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The project 'Otter Habitat Network Europe' (OHNE) – Method and progress of an attempt to prepare a spacious standard of assessment for potential otter habitats.

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Schlüsselwörter: *Lutra lutra*, Geographische Informations Systeme, Lebensraumbewertung

Summary

In 1998 a project was started aimed at defining the search for the best wetland habitats for reconnecting the separated and sometimes isolated otter occurrences in Central Europe, by means of a Geographic Information System (GIS). In a first phase the methodology was tested for Germany. Primary results indicate that it is possible to define search zones for potential "corridors" by a GIS despite the low number of parameters available in a digitized form.

Zusammenfassung

1998 wurde ein Projekt begonnen, das darauf abzielt, mittels eines Geographischen Informations Systems (GIS) Feuchtgebiets-Habitate zu ermitteln, welche die besten Voraussetzungen dafür bieten, die zersplitterten und zuweilen isolierten Ottervorkommen in Mitteleuropa wieder miteinander zu vernetzen. In einer ersten Phase wurde die Methodik für Deutschland getestet. Die vorläufigen Ergebnisse deuten darauf hin, daß es, trotz einer geringen Anzahl digitalisiert verfügbarer Parameter, möglich ist, Suchräume für potentielle „Korridore" mittels des GIS zu ermitteln.

1. Introduction

The distribution of the Eurasian otter (*Lutra lutra*) changed dramatically in large parts of its European range. Inhabiting almost all wetland areas in Europe up to the last turn of the century the species became extinct in many regions until the second half of the 20th century. Since the late 80s and the early 90s of this century, in numerous parts of Europe a recovery tendency is noticeable. (REUTHER in press,a).

The reasons for this change are not clear. Four main aspects of possible reasons are disputed at the moment: excessive persecution and accidental mortality, pollution and toxic chemicals, reduced food supply, and alterations of habitat (structures). Examining the situation in the different European regions it becomes obvious that in most regions all these factors occurred. Although this happened on different levels of intensity and in different combinations, in most cases the result was the same: the otter became extinct.

One of the main problems in evaluating the reasons of decline is the fact, that otters can not be counted on a reliable basis (Reuther 1993). Therefore the development of populations has to be estimated on the base of changes of the distribution area. In those regions where it was possible to examine this development over long periods (Bouchardy 1986, Reuther 1980) a fragmentation tendency became obvious: Step by step spacious occurrences of the otter were divided into smaller and smaller and frequently isolated "populations" which finally were no longer viable.

This hypothesis formed the background for the idea to try to reverse this development. Reuther (1992, 1996a) suggested the development of a network of potential otter habitats which could contribute to the reconnection of the several isolated otter occurrences in Germany. This network should be based on three fundamental categories of activities:

- To protect the otter habitats and populations in the core areas of its current distribution range, which form the base for a natural recolonization. These protection measures should result in a population surplus and a territory or population pressure which causes an emigration of animals.
- To develop habitats between these core areas to a state where they can become habitat for dispersing otters. These habitats should function as "corridors" between isolated populations.
- To protect those otter habitats where only low otter populations survived and to include them into this network of core areas and corridors. These low populated areas should function as stepping-stones in this network.

As a long range vision this program could result in a complete recolonization of all riverine and wetland areas by the otter.

Whilst preparing this project it became obvious that it makes more sense to include the neighbouring countries mainly because of two reasons. The lack of otter occurrences at the western and south-western border-areas of Germany meant the lack of target points for a network of corridors. And because of the central geographical position of Germany in Europe the incorporation of the other central European countries would offer the chance to widen this reconnection program to the isolated otter populations in the other countries as well (REUTHER 1995a, 1995b, 1996b).

2. Methods and Progress

An important precondition for the start of the project could be fulfilled in 1998 (REUTHER 1998a). Subsidies of the German Federal Bureau of Labor made it possible to employ a biologist and a landscape planning engineer in October 1998, founding the personnel base of the project. And grants of the Kurt-Lange-Foundation and the Environmental Foundation of Hamburg Electricity Company enabled the establishment of the technical base of the project by using a geographic information system (GIS).

