SKINT WATER SERIES

SUSTAINABLE URBAN WATER PLANNING ACROSS BOUNDARIES

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Heuckenlock Nature Reserve – a Hamburg Case Study

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INTRODUCTION

The Heuckenlock nature reserve, situated within the city state of Hamburg in northern Germany, is an exemplary case-study area due to its specific location in the floodplain of the Elbe, which offers various points of reference for nature and water protection and exposure to the most diverse interest groups. The case study will focus on the ecological features of the nature reserve, its role as a recreational area, the statutory conditions governing its status and conflicts of interest and use.

With a length of more than 1,094 km, the River Elbe is the fourteenth longest river in Europe. It rises in the Czech Republic, flows in a north-westerly direction through Germany and finally into the North Sea. The Heuckenlock area in northern Germany, which is the subject of this case study, has an area of 120 ha and is located close to the end of the river. It lies in a particular section of the Elbe valley known as the "Stromspaltungsgebiet" (area where the river splits). With the post-glacial rise of the sea level and the resulting tidal backwater, a large tidal floodplain landscape emerged, of which the Heuckenlock is now the main remaining section. The name "Heuckenlock" means "tideway of the Heucke", Heucke being the name of a family which is still one of the landowners in the nature reserve.

FIGURE 1: THE NATURE RESERVE HEUCKENLOCK FROM A BIRD'S EYE VIEW (© GÖP E.V.).

The nature reserve is situated on the Elbe undercut slope and is an area with a high level of natural vitality and constantly changing vegetation. Since the river gorge on the undercut bank is close to the bank of the river, there is a lack of shallow water areas upstream. The area is nowadays flooded up to a height of 3.5 m as many as a hundred times a year (the highest storm surge occurred in 1976). The mean tidal range (difference between the mean high and low tides) of the Elbe is today approximately 3.3 m. The nature reserve is located in the lee of the Harburg hills to the south, which rise to an altitude of 155 m. It extends for three kilometres along the bank of the Southern Elbe and has a width of up to 400 m (Figure 1).

The driver for developing the nature reserve is to maintain its natural vitality and to restore disturbed sections.

BACKGROUND

FLOODING POTENTIAL

The Heuckenlock is a freshwater tidal area with remnants of an alluvial forest and exhibits a characteristic variety of terrain (Figures 2 and 3): areas of water (tideway), freshwater mud flats which dry out at low tide, reed beds, shrub land, the softwood floodplain comprising above all willows and poplars, and the remains of the hardwood floodplain with ash, oak and elm trees, including an old white elm with a trunk circumference of almost 4.5 m. Apart from the young roots of hybrid poplar trees, there are very few young trees, and hardly any hardwood varieties.

The frequency of flooding and the soil structure are the decisive locational factors for vegetation. The area is rich in mud, while the preponderance of sand deposits increases towards the river, partly in the form of an extensive sand embankment on which primarily the alluvial forest grows. The value of nature protection is particularly high in the middle section, while the eastern section and areas around the former castle offer less variety of relief.

FIGURES 2 AND 3: FRESHWATER TIDAL AREA WITH REMNANTS OF AN ALLUVIAL FOREST (© HAW HAMBURG).

VEGETATION

The shrubbery (containing willow species, hawthorn, guelder rose and spindle trees, including one example estimated to be 300 years old) and weed beds exhibit a high diversity. The richness of nutrients due to flooding gives rise to almost impenetrable primeval-forest-like vegetation and a unique landscape. The shrub land and reed beds are partly characterised by overgrowth, with reed heights of four to five metres. The marsh marigolds are also extremely overgrown. The lush vegetation creates a clearly measurable filtering effect on the water of the Elbe as it flows in and, six hours later, out of the area. Such pre-embankment areas are an important pillar of the river's self-cleaning power.

BIODIVERSITY

The area exhibits considerable biodiversity. 700 plant species have been identified in the past, but changes in the area mean that the number is probably much lower nowadays. The difficulty of surveying the area, the frequent natural reshaping of the terrain and the introduction of seeds by the Elbe and shipping make it virtually impossible to obtain a precise listing.

FIGURE 4: THE WATER DROPWORT ONLY GROWS IN THE FRESHWATER TIDAL AREA OF THE ELBE AND IS A HIGHLY ENDANGERED SPECIES (© GÖP E.V.).

