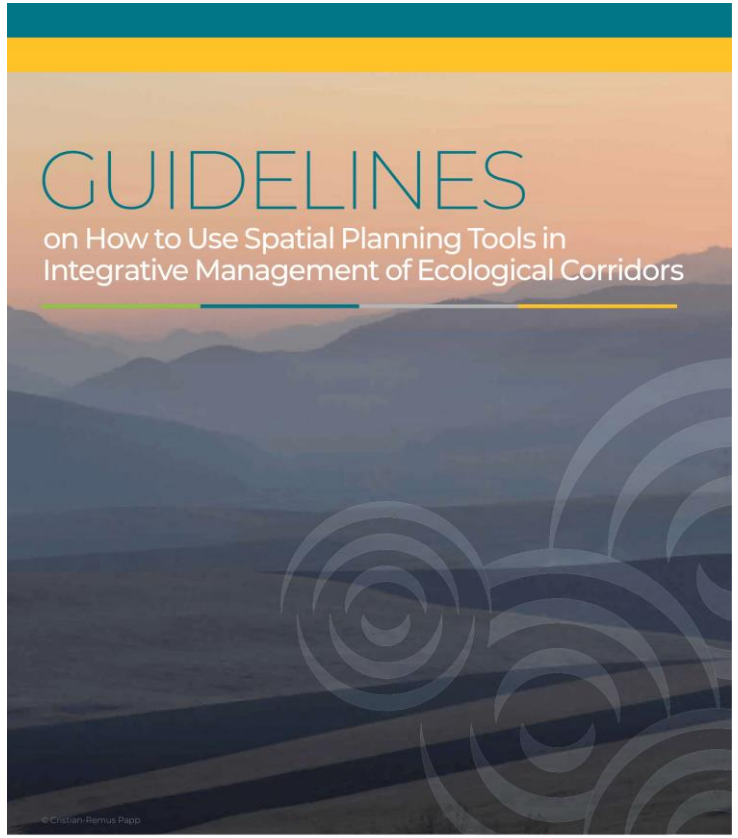
ConnectGREEN project

"Restoring and managing ecological corridors in mountains as the green infrastructure in the Danube basin"

Guidelines on How to Use Spatial Planning Tools in Integrative Management of Ecological Corridors



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Visegrad, 29th September 2021

ConnectGREEN project – Title/Aim: "Restoring and managing ecological corridors in mountains as the green infrastructure in the Danube basin"

What is needed?	Tools in the project
political will/support to prioritize the nature protection and in particular connectivity protection	development of strategic documents that will be accepted on the level of the Carpathian Convention
bullet-proof data and arguments from nature protection managers in respect to the needs of the connectivity protection	development and adoption of the Methodology for identification of ecological corridors in the Carpathian countries by using large carnivores as umbrella species
harmonization of interests of spatial development and nature protection	development of a Guideline for harmonizing the interests between nature conservation and different land uses

Project co-funded by the European Regional Development Fund (ERDF).

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Guidelines on How to Use Spatial Planning Tools in Integrative Management of Ecological Corridors

The objective

to clarify how and where the aspects of the ecosystems` inter-connectivity and wildlife can be supported in the management process of comprehensive spatial/land-use development in ecological corridors.