This system contains a personal computer Pentium II 400 MMX, ATX-100MHz Mainboard (128 MB SDRAM, 10.1 gigabyte memory capacity with an external storage unit of 18 gigabyte, 18 MB graphic card and 19" screen). Software used is ArcView 3.1 GIS by ESRI for Windows with Avenue supported by MS Office 97 and especially the databank software Access.

The project is divided into six steps (figure 1) which are done partly parallel. As a fundamental precondition the data base about the distribution of the otter needed to be updated and to be prepared in a manner allowing its use by a GIS. Numerous technical problems made this first step much more difficult than expected. In most countries there are no central data banks containing distribution data of the otter. The majority of data is stored by regional institutions or by private persons. Accordingly heterogeneous are the storage techniques, formats and contents of the data. To overcome this problem the data bank system ISOS (Information System Otter Surveys) was developed which enables to store the distribution data in a comparable format and which is compatible to common data bank and GIS software (REUTHER et al. in prep.).

Different are also the maps (and their topographic projections!), the scales and the grids which are used to present the data. Of the two grid systems mainly used in Europe, the UTM grid and the grid of topographic maps, the latter has the additional disadvantage of different and partly noncompatible scales which are used in the different European countries (REUTHER & ROMANOWSKI in prep.). On balance of all circumstances it was decided to use the UTM (Universal Transversal Mercator) grid in a 10x10 km raster. But surprisingly such a grid was not available in a digitized form for the whole of Europe and had to be prepared.

On the base of the data bank system ISOS and the digitized 10x10 km UTM grid, both self developed as part of this project, the updating of otter distribution

STEP	1	2	3	4	5	6
LEVEL	Fundamentals level	Macro planning level	Median planning level	Micro planning level	Realization level	Evaluation level
RESULT	Actualisation of distribution data for Europe and definition of core areas.	Definition of potential connecting zones (search zones for connecting corridors).	Definition of potential connecting corridors and establishment of spatial priorities.	Planning of definite measures for the development of connecting corridors to otter habitats. ①	Realization of measures planned on the micro planning level.	Monitoring of otter distribution and investigation of efficiency of measures realized.
ASSOCIATES	OHNE-Team, national otter specialists	OHNE-Team	OHNE-Team, national/regional otter-/nature conservation specialists	OHNE-Team, national/regional otter-/nature conservation specialists	OHNE-Team, national/regional otter-/nature conservation specialists	OHNE-Team, national/regional otter-/nature conservation specialists

①respectively to wetland habitats, where ecological functions and processes can be effective, which are typical of regional natural states and wetlands.

Fig. 1: The six, partly parallel done, steps of the project, their aspired results and their associates

No "artificial" recolonisation	**No planning exclusively focused on the otter**
Stimulation of the recovery of habitats by immigration of animals from existing wild living populations.	Support of ecological functions and processes for which the otter serves as a target species and which are typical of regional natural states and wetlands.
Non-technical nature conservation disposition	*Holistic nature conservation disposition*
No exclusive concentration upon protected areas	**No planning of a (final target) state**
Guaranty of ecological functions and processes which are typical of regional natural states and wetlands as well beyond protected areas.	Initiation of a development orientated by ecology and adjusted to sustainability.
Integrated nature conservation disposition	*Dynamic nature conservation disposition*

Fig. 2: The target premises of the project

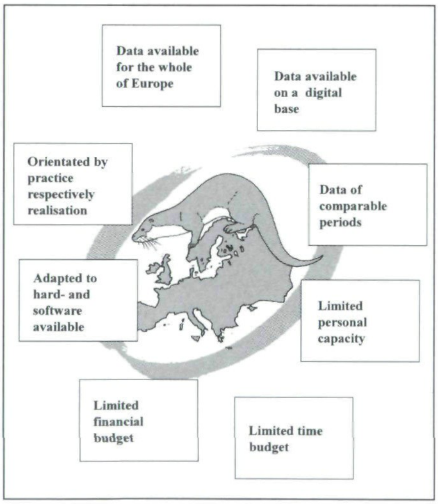

Fig. 3: The premises for the framework conditions

data and the preparation of new distribution maps had been started in summer 1999. So far more than 3.000 data records of evidence could be stored and treated.