Flora

The plant species include the following: Elbe hair grass and Elbe water dropwort (Figure 4), which only occur in the freshwater tidal area of the Elbe, wheat sedge, which only grows at this location in Germany, and species at the edge of their natural range of distribution. Plant species of eastern origin have also settled here, such as the long-leaf speedwell and black poplar. Rare or eye-catching species include broad-leaved ragwort, danewort, butterbur, common fleabane, various allium species, calamus, purple loosestrife, bistort, other sedge and scipus species, flowering rushes and snake's head fritillary, whose decline can only be warded off by their being cut back to prevent overgrowth and disappearance. The Elbe water dropwort is found in its greatest numbers in the Heuckenlock. A project by the Botanical Association, which has received financing from the Federal Ministry of the Environment for a period of five years, is concerned with the chances of survival and propagation of these plants along the Elbe in Hamburg. A new embankment has been constructed in Overhaken (Vierlande).

FIGURE 5: THE PENDULINE TIT AND ITS HANGING NEST (© GÖP E.V.).

Fauna

Due to the frequent flooding, there are only a few ground-nesting birds in the nature reserve. Tree/reed-nesting birds predominate. Breeding birds include the penduline tit (Figure 5) with its distinctive hanging nest, the nightingale, the long-eared owl, the lesser spotted woodpecker, the great reed warbler and the reed bunting. Large bird colonies of grey heron and cormorant can no longer be found in the alluvial forest; these birds only come to the nature reserve to feed and rest. The area does serve as a roost during bird migration: as many as 20,000 barn swallows and 42,000 starlings have been counted. If north-westerly winds are strong, up to 20 other seabird species appear along the Elbe in Hamburg.

The tideways in the nature reserve offer a good calm-water refuge for Elbe fish, but can also be a death trap if water levels are extremely low.

NATURAL VITALITY OF THE RIVER ELBE

The development of vegetation is essentially dependent on the area's natural vitality. There is no forest use, and only at two places has an attempt been made to push back cultivated poplar. Deadwood is removed from the nature reserve only if it threatens embankments. To maintain stocks of snake's head fritillary in particular, three areas are cut back at least once a year. Willow trees are regularly cut in the area of the footpath by the River and Port Development Office (known since 2005 as the Hamburg Port Authority) and, in the western section of the nature reserve, by the Society for Ecological Planning (GÖP), an association concerned with nature conservation. There has been little planting in recent decades: willow cuttings have been planted, mainly close to the embankment, by the River and Port Development Office, a few hawthorn bushes by the hunting leaseholder and a group of oaks and white elm trees at the former castle by the association which looks after it.

Surrounding the nature reserve are a number of smaller dike forelands with freshwater tidal habitats, giving rise to the possibility of cross-linking with other areas along the river, although these are potentially open to development. The Society for Ecological Planning has produced a catalogue of measures for biotope improvement in these areas.

Inside the embankment, the Society for Ecological Planning, Friends of the Earth Germany (BUND) and the Foundation for Nature Protection have attempted to establish better linkage by restoring and rehabilitating small biotopes. However, intensive market gardening and the lowering of trench water levels have had a negative impact on the natural diversity of species there.

MAIN STAKEHOLDERS AND THEIR INVOLVEMENT

AUTHORITIES

Hamburg City, Authority of Urban Development and Environment (BSU)

In Hamburg the governmental nature preservation is executed by the Authority of Urban Development and Environment (BSU). Hamburg is divided into seven districts, each with its own district authority that is responsible for local nature preservation. The BSU is responsible for defining areas as legal nature reserves. Specific measures for each reserve are defined within various individual plans, the so-called PEP plans ("Pflege- und Entwicklungsmaßnahmen", care and development measures). The district authorities carry out the PEP in cooperation with local partners. Currently the BSU is finalising a special management planning for the Tideelbe region called IBP ("Integrierter Bewirtschaftungsplan Elbe-Ästuar", Integrated Management Plan Elbe-Estuary).

It includes very specific measures to save different sorts of habitats in the entire Tideelbe region, according to Article 6 of the EU Habitat Directive. All plans are focused on communication and cooperation between different stakeholders: the neighbouring states of Niedersachsen and Schleswig-Holstein, various associations for nature protection, other authorities such as HPA and residents and companies that operate in shore areas. The IBP is accompanied by a funding programme from the Federal Ministry of the Environment (BMU) to ensure that the measures can be financed.

Harburg District Authority ("Bezirksamt")

Harburg is a district in the south of Hamburg. Until 2008, the Hamburg-Harburg District Authority was responsible for the Heuckenlock nature reserve. In that year responsibility was transferred to the Hamburg Central District Authority, due to a reform of the administrative organisation. Nevertheless, Hamburg-Harburg

still co-operates in the administration of Heuckenlock as the district authority is responsible for the neighbouring Schweensand nature reserve. Both nature reserves are managed by the Society for Ecological Planning (GÖP e.V.).

