

# Monitoring Specifications

Date: 2010-05-27

## HD Habitat Type 1130 Estuaries





## ARGE BLMP - Working Group for the North Sea and Baltic Sea Monitoring Programme

At the 34th North German Environmental Ministerial Meeting held on 17 April 1997, the competent departments of the German Federal Government and of the federal states of Hamburg, Mecklenburg-Vorpommern, Lower Saxony and Schleswig-Holstein agreed to establish a joint working group co-ordinating the monitoring of the marine environment of the North and Baltic Seas (ARGE BLMP Nord- und Ostsee).

Members of ARGE BLMP are:

- Federal Ministry of Food, Agriculture and Consumer Protection
- Federal Ministry of Transport, Building and Urban Development
- Federal Ministry for the Environment, Nature Conservation and Nuclear Safety
- Federal Ministry of Education and Research
- Authority for Urban Development and Environment of the Free and Hanseatic City of Hamburg
- Mecklenburg-Vorpommern Ministry for Agriculture, the Environment and Consumer Protection
- Lower Saxony Ministry for the Environment and Climate Protection
- Schleswig-Holstein Ministry for Agriculture, the Environment and Rural Areas

The Monitoring Manual describes the current measuring programme implemented under BLMP. The monitoring requirements of the different EC Directives (Marine Strategy Framework Directive, Water Framework Directive, FFH, Birds Directive), marine protection conventions (OSPAR, HELCOM, Trilateral Monitoring and Assessment Program) and other bodies of regulations have been taken into account in the Manual. The Monitoring Manual is available free of charge on the BLMP website at [www.blmp-online.de/Seiten/Monitoringhandbuch.htm](http://www.blmp-online.de/Seiten/Monitoringhandbuch.htm)

### Editorial information

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# 1 General

## 1.1 Subject area

Biological Monitoring - Habitats - HD Habitat Type 1130 - Estuaries

## 1.2 Definition

Estuaries (Natura 2000 Code 1130)

### 1.2.1 EU-Definition

The European Commission is currently drafting a *Guidance document on estuaries and adjacent coastal zones*. The latest draft proposes the following revision of the definition of Habitat Type 1130 in the EC *Interpretation Manual*:

Downstream part of a river valley extending from the limit of brackish water. The outer limit has to be defined at local level in coherence with the transitional water bodies identified during the WFD implantation.

In North-East Atlantic coast, estuaries are subject to the tide. River estuaries are coastal inlets where, unlike "large shallow inlets and bays" there is generally a substantial fresh water influence. The mixing of fresh water and sea water and the reduced current flows in the shelter of the estuary lead to deposition of fine sediments, often forming extensive intertidal sand and mud flats. Estuarine ecosystems are characterized by subtidal and intertidal habitats (slikke) including salt marshes (shore). Some of them are identified as habitat types in their own right and occur in other coastal areas. Where the tidal currents are faster than flood tides, most sediments deposit to form a delta at the mouth of the estuary.

Channels and/or shipping lanes are part of the habitat in all geographical conditions as they play a role in the hydrological functioning of estuaries, including the circulation of water and the deposition of sediment. Furthermore, these channels may also form part of the estuarine migration routes of Annex II fish species.

If fresh water tidal areas form part of the estuary, the upstream boundary may be marked by the limit of tidal influence. However occurrence of tidal influence without brackish water is not sufficient for defining the habitat type 1130 estuaries. Nevertheless, it is possible and in the discretion of Member States to designate such areas under 1130.

Baltic, Mediterranean and Black sea river mouths may be considered as estuary subtypes with brackish water and nearly no tide. Their definition is made at Member states level in relation with the obligations of the annex 2 of the Water Framework Directive (typologies). When the distinction among habitat is uncertain, as between 1130 estuaries and 1150\* lagoons, the choice made by the Member states in the Standard Data Form will be considered as accurate. In Baltic estuaries, large wetland vegetation (halophytic) and luxurious aquatic vegetation in shallow water areas occur.

An estuary forms an ecological unit with the surrounding terrestrial and subtidal coastal habitat types. In terms of nature conservation, these different habitat types should not be separated, and this reality must be taken into account during the selection of sites. Estuaries are sometimes related to coastal lagoons (1150\*) or to large shallow inlets and bays (1160). Sand banks (1110), sandflats and mudflats (1140), reefs (1170) and salt marshes (1310 to 1330) may also be a component part of habitat 1130 Estuaries.