Parallel to this technical step one the second step was done aimed at the definition of potential connecting zones. Examining the distribution of the otter in central Europe it became obvious that there are spacious gaps with great distances between core areas; and there were no isolated otter occurrences available which could be used as stepping-stones. To make the search for potential connecting "corridors" more efficient it seemed necessary first to define potential connecting (search) zones in which such "corridors" could be looked for.

The first precondition for the realization of this second step was the definition of some premises for the targets and the framework conditions of the project. The four target premises (figure 2) aim at

- a "natural" recolonization of habitats by the otter,
- a planning process which uses the otter as target species but is mainly focused on the support of ecological functions and processes which are typical of regional "natural" states and of wetlands in general,
- a realization of nature conservation measures as well beyond protected areas, and
- a planning process initiating a development in the defined habitats orientated by ecology and adjusted to sustainability.

As in each project some framework conditions needed to be considered (figure 3). They refer mainly to technical aspects, like availability of time, of financial, personal and technical resources or of workable, comparable and compatible data sources.

Having defined these premises the main question was: "What makes a habitat an otter living space?". Analyzing the biological data we know, it has to be stated that, the otter preferably uses

- habitats which are somehow connected with water,
- linear territories (sea or lake shores or river banks),
- places to hide while sleeping which offer good shelter,
- places to mark their territories which feature special structures,
- habitats which offer a sufficient food supply (not only of fish!),
- places where food is available by an energy input as low as possible,
- places where cubs can be raised undisturbed and at low risk of flooding,

and that the otter needs the possibility to interact with other specimens of the same species to be able to reproduce. Because of its position as a top predator the aspect of pollution and bioaccumulating contaminants needs to be regarded, as well.