Hamburg Central District Authority
Hamburg Central District Authority is responsible for the Heuckenlock nature reserve. The district authority executes measures defined in the local PEP in cooperation with its main local partner for the Heuckenlock nature reserve, the Society for Ecological Planning (GÖP e.V.). The PEP includes general instructions. Most of the smaller measures do not change from year to year. To ensure that measures also match the changing situations, regular meetings take place in order to devise an up-to-date plan. In case extended measures are necessary, other stakeholders are also invited to join the meetings, for example the Authority of Urban Development and Environment of the City of Hamburg (BSU) and Hamburg Port Authority (HPA).

River and Port Development Office (known since 2005 as the Hamburg Port Authority)
The Hamburg Port Authority (HPA) was established in October 2005 during the merging of the port-related activities of various Hamburg authorities. The HPA is the central contact partner for all inquiries related to infrastructure, navigational and operational safety and port security, property management and economic conditions in the port.

The essential aim of the HPA is to develop the port of Hamburg for economical purposes. However, there is also awareness that this development can only be sustainable if it takes the natural dynamics of the Tideelbe into consideration. Further planning, therefore, takes a more integrated and sustainable approach which also considers the interests of the various stakeholders.

In 2006, HPA published the Tideelbe Concept. The main goal is to harmonise ecological and economic demands within this area. The measures planned to secure the Elbe for economical use are aligned as far as possible with current guidelines for nature conservation. Measures for a better flood protection are also detailed. HPA is a cooperation partner for the Heukenlock, as described above. HPA also assists the work of GÖP e.V. by executing small measures such as regularly cutting willow trees within the area of the footpaths.

ASSOCIATIONS FOR NATURE PRESERVATION/NGOS

The Society for Ecological Planning (GÖP e.V.)
The Society for Ecological Planning (GÖP e.V.) handles various nature reserves in Hamburg, in the context of care contracts with the Authority of Urban Development and Environment (BSU) and the district authorities. Therefore GÖP executes a wide range of measures which are defined in official plans, so-called PEP plans (“Pflege- und Entwicklungsmaßnahmen”, care and development measures). GÖP also provides detailed reports on the situation of habitats and offers recommendations for measures to the local authorities. GÖP is a member of the Community for Nature Protection (Arbeitsgemeinschaft Naturschutz), a union of several established associations. This community reviews and comments on current federal plans which may have a significant effect on nature in Hamburg.

Currently, the development and conservation of the Hamburger Elbauen is one of their largest projects. GÖP therefore runs a public information centre at Bunthäuser Spitze in Hamburg-Wilhelmsburg including information and education services. It also supports cooperation and dialogue between the stakeholders.

As described above, GÖP executes measures in Heuckenlock according to the PEP and in close cooperation with the Hamburg-Harburg District Authority. There is also a close cooperation and exchange of practical experience with other associations for nature protection on an informal level. Inside the Heuckenlock embankment, the

Society for Ecological Planning, Friends of the Earth Germany (BUND) and the Foundation for Nature Protection (NABU) have attempted to establish better links by restoring and rehabilitating small biotopes. These biotopes are not officially part of the nature reserve but nevertheless worth saving.

Friends of the Earth Germany (BUND)
Friends of the Earth Germany (BUND) is a non-profit non-governmental organisation (NGO) that handles its own project on nature preservation for the river Elbe. The goal is to restore flood areas and habitats for flora and fauna and improve the water quality of the Elbe. BUND is not formally handling the Heuckenlock; however, it takes part in cooperation and exchange with the different associations to support the parent goal of nature preservation.

Foundation for Nature Protection (NABU)
The Foundation for Nature Protection (NABU) is a non-profit NGO which handles several nature reserves along the Tideelbe, for example Mühlenberger Loch/Neßsand and Elbinsel Pagensand. The goal is to conserve rare habitats for flora and fauna. NABU is also committed to preventing further deepening of the Elbe shipping channel. NABU is not formally handling the Heuckenlock; however, it also co-operates with the different associations to support the parent goal of nature preservation.

Botanical Association Hamburg (Botanischer Verein zu Hamburg e.V.)
The Botanical Association is a non-profit NGO that handles various natural monuments and nature reserves in Hamburg. Members of the Botanical Association Hamburg also support the work of GÖP in an informal way, as partners and counsellors, especially in matters of the endangered Elbe water dropwort species. The Botanical Association has received financing from the Federal Ministry of the Environment.