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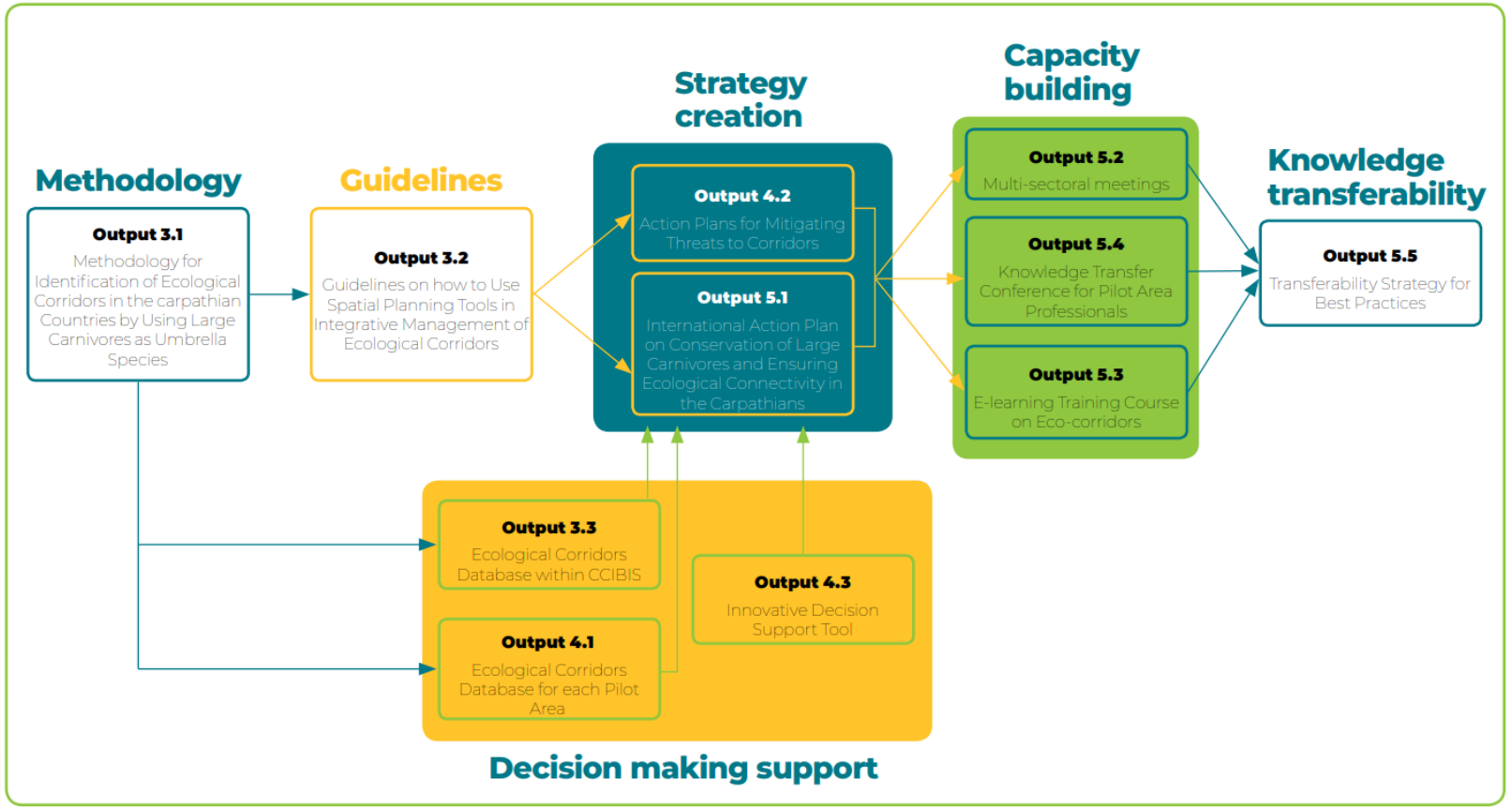
Relation of the Guidelines to the other ConnectGREEN Project Outputs



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Main conflicts in ecological corridors

Drastic changes in a large scale are taking place influencing ecological connectivity in a non-reversible way

- Privatisation and fragmentation of land (e.g. large scale fencing)
- Developing road infrastructure and urbanisation
- Unsustainable development of tourism and recreational facilities

Key threats to biodiversity in the Carpathian region

- Fragmentation of landscape
- Human-wildlife conflicts
- Conflicting strategies, plans and policies
- Capacity for landscape scale conservation (human resources, funding)
- Poaching
- Socio-economic decline
- Lack of awareness of landscape and values

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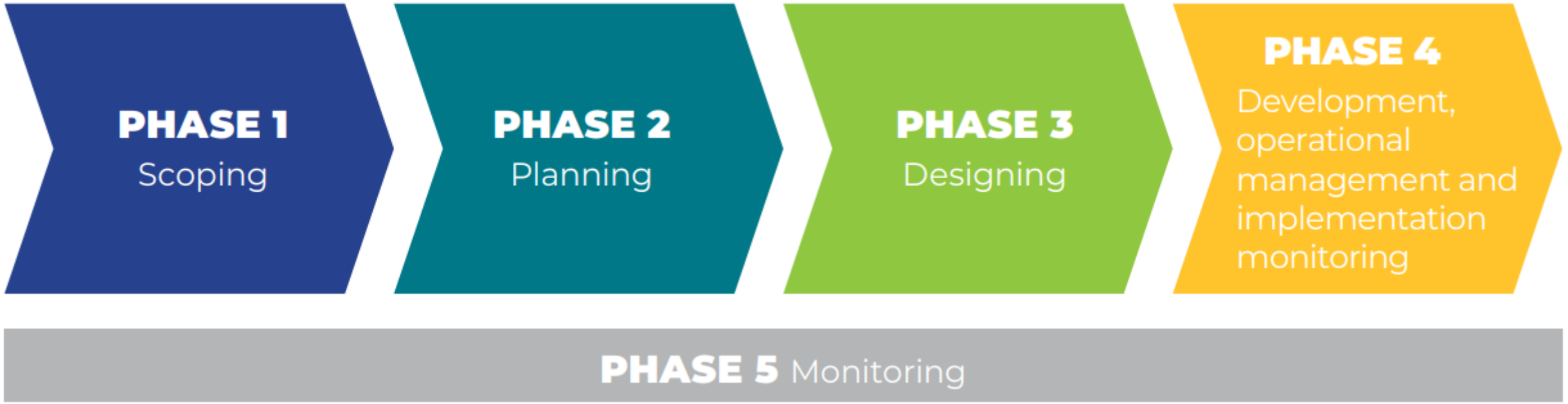
Importance of spatial planning and land-use management

The most efficient way to avoid or minimize the conflicts and negative effects of human activities on nature and wildlife is to reflect the needs to protect the biodiversity, wildlife and the life preconditions for natural ecosystems, including their connectivity in a proactive approach in each step of spatial/land-use development management, but especially in the planning phase.