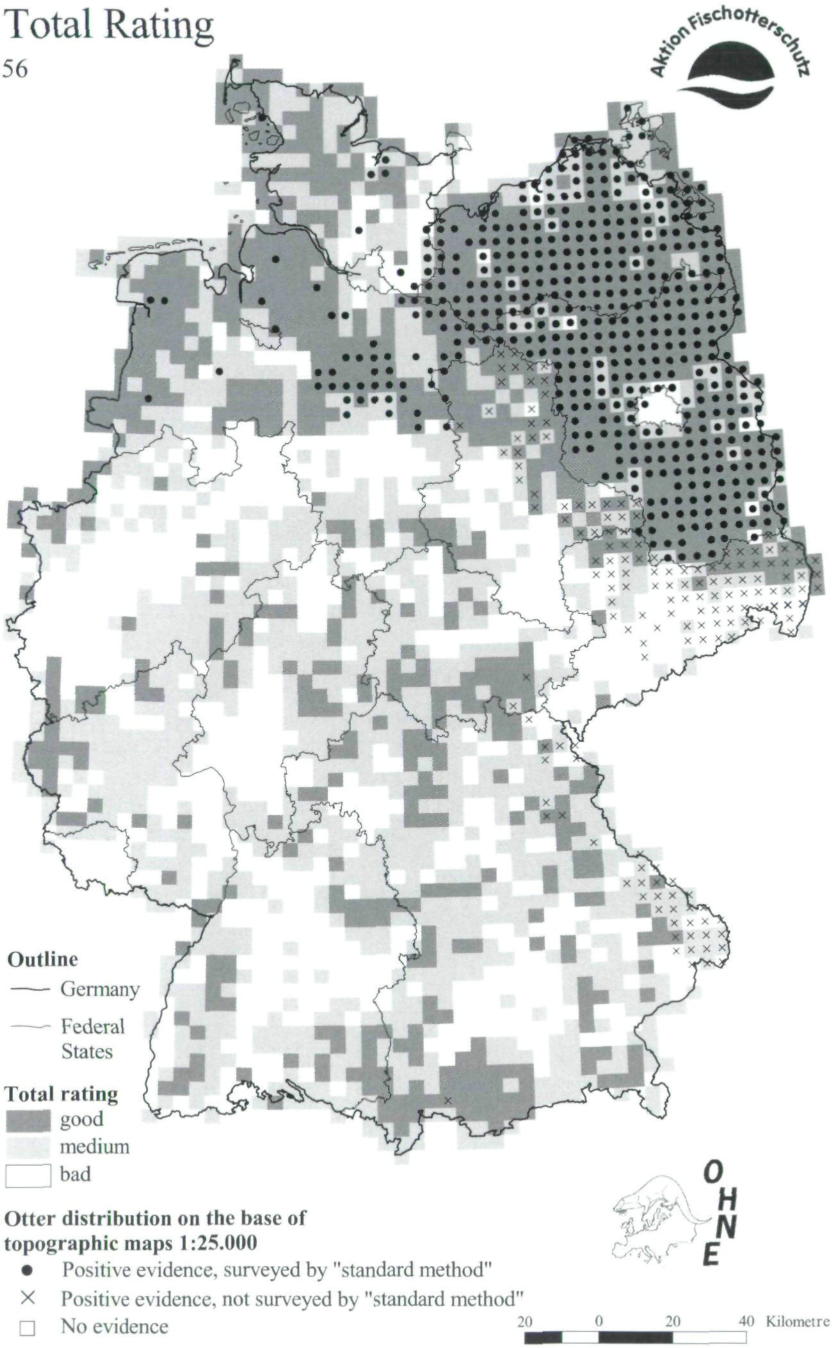

Figure 4: Result of total rating on the base of 11 parameters for the definition of search zones for potential "corridors" and current otter distribution in Germany (the latter is based upon TEUBNER et al. 1999 and REUTHER in press, b)

The problem in otter conservation is, that no limiting levels can be defined for the different parameters. Some of the above named factors might be of more, others of less importance. But nobody can say, which factor can compensate a reduced supply or availability of one of the other factors. From a technical or administrative point of view this might be seen as a dilemma. From an ecological point of view this is the important contribution of otter conservation to nature or wetland conservation in general. This is because the conclusion we have to draw from this cognition is, that we have to conserve or to revitalize wetland habitats to as "natural" a level as possible.

Using the term "natural" requires keeping in mind that this level can not be defined on human standards exclusively. "Nature" (in contrast to "wilderness") should consider economical, social or culturally based human demands (accepting humans as part of nature), but has to be based upon ecological functions and processes in ecosystems.

Three of such functions and processes seem to be most typical for wetland ecosystems:

- Retention of water and substances, since wetlands function as accumulator, buffer and source of water and substances (as nutrients).
- Dynamics over time and space, since wetlands are determined by changes in water levels over seasons or years and over the landscape (as banks, river beds, wet and dry areas, etc.) they are influencing.
- Diversity of species and structures, since the different types of wetlands are inhabited by specific zoonosis' and vegetation formations and are determined by specific structures and habitat types.

Following the premise "no exclusive planning focused on the otter" two groups of "key factors" were defined (table 1), representing those factors which are specific for an otter living space and are related to wetland ecosystems. Subsequently it

Table 1: "Key factors" for the definition of habitats as otter living space or "natural" wetland

Otter specific	**Ecosystem/ socio-economic related**
Availability of riverine- and wetland habitats	Guaranty of retention of water and substances*
Availability of food	Guaranty of dynamics over time and space*
Guaranty of harmless pollution	Guaranty of diversity of species and structures*
Guaranty of possibilities for exchange and expansion	
Guaranty of low, anthropogenous caused interferences	*typical of regional natural states and wetlands

was listed which parameters seem to be useful to represent these key factors and to evaluate which advantages or disadvantages a habitat offers relating to its suitability as an otter living space or to its supply as a "natural" wetland.

This resulted in a list of 37 potential parameters (table 2). But after having examined the list for the availability of reliable and comparable parameters, which additionally are available in a digitized form, only 14 parameters remained.

These data result from

- CORINE, the 'landcover' data of the European Commission based on LANDSAT satellite data,
- GISCO, the geographic information system of the European Commission,
- DDS, a private European road network data supplier,
- GIS data of the German Federal Office for Nature Conservation (BfN) and national agencies of other European countries,
- GIS data of the German Federal Office of Environment (UBA) and national agencies of other European countries,
- Statistic data of the German Federal Office of Statistics and national agencies of other European countries, and
- ESRI data and maps for administration units.

