

TEXTE

07/2018

Utilization of planning instruments outside of nature conservation law and spatial planning instruments for implementation of the National Biodiversity Strategy

**Recommendations for improving the environmental
quality of space as a means of improving the quality of
habitat corridors in Germany**

Brief Summary

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Utilization of planning instruments outside of nature conservation law and spatial planning instruments for implementation of the National Biodiversity Strategy

Recommendations for improving the environmental quality of space as a
means of improving the quality of habitat corridors in Germany

Brief Summary

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1 Brief Summary

In order to counteract the loss of biodiversity it is necessary not only to preserve, enlarge and improve the quality of habitats, but also to protect and restore their coherence. To this end, the Federal Agency for Nature Conservation has arranged for the development e.g. of a nationwide habitat corridors plan.

Habitat corridors are an informal concept representing the primary axes of green infrastructure for humans and nature, and such corridors therefore need to be located, secured and developed. The territory within habitat corridors includes nature preserves, biotopes and land covered by the biotope network, as well as land outside of these areas. They are geographically contiguous axes chosen because their location and quality make them suitable for securing or developing the potential for animal migration, integrating populations in different habitats and (re-)proliferation of plants and animals, as well as their suitability as a means of allowing people to experience nature. Accordingly, habitat corridors serve to secure biological diversity in a lasting manner. But at the same time, located in peripheral areas and between population centers, they are to contribute decisively to the experience of nature, natural recreation and preservation of the unique landscape of each area.

Requirements to promote environmental quality in the sphere of planning outside of nature conservation law are necessary in order to effectively protect, preserve and improve the environmental quality of these habitat corridors, and therefore of biodiversity, in addition to existing instruments within the sphere of nature conservation law.

This project examined how planning instruments outside of nature conservation law, in the spheres of sectoral environmental planning, sectoral planning in other sectors and general spatial planning, as well as other instruments of relevance to the environment, could contribute towards securing habitat corridors, improving their quality and changing their mode of use so that they can actually perform the function of preserving biological diversity in a lasting manner. To this end, the following procedure was followed:

- In order to appropriately address this question, relevant threat factors were identified for habitat corridors on a nationwide level, relevant planning instruments outside of nature conservation law were compiled and analyzed and actors were identified with the ability and inclination to exert influence over the formation of habitat corridors in connection with the relevant planning procedures (investigation of the present condition).
- In addition, the results of the analysis of the existing condition were verified using examples in selected case study regions. The function and usefulness of "fallow land" for the purposes of habitat corridors were analyzed separately in the Berlin region.
- Finally, the potential and deficiencies of planning instruments outside of nature conservation law were identified and recommendations for optimization were derived.

1.1 Identification of Threat Factors

In order to ascertain relevant threat factors, possible threats to habitat corridors were identified and their impact described using available nationwide data. This list of potential threat factors

was then examined in order to filter out the factors with the potential to harm the quality and function of habitat corridors on a nationwide level or to exert a negative impact on the connecting function of the corridors (relevant threat factors) (Tab. 1).

The intensity of the threat posed by the individual factors may differ substantially and depends on the local conditions of each individual case. In general, factors which could lead to a direct loss of habitat space or to a loss of contiguity have the potential of causing serious harm to the corridors. Nevertheless, the potential hazard caused by "creeping" impacts, such as those caused by contamination with hazardous substances and eutrophication, the effects of which only become visible in the long run.

Tab. 1 Relevant threat factors and causes

Threat factors	Principal causes of the threat
Loss/use of space	
Sealing	Construction of roads, traffic installations, squares, buildings and industrial plants (settlement and traffic)
Unadapted and abandoned use	Intensified agriculture and forestry use or abandonment of traditional forms of use, drainage
Dissection	Growth in linear elements, particularly from technical infrastructure (roads, rails, canals, residential areas, pipelines)
Change in water balance	
Drainage	Intensive agricultural or forestry use
Water flow regulation, extension and maintenance of watercourses	Flood prevention, construction of dikes for more intensive use of flood plains, maintenance of trenches in connection with intensive agricultural use
Release of hazardous substances and nutrients (particularly nitrogen)	Pollution from traffic or industry and the combustion of fossil fuels Agriculture (livestock, use of pesticides and fertilizers)
Nuisances	
Noise	Traffic (road, railway or air traffic), industry and commerce
Disturbance	Human presence, recreational/leisure activities ¹ , tourism, wind power installations, disruptions from hunting

The potential hazard was estimated differently for the various types of ecosystems within habitat corridors (forest habitats, wetland habitats and dry habitats).