The effects of the spatial/land-use development on eco-connectivity and potentials for their minimizing differ depending on:

- Spatial organisation, modes, forms and intensity of land-use and linked infrastructure (transport infrastructure, water, energy, waste management infrastructure etc.)
  - Functional use of land
  - Land cover / built-up structures
  - Infrastructure systems
  - Functional ties and external impacts
- Landscape contexts
  - Types and resilience (incl. health conditions) of ecosystems
  - Species presence
  - Landscape features, land cover, modes of land-use

The ecosystems sustainability management as a part of the process of spatial planning, development, land-use and infrastructure operation



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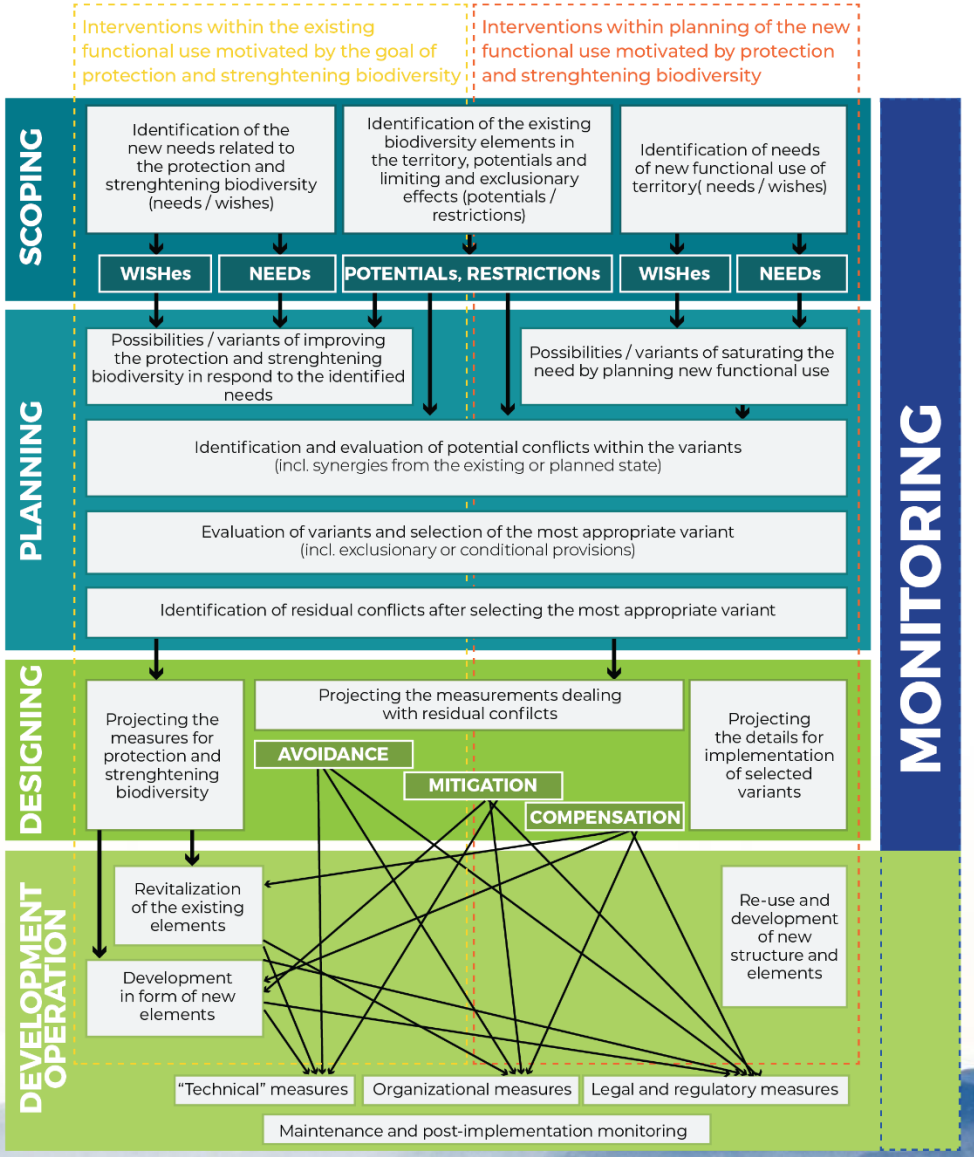
The ecosystems sustainability management as a part of the process of spatial planning, development, land-use and infrastructure operation



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The ecosystems sustainability management as a part of the process of spatial planning, development, land-use and infrastructure operation

What?