The greatest numbers of Elbe water dropworts are found in the Heuckenlock and are classified as a priority species in the EU Habitats Directive. Therefore, a testing and development project (E+E-Vorhaben/Erprobungs- und Entwicklungsvorhaben) was run from 2000 to 2004. The aim of the project was to develop appropriate measures for the settlement of the Elbe water dropwort. The results support the aim to sustainably establish and maintain the Elbe water dropwort in this area as set in the EU Habitats Directive.

OTHER NATURE RESERVES

Schweenssand nature reserve
Schweensand is a nature reserve neighbouring Heuckenlock. It is protected by a separate municipal decree. It is under the responsibility of Hamburg-Harburg District Authority and is also handled by the Society for Ecological Planning (GÖP e.V.).

PARENT ORGANISATIONS

UNESCO
UNESCO biosphere reserves are model regions for sustainable development. They strike a balance between the interests of environmental protection and of social and economic development. Biosphere reserves are proposed by member states, and are designated and regulated on the basis of national legislation.

Territories must be characteristic of important ecosystems and specific landscapes. Biosphere reserves must combine nature conservation with the promotion of sustainable social and economic modes of utilisation of natural resources. As model regions they are outdoor laboratories for testing innovative methods which harmonise preservation and utilisation. Biosphere reserves are the only category of “protected areas” set up according to globally consistent criteria by an intergovernmental organisation.

In 1979 the Elbe River Landscape was designated a biosphere reserve (extended in 1997). The designation broadly strengthens the existing legal guidelines (EU Habitats Directive and nature reserve) and validates the importance of nature protection in this region.

CITIZENS

Citizens/residents

All described plans and concepts are always open to dialogue between stakeholders and the public. Information about current measures is provided on the web (for example the special HPA website www.tideelbe.de) and particularly at the public information centre at Bunthäuser Spitze in Hamburg-Wilhelmsburg, run by GÖP. Where comprehensive measures are planned, the public is regularly informed by the media. This approach has already led to a much better appreciation amongst the public for environmental measures, for example amongst neighbouring farmers, who might naturally be sceptical of these issues.
The Heuckenlock is located in a reasonably remote area, so that measures generally do not directly affect citizens. The main stakeholders and their roles are summarised in Table 1.

Stakeholder	Role				Interest										
					Regulators and interest groups						Planning bodies				Others
	Decision-maker	Advisor	Developers	Long term ownership	Wild life	Heritage	Environment	Water quality	Water quantity	Local communities	Strategy planners	Development control	Building control	Road/Transport	
Main Stakeholders:															
Authority of Urban Development and Environment (Hamburg City, BSU)	x			x	x	x	x	x	x	x	x	x			
Hamburg-Central District Authority	x									x	x	x			
Hamburg Port Authority (HPA)	x		x					x	x	x	x	x			
Society for Ecological Planning (GÖP e.V.)	x	x			x		x	x	x		x	x			
Other Stakeholders:															
Hamburg-Harburg District Authority		x								x					
Friends of the Earth Germany (BUND)		x			x		x	x	x						
Foundation for Nature Protection (NABU)		x			x		x	x	x						
Botanical Association		x			x		x	x	x						
Schweenssand Nature Reserve		x			x		x	x	x						
UNESCO		x			x	x	x	x	x						
Citizens															x

TABLE 1. MOST IMPORTANT STAKEHOLDERS LINKED TO HEUCKENLOCK

MAIN PROBLEMS RELATED TO THE INTEGRATION OF LAND AND WATER MANAGEMENT

Conflicts of interest and use arise wherever nature protection, economic use and citizens, as both residents and users, come into contact with each other. Some of the main aspects relating to the use of the site are described below:

Economic use

The alluvial areas were extensively exploited in the Middle Ages, and there was agricultural activity in what is now the nature reserve, such as cutting and grazing, timber harvesting, fruit growing, reed cutting, tree cutting to obtain willow rods and, after 1945, market gardening. All such use was suspended at the beginning of the 1970s because of the difficult terrain and frequent flooding.

Bank stabilisation

The river bank has been largely stabilised with a stone edge. If this were to disintegrate as a result of the present-day flow velocity and water level, this would lead to rapid floodplain loss.

Extension of navigation channels and embankment construction

The extension of navigation channels and embankment construction have permanently changed the frequency and height of flooding and thus impacted on the microclimate and vegetation.