The principal causes of threats to forest habitats are intensive and unadapted forestry use, interference with the water balance, as well as the release of hazardous substances and nitrogen from the air or from adjoining uses.

¹ Although habitat corridors are meant in part to facilitate natural recreation, human presence or leisure activities could have a disruptive effect on animals living in the wild. This represents a conflict in the purpose of habitat corridors which needs to be resolved in each specific case.

Anthropogenic influence over the natural water balance represents a principal threat for wetland habitats. In the case of wetland habitats with the character of open space, local conditions can be heavily affected by intensive agricultural use, so that typical wetland biotopes may be driven out by other plant populations. The release of nutrients has a similar effect, resulting in eutrophication. Standing water in particular may be harmed due to the release of nutrients and hazardous substances through the introduction of sewage, adjoining agricultural use or atmospheric contamination, as well as through structural changes and use for leisure activities.

Land management plays a key role for open dry habitats. The survival of these biotopes depends on special uses or preservational measures, and they are often very sensitive to changes in environmental factors. The abandonment of traditional agricultural or other uses (e.g. sheep herding, military training grounds) therefore results in threats. These areas are also threatened by changes in use, such as the planting of trees. Since the types of biotopes which give these habitats their character are largely found in lean areas and since their species composition is adapted to those specific conditions, the more intensive introduction of nutrients represents another key threat. In addition, valuable open-land ecosystems, such as dry and semi-dry grassland, may be harmed by certain leisure activities, such as motocross, mountain biking and winter sports.

1.2 Actor Analysis

The actor analysis provides an overview of the opportunities which the actors have to exercise influence within the context of the various planning procedures, as well as the existing interaction processes. The starting point of the actor analysis is the question as to the extent to which, and by whom, content can be introduced into the various planning procedures in order to secure the linkage of habitats by means of habitat corridors. Unrealized potential is shown and recommendations are worked out as to how actors in planning procedures outside of the sphere of nature conservation can contribute to the securing and development of habitat corridors.

The analysis was performed in two stages: a general abstract analysis and, building on this basis, a concrete planning-related actor analysis in the case studies. In the course of the case study analysis, questionnaires were developed which were sent out to 62 selected actors and evaluated. Around 50% of the questionnaires were returned.

Given that the starting point of the research and development project relates to planning, actors were organized into the following relevant groups:

- planners and developers;
- authorizing bodies;
- public institutions;
- the public:
 - recognized nature conservation and environmental associations;
 - groups and initiatives;
 - property owners and managers;

- the general public/private individuals.

The cooperation of actors and groups of actors arises primarily from the administrative rules in effect for the relevant planning process. Accordingly, it typically takes place on the institutional and spatial planning level for the specific planning instrument. Cooperation with higher technical and planning authorities is also largely governed by the rules for the planning process (consultation structures).

Evaluation of the questionnaires revealed that the attitude of actors towards the concept of habitat corridors is generally positive. However, deficiencies exist in the technical specification of the concept, especially with respect to the location of the space and the specific technical requirements for the qualitative development of habitat corridors.

As expected, it is evident from the returned questionnaires that the position of the actors towards habitat corridors in each case reflects the interests of the actor in question. For example, the focus of public institutions responsible for general planning is on weighing and coordinating the various spatial requirements, and the interest in linking habitats is one of many. Private planners and developers are primarily interested in implementing their projects, which are motivated by economic considerations. Even public institutions (with the exception of institutions responsible for natural conservation) are not primarily focused at first on linking habitats, and in some cases have little specialized knowledge with respect to biodiversity goals and habitat corridors. Public institutions responsible for natural conservation generally have the ability to actively contribute their expertise to planning and approval processes and to stress the need for linkage in order to secure and develop nature conservation interests, and therefore habitat corridors as well. Recognized nature conservation and environmental protection groups also have a positive attitude towards the habitat corridor concept, as well as opportunities for involvement in many planning procedures.