To be able to evaluate these parameters two preconditions needed to be fulfilled: a spatial reference quantity had to be found and a rating system had to be developed. As said earlier it was the intention to use the 10x10 km UTM grid as a spatial reference quantity. But at this point of the project such a grid system was not available in a digitized form. Therefore it was decided to use for a test limited to Germany the digitized topographic map grid on the scale 1:25.000. On an average each square of this grid represents an area of approximately 11x11 km. 3.003 of these squares cover the whole of Germany.

Referring to the fact that most parameters are founded on an indirect, interpretative or empirical base and some of related data are rough or of limited comparability a classification by three classes seemed to be sufficient. The classes "good", "medium" and "bad" express to which degree the parameters correspond to the demands of the otter or to the functions/processes retention, dynamics and diversity. In the beginning it was planned to use a uniform rating system of three groups for these classes. But it became obvious that the quality of the results increased by using three ranking systems. Most classes for the parameters were classified by a "one third variant", where each third of the squares was related to the three groups "good", "medium", "bad". For two parameters (protected areas, potential food supply-altitude) the rating in the three classes was done on an expertise base. And for two other parameters (standing waters, wetland biotopes) their complete absence was classified as "bad" and the cut between "medium" and "good" was done with the arithmetic mean.

On the base of the 14 thematic maps which resulted from the processing of the data and the rating system by the GIS, different variants for the total rating of all parameters were tested. The reason are the two parameters "urban areas" and "agriculture land use" which are considered three or rather two times as separate parameters (urban areas = urban areas as migration barriers, as anthropogenic interference and as level of ground sealing; agriculture land use = pollution from agriculture and agriculture use as anthropogenic interference). It became obvious that this multiple consideration resulted in an overrepresentation of these two parameters. Therefore the number of parameters included in the total rating was reduced to 11, considering "urban areas" and "agriculture land use" only once each.

The total rating of all parameters resulted in a map showing accumulations of squares which are classified as "bad" or as "good". Surprisingly and fortunately the latter correspond to a high degree to the distribution area of the otter in Germany (figure 4). Only in Saxony an incongruity of evidence of otters and the accumulation of squares classified as "bad" is obvious. This deviation needs to be examined in connection with the neighbouring situation in the Czech Republic.

But it looks like the target of this macro planning level could be reached. Some areas became visible which seem to offer low preconditions for a rapid recovery of the otter and which seem to be connected with high problems for the development of "corridors". On the other hand some zones could be defined which seem to offer good preconditions and which should be investigated in more detail for the chance to find suitable wetland areas as part of an otter habitat network.

At the moment the tests for step three of the project is under preparation. This will lead from the theoretical view on "zones" to the realistic examination of wetland areas on the topographic level. It is planned to do this on a scale of 1:250.000. To be able to narrow down the potential search zones quite a bit more, and to do this on a more detailed and realistic base, additional data have to be collected. As one key factor on this level, data are collected about the priorities set by the government for the conservation of wetlands and for nature conservation activities - referring to the "priority zones" defined on the macro level. Another key factor represents the ability of wetland areas to become part of a real connected network. Therefore rivers and small streams are in the foreground since they are the least fragmented by negative factors like crossing roads, urban areas, etc.

Table 2: Potential parameters for key-factors and availability of corresponding data (parameters used for assessment process are shaded grey, the light grey shaded parameters "urban areas" and "arable farm land" have been considered only once each in the total rating process)