### 1.2.2 National definition (BfN)

See the [BfN-Definition](#) and the following explanations:

Sea river mouths, provided they are still subject to regular influences from brackish water (with identifiable adaptations on the part of plants and animals) and tides (North Sea only), with communities in the water body, on the bed of the estuary and on the banks. In contrast to "shallow inlets and bays", there is a throughflow of water markedly influenced by fresh water. The vegetation along the banks (riparian tall herbs, annual populations, salt marsh, tidal alluvial forest, etc.) is included in this habitat type. Habitat Type 1130 constitutes a landscape complex that may consist of numerous biotope types.

### 1.2.3 Mapping procedure

In its horizontal plane, Habitat Type 1130 (estuaries) encompasses the whole, passable river water body of the polyhaline river mouth area as far as the upper brackish water limit (oligohaline zone). Optionally, limnic areas of the tidally influenced river system may also be components of the network of sites used for reporting on this habitat type, in which case they are also to be integrated into the relevant sites.

Estuaries are taken to comprise all river mouth areas and lower reaches of rivers that are subject to regular influences from salt or brackish water (defined as  $\geq 0.5$  parts per thousand; in the Elbe, this area extends as far as the confluence of the Wedeler Au); on the North Sea, 1130 sites also include areas that are subject to a tidal influence in the fresh water area (Baltic Sea, see below). As a matter of principle, according to an agreement between the Länder, those areas that are reached at least ten times a year (ten-year average) by tidal and/or high water-related water level fluctuations are included in the sites designated. In this respect, ecologically coherent biotope and habitat complexes, and hydrological and

geomorphological structures typical of estuaries are to be incorporated into the sites as fully as possible. The influence of flowing water must be a determining factor when areas are allocated to estuaries. The boundaries of estuaries in the North Sea are defined using the same method as for the implementation of the WFD, which involves drawing a straight line between the outermost landmarks (Elbe: Cuxhaven-Friedrichskoog; Eider: Hundeknöll-Vollerwiek (Eider Barrage); Weser: Langwarden-West Padingbüttel dyke corner (in contrast to the delimitation of transitional waters under the WFD); Ems: East Eemshaven dyke corner-West Pilsum dyke corner).

Estuaries on the Baltic Sea are delimited from large shallow inlets and bays, and coastal lagoons on the basis of the determining hydrological and hydrochemical conditions. In the absence of tides, the up-river boundary is determined exclusively by the brackish water limit (0.5 parts per thousand). In practice, this boundary is frequently drawn by reference to plant species indicative of salt. When the salinity of surface water is being measured, it is to be kept in mind that, due to its greater density, salt water forms a layer under fresh water when conditions are calm, which means the salinity is frequently greater at deeper points in flowing water than that at the surface.

The vertical plane of Habitat Type 1130 (estuaries) encompasses all zonations of the deep water area (including artificially deepened navigation channels) as far as the upper limit of the area influenced by the highest water levels (e.g. due to storm surges, high waters). The upper boundary is often determined by built structures (e.g. dykes) that artificially constrict the original estuary. Heavily anthropogenically influenced areas, including adjacent seaward tidal and wind flats and expanses of water that do not belong to current HD areas, are excluded.

In addition to this, sites assigned to other habitat types within the biotope complex (including 1110, 1140, 1210, 1310, 1330, 6430, 6510 and 91E0) are surveyed and assessed as habitat types in their own right. Other biotope types found in estuaries, such as sandy beaches, brackish and fresh water riverine tidal and wind flats, beds of common reeds, grasslands and wooded areas are also surveyed separately, but summarily assessed as delimited functional spaces within Habitat Type 1130.

Estuaries may be subdivided into ecological functional spaces (see section 4.1) for the purposes of mapping and assessment.

### 1.3 Competent authority/ies

Bremen:	SBUV
Hamburg:	<a href="#">BSU</a>
Mecklenburg-Vorpommern:	<a href="#">LUNG</a>
Lower Saxony:	<a href="#">NLWKN</a> , <a href="#">NLPV NI</a>
Schleswig-Holstein:	<a href="#">LLUR</a> , <a href="#">LKN-SH</a>

### 1.4 Working group

Ad Hoc Working Group on Habitat Types

## 2 Monitoring requirements

### 2.1 Necessity

#### [MSFD \[1\]](#)

##### Article 11, Annexes III and V

Comments

On the basis of the initial assessment made pursuant to Article 8(1), Member States shall establish and implement coordinated monitoring programmes for the ongoing assessment of the environmental status of their marine waters on the basis of the indicative lists of elements set out in Annex III and the list set out in Annex V, and by reference to the environmental targets established pursuant to Article 10.