Sensitizing virtually all groups of actors to the need to strengthen habitat linkage is indispensable and this can best be achieved in the planning process through the involvement of nature conservation and environmental authorities in the procedure. The dissemination of technical data over the internet is also a particularly suitable means of making available key information concerning the importance and location of habitat corridors in a timely manner to actors in all planning and analysis levels.

1.3 Analysis and Recommendations for Optimization in Planning Instruments Outside of Nature Conservation Law

In order to examine the potential for utilizing planning instruments outside of the sphere of nature conservation law for the benefit of habitat corridors, it is first necessary to identify, out of the overall category of instruments outside the sphere of nature conservation law, the instruments which are to be further investigated in this project.

Planning instruments outside the sphere of nature conservation law include general planning instruments and sectoral and other planning instruments, including other formal and informal plans.

In selecting the instruments, particular consideration was given to areas and sectors in which conflicts may arise in the course of planning with the interest in securing and developing habi-

tat corridors. Consideration was also given to instruments which are expressly related to the threat factors identified.

A form was created for each of the planning instruments selected, containing a description e.g. based on the following criteria:

- the legal basis and relevant content outside of the sphere of nature conservation law for the task;
- binding status;
- relationship with other planning instruments;
- relation to threat factors;
- statutory requirements;
- relation to areas/space;
- scale;
- actors and their tasks/responsibilities (planners, participants, executing persons).

The forms also include a final assessment with respect to

- evaluation of current usefulness for securing/improving quality;
- existing deficiencies;
- recommendations for actions and priorities.

The forms are made available to the reader in Annex I to the final report on this project.

A fundamental element of the study within the context of the research project consisted of analyzing

- whether the identified planning instruments can be used to secure and develop habitat corridors and improve the environmental quality of habitat space;
- whether existing use potential is currently exhausted; and
- whether their usefulness can be optimized through rule-based or behavioral changes. To this end, rule-based deficiencies and actor-specific use potential are indicated.

The analysis showed that, in general, many planning instruments are already useful today for the purposes of habitat corridors. However, the case studies revealed that, in fact, these instruments can be used only sometimes in such a way as to produce a positive impact for habitat corridors. Actor-specific use potential is evident in this regard. However, legal changes or clarifications are needed in order to increase usefulness.

Based on the analysis of planning instruments, actor- and rule-based proposals were developed in order to improve the usefulness of individual instruments. In addition, general proposals are made which relate to the usefulness of all planning instruments included in the analysis.

In order to determine the relevance of the recommendations to improve the environmental quality of space in habitat corridors, the proposals were evaluated based on the following criteria:

- relation to the habitat corridors;
- consideration of matters relating to habitat corridors; and
- ramifications of the recommendation with respect to other planning instruments.

Based on the result of this evaluation, the proposals are classified as "prioritized," "recommended" or "deferred."

Federal and state spatial structure plans, regional planning, land use and development plans, as well as the spatial planning process, were identified as relevant general planning instruments. In the sphere of sectoral planning, large-scale infrastructure planning was analyzed closely (particularly in the "transportation" and "energy" sectors), as well as "area- or media-specific" planning instruments like noise action and air quality plans, risk management plans and water management plans, as well as land reorganization and forest planning. Urban development plans were also analyzed as an informal planning instrument.

In the sphere of general spatial planning and infrastructure planning (particularly in the "transportation" and "energy" sectors), a hierarchical system of planning instruments exists, in which land use or routing is progressively specified, starting from a general overarching determination and concluding with a binding planning instrument (generally a development plan or plan approval). In some cases, the determinations and requirements adopted in earlier stages of the planning process merely have to be taken into consideration, e.g. weighed against other factors, and in some cases those determinations and requirements are binding.