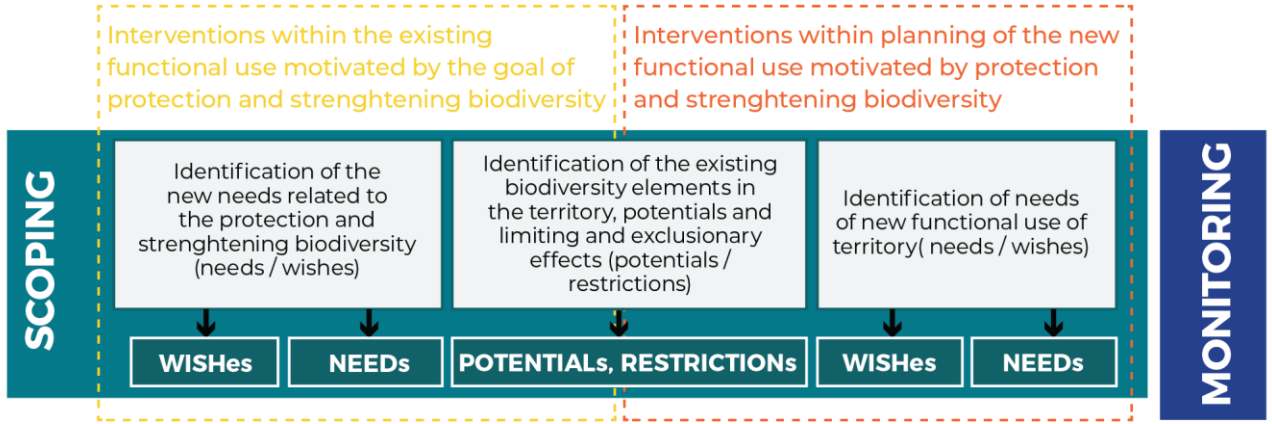
- What are the needs for improvement and challenges for future development/evolution of natural ecosystems under current land-use/ spatial arrangement of the territory?
- What are the demands on new land-use/spatial organisation resulting from the current and expected social and economic development?
- What are the potentials, limitations, and restrictions for covering the demands?

Where?

- Where in the territory are the needs for improvement interventions identified and where are the potentials to cover the demands?

How?

- How is it possible to cover the demands in the most efficient and sustainable way? (best practice)



Project co-funded by the European Regional Development Fund (ERDF).

The ecosystems sustainability management as a part of the process of spatial planning, development, land-use and infrastructure operation

What?

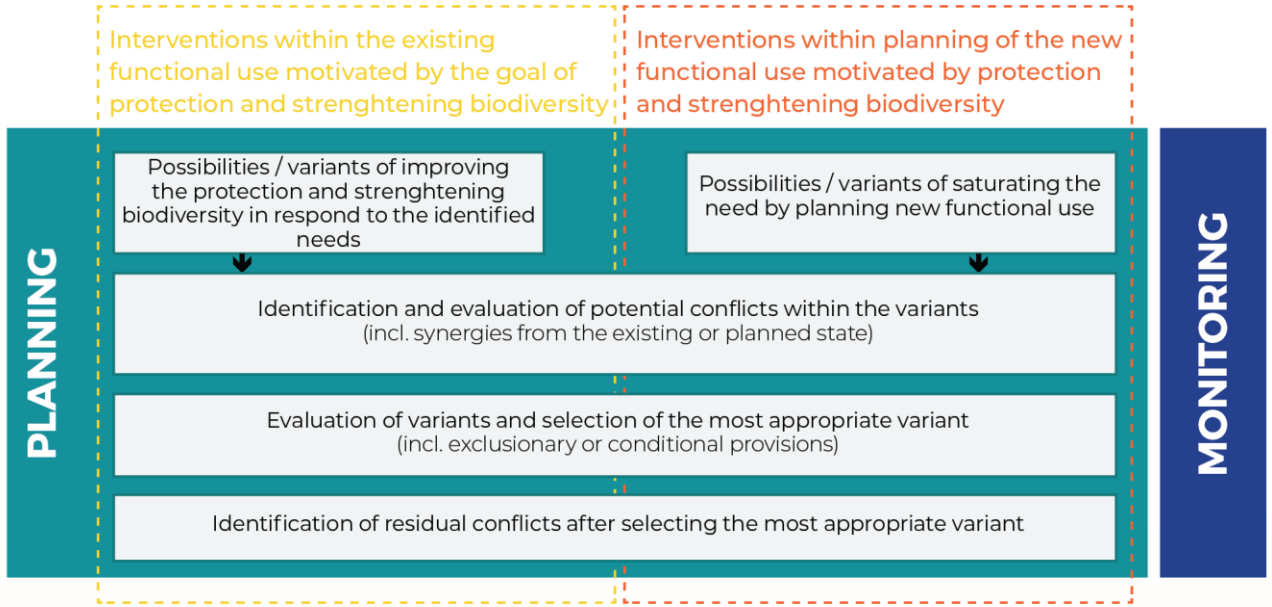
- What are the alternatives/variants of responses to identified demands in the territory?
- What are the expected conflicts linked to particular alternatives/variants with a special focus on conflicts in land-use/spatial organisation and sustainability of ecosystem?

Where?

- Where to locate interventions?
- Where to locate the mitigation/compensation measures?

How?

- How is it possible to cover the identified demand in the most efficient and sustainable way with minimum conflicts?/ how to avoid conflicts? (which alternative/ variant under which conditions)?
- How to mitigate and compensate for residual conflicts?