The monitoring programme should cover the essential features and characteristics and the environmental status of those waters, based on the indicative lists set out in Annex III.

The following aspects must be covered:

- a) The physical and chemical features, the habitat types, the biological features and the hydro-morphology.
- b) The predominant pressures and impacts, including human activity, on the environmental status of those waters.

#### [Birds Directive](#)

##### Article 10

Comments

1) Member States shall encourage research and any work required as a basis for the protection, management and use of all species of bird referred to in Article 1.

2) Particular attention shall be paid to research and work on the subjects listed in Annex V.

ANNEX V

- a) National lists of species in danger of extinction or particularly endangered species, taking into account their geographical distribution.
- b) Listing and ecological description of areas particularly important to migratory species on their migratory routes and as wintering and nesting grounds.
- c) Listing of data on the population levels of migratory species as shown by ringing.

#### [HD \[2\]](#)

##### Article 11 [3]

Comments

Member States shall undertake surveillance of the conservation status of the natural habitats and species referred to in Article 2 with particular regard to priority natural habitat types and priority species.

##### Article 17 [4]

Comments

Every six years [...] Member States shall draw up a report on the implementation of the measures taken under this Directive. This report shall include in particular information concerning [...] the main results of the surveillance referred to in Article 11.

#### [WFD \[5\]](#)

##### Article 8

Comments

Member States shall ensure the establishment of programmes for the monitoring of water status in order to establish a coherent and comprehensive overview of water status within each river basin district:

for surface waters such programmes shall cover:

- the volume and level or rate of flow to the extent relevant for ecological and chemical status and ecological potential, and
- the ecological and chemical status and ecological potential.

## HELCOM

Comments

See the following monitoring specifications: [Macrophytes](#), [Macrozoobenthos](#), [Fish](#), [Birds](#), [Pollutants](#), [Hydrochemistry](#), [Hydrography](#), [Hydrology](#), [Substrate](#) und [Bathymetry](#)

## OSPAR

Comments

See the following monitoring specifications: [Macrophytes](#), [Macrozoobenthos](#), [Fish](#), [Birds](#), [Pollutants](#), [Hydrochemistry](#), [Hydrography](#), [Hydrology](#), [Substrate](#) und [Bathymetry](#)

## TMAP [6]

Comments

See the following monitoring specifications: [Macrophytes](#), [Macrozoobenthos](#), [Fish](#), [Birds](#), [Pollutants](#), [Hydrochemistry](#), [Hydrography](#), [Hydrology](#), [Substrate](#) und [Bathymetry](#)

## Technical necessity

The monitoring frequencies required differ depending on the relevant law, directive, convention, etc. and the parameters to be considered. In each case, the monitoring frequencies are specified by reference to the individual parameters. On this topic, see the following monitoring specifications: [Macrophytes](#), [Macrozoobenthos](#), [Fish](#), [Birds](#), [Pollutants](#), [Hydrochemistry](#), [Hydrography](#), [Hydrology](#), [Substrate](#) und [Bathymetry](#)

## 2.2 Environmental targets

### HD

To secure and, where applicable, develop the favourable conservation status of Habitat Type 1130 (estuaries). The following measures may be required for this purpose:

a.) General targets:

- Conservation and development/restoration of the estuary with its saline, brackish and fresh water zones, and adjoining areas as a large ecosystem and habitat complex in as natural as possible a state with all structures and functions
- Conservation and development/restoration of the characteristic saline, brackish and fresh water zoning with its corresponding biotopes and species
- Conservation and development/restoration of hydrochemical and hydrophysical water conditions and processes of neritic zones and estuaries involved in the formation of biotopes
- Conservation and development/restoration of largely natural sedimentation and current conditions, and largely natural dynamics in coastal, river and riparian areas affected by natural inundations
- Conservation and development/restoration of a largely natural soil structure and morphodynamics
- Conservation and development/restoration of sections of river that do not have hard structures along their banks, are unchannelised, have undergone few other modifications or have been regenerated without their banks and bed being stabilised or the construction of dams and water extraction systems
- Conservation and development/restoration of ecological interrelationships with surrounding terrestrial, limnic and marine areas
- Conservation and development/restoration of the estuary's function as a barrier-free migration route for water-bound organisms
- Conservation, development, safeguarding and, if necessary, restoration of the estuary's general and specific functions for species for which special responsibilities exist (Annex II HD, Annex I BD and other international agreements).