The more specific the rules adopted in the earlier stages of the process, the easier it is to account for the inter-regional habitat corridor concept. On the other hand, if the rules adopted in the earlier stages are too strong, the flexibility needed at the regional level may be lacking.

Since some of the deficiencies identified relate to a large number of planning instruments, and not just individual ones, we begin by formulating general recommendations. Implementation of these recommendations should be assigned a high priority given their broad impact. Following these general recommendations, the analysis and recommendations for optimization concerning the individual planning instruments are summarized.

Statements with respect to the recommendations which are prioritized within the context of the research project are emphasized in the following text. The table at the end of this summary provides an overview of the priority recommendations.

1.3.1 General recommendations

In order to ensure the consideration of habitat corridors within the context of general planning, sectoral planning and informal planning, the principle of linkage should be incorporated into the text of statutes relating to environmental protection and nature conservation. For example, additions to the Urban and Rural Planning Code or the Environmental Impact Assessment Act should be examined.

Moreover, in order to formulate specific statutory requirements in the form of limits or benchmarks (noise levels, minimum space requirements, etc.) so as to preserve and improve environmental quality in habitat corridors, the development of environmental quality goals is recommended, broken down by function and ecosystem type, and based on scientific data.

1.3.2 General spatial planning instruments

As an overarching general planning instrument, the federal government's spatial structure plan may contain only spatial planning principles which may be outweighed by other factors, and which are not presented in relation to any specific space. However, it can make a contribution towards resolving conflicts in subsequent planning and decision-making stages or lend emphasis to a public interest with respect to general spatial development by specifying the principles contained in § 2(2) of the Spatial Planning Act with respect to protection of open space, creating a network of open spaces and preventing further dissection of the open landscape, and therefore influencing the deliberation prior to the spatial planning process on the State (and regional) level.

A federal spatial structure plan in accordance with § 17(1) of the Spatial Planning Act can make general specifications for subsequent planning and measures in order to secure and develop habitat networks. In this way, a mandate for action can be formulated for subsequent planners stating that the latter must define criteria for the handling of functional and structural spatial conflicts (such as e.g. the relationship between habitat networks and the development of transportation and energy infrastructure) or that the latter should make spatial determinations in the form of priority zones and reserves.

However, the Federal Ministry of Transport has yet to exercise its option to prepare a spatial structure plan in accordance with § 17(1) of the Spatial Planning Act. For the designation of significant national and transnational habitat corridors, it would be expedient to create consistent national rules for further implementation on the State and regional levels. To this end, the preparation of a spatial structure plan in accordance with § 17(1) of the Spatial Planning Act is recommended with priority as an actor-related optimization proposal.

The state regional development plans offer a way to define spatial planning principles and make corresponding territorial determinations (reserves), as well as defining spatial planning goals and corresponding territorial determinations (priority zones) which must be observed in other planning procedures and which cannot be outweighed by other factors. In this way, specific requirements for the securing of habitat corridors can be defined for all subsequent planning and measures.

However, these existing legal options for the securing of habitat corridors are not yet fully exhausted. In particular, the option of defining spatial planning goals instead of spatial planning principles and of making specific territorial definitions instead of general textual formulations, is used only to a relatively minor extent, and these determinations are generally shifted to the regional planning process. Spatial planning formulations are often "soft" and "flexible," i.e. they are not presented in a strict and clearly specific manner. Even the principles in § 2(2) of the Spatial Planning Act, which are kept largely abstract, possess hardly more than the character of appeals when weighed against other factors, and against contrary claims for use of the space. The same is true for goals and principles in spatial planning by the States, when they are too abstractly formulated. This is caused in part by the fact that the planning authorities have unlimited discretion when it comes to determining the type of stipulation (goal or principle of spatial planning, as well as corresponding territorial definitions).

At the level of regional planning at the latest, priority zones with target quality can and should be defined and should be clearly recognizable in the plans in order to ensure the securing and development of habitat corridors. State-wide spatial planning is highly significant for the content of regional planning. However, regional planning does offer the opportunity to make more specific stipulations with respect to space and content than can be made in the state-wide spatial planning. Space-related requirements and nature conservation and landscape preservation measures in landscape programs and framework plans can also be secured through regional planning: the landscape planning specifications can be implemented through incorporation into regional planning. Existing legal options with respect to regional planning are also not currently exhausted.