Key factor	Parameter	Arguments	Availability of data
Availability of riverine- and wetland habitats	Running waters	Basis for otter habitats.	Flowing waters digitized for Germany (1:25,000) by BfN, for Europe (1:3,000,000) by GISCO. Expressed as „density of waters network".
	Standing waters	Basis for otter habitats. Coastal areas to be ignored, since they are only of importance if freshwater is available (KRUUK 1995)	Standing waters (>25 ha) CORINE 'landcover' data.
	Nearness to ground-water level	Height of ground-water can be a feature for wetlands.	No current (and digitized) data available.
	Wetland biotopes		Moors (peat bogs only), swamps (>25 ha) CORINE 'landcover' data.
Availability of food	Real food supply of fish beyond fish production facilities	Measurements of fish biomass would allow conclusion of availability of the most important food compound of the otter.	Only isolated studies available, which are not comparable. No digitized data.
	Number and density of fish production facilities	Distribution and density of fish production facilities could indicate a high anthropogenic founded food supply.	Not available in detail as necessary.
	Harvest of fish production facilities	Harvest of fish production facilities could be an indicator for a high anthropogenic founded food supply.	Not available.
	Potential food supply - water quality	Data for level of trophic level or of water quality could be used for a calculation of potential availability of fish biomass.	Comparable data not available. Calculation of fish biomass on this base problematic.
	Potential food supply - altitude	By increasing altitude availability of food supply decreases (STRACHAN & JEFFERIES 1996)	Altitude data available in digitized form.
Pollution burden	Chemical water quality	Chemical parameters can indicate the level of anthropogenic caused pollution burden.	Available data not covering the whole area and not comparable.
	Biological water quality	Saprobic classification can indicate the level of anthropogenic caused pollution burden.	Survey methods on European level not comparable. Data cover large water systems only.

Key factor	Parameter	Arguments	Availability of data
	Pollution burden of air, water and ground	Measured values of toxic compounds (heavy metals, PCB's, HCH's) could indicate universal pollution burden in specific areas.	Available data not covering the whole area and not comparable.
	Burden from agriculture land use	The higher the portion of arable land bordering on water systems the higher the pollution burden of water from fertilizers and pesticides.	CORINE 'landcover' data („agriculture land use" is considered only once in total ranking).
Guaranty of possibilities for exchange *and* expansion	Settlements as migration barriers („urban areas")	Despite otters inhabiting urban areas it can be stated that these are not optimal habitats. In most cases here canalization and maintenance of water systems reaches highest intensity. It is assumed that migration barrier function of settlements is increasing by their size.	CORINE 'landcover' data („urbanareas" is considered only once in total ranking).
	Density of traffic network	For otters traffic is one of the main accidental mortality factors. As long as no reliable data are available, which classes of road cause a high or a low threat, all roads have to be considered.	Data available for the whole of Europe in digitized form.
	Frequency of traffic	Threat caused by roads is not only represented by density of traffic network, but also by intensity of its use.	Available data not covering the whole area.
	Size of uncut areas	Size of areas not cut by roads can indicate threat caused by traffic and level of disturbance by human activities.	Available data not covering the whole area and not comparable.
	Technical constructions as migration barriers or potential threats	Weirs, sluices, turbines, water mills, etc. can represent migration barriers or, especially if connected with roads, cause additional threat of accidental mortality. Frequency of such constructions in specific sections of water systems additionally can indicate intensity of utilization of water systems and the conflict potential in case of revitalization measures.	Available data not detailed enough and not comparable.
Influence of anthropogenic interferences	Protected areas	Generally it can be assumed that intensity of landuse and conflict potential in case of revitalization measures is lower in protected areas	In digitized form available for Germany for protected areas >500ha only. Unclear if level of protection is comparable in different European countries.
	Human population density	The number of inhabitants per km^2 can indicate the general utilization or burden of landscape by human activities.	For Germany available on the base of administration units. Need to be transferred to digitized format.
	Intensity of tourism (number of overnight stay of guests)	Indication for general utilization or burden of landscape by human activities additionally to residents.	For Germany available on the base of administration units. Need to be transferred to digitized format.