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The ecosystems sustainability management as a part of the process of spatial planning, development, land-use and infrastructure operation

What?

- What particular interventions are needed to avoid/mitigate/compensate for residual conflicts linked with the implementation of the chosen alternative/variant of the response to identified demands/needs?
- What resources are necessary to be activated in order to implement the proposed interventions?

Where?

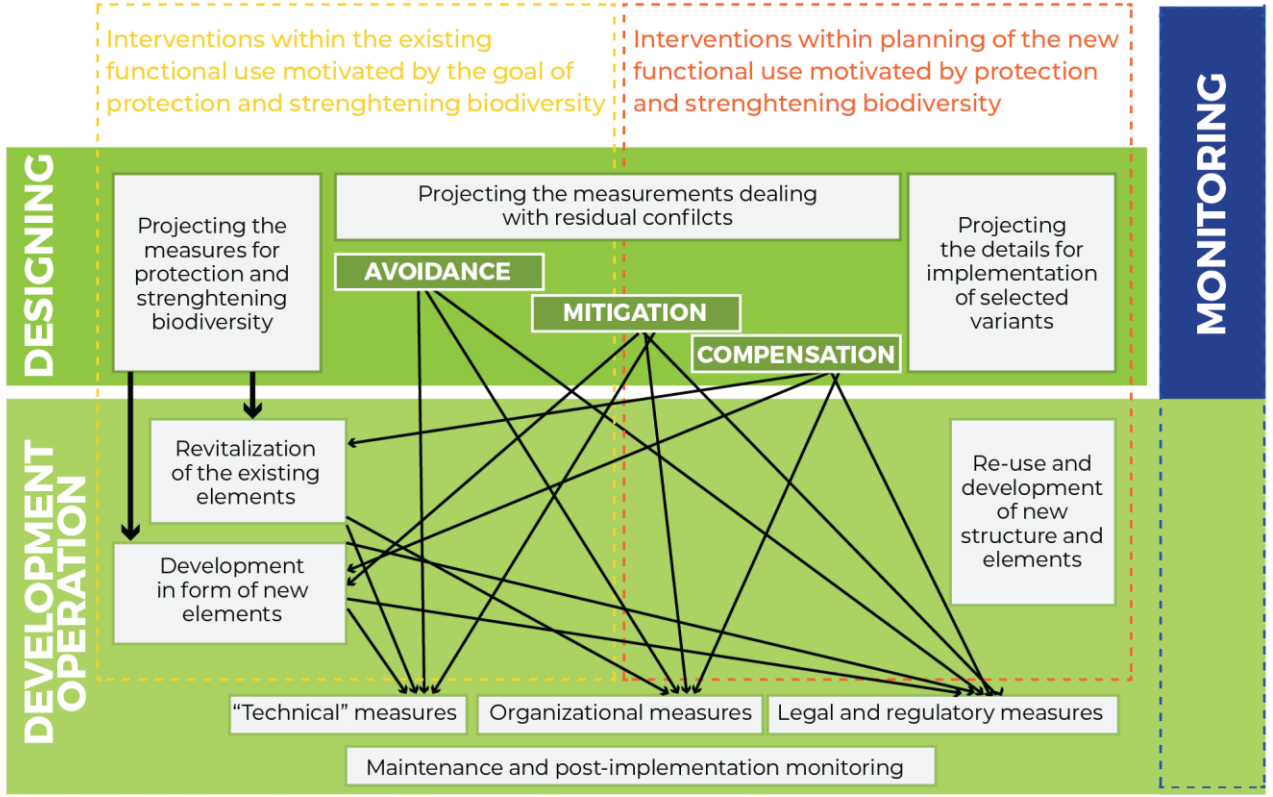
- Where should the proposed interventions be implemented?

How?

- How should the proposed interventions, their timing, extend, content, technologies, preconditions be implemented?
- How should the proposed interventions be combined so as to achieve the expected effects and their synergy?

Who?

- Who will be responsible, collaborating, affected by the implementation of the proposed particular interventions?
- Who will coordinate the implementation process?



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The ecosystems sustainability management as a part of the process of spatial planning, development, land-use and infrastructure operation

What?