The actor-specific recommendation that habitat corridor space should be kept clear of contrary uses through increased use of instruments to secure habitat corridors in the State and regional planning stage (spatial presentation of habitat corridor and/or definition of spatial planning goals) is prioritized. In order to strengthen consideration of habitat corridors in State and regional planning and realization of the principles of § 2 of the Spatial Planning Act, an obligation should be added to § 7(1) of the Spatial Planning Act stating that, without prejudice to more far-reaching provisions of federal and state law, planning statements should be formulated as spatial planning goals to the extent possible. In addition, specific rules for the implementation of space reduction goals should be added to § 8(5) Sentence 1 of the Spatial Planning Act.

Inter-disciplinary general spatial planning at the local level takes place through municipal development planning, i.e. the development plan and, preceding the latter, the land use plan, which typically applies to all the territory of the municipality.

Since the land use plan describes the intended use of the land in the municipality's territory, for development and otherwise, in its broad contours, it is entirely useful for the purposes of habitat corridors even today. For example, a significant amount of space can be kept clear of development for the purpose of habitat networks. The land use plan also allows the map to be drawn in such a way as to secure space for the protection, preservation and development of soil, nature and the landscape.

The development plan specifies how land is to be used in certain sections of the municipality and can therefore be used in order to exert a direct influence over the threat factors of relevance for habitat corridors: loss of space and use of space. However, since the development plan is developed based on the land use plan, basic questions concerning the locations of development have already been decided in the land use plan. As a result, the development plan tends to offer only slight opportunities to minimize conflict as a fundamental approach to the protection of habitat corridors.

In the case of both of these instruments, the deliberation options given to municipalities pursuant to § 1(7) of the Urban and Rural Planning Code allow the municipalities broad discretion, so that interests relating to habitat networks may be subordinated to other interests. Habitat corridors should therefore be identified as a separate interest and should be weighted accordingly in each individual case. The relevant actors should be motivated to realize this goal.

In order to clarify that the matter of habitat networks is to be included in the deliberation, the concept of habitat networks can be added to the list of interests in § 1(6) of the Urban Planning Code as a new and separate interest, or added to § 1a of the Urban and Rural Planning code as a separate paragraph (cf. with the general recommendations in 1.3.1). The habitat corridor concept should also be added to the legislative intent. It is recommended that these recommendations be implemented as a priority.

A spatial planning process is to be executed prior to the sectoral approval procedure for various plans and measures, generally with spatial relevance. If habitat corridors are established in spatial structure plan, it must be ensured, within the context of the spatial planning procedure, that such habitat corridors are not interfered with by the planned project. Since many space-related measures require an environmental impact assessment, the matter of habitat networks can be introduced into the spatial planning procedure as a non-independent component of the procedure through this assessment. The spatial planning procedure also calls for an assessment of alternatives, in which the matter of habitat corridors could play a role. However, the fact that the assessment of alternatives depends on the alternatives brought forward by the planner must be regarded as a deficiency. It is therefore recommended for the authority conducting the procedure to try to induce the planner to introduce certain alternatives. In addition, § 15 of the Spatial Planning Act should be amended so that alternatives which appear to be far more suitable from a spatial planning perspective (taking into consideration habitat network axes of relevance for spatial planning) must be examined during the spatial planning procedure to ascertain their compatibility with the space, and that the authority may require that certain alternatives be examined.

1.3.3 Sectoral planning

Noise action plans and air quality plans, risk management plans, water management plans, land reorganization and forest plans have been identified as relevant sectoral planning instruments.

A second area of focus is sectoral planning concerning roads, railways and energy lines, including the associated plan approval procedures.

