TIDE
Tidal River Development

Project part-financed by the European Union (European Regional Development Fund)

The Interreg IVB North Sea Region Programme

‘Compensation measure Hahnöfer Sand’

Measure analysis 08
in the framework of the Interreg IVB project TIDE

J. Knüppel [1]

[1] Hamburg Port Authority (HPA)

December 2012

HPA
Hamburg Port Authority

Disclaimer

The authors are solely responsible for the content of this report. Material included herein does not represent the opinion of the European Community, and the European Community is not responsible for any use that might be made of it.

Johanna Knüppel
Hamburg Port Authority (HPA)

Citation:
Knüppel, J. (2012): 'Compensation measure Hahnöfer Sand' (Elbe estuary). Measure analysis in the framework of the Interreg IVB project TIDE. Measure 08. 14 pages. Hamburg.

Project part-financed by the European Union (European Regional Development Fund)

Table of Contents

Project part-financed by the European Union (European Regional Development Fund)

The Interreg IVB North Sea Region Programme

List of tables

List of figures

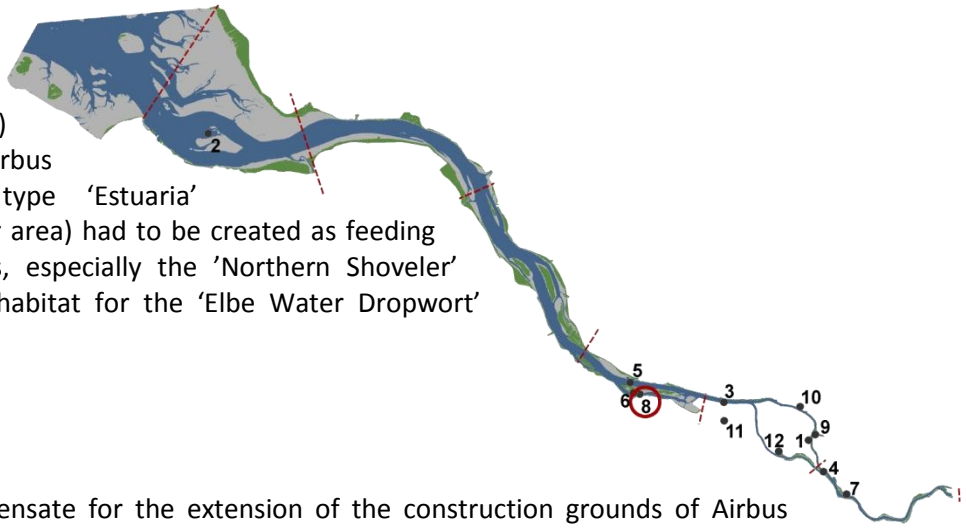
Project part-financed by the European Union (European Regional Development Fund)
The Interreg IVB North Sea Region Programme

Part 1: Measure description

measure category	biology, ecology
estuary	Elbe
salinity zone	freshwater
pressure	habitat loss and degradation
status	implemented 2003
river km	640
country/location	Germany, Hamburg, island Hahnöfer Sand
responsible authority	ReGe Hamburg

1.1 Introduction

In 2001 the measure "Hahnöfer Sand" was implemented as a compensation for the intervention in the 'Birds & Habitat Directive' (BHD) by the expansion of the Airbus company. The habitat type 'Estuaria' (mudflat and shallow water area) had to be created as feeding and resting area for birds, especially the 'Northern Shoveler' (*Anas clypeata*) and as a habitat for the 'Elbe Water Dropwort' (*Oenanthe conioides*).