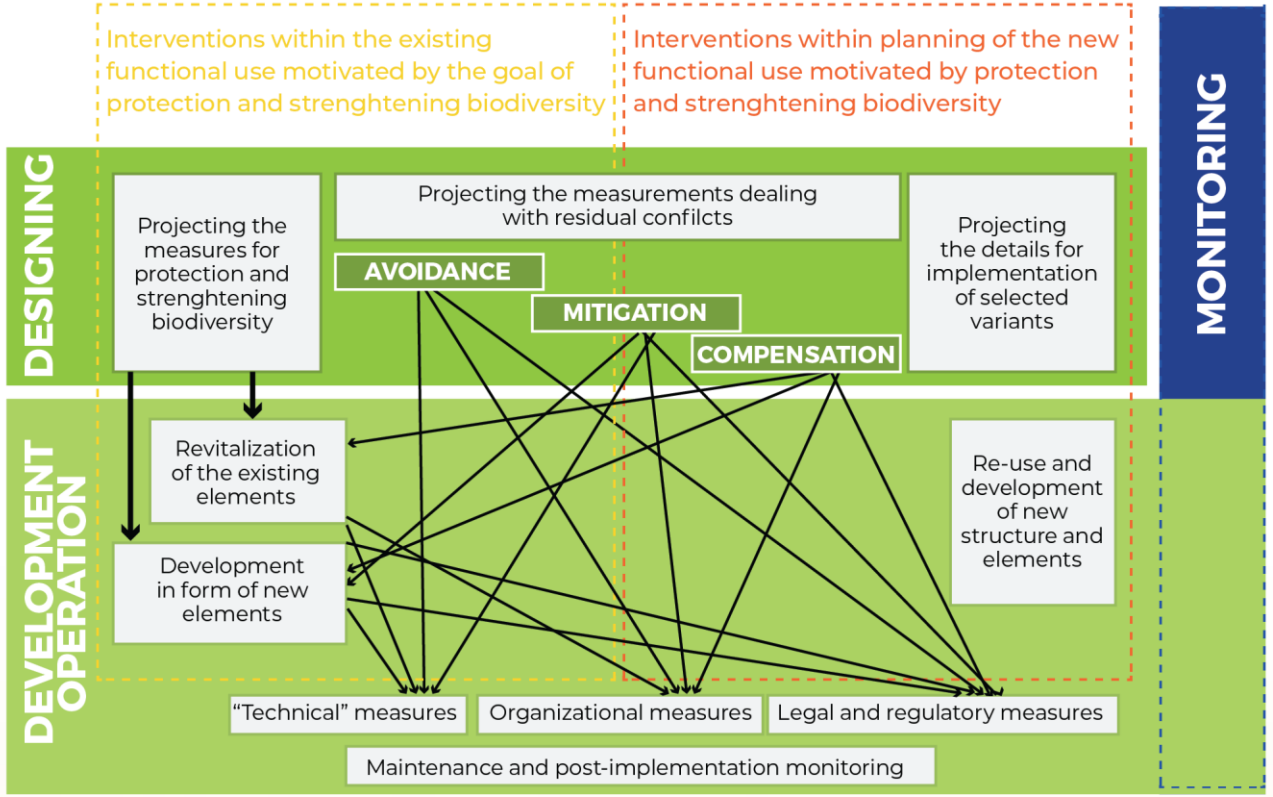
- What are the achieved effects of the development and to which extent they meet the expectation?
- What are the side effects of the development?

Where?

- Where should be the proposed corrective interventions implemented?

How?

- How is it necessary to react to the monitoring outputs by corrective interventions of operational management?
- How is it necessary to react to the monitoring outputs by modification of land-use/spatial development plans?



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The ecosystems sustainability management as a part of the process of spatial planning, development, land-use and infrastructure operation

Challenge / problem	Planning approaches / methods / instruments
Conflicts between (existing, demanded) functional land-use or mode of land-use/ spatial organisation and ecosystems` sustainability protection	Planning instruments: Organisational principles of land-use » Organisational principles of land-use » Land-use plan (1:5 000 – 1: 10 000) » Spatial development plan (1:50 000) » Landscape plan » Land-use/structural (3D) organisation Conservation methods & approaches: » Legal processes supporting protection » Specific nature protection documentation » Preserved/protected areas » Migration study » Concept of ecosystem services » Areas with land-use limitations
Assessment/comparison of benefits resulting from respective land-use/ spatial organisation for particular beneficiaries and their values for society, identification of public interest and cost/ benefit balance in relation to particular stakeholders	» Assessment and evaluation (incl. methods e.g. the SWOT analysis) » Legal processes supporting protection » Subsidies, payments for owners` limitation due to public interest
Ecosystems degradation/ devastation by overstepping carrying capacity of the territory	» Areas with the land-use limitations » Restrictions/penalties
Ecosystem degradation or resilience lowering due externalities (climate change, explosion to the imissions e.g. noise, pollutions etc.)	» Areas with the land-use limitations » Change in land-use » Land-use plan (1:5 000 – 1:10 000) » Spatial development plan (1:50 000) » Landscape plan » Eco-barriers » Landscape vegetation adjustments » Change of the mode of agricultural land-use » Splitting large plots of arable land by planting lanes of vegetation » Noise/Visual/Light barriers (e.g. walls, embankments) » Upgrading existing critical elements of ecosystems
(Existing, potential) functional radiation into surrounding area with ecosystems	» Land-use plan (1:5 000 – 1:10 000) » Spatial development plan (1:50 000) » Areas with the land-use limitations » Change in land-use » Eco-barriers
Landscape connectivity/fragmentation (existing, potential)	» Land-use plan (1:5 000 – 1:10 000) » Landscape plan » Eco-connectivity concept (habitat, landscape, ecological) » Bridges, tunnels, underpasses » Fauna Passages » Placement of a spare/replacement habitat » Removing of fences and other barriers » Protected landscape sub-systems and their elements » Areas with the land-use limitations » Change in land-use » Landscape vegetation adjustments » Upgrading existing critical elements of ecosystems » Landscape water regime management