While sectoral plans of the first category may contribute to strengthening habitat corridors in principle, because their goals are generally limited to one specific area, this effect tends to be merely coincidental at the moment, as habitat corridors benefit from protective measures which are adopted for the benefit of other forms of use. Habitat corridors which are not located within the relevant target areas (e.g. populated areas in the case of noise action plans or flood zones in the case of risk management plans) are not considered even though they may be equally affected by the hazards in question. In many cases, the means are lacking to apply the protective goals of the planning to other, non-anthropocentric goals. This is the case e.g. for air quality plans. In the worst case, these instruments can be used in such a way as to produce negative effects for habitat corridors, e.g. if flood prevention measures are adopted which interfere with nature and the water balance, such as the construction of dikes or barriers. In the case of land reorganization procedures as well, private and corporate interests are at the forefront of the procedure. Forest planning may be performed to secure the beneficial, protective and recreational functions of the forest in lasting fashion and to organize and improve forest

structure, and would therefore be useful for forest habitat corridors. However, forest planning is no longer required under federal law, so that forest plans are not prepared in all Federal States.

For noise action plans, it is recommended as a priority that actors should be encouraged to designate "quiet areas" in the country, as well as in heavily populated areas, in order to protect habitat corridors.

It is also recommended for the scope of Part Six of the Federal Emission Control Act to be extended to cover either all surrounding noise or areas of nature and the landscape of relevance for habitat networks. A revision of the Federal Emission Control Act and the 39th Ordinance to the Federal Emission Control Act is also recommended in terms of the usefulness of air quality plans. To this end, relevant harmful substances and specific limits would have to be defined to secure the function of the various corridor types as a habitat network (cf. general recommendations for goals of environmental quality).

In order to make risk management plans useful for the purposes of habitat corridors, rules should be adopted prioritizing natural conservation measures over technical measures provided that flood prevention is secured to an equal degree, public safety is adequately ensured and the prioritization of natural conservation measures is reasonable.

Various legal changes are recommended in order to improve the usefulness of land reorganization procedures, including the assessment of fines for violating environmental protection conditions, statutory checks to ensure implementation of environmental protection requirements and verify results and changing the orientation of land reorganization procedures.

The introduction of a remaining option, conducting land reorganization for the purposes of natural conservation and biodiversity as a principal goal, is recommended with priority, since land reorganization is the only planning instrument analyzed which would enable consideration of habitat corridors in the agricultural sector.²

In order to improve the usefulness of the instrument of forest planning for the benefit of habitat corridors, the (re-)introduction of a basis in federal law specifying the preparation of forest plans as a mandatory measure and naming the principles which are to be considered within the context of forest planning is recommended as a priority.

The sectoral plans which are prepared in advance of major infrastructure projects are all useful for the purposes of habitat corridors even today:

The first type of plan which should be mentioned at this point is the Federal Transport Infrastructure Plan (FTIP), which stands at the top of the planning hierarchy for the transportation sector. The FTIP therefore has the effect of defining the framework and plotting the course for specific infrastructure projects. Because of these effects and the function of the FTIP, this in-

² Agricultural use is influenced primarily by financial control instruments. These instruments were not a subject of the research project.

strument is of great significance for habitat corridors. After all, this plan defines the need for measures which could have the effect of dissecting or sealing habitat corridors.

The FTIP is generally useful for the purposes of habitat networks and habitat corridors even today. From the viewpoint of procedural law, this is made possible by the SEA requirement, which necessitates a description and evaluation of the full environmental impact of the FTIP, as well as an assessment of alternatives across transportation networks and means of transportation. These statements and evaluations, as well as the other statements in the environmental report, are to be included in the deliberation which is required for the resolution concerning the FTIP. The SEA was performed for the first time as part of the ongoing procedure for preparation of the 2015 FTIP.³

However, there is need for action with respect to the formal rules for preparation of the FTIP. In particular, consistent rules from an environmental perspective need to be introduced with respect to the requirement assessment and traffic forecasts, as well as concerning the checking of State forecasts. Concrete statutory specifications are important, especially in light of the fact that the FTIP is not subject to judicial review.

In addition, a stronger link is generally necessary between transport infrastructure planning and spatial planning. Implementation of this proposal is recommended as a priority recommendation. However, implementation of the spatial planning recommendations is a prerequisite for this prioritization.