1.2 Objectives

The measure should compensate for the extension of the construction grounds of Airbus company into the river. It was carried out according to Art.6 § 4 of the Birds & Habitat Directive in order to reach the coherence of the NATURA 2000 network.
The most important target for this measure was the establishment of estuarine habitat with shallow water areas and broad freshwater mudflats as a feeding and resting place for ducks and birds, particularly the *Anas clypeata*. The development of *Oenanthe conioides*, a species of annex II of the Birds & Habitats Directive should be stimulated. The plan was to create the necessary morphological conditions and enhance the predicted sedimentation process of the area in order to create a resting and feeding area for 400 individuals of the *Anas clypeata*. This number of individuals was set by the RAMSAR convention

Project part-financed by the European Union (European Regional Development Fund)
The Interreg IVB North Sea Region Programme

1.3 Background and side conditions

As a part of the compensation for the intervention in the Birds & Habitats area 'Komplex NSG Neßsand' and 'LSG Mühlenberger Loch' two bays were constructed at the location 'Hahnöfer Sand' downstream of the Port of Hamburg in order to create areas for the development of the habitat type 1130 'estuaria'.

1.4 Measure

The beginning of works was in March 2001. Since October 2002 a mudflat area of 63 ha in the western bay is influenced again by the tides. Remaining works for profiling this area, i.e. building of a training wall in front of the bay were finished in 2003.
In 2002 the works in the eastern part of the mudflat started. The area was opened for tidal influence in 2004. All works were completed in 2005. Approximately 80 mill. € were invested.
In 2008 the area became a nature reserve, and since 2010 it is part of the NATURA 2000 network. Further measures in this area should be assessed in order to protect the species *Oenanthe conioides*.

Figure 1: Two created bays at 'Hahnöfer Sand`

1.5 Expected effect

Within the monitoring program 'Suitability of the area as a resting and feeding location for *Anas clypeata'* (Mitschke 2009) it was investigated whether this area is sufficient for establishing the requested population of this duck species. A monitoring program concerning *Oenanthe conioides* (KiFL 2004) and a fish monitoring program were carried out two years after the work on the western part of the area was finished.

Project part-financed by the European Union (European Regional Development Fund)
The Interreg IVB North Sea Region Programme

Figure 2: Oenanthe conioides at the new-build mudflat

Project part-financed by the European Union (European Regional Development Fund)

The Interreg IVB North Sea Region Programme

Part 2: Execution of the main effectiveness criteria

2.1 Effectiveness according to development targets of measure

Definition of development targets:

- Establishment of an intertidal area with freshwater mudflats to compensate the loss of freshwater mudflats in the area of the ´Mühlenberger Loch´.
- Development of feeding and resting place for ducks and other water birds, especially for the 'Northern Shoveler' (Anas clypeata) which is one of the most valuable species in the area 'Mühlenberger Loch'.
- Improving the development of the endemic 'Elbe Water Dropwort' (Oenanthe conioides)

Achievement of development targets

A controversial discussion about reaching the development targets of the realignment 'Hahnöfer Sand' took place. The success concerning nature compensation efforts in this area was generally negated by the NGO's. They considered the compensation measure being not sufficient to compensate the intervention of Airbus Company in the area 'Mühlenberger Loch'.

Siltation of the shallow water area took place and the sediment composition of the mudflats developed in a slightly different way than predicted. However, in general the measure was considered as a success. The area consists of 3% shallow water and 97% mudflats. Two years after the western part was opened to the tide, broad freshwater mudflats had evolved. Expectations on the development of *Oenanthe conioides* were more than fulfilled. The stocking of *Oenanthe conioides* had increased significantly (June: 62 individuals, September: 302 individuals) in front of a margin of willows which developed in 2004. This target was not only fulfilled, the expectations have been exceeded. Other vulnerable species established as well.

The area seemed not to be a good feeding ground for the species *Anas clypeata*, but for many other resting bird species and species protected by the BHD. Populations of ducks and wading birds are fully established. Only the demand of an *Anas clypeata* population of about 400 individuals could not be reached. Therefore the RAMSAR value of threshold criterion (400 individuals) was not fulfilled with regard to the key species *Anas clypeata*. The monitoring on the development of the population of *Anas clypeata* is still going on.