Transport infrastructure

The present-day nature reserve was split in two by the construction of the motorway back in 1939.The area east of the motorway suffered the most damage, with a tideway being filled in. After 1945, the hardwood trees were felled to be supplied as reparations to Great Britain, and they were later replaced with fast-growing balsam poplar trees.

Changes to the water level

However, the greatest problems for the nature reserve result from water-level changes caused by the deepening of the Elbe shipping channel, the closing of barriers on Elbe tributaries due to storm surges and the construction of embankments closing off former tidal areas. While the tidal range at the Bunthäuser Spitze was indicated as being 2.21 m in 1959, it had risen to 3.22 m by 1989. Further deepening of the shipping channel from 13.50 m to 14–15 m will again affect water levels and would inevitably impact the vegetation.

WATER MANAGEMENT SOLUTIONS

SELECTED SOLUTIONS

The main aim in developing the nature reserve is to maintain its natural vitality and to restore disturbed sections. A number of water management solutions have been applied, such as lowering the bank revetment at a number of additional points in order to encourage the formation of further inlets and natural and diverse river banks. There had previously been four 8–15 metre-wide openings behind which troughs formed. However, the erosive force at the undercut bank of the river is so high that, over long stretches away from inlets, the bank reinforcement can be lowered but not completely dismantled.

In order to restore the flow diversion, the Heuckenlock tideway has been extended and is again connected to the Elbe on both sides, which might reduce silting in the tideway.

In order to maintain a minimum water level for fish in the main tideway, remains of old bank reinforcements have been removed and deep-water drums have been dredged at a depth of 1.5–2 m.

Higher flooding has made it necessary in recent decades to raise the level of embankments and strengthen them. Considerable encroachment occurred in 1965 as a result of the embankment being moved inland, and the most recent raising and widening of the embankment in the 1990s took up further land in the nature reserve. It was initially agreed between the environmental and building authorities to leave out the section of the embankment situated in the nature reserve in order to examine further the possibility of shifting it towards the river so as to reduce floodplain encroachment to a minimum. However, shortly after, the turf was removed over the full length of the embankment on the nature reserve, and it was only after the environmental authorities intervened that the works in question were suspended. In view of the fait accompli and the fact that the embankment had to be finished by the autumn in order for it to perform its protective function, it was agreed to continue the works. Nevertheless, a steeper embankment with a paved exterior was built in the Heuckenlock in order to protect the floodplain. Although embankment construction was not subject to compensation measures under the (legally contested) Hamburg Nature Protection Act, the authorities agreed to act in accordance with the impact rules for the purposes of the €180 million programme to raise the Elbe embankment. The replacement of embankments planned as a substitute measure at other locations was only partially implemented, primarily because of legal problems, which meant that there was a deficit of compensation measures.

Other problems for the nature reserve are the water quality of the Elbe, which is still not optimal, and the large-scale washing-up of refuse with the tide, which gets caught in the lush vegetation and accumulates. Recreational activities are limited in the nature reserve because the area is not accessible beyond a footpath that has been built. At the end of 2003 a new bridge was inaugurated over the tideway, which means that the circular route can again be walked. The lush flora in the freshwater tidal area offers the possibility of nature watching.

The water bodies in the nature reserve are closed to boat traffic.

SUSTAINABILITY OF THE SOLUTIONS

The designation as a nature reserve (national legislation) and the determinations of the EU Habitats Directive (international legislation) requires sustainable measures with three main goals: to preserve the natural function of the area, to carry out interventions if necessary (such as the promotion of settlements of endangered species) and to remove and prevent disturbing influences.

Sustainability in nature preservation means that measures have to be continuously implemented. The cooperation between partners such as the BSU, the district authorities and GÖP are, therefore, based on long-term contracts. Agreements are legally set in the PEP. Short-term issues can be quickly resolved as a result of continuous cooperation between the partners.

The legal status of the nature reserve does not allow building and forest use, and the water bodies in the area are closed to boat traffic, so the Heuckenlock is sustainably protected from interference of this kind. This is a key factor in achieving the main goal of the nature reserve: keeping the natural dynamics of the area. Small interventions such as cutting and planting and larger interventions such as lowering embankments also support this aim.

A key point to ensuring sustainability of measures is the cooperation of stakeholders. The greater the consensus that a measure receives, the more reliable are the implementation and the long-term effect. In the past, there already has been a good cooperation between stakeholders, often on an informal basis. Newer concepts and plans such as the IBP and the Tideelbe Concept bring all partners together with a single aim, which in turn means that short-term, unilateral solutions are avoided. The focus lies on measures which are supported by all. Thus conflicts of interest and harmful actions can be avoided.