Key factor	Parameter	Arguments	Availability of data
	Intensity of ship- or boat-traffic	Can indicate level of general utilization of water systems (possibly also intensity of water maintenance)	Data available for large streams or canals only.
	Intensity of use of fyke.nets	For otters fyke-nets are one of the main accidental mortality factors.	No data available covering the whole area.
	Number and/or density of fish production facilities	Can indicate level of conflict potential since otters are regarded as pest by fishermen.	No data available covering the whole area.
	Agriculture land use	It is assumed that a reduction of utilization in agriculture and water maintenance will meet lower resistance in grassland areas than in arable farmland areas and that conflict potential will increase parallel to increasing portion of arable land.	CORINE 'landcover' data („agriculture land use" is considered only once in total ranking).
	Urban areas as anthropogenic interference	It is assumed that potential for conservation and revitalization measures will decrease parallel to increasing portion of urban areas.	CORINE 'landcover' data („urban areas" is considered only once in total ranking).
Retention	Trophic level of water systems	Trophic level of standing waters could indicate potential food supply (of fish). Trophic level indicates intensity of landuse of bordering areas (nutrient burden from agriculture or urban areas).	No data available covering the whole area.
	Level of sealing of the ground (urban areas)	Can indicate level of intensity of urbanization and interference to flowing off system of water.	CORINE 'landcover' data („urban areas" are considered only once in total ranking).
	Type of land use	A relationship is assumed between the kind or intensity of land use and the retention of water and/or substances expressing a increasing order positive for retention: settlement, arable land, grassland, forest.	CORINE 'landcover' data.
	Dams	Dams can increase retention of water in upstream areas. But downstream they can cause reduced water levels and (at least temporary) destruction of semi-aquatic habitats.	No data available covering the whole area.
Dynamics	Type of land use	A relationship is assumed between kind or intensity of land use and guaranty of dynamic processes in wetland habitats. The more intensive land use there is, the narrower is the margin for selfdynamic (natural) development. Parallel to intensity of land use conflict potential in case of revitalization measures is increasing in the order of forest, grassland, arable land, settlement.	CORINE 'landcover' data available but no possibility was found to aggregate these data to a meaningful index.

Key factor	Parameter	Arguments	Availability of data
	Flood zones	Availability of flood zones indicates availability of a high dynamic potential.	No data available covering the whole area.
	Dams	Dams affect to a high degree (especially chronological) dynamic of water flow off by cutting the flow off peaks.	No data available covering the whole area.
Diversity	Present revitalization projects	Revitalization, restoration or similar measures indicate an (aimed) increase of diversity in species and structures and a reduced conflict potential for the development of habitat networks.	Necessary collection and processing of data not achievable in time available.
	Diversity of land use	It is assumed, that a small spacious diversity of land use represents a high level of diversity in structures and possibly in species, too.	CORINE 'landcover' data available but no possibility was found to aggregate this data to a meaningful index.
	Type of bank structures	It is assumed that a high diversity of bank structures has a positive effect to diversity in species.	Available data not covering the whole area and not comparable.
	Intensity of waters maintenance	Parallel to increase in waters maintenance diversity in structures and species is decreasing.	Available data not covering the whole area and not comparable.

3. Discussion

It is undisputed that the methodology is founded on many hypothesis. But is has to be kept in mind that the project was not outlined primarily as a research project and that it has a pragmatic background. It is not the target of the project to construct "otter habitat corridors laboratory". The main aim is to define areas were with a minimum of administrative, economic or technical efforts the limited financial and personal resources can be used most efficiently to develop a real connected network of wetland habitats which offer the chance of a recolonization by the otter. There is no guaranty that the otters will use this network. The question to which extent they will do so, can be an interesting research program for the future. This assumes that the development of the recovery and of the environmental factors will be monitored for a long period and by comparable methods. If this can be assured the project can found the base for further habitat evaluation methods and habitat management programs. But this is a long range vision.

At the moment two main aspects are in the foreground: The optimal use of limited resources for conservation efforts and the connection of local or regional otter conservation activities. In all European countries financial and personal resources for nature conservation are available on a level which is lower than needed. And nature conservation is not restricted to otter conservation. If otter conservation will have a chance to leave the niche of being one problem amidst a hundred others it needs to be incorporated into other aspects of nature conservation. After having the otter popularized since decades as a "symbol" of wetland habitats it now should be used as a target species for wetland conservation (REUTHER 1998b).