Project part-financed by the European Union (European Regional Development Fund)

The Interreg IVB North Sea Region Programme

2.2 Impact on ecosystem services

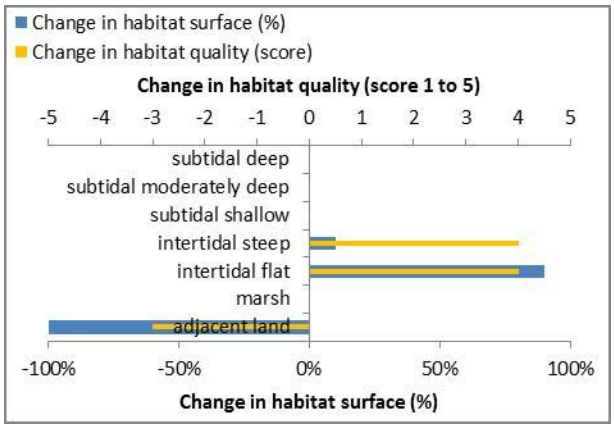


Figure 3: Ecosystem services analysis for Compensation measure Hahnöfer Sand (2002): Indication of habitat surface and quality change, i.e. situation before versus after measure implementation.

- From the ES assessment it is concluded that this measure generates overall a positive expected impact for many ES, with very positive expected impact for:
  - "biodiversity"
  - Erosion and sedimentation regulation (by water bodies)
- The expected impact on the development targets ("Biodiversity") is very positive.
- The expected impact for the different beneficiary groups is overall positive, with a positive to very positive expected impact for indirect and future use and for local use.

Table 1: Ecosystem services analysis for Compensation measure Hahnöfer Sand (2002): (1) expected impact on ES supply in the measure site and (2) expected impact on different beneficiaries as a consequence of the measure.

Compensation measure Hahnöfer Sand (2002)

Cat.	Ecosystem Service	Score
S	"Biodiversity"	3
R1	Erosion and sedimentation regulation by water bodies	3
R2	Water quality regulation: reduction of excess loads coming from the catchment	1
R3	Water quality regulation: transport of polutants and excess nutriënts	0
R4	Water quantity regulation: drainage of river water	1
R5	Erosion and sedimentation regulation by biological mediation	2
R6	Water quantity regulation: transportation	0
R7	Water quantity regulation: landscape maintenance	2
R8	Climate regulation: Carbon sequestration and burial	2
R9	Water quantity regulation: dissipation of tidal and river energy	1
R10	Regulation extreme events or disturbance: Wave reduction	1
R11	Regulation extreme events or disturbance: Water current reduction	1
R12	Regulation extreme events or disturbance: Flood water storage	1
P1	Water for industrial use	0
P2	Water for navigation	0
P3	Food: Animals	0
C1	Aesthetic information	2
C2	Inspiration for culture, art and design	2
C3	Information for cognitive development	2
C4	Opportunities for recreation & tourism	1

Beneficiaries:	
Direct users	0
Indirect users	2
Future users	3
Local users	2
Regional users	1
Global users	1

X Targeted ES

Legend: expected impact*	
3	very positive
2	positive
1	slightly positive
0	neutral
-1	slightly negative
-2	negative
-3	very negative

*: Indicative screening based on ES-supply surveys and estimated impact of measures on habitat quality and quantity. Quantitative socio-economic conclusions require local supply and demand data to complement this assessment.

Project part-financed by the European Union (European Regional Development Fund)
The Interreg IVB North Sea Region Programme

The screening of the ecosystem services (ESS) that were effected by the measure `Hahnöfer Sand` showed the additional benefits that were achieved with the implementation of the realignment.

2.3 Degree of synergistic effects and conflicts according the uses

After implementation of the measure the area was designated as a nature protection area and therefore all hunting and fishing activities, even the hunting from the unprotected dyke area, were forbidden.

.

Project part-financed by the European Union (European Regional Development Fund)

The Interreg IVB North Sea Region Programme

Part 3: Additional evaluation criteria in view of EU environmental law

3.1 Degree of synergistic effects and conflicts according WFD aims

Table 2: Effect of the measure concerning the main pressures in the freshwater zone of the Elbe estuary