INTEGRATION OF WATER MANAGEMENT SOLUTIONS IN THE PLANNING PROCESS

An important factor to the success of the preservation of the Heuckenlock was, above all, the competition between Hamburg and Harburg. The channel flow for the North and South Elbe rivers could be partially regulated at the Bunthäuser Spitze, which meant that the relative importance of both ports could be shifted. Hamburg succeeded in concentrating port development on the North Elbe. The conflict was not resolved until 1937, with the passing of the Greater Hamburg Act, which ended Harburg's autonomy. Up to that point, the boundary between the two cities was disputed at the Heuckenlock, so that parts of the territory were not even used for agriculture and the alluvial forest could be preserved. Protection of the area was already envisaged by Harburg, then part of Prussia, as early as 1935. In 1948, Hamburg issued a decree establishing a nature reserve. This was revised in 1977 to extend the nature reserve, primarily to areas to the west of the motorway. Up to 2008, the Hamburg-Harburg District Authority was responsible for the nature reserve, but responsibility was transferred in that year to Hamburg Central District Authority.

As a unique area in Europe, the nature reserve has been incorporated into the network of biogenetic reserves, a worldwide programme of UNESCO. The Heuckenlock is also a European protected area under the EU Habitats Directive.

The decree setting up the nature reserve does not restrict hunting, and the District Authority is therefore able to issue a normal hunting lease. The nature reserve also includes many small, narrow privately owned plots of land, largely on the meadowland behind the embankment. On the opposite bank of the Elbe is the Schweenssand nature reserve, which is also protected by its own decree.

All of the upstream dike forelands have also been notified to the European Commission under the Habitats Directive, but have not yet been designated as a nature reserve by the Hamburg Senate. The new Auenlandschaft Norderelbe nature reserve borders directly on the Heuckenlock to the east.

Of the plant species to be found in the Heuckenlock, the Elbe water dropwort is one of the priority species covered by the EU Habitats Directive.

DIFFICULTIES AND HOW THEY WERE OVERCOME

The main issues were the economic use of the Elbe, the need for protection against floods and the need for nature protection. Changing water levels due to constant extension of navigation channels and embankment construction have had a deep impact on the habitat. On the other hand, higher flooding has made it necessary in recent decades to raise the level of embankments and strengthen them. For example, in order to restore the natural tidal vitality of the area, a lowering of the bank revetment has taken place wherever possible.

The issue does not only have a physical aspect. In previous years, it was legal practise to comprehensively seal the river banks of the Elbe. Nowadays, there is a better understanding of environmental needs and the aim of planning is to achieve agreements with a broad consensus. The HPA, responsible for economic river management, has become more sensitive to nature issues and has integrated them into the Tideelbe Concept. As neighbours at the Tideauen-Zentrum (information centre, run by GÖP), cooperation and exchange between HPA and GÖP has greatly improved over the years.

New measures such as the IBP (developed by the BSU) aim to carry out projects that take environmental and economic needs into consideration and find a balance between these contrary interests. Issues may also arise due to unforeseen costs. For example, the lowering of revetments exposes contaminated material such as rubble and stones. The disposal of this is problematic and expensive. Problems of this kind should be solved more easily in the future when more financial funding is provided, as announced in the IBP.

KEY SUCCESS FACTORS

The conflict between Hamburg and Harburg can definitely be seen as the key factor. The Heuckenlock was not affected by any economic factors. Neither planners nor environmentalists have been particularly interested in the area. As a consequence, it has been left to itself, and habitats could flourish undisturbed.

DISCUSSION AND CONCLUSIONS

As it is so multi-faceted, the Heuckenlock nature reserve is well suited as a case-study area. The flora and fauna at this site are exceptional and worthy of protection. This is legally achieved by the site's designation as a nature reserve.

The nature reserve touches on the specific interests of a wide variety of groups: economic, political, ecological and residents. The Society for Ecological Planning, through its on-site information centres and activities, promotes dialogue enabling these often conflicting interests to be voiced and reconciled.

In this context, this case promotes awareness among experts and the public of the value of the Heuckenlock nature reserve and the need for sustainable water management. An integrated approach to spatial planning and water management and the interaction between the various stakeholder groups involved in planning offer important opportunities for guaranteeing the preservation of this area so worthy of protection.

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