b.) Specific targets:

- Extension of the areas subject to inundation and sedimentation
- Increase in the proportion of shallow water zones
- Increase in the proportions of alluvial forests, reedbeds, tall herbaceous communities, salt meadows, species-rich grassland and other biotope types typical of estuaries
- No action to maintain bank defences or construct new bank defences, where there are no compelling grounds for the bank to be stabilised
- Restoration of passability for migrating fish and lampreys

Overall, it is not so much a matter of conserving the status quo of individual HD conservation resources in the estuary, but of preserving and promoting the essential functions of the estuary in a changing landscape.

## 2.3 Threats

The following anthropogenic influences are potential threats:

- Inputs of nutrients and pollutants
- Changes in course and structure
- Expansion and maintenance of navigational channels
- Construction and operation of port and industrial installations (e.g. power stations)
- Dyke building, training dykes, bank revetements
- Relocation of sediment, dumping, disposal sites for dredged materials
- Alterations to characteristic hydrological variables, e.g. passability, due to structures built across the estuary and hydropower stations
- Shifts in the brackish water limit upstream
- Increases in current speeds
- Tidal pumping effect: decline in areas of shallow water due to the silting up of side channels
- Exploration and extraction of raw materials (gas and oil)
- Drainage of the inundation area
- Intensive agricultural and forestry use of the inundation area
- Shipping traffic, e.g. erosion of banks caused by wave attack
- Recreational use/tourism
- Professional and sport fishing
- Hunting
- Rising sea levels
- Encroachment of invasive species

## 2.4 Spatial allocation

	EEZ	12- nm zone	Coastal waters 1)	Transitional waters
MSFD	-	-	x	x
Birds Directive	-	-	x	x
HD	-	-	x	x
WFD	-	-	x	x
HELCOM	-	-	x	x
OSPAR	-	-	x	x
TMAP	-	-	x	x

1) Under the WFD: baseline plus one nautical mile

## 3 Monitoring concept

The foundation for the network is provided by the Concept for the Monitoring of the Conservation Status of Habitat Types and Species under the Habitats Directive in Germany (*Konzept zum Monitoring des Erhaltungszustandes von Lebensraumtypen und Arten der FFH-Richtlinie in Deutschland*), which was drawn up at the federal level for terrestrial habitat types on the basis of the results of an R+D project (Sachteleben, Behrens et al., 2009).

Each of the occurrences of HD Habitat Type 1130 (estuaries) is to be regarded as a single site within the boundaries described by the Länder in the Natura 2000 report. There are therefore four sites in the North Sea catchment (the Elbe, the Weser, the Ems and the Eider) and four further sites in the Baltic Sea catchment (the Trave, the Warnow, the Darß-Zingst Bodden Chain with the Recknitz, and the Peenestrom with the Achterwasser and the Kleines Haff). Under the concept, a total census is to be carried out for this habitat type on account of the small number of sites.

### 3.1 Description of monitoring network

#### North Sea

Monitoring units have been defined for the North Sea and are available within the BfN as shapefiles.

#### Baltic Sea

Monitoring units have been defined for the Baltic Sea and are available within the BfN as shapefiles.

The following parameters, which are derived from the habitat type assessment matrix (section 4.1), are already covered by monitoring networks that can be used to aggregate data meaningfully for the assessment of Habitat Type 1130 (estuaries):