Indicator Group	Code	Main pressures freshwater zone Elbe	Effect?					Description: Aim of the measure 'Hahnöfer Sand'
			- -	-	0	+	+ +	
S.I.	-	Habitat loss and degradation during the last about 100 years: Subtidal			0			
S.I.	1.1	Habitat loss and degradation during the last about 100 years: Intertidal					++	Construction of new intertidal areas through dyke realignment
S.I.	1.4/ 1.5	Gross change in morphology/hydrographic regime during the last about 100 years			0			
S.I.	3.1/3.2	Decrease of water and sediment chemical quality			0			
D.I.	2.3	Discharge of nutrients or harmful substances			0			
D.I.	1.3	Land claim during the last about 100 years					++	Construction of new intertidal areas through dyke realignment
D.I.	2.6	Capital dredging			0			

S.I. = state indicator; D.I. = driver indicator

The measure 'Hahnöfer Sand' is, conducted as a compensation measure, not assigned to the WFD. Nevertheless it covers two of the main pressures related to the WFD.

Project part-financed by the European Union (European Regional Development Fund)

The Interreg IVB North Sea Region Programme

3.2 Degree of synergistic effects and conflicts according NATURA 2000 aims

Table 3: Effect of the measure concerning the main conservation objectives in the operational area 3

Operational area (zone)	Natura 2000 conservation objectives	Effect of Measure on conservation objectives			Description
		Positive	No effect	Negative	
3	Improvement of the hydro morphological habitat conditions of the habitat type Estuaries, if possible conservation and improvement of estuary typical dynamics	+			
3	Conservation and development of tidal reeds, hydrophilous tall herb fringe communities (6430) and floodplain/alluvial forest (*91E0) esp. on islands.	+			
3	Conservation, reestablishment and development of meadows with vegetation typical for the Elbe region, like lowland hay meadows (6510) with respect to their avifaunistical function.		+		
3	Conservation and partly reestablishment of the primarily 'Elbe Water Dropwort' (*Oenanthe conioides)* populations with typical dynamics, esp. on the island of Neßsand and Hanskalbsand, as well as Hahnöfersand, development of additional habitats for the improvement of the habitat network.	+			

Project part-financed by the European Union (European Regional Development Fund)
The Interreg IVB North Sea Region Programme

3	Conservation and reestablishment of the outstanding relevance of the functional zone for the reproduction of the twaite shad.	+			
3	Conservation, partly reestablishment and development of the brooding function esp. for the species on extensive used meadows, large-scale reeds and grassland-ditch complexes of the marshes and the associated habitats.		+		
3	Conservation and development of the resting function esp. for Nordic goose and swans, as well as for waders (limnicoles) on the widespread, low disturbed grasslands.	+			
3	Conservation of the resting occurrence of ducks, gulls and sea swallows	+			

Part 4: Crux of the matter

The reasons for the failure of the compensation target “Reaching a valuable resting population for *Anas clypeata*” was investigated within two studies.
The shortfall of shallow water area and an unfavorable development of the evolved mudflats were considered to be the main reason for the absence of the predicted amount of *Anas clypeata*.
The compensation obligations of the coherence targets of NATURA 2000 for the species *Anas clypeata* was finally achieved by the designation of an old unused harbor area were wide mudflats had evolved and the resting population of *Anas clypeata* reached the demanded amounts of about 400 individuals.
It is important to keep in mind, that the system is highly dynamic and the development of an area can only be predicted and steered to a certain extend.
.

Project part-financed by the European Union (European Regional Development Fund)
The Interreg IVB North Sea Region Programme

Contact

Hamburg Port Authority
Manfred Meine
Neuer Wandrahm 4
20457 Hamburg

+49 (0)40 428 47-3052

References

Kieler Institut für Landschaftsökologie KIfL, ReGe Hamburg, Dipl.-Biol. Alexander Mitschke (2009): Kohärenzsicherungsmaßnahme Hahnöfersand. Eignung als Rast- und Nahrungsgewässer für die Löffelente. i. A. ReGe Hamburg.

Kieler Institut für Landschaftsökologie KIfL (2004): Ausgleichsmaßnahme Hahnöfer Sand. Monitoring des Schierlings-Wasserfenchels. Bericht 2004. i. A. ReGe Hamburg.

Project part-financed by the European Union (European Regional Development Fund)

The Interreg IVB North Sea Region Programme