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UN environment programme

CARPATHIAN CONVENTION

CNPA

Interreg CENTRAL EUROPE
Centralparks

CEEweb for Biodiversity

WWF

Restrictive financial land-use instruments

Brief description:
Deforestation and carbon-intensive agriculture contribute almost a quarter of all global greenhouse gas emissions, making land-use and land-use change one of the most important targets for emission reductions in the fight against climate change. In turn, climate change is harming forests. If tropical forests are to survive, then existing agricultural lands must become more productive. Financial farming and forestry techniques could halt the expansion of the agricultural frontier and, at the same time, enhance productivity to yield more from the same area. Governments can use basic financial instruments to channel greater investment in this area such as:
- Systems that directly or indirectly incentivize forest conservation, sustainable land use, and afforestation/ reforestation. Credit to farmers that bring proof of environmental and legal compliance with local legislation and with the conditions established by the program;
- Regulations, norms and standards, land-use restrictions, disallow certain types of activities in designated places through a planning process (e.g. logging bans etc.);
- Tax reform: tax credits, preferential tax treatment, environmental taxes: Reduce applicable tax for preferential investments and activities, increase taxes for activities that are not in line with government priorities;
- Require certification of technologies or outcomes. Performance-based standards prescribe a certain outcome (e.g., zero net emissions);
- Establishment and management of protected areas on public lands;
- Environmental taxes and user fees (e.g., water user fees), targeted subsidies, results-based payments, land-use regulations, restrictions etc.

Type of measure: *legal, economic*
Involved sectors: *land-use, agriculture, forestry, nature protection*
Dominant stakeholder: *users of the land (farmers etc)*
Involved stakeholders: *public authority responsible for nature protection and land-use planning*
Addressed problem: *deforestation, increasing food demands, deterioration of the natural environment*

Impacts:

Impacts	Targeted	Accompanying
Preservation of ecosystems	x	
Strengthening of condition		
Connectivity improvement		
Connectivity establishment		
Mitigation of environmental damages	x	
Removal of ecological loads		
Biodiversity improvement		x
Biotope fragmentation reduction		
Conflicts mitigation	x	
Reduction of pressure on ecosystems	x	
Economic and social harmonisation		x
Improving the maintenance		

Another targeted impacts: environmentally sustainable land use
Another accompanying impacts:

Additional information
Impact scope (scale):
☐ Local (less than 1 hectar)
☒ Area impact (more than 1 hectar)
☐ Linear
In what phase of project was it implemented?
☒ Scoping
☐ Planning
☐ Design
☐ Development, operational management and monitoring

Further information on example:
https://winrock.org/wp-content/uploads/2016/05/Winrock-FinancingLandUseMitigation_7-22-2015.pdf
https://www.globalcanopy.org/sites/default/files/documents/resources/Incentives%20to%20save%20the%20forest-web_1.pdf

Example: Land-use restrictions: logging bans - state-owned forests

Location: China, including the upper reaches of the Yangtze River and the middle and upper reaches of the Yellow River
GPS Coordinates: 31° 13' 2.997703" N, 109° 33' 20.390625" E, 36° 6' 3.4996843" N, 116° 5' 49.9454498" E
Measure ID: 02
Time of realization: 1998-present
Reported by: Michaela Högyevá
Reported: 03.11.2020
Resources:
https://www.bvrd-trends.org/wp-content/uploads/Imported/china-logging-ban-in-natural-forests-final-3-14-2016-pdf.pdf
https://www.pnas.org/content/105/28/9477

Figure 1. The Project Area of the Natural Forest Protection Program

Eco-barriers

Brief description:
To learn more about the need for wildlife fencing, one simply needs to picture the image of a dead fawn curled up alongside a fence. However, livestock fences present a real issue for wildlife. The direct result can be mortality or injury to individuals. The indirect result can be fragmentation of fish and wildlife habitat, putting populations at risk and increasing stress on ecosystem services. Recognizing the movement needs for species, fish and wildlife is essential. Providing habitat connectivity is a primary management strategy to maintain species and ecosystem services under a changing climate. Many species rely on the ability to move throughout the landscape to fulfil their needs for survival or complete their life cycles. For this reason, it is necessary to adapt eco-barriers as much as possible to the conditions necessary for wildlife, whether aquatic or terrestrial.
Barriers can present a significant hazard to wildlife. It can disrupt migration, separate herds and even kill wildlife. Fortunately, wildlife friendly eco-barriers present an alternative that helps contain livestock while also not presenting a mortal threat to wildlife. The ideal wildlife friendly fence should allow relatively free passage for animals to jump over and crawl under and be highly visible for both ungulates and birds. Some of the specifics of wildlife friendly fencing are relatively straightforward. An eco-barrier will give animals a much better chance to get over or under it. Properly designed, installed, and maintained livestock fences can save wildlife.