Requirement plans are prepared based on the FTIP, which are legislative plans with statutory character. These plans define urgently needed construction projects and improvements to transportation infrastructure (roads and railways), as well as additional requirements, with a simplified presentation of routes. These plans are useful for the purposes of habitat corridors due to the need to take into account environmental protection and spatial planning aspects, as well as the SEA requirement. The subsequent alignment determination procedure, because of the assessment of alternatives which is required within the framework of the assessment of implications in accordance with the FFH Directive, the environmental impact assessment and the deliberation, provides a suitable legal framework for comparing and evaluating alternative routes connecting the starting and end points. As a result, this planning instrument can make a very concrete contribution towards securing habitat corridors. Moreover, the rights of action available to recognized environmental and nature conservation organizations and the general public ensure that the matters brought forward by the latter can be enforced in court.

Further potential for optimization has been identified for both instruments: it is recommended to sensitize actors to the need for greater consideration of habitat networks in the selection of projects for the requirement plans and in the deliberations in connection with the alignment determination. In addition, a statutory rule should be added to the acts governing the requirement plans (Federal Trunk Road Upgrading Act and the Federal Railway Infrastructure Upgrading Act) calling for a separate requirement report in the requirement plans.

³ For this reason, it was not possible within the context of this research project to evaluate actual utilization of the SEA instrument in federal transport infrastructure planning for the benefit of habitat networks and habitat corridors.

It is also recommended as a priority recommendation that the term habitat networks should be expressly included in Federal Highways Act as a matter of relevance for deliberation in the alignment determination procedure.

The network development plan (NDP) is an instrument with a purpose comparable to that of the FTIP, and which forms the basis of the planning and approval regime for certain high-priority pipeline projects in the energy grid. Similar to the FTIP, the NDP has an impact on matters relating to habitat corridors by identifying urgent needs and establishing the necessity of projects, as well as their starting and end points, with binding effect for the subsequent approval procedure for the relevant pipeline. Given that several opportunities exist for public consultation and involvement of other authorities, the NDP is generally useful for the benefit of habitat corridors. The NDP serves as the draft for a federal requirement plan (in accordance with the Energy Act), and the instrument of the SEA can be utilized for the consideration of matters relating to habitat corridors during the procedure for preparation of the NDP.

For the NDP and the federal requirement plan, it is recommended that transmission system operators and the Federal Network Agency should be sensitized to the need for more intensive consideration of spatial alternatives and/or alternative measures. In addition, the rule in § 12b (4) of the Energy Act should be supplemented by the addition of concrete specifications concerning the necessary scope of the assessment of alternatives. For the federal requirement plan as well, clear formulation of the specifications relating to the procedure for the assessment of alternatives is recommended.

The research project also examined a third category of sectoral planning, plan approvals in the spheres of road traffic law, railway law, waterway law, water law, air traffic law and energy law.

The specifications of the upstream planning instruments (e.g. the specifications of the alignment determination and requirement plans in the transportation sectors and e.g. the specifications of sectoral federal planning and the Federal Requirement Plan Act in the energy sector) are to be observed and taken into account within the context of the plan approval procedure. Due to the binding status of these instruments, the usefulness of plan approval as a planning instrument is limited to a certain extent. Nevertheless, plan approval can influence whether habitat corridors are interfered with, as well as the manner and scope of the interference, since in addition to authorizing the specific and imminent interference with the habitat corridors, plan approval can require a comprehensive investigation of environmental matters, initially within the context of the environmental impact assessment, including the aspect of biological diversity, as well as full consideration of all relevant matters. Given that detailed consideration and weighing of all matters, as well as determination e.g. of compensatory measures required under nature conservation law and possible measures to ensure coherence for Natura 2000 areas take place only within the context of plan approval, plan approval is of high significance in determining whether and to what extent the environmental quality of habitat corridors is harmed.

With respect to the assessment of alternatives which is required as part of the plan approval procedure, it should be kept in mind that the actual formulation of the project which is to be approved is influenced by the specifications made in the prior stages of the planning process. There is a difference at this point between the plan approval procedures in the various sectors.