- Hydrology  
See the monitoring specifications for Hydrology and Morphology (Substrate, Bathymetry)
- Sublittoral and eulittoral structures, bank structures, inundation areas  
See the monitoring specifications for Hydrology and Morphology (Substrate, Bathymetry); depth-sounding plans; evaluation of aerial images
- Vegetation structures  
See the monitoring specifications for Hydrology and Morphology (Substrate, Bathymetry); evaluation of aerial images; biotope mapping
- Completeness of typical species inventory  
See the monitoring specifications for Macrophytes, Macrozoobenthos, Fish, Birds, Mammals
- Global input of nutrients  
See the monitoring specifications for Pollutants
- Global input of hazardous substances  
See the monitoring specifications for Pollutants
- Dumping activities  
WSV data
- Passability for migrating fish  
See the monitoring specifications for Hydrology and Morphology (Substrate, Bathymetry)
- Bank improvement  
WSV data
- Bank erosion  
See the monitoring specifications for Hydrology and Morphology (Substrate, Bathymetry)
- Water engineering measures and shipping traffic  
WSV data; official statistics
- Drainage of the inundation area  
Evaluation of aerial images
- Exploration and extraction of raw materials  
Official statistics
- Sediment extraction  
WSV data
- Built developments  
Evaluation of aerial images
- Professional and sport fishing of all types (e.g. beam-trawl fishing, trawl fishing, gillnet fishing, angling)  
Official statistics

- Recreational use/tourism  
Partly from official statistics
- Dyke building  
Evaluation of aerial images
- Agricultural and forestry use  
Evaluation of aerial images
- Invasive species  
Evaluation of biotope mapping

## 3.2 Monitoring activities

### North Sea and Baltic Sea

#### Surveying and Evaluation of Estuaries (1130)

##### Methods:

Area-wide surveying of all sites to ascertain their range and area. Selection and permanent specification of representative sample areas or transects for the detailed surveying of particular parameters (see below).

##### Basic monitoring and specification of the monitoring network

An area-wide survey of the habitat type is carried out in the course of the six-year reporting cycle in order to assess its range and area as characteristic variables. Both on the North Sea and on the Baltic Sea, this survey is carried out using aerial images and the biotope mapping keys issued by the Länder and/or the TMAP typology and the associated mapping key. The primary goal is the uniform characterisation and assessment of the HD habitat type across the different Länder.

HD Habitat Type 1130 (estuaries) constitutes a habitat complex that, in consequence, may also include further HD habitat types, which are integral components of the complex. The following are among the possible component habitat types:

- 1110 Sandbanks which are slightly covered by sea water all the time
- 1140 Mudflats and sandflats not covered by seawater at low tide
- 1210 Annual vegetation of drift lines
- 1310 *Salicornia* and other annuals colonising mud and sand
- 1320 *Spartina* swards (*Spartinion maritimae*)
- 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- 2120 Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes')
- 2330 Inland dunes with open *Corynephorus* and *Agrostis* grasslands
- 2310 Dry sand heaths with *Calluna* and *Genista*
- 6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels
- 6510 Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*)
- 91E0\* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)
- 91F0 Riparian mixed forests of *Quercus robur*, *Ulmus laevis* and *Ulmus minor*, *Fraxinus excelsior* or *Fraxinus angustifolia*, along the great rivers (*Ulmenion minoris*)

Furthermore, the following Habitats Directive species are significant for the characterisation of estuaries:

- 1095 Sea lamprey, *Petromyzon marinus*
- 1099 River lamprey, *Lampetra fluviatilis*
- 1103 Twait shad, *Alosa fallax*
- 1106 Atlantic salmon, *Salmo salar*
- 1130 Asp, *Aspius aspius*
- 1351 Harbour porpoise, *Phocoena phocoena*
- 1365 Common seal, *Phoca vitulina*
- 1601\* Elbe water dropwort, *Oenanthe conioides*

As components of the superordinate HD Habitat Type 1130 (estuaries), all the above-mentioned conservation resources are subject to EU reporting obligations in their own right, and are therefore covered by the regular HD monitoring programme run by the German federation and Länder under the LANA decision, as well as, where applicable, the HD monitoring programmes implemented by the individual Länder. In consequence, it is also possible for questions raised about Habitat Type 1130 (estuaries), as the next higher level in the hierarchy, to be answered by aggregating in a meaningful fashion the data obtained from investigations and assessments that are conducted for these purposes using the monitoring networks dedicated to specific conservation resources. This applies to the same extent for the exploitation of the data on the quality parameters 'macrozoobenthos', 'macrophytes' and 'fish' acquired in the context of the monitoring obligations imposed by the WFD. If appropriate monitoring units required to satisfy the obligations imposed by the Habitats Directive and Water Framework Directive are located within the boundaries of Habitat Type 1130 (estuaries) sites, the information

gathered there may be fed directly into the evaluation of these sites.