Type of measure: technical
Involved sectors: *nature protection, agriculture, farming*
Dominant stakeholder: *investor*
Involved stakeholders: *public authority responsible for nature protection, agriculture and land-use*
Addressed problem: *eco-barriers*

Impacts

Impacts	Targeted	Accompanying
Preservation	X	
Strengthening of condition		
Connectivity improvement		X
Connectivity establishment	X	
Mitigation of environmental damages	X	
Removal of ecological loads		
Biodiversity improvement	X	
Biotope fragmentation reduction	X	
Transport security		X
Reduction of roadkills		X
Decreasing economic damages		X
Improving the maintenance		

Another targeted impacts:
Another accompanying impacts:

Additional information
Impact scope (scale):
☐ Local (less than 1 hectar)
☐ Area impact (more than 1 hectar)
☒ Linear
In what phase of project was it implemented?
☐ Scoping
☒ Planning
☐ Design
☐ Development, operational management and monitoring

Further information:
https://www.oregonconservationstrategy.org/key-conservation-issue/barriers-to-animal-movement/
https://www.dropbox.com/s/3uqd26kmkv8pxl0/MT%20Fencing%20Guide.pdf?dl=0

Example: Building fences with wildlife in mind

Location: Montana, *U.S.*
GPS Coordinates: not specified
Measure ID: 38
Time of realization: 2008
Reported by: Ágnes Agócsová
Reported: 11/2020
Resources:
Paige, Christine. "A Landowner's Guide to Wildlife Friendly Fences." Wildlife Resource Program, Montana Fish, Wildlife and Parks. Helena, MT. 2008.
https://www.dropbox.com/s/3uqd26kmkv8pxl0/MT%20Fencing%20Guide.pdf?dl=0

Migration study

Brief description:
Due to climate change, a wide range of ecological processes, including wildlife migration, will modify. Notably, altered climatic conditions can modify migratory phenologies and result in shifting wintering and/or breeding areas, with consequences for migratory distances. Global changes may even result in species/populations switching from a migratory to a resident strategy, and vice versa.
Migration studies allow a better understanding of how wildlife might choose migratory routes and wintering areas, and help analyze in shaping wildlife responses to geographical and ecological barriers, intra- and interspecific competition, as well as the consequences of environmental change. These studies illustrates how global warming may radically modify the biogeography of migratory species. Migration studies offered a wide range of wildlife migration data, such as identifying wildlife migration (e.g., bird, turtles, fishes,...). Monitoring of migration changes due to climate change may help to establish early detection, and set cost-effective preventive measures.
Wild migratory waterfowl are considered one of the most important reservoirs and long-distance carriers of highly pathogenic avian influenza (HPAI). Migration studies may to explore the spatial and temporal characteristics of wild migratory waterfowl's wintering habitat and to evaluate the impact of these habitats on the risk of HPAI outbreaks in commercial poultry farms.

Type of measure: *organisational, monitoring*
Involved sectors: *nature conservancy*
Dominant stakeholder: *nature conservation authority*
Involved stakeholders: *public authority responsible for nature protection*
Addressed problem: *monitoring of species' migration*

Impacts:

Impacts	Targeted	Accompanying
Preservation of ecosystems		
Strengthening of condition		
Connectivity improvement	x	
Connectivity establishment		
Mitigation of environmental damages		x
Removal of ecological loads		x
Biodiversity improvement	x	
Biotope fragmentation reduction		
Conflicts mitigation	x	
Reduction of pressure on ecosystems	x	
Economic and social harmonisation		
Improving the maintenance		

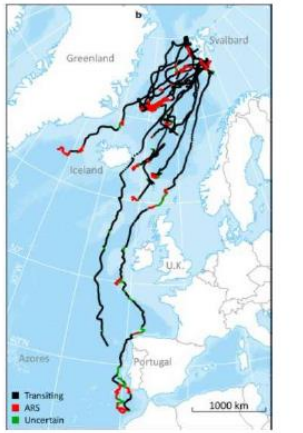
Another targeted impacts: *using data from satellite tracking of species to explore movements patterns and behaviour and habitat use during periodic migration*
Another accompanying impacts: *localization of breeding areas, feeding during migration, transiting speed for long periods*

Additional information
Impact scope (scale):
☐ Local (less than 1 hectar)
☒ Area impact (more than 1 hectar)
☐ Linear
In what phase of project was it implemented?
☐ Scoping
☐ Planning
☐ Design
☒ Development, operational management and monitoring

Further information on example:
https://www.nature.com/articles/s41598-019-54228-5
https://www.nature.com/articles/s41467-020-14589-2
https://www.nature.com/articles/s41598-020-75695-z

Example: Autumn movements of fin whales from Svalbard, Norway, revealed by satellite tracking

Location: Svalbard, Norway
GPS Coordinates: 78° 47' 13.3270379" N, 20° 20' 48.046875" E
Measure ID: 29
Time of realization: 2015-2019
Reported by: Michaela Högyevá
Reported: 03.11.2020
Resources:
https://www.nature.com/articles/s41598-020-75695-z



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Thank You for Your attention

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