For example, the assessment of alternatives in connection with plan approval in railway law is of greater significance than assessments of alternatives which are made in connection with plan approvals in road traffic law, since there is no requirement to perform an alignment determination, and therefore an advance assessment of alternatives, prior to the procedure for plan approval in railway law. The same is true with respect to the actual formulation of projects in water and air traffic law which are to be submitted for approval.

Consideration of the requirements of habitat corridors is possible to a greater degree for plan approvals in accordance with the laws governing water and waterways. After all, plan approval in accordance with the laws governing waterways is to be denied if the construction or improvements can be expected to harm the general welfare, including the impairment of public interests such as those of natural conservation and preservation of the landscape, unless such harm can be prevented or balanced out through the imposition of conditions. Moreover, plan approval or authorization in water law can only be granted if no harm is caused to the general welfare or interests of natural conservation and preservation of the landscape, and if other requirements in accordance with the Federal Water Act and other provisions of public law are satisfied.

Due to the existence of rights of action, objections from the general public and recognized environmental and nature conservation groups have a significant capacity to influence development plan adoption procedures in favor of habitat corridors. However, since such procedures typically allow measures which result in harming habitat corridors, the usefulness of such objections tends to be more with respect to mitigating damage than improving quality.

It is recommended that actors in plan approval procedures be sensitized to the circumstances so that environmental interests (particularly interests of habitat networks) are taken into greater consideration in the procedure, and are assigned greater weight in the deliberation. In addition, strengthening of the rules concerning consideration of habitat corridors in the context of the deliberation is recommended as a priority (in addition to extension of the specifications in emissions control law with respect to the consideration of overall noise and additions to various sectoral planning laws in line with the requirements for approval in the Water Act).

1.3.4 Informal planning

The instrument of urban development plans/informal planning is used as an umbrella term, and includes municipal plans other than municipal development plans in the form of entirely site-specific urban development plans which are prepared and updated in the interests of managing the municipality's general development. The formal and substantive requirements and legal consequences of planning instruments are not defined by law, so that no limitations exist with respect to the use of such instruments for the purposes of habitat corridors. Since development plans sometimes prepare the way for decisions concerning sites, general consideration of habitat corridors can contribute decisively to the protection of such areas and keeping them clear of development.

In order to utilize this tool to secure habitat corridors, it is recommended that municipalities be sensitized as to the significance of habitat networks so that this matter will be given appropriate weight within the context of their informal planning.

Tab. 2 Overview of priority recommendations

Priority recommendations	Actor-based	Rule-based
General recommendations		
Expressly mentioning habitat networks as a matter to be considered in statutes relating to environmental and nature conservation law, e.g. in § 1 (6) No. 7 a of the Urban and Rural Planning Code and in § 2 (1) Sentence 2 No. 1 of the Environmental Impact Assessment Act		X
Defining environmental quality goals relating to the habitat corridor function, broken down by type of ecosystem, in the form of specific limits or benchmark values (e.g. noise levels, minimum space) based on scientific data		X
Spatial planning instruments		
Federal spatial structure plan		
Motivating actors to prepare a spatial structure plan for habitat corridors	X	
State spatial planning and regional planning		
Motivating actors to designate habitat corridors as a goal or principle of spatial planning	X	
Determination of spatial planning goals to the greatest extent possible		X
Specifying statutory rules for spatial planning with respect to the network concept, specifying rules concerning space reduction goals		X
Municipal development planning (land use plans and development plans)		
Motivating actors to devote more consideration to habitat corridors in the municipal deliberation	X	
Sectoral planning		
Noise action plans		
Motivating actors to utilize noise action plans to improve the quality of habitat corridors in targeted fashion	X	
Federal Transport Infrastructure Plan		
Closer integration of traffic planning and spatial planning (priority recommendation if spatial planning recommendations are also implemented)		X
Alignment determination: roads		
Strengthening rules by expressly mentioning the matter of habitat networks in the Federal Highways Act		X
Land reorganization		
Two-tracked alignment; option to conduct land reorganization to serve public interests such as habitat networks		X
Forest planning		
Nationwide requirement to prepare forest plans		X