Remaining gaps in knowledge require dedicated surveys. For instance, there is a need for, above all, continuous observation of the increase or decline in the areas covered by the biotopes found in 'estuary' habitat complexes, such as deep water areas, shallow water zones, tidal and wind flats, reedbeds, alluvial forests and farmland. To this end, evaluations of water depth-sounding plans, laserscanning overflights and the evaluation of aerial images are necessary every three years if possible (every six years, at least).

Should the information gained from the two approaches discussed above not be sufficient for a plausible assessment of conservation status, additional terrestrial mapping is required. To this end, transects are to be established at suitable points from the foot of the dyke to the sublittoral zone as long-term observation areas that reflect the gradients characteristic of the estuary in question (shallow to deep, fresh water to sea water), as well as the typical habitat and species inventories.

Since reedbeds are not subject to monitoring obligations as a separate HD habitat type and their significance for the quality of HD Habitat Type 1130 (estuaries) is particularly great, a monitoring programme should be established for this biotope type that meaningfully consolidates data from the current macrophyte monitoring units, which are required in transitional waters to comply with the WFD. In addition to this, depending on the salinity gradient, up to ten monitoring units should be established between the polyhaline river mouth and the limnic area. The reedbeds are to be mapped accordingly every three years if possible (every six years, at least).

**Frequency:**

All sites must be sampled at least once within a reporting period of six years, in which respect attention is to be paid to the even and ecologically meaningful distribution of sampling activities across these six years.

**Parameter:**

- Completeness of the typical species inventory (plants, macrozoobenthos, fish, birds, beetles, mammals)
- Hydrology
- Impairment factors
- Impairments (exploration and extraction of raw materials, sediment extraction, built developments, professional and sport fishing of all types (e.g. beam-trawl fishing, trawl fishing, gillnet fishing, angling))
- Impairments (global input of nutrients, global input of hazardous materials, dumping activities, passability for migrating fish, bank improvement, bank erosion, water engineering measures and shipping traffic, drainage of the inundation area)
- Impairments (recreational use/tourism, dyke building, agricultural and forestry use, invasive species)
- Range and area
- Sublittoral and eulittoral structures, bank structures, inundation area
- Typical spectrum of structures, species and vegetation types
- Vegetation structures (biotope types according to the mapping keys issued by the Länder)

**3.3 Additional parameters**

## 4 Assessment

### 4.1 Assessment procedures

#### North Sea and Baltic Sea

**Title**

HD Habitat Types - Estuaries (1130)

**Guideline:**

HD

**Comments:**

The assessment matrix for Habitat Type 1130 can be downloaded by clicking on the following link:

[Assessment matrix](#)

For the purposes of assessing conservation status, functional spaces that are to be assessed separately (assessment subareas) may be delimited within extensive estuaries, thus making it possible for both quality differences and any measures that are required to be identified with greater clarity. The criteria for the delimitation of such functional spaces are: salinity levels, differentiation into sublittoral/eulittoral/supralittoral zones, main rivers and tributaries or side channels, bays, islands, types of agricultural use.

Biotopes that are simultaneously to be allocated to another habitat type (e.g. salt meadows) are assessed twice (as a separate habitat type and as part of the estuary complex in question).

The assessment table referred to above is supplemented by the assessment of estuarine functional spaces designated as assessment subareas according to the following principles:

**Subarea assessment of the conservation status of estuarine functional spaces**

	A	B	C
Sublittoral zone	Side channels without deepened navigational channels and major impairments	Side channels without deepened navigational channels, but with indirect impairments, e.g. due to changes in currents and pressure on water quality	Main rivers with regularly deepened navigational channels
Eulittoral zone (tidal and wind flat areas, incl. bank line, not including additional habitat types)	Near-natural tidal and wind flat areas with complete vegetation zoning (including well developed beds of rushes and common reeds), gradual transition to shallow water zones, banks unstabilised	Near-natural tidal and wind flat areas with well developed vegetation zoning (including extensive beds of common reeds), shallow water zones restricted, banks stabilised in places	Tidal and wind flat areas heavily impaired by the deepening of shipping channels and wave attack (tidal and wind flat areas slope relatively steeply into deep water, reedbeds absent or only fragmentary), banks stabilised
Supralittoral zone (inundation areas, not including additional habitat types)	Species-rich grassland (mesophile grassland (GM), other species-rich humid and wet grassland (GF), sedge-, rush- or tall herb-rich wet meadow (GN)), dry reedbeds, sedge fens and/or willow scrub with natural relief and natural tidal channel system	Species-rich grassland (mesophile grassland (GM), other species-rich humid and wet grassland (GF), sedge-, rush- or tall herb-rich wet meadow (GN)), dry reedbeds and/or sedge fens with group structure or with subareas comprising species-poor grassland (intensive marsh grassland (GIM)); apart from ditches, near-natural tidal channels also present	Artificially drained areas with species-poor grassland (intensive marsh grassland (GIM), sown grassland (GA)), eutrophic fallow stages (semiruderal grass and herbaceous communities (UH)), allochthonous stands of woody plants, arable land, etc.; more natural biotopes scattered in small patches, at most
Subareas that are to be allocated to another habitat type	Assessment in accordance with the standards for the habitat type in question (cf. 1140, 1170, 1310, 1320, 1330, 6430, 6510, 91E0, etc.)		

## 5 Quality assurance

- Quality Assurance Panel

### Comments

The participating institutions are striving to build up uniform QA standards using a quality management system.

### 5.1 Monitoring institutions

- [LLUR](#)
- [NLPV HH](#)
- SBUV
- [LUNG](#)
- [NLWKN](#)
- [NPV SH](#)
- [BSU](#)
- [NLPV NI](#)
- [NPA-MV](#)
- Counties

### 5.2 Guidance documents

- Drachenfels, O.v., ed., 2008: 'Hinweise zur Definition und Kartierung der Lebensraumtypen von Anh. I der FFH-Richtlinie in Niedersachsen - auf der Grundlage des Interpretation Manuals der Europäischen Kommission (Version EUR 25 vom April 2003): Stand: 04/2008' (unpublished).
- Drachenfels, O.v.; 2004: *Kartierschlüssel für Biotoptypen in Niedersachsen unter besonderer Berücksichtigung der nach § 28a und § 28b NNatG geschützten Biotope sowie der Lebensraumtypen von Anhang I der FFH-Richtlinie: Stand März 2004: 6., völlig überarb. Aufl.*; Naturschutz Landschaftspf. Niedersachs.; A/4; 240 pp.
- Draft-version [Guidance document on estuaries and adjacent coastal zones](#)
- European Commission / DG Environment, 2003: [Interpretation Manual of European Union Habitats, Eur 25 \(April 2003\)](#).
- European Commission, 1999: [Towards a European Integrated Coastal Zone Management \(ICZM\) Strategy: General Principles and Policy Options](#); Luxembourg; Publications Office of the European Union.
- European Commission, 2003: [Common implementation strategy for the water framework directive \(2000/60/EC\), Transitional and coastal waters-Typology, Reference conditions and classification systems, Guidance Document No 5](#); Luxembourg; Office for official publications of the European Communities; 116 pp.
- European Commission, 2004: 'Note to the file: German Site Proposals for the Habitat Type 1130 "Estuaries"; European Commission, DG Environment, Nature and Biodiversity; 4 pp. (unpublished).
- European Commission, 2005: 'Interpretation note on "Estuaries" (habitat type 1130), with a view to aiding the selection/delimitation and protection/management of Sites Of Community Interest hosting this habitat type' (unpublished).
- European Commission, 2006: *Assessment, monitoring and reporting under Article 17 of the Habitat Directive: Explanatory Notes and Guidelines: Final Draft October 2006*; European Commission, DG Environment, Nature and Biodiversity; 64 pp. + annexes.
- European Commission, 2007: [Interpretation Manual of European Union Habitats](#); DG Environment, Nature and biodiversity; 142 pp.
- European Environment Agency, 2004: *EU Headline Biodiversity Indicators: Proceedings of the Stakeholders Conference Biodiversity and the EU - Sustaining Life, Sustaining Livelihoods: Malahide, Ireland, 25 - 27 May 2004*.
- Monitoring specifications for the other parameters listed in section 3.
- Sachteleben, J., Behrens, M. et al., 2009: *Konzept zum Monitoring des Erhaltungszustandes von Lebensraumtypen und Arten der FFH-Richtlinie in Deutschland: Ergebnisse des F+E-Vorhabens "Konzeptionelle Umsetzung der EU-Vorgaben zum FFH-Monitoring und Berichtspflichten in Deutschland" (Stand: November 2008)*; commissioned by the Federal Agency for Nature Conservation.
- Ssymank, A., Hauke, U., Rückriem C. and E. Schröder, 1998: *Das europäische Schutzgebietssystem NATURA 2000 - BFN-Handbuch zur Umsetzung der Fauna-Flora-Habitat-Richtlinie und der Vogelschutz-Richtlinie*; Schriftenreihe für Landschaftspflege und Naturschutz; 53; Bonn Bad Godesberg.