There are many local, regional or national activities referring to otter conservation – private as well as governmental. And fortunately enough of their number is increasing. But because of different circumstances, as administrative regulations, individual vanities, limited knowledge and contacts, etc., many of these activities stay limited on the local, regional or national level. These projects offer a great chance to overcome such borders. For people or institutions working on the local, regional or national level it offers the opportunity to adapt their activities to a supraregional or multinational network. This might be a new impetus and motivation for these activities. Anyway it offers new or additional arguments. Being able to explain local, regional or national authorities or financiers that a project is part of an international network will make authorizing procedures or fundraising much easier. And the possibility to point out that a local or regional otter population is an important part of such an international network will ease discussions about the necessity for otter conservation activities on this administrative level.

One of the great methodical weak points of the project is the low availability of spacious, comparable and digitized data. But this supposed disadvantage should be seen as an additional benefit of this project. It can be used as a practical example to show how far away we are, not only from a uniform data base on an international scale, but also from a reliable data base to evaluate the threats or the chances for conservation of wildlife. This example can be used to increase the efforts to make modern techniques available for conservation purposes, too.

The main risk for the project are conservationists who argue that our knowledge about the otter's biology is not sufficient, that the methodology is founded upon too many hypothesis, that there is no chance to realize such an ambitious plan, or that there is no need to prepare special conservation measures for the otter, since the species will find its own way to recover.

If we wait to act until we understand the ecology of each species completely it will be too late for many species. In many cases, not only in conservation, we have to make decisions on a base of little knowledge and have to use what we have. Applying for tangible conservation activities should not automatically mean the reduction of research efforts. Last but not least, practical conservation measures produce new cognitions and thus new chances for research.

There is no doubt that the targets of this project are ambitious – but progress results always from a combination of challenge and risks. The network aspired shall not stay isolated, it shall become part of other nature conservation activities and so called networks, e.g. EECONET (Wolters 1996). And since many of the latter do not form a true connected net, this project can contribute to close the gaps. It is not intended to realize the measures resulting from this planning process as a solo attempt and from a central point. The results of OHNE will form the background for bi- or multilateral activities. A first step and a good example is the TEN (Transnational Ecological Network) project containing Denmark, northern Germany and The Netherlands (Brunken-Winkler 1999).

It is undisputed that the otter will find its own way to recolonize former living spaces. But why should we not support this development? Man is responsible for the decline of otters and nature conservation is not only a social commitment, it is also part of the survival strategy of humans. It is not enough to administrate the problems we caused to our natural environment, we have to find solutions. An efficient nature conservation strategy needs visions and clearly defined targets. "Visions need schedules", this quotation of Ernst Bloch is a guiding principle for the project Otter Habitat Network Europe (OHNE). And the vision is to offer the otter the opportunity to recolonize as many habitats as possible. This is a contribution to biodiversity in wetlands and to the resistance of the population of the Eurasian otter to natural and anthropogenous threats.

4. Forward look

Hitherto experience has shown that it is advantageous to give regional otter or nature conservation specialists a share in the examination process at the end of step 2, the macro planning level. When changing from this theoretical level to the regional and topographic orientated level, the national or regional know how of habitats, data sources, conservation priorities, etc. is needed. How to make such a cooperation most efficient will be tested in the near future in Germany. This will be combined with the first tests for step 4. On this micro planning level definite measures for the development of connecting "corridors" will be planned. It is intended to do this on a topographic scale of 1:50.000 or 1:25.000.

Parallel to this, the acquisition of data for neighbouring countries like Denmark, Poland, Czech Republic, Austria, Switzerland, France, Belgium, Luxembourg and The Netherlands will be continued. Because of the good chances the TEN project offers for a realization of measures priority for the first borders crossing "corridors" is given at the moment to Denmark and The Netherlands. The next priority is planned to be given to the south-eastern part where "corridors" between Saxony, Bavaria, the Czech Republic and Austria have to be defined.

Collection and storage of proofs for the distribution of the otter will be continued also parallel. More than 200 maps of the scale 1:250.000 were mailed to national otter specialists containing the UTM grid. They are instructed how to transfer their distribution data to a data bank allowing to integrate and to process these data by the GIS. On this base the distribution map of the otter for Europe can be actualized continuously in the future.

– The results are based on the state of 1999 –

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