### 5.3 Standards

- Monitoring specifications for the other parameters listed in section 3

### 5.4 Current status

Monitoring specifications for the other parameters listed in section 3

## 6 Literature

- ARGE Elbe, 1995: [Spektrum und Verbreitung der Rundmäuler und Fische in der Elbe von der Quelle bis zur Mündung: Aktuelle Befunde im Vergleich zu alten Daten.](#)
- ARGE Elbe, 2002: [Typisierung des Übergangsgewässers in der Flussgebietseinheit Elbe nach EG-Wasserrahmenrichtlinie](#); ed. T. Gaumert.
- ARGE Elbe (Special Action Group) with the Elbe Water Quality Office, 2004: *Umsetzung der EG-Wasserrahmenrichtlinie (WRRL), Koordinierungsraum Tideelbe - Bestandsaufnahme und Erstbewertung (Anhang II / Anhang IV der WRRL) des Tideelbestroms (C-Bericht)*; draft, 31 August 2004: pp. 18 - 19.
- Abraham, R. and T.-P. Lübbe, 1996: 'Effizienzkontrolle im Naturschutzgebiet "Haseldorfer Binnenelbe mit Elbvorland": Endbericht'; report commissioned by the Itzehoe Office for Agriculture and Water Management; unpublished.
- Aschenberg, H., 1992: 'Deichschutz und Binnenentwässerung im Stromspaltungsgebiet der Elbe im Raum Hamburg'; in: German Association for Water Resources and Land Improvement (DVWK): *Historischer Küstenschutz*; ed. Kramer, J. and H. Rohde; Konrad Wittwer-Verlag; Stuttgart.
- BBB - Büro für Biologische Bestandsaufnahmen, 1997: 'Beschreibung des Ist-Zustandes, Bewertung der Unterelbe als Lebensraum für terrestrische Tiere und Pflanzen und Prognose der Entwicklung'; in: //UVS zur Anpassung der Fahrwinne der Unter- und Außenelbe an die Containerschifffahrt - Schutzgut Pflanzen und Tiere: Terrestrische Lebensgemeinschaften, Materialband IV, Kartenband, Materialband VII//; report commissioned by the Federal WSW, the WSA Hamburg and the BWA Hamburg.
- Backx, J.J.G.M., Berg, G.v.d., Geilen, N., de Hoog, A., Houwing, E. J., Ohm, M., van Oirschot, M. and M. van Wijngaarden, 2003: '[Case Study on the Haringvliet Estuary](#)'; in: CIS Working Group 2.2, ed.: *Guidance Document on Identification and Designation of Heavily Modified and Artificial Water Bodies in Europe*.
- Balzer, S., Boedeker, D. and U. Hauke (2002): 'Interpretation, Abgrenzung und Erfassung der marinen und Küsten-Lebensraumtypen nach Anhang I der FFH-Richtlinie in Deutschland'; *Natur und Landschaft*; 77(1): pp. 20 - 28.
- Below, H. and C. Hobohm, 1998: 'Fahrwasservertiefungen in der Tideelbe und mögliche Auswirkungen auf den Bestand des Schierlings-Wasserfenchel (*Oenanthe conioides*)'; *Jb. Naturw. Verein Fstm. Lbg.*; 41: pp. 103 - 115.
- Belting, S., 1995- 2000: *Dauerbeobachtungsflächen zur vegetationskundlichen Erfassung in den Naturschutzgebieten Asseler Sand, Hullen und Allwördener Außendeich (Schachblumen-Bestände)*.
- Bergemann, M., 1995: 'Die Lage der oberen Brackwassergrenze im Elbästuar'; *Deutsche Gewässerkundliche Mitteilungen*; 39(4/5): pp. 134 - 137.
- Federal Waterway and Shipping Administration and Hamburg Waterway and Shipping Office: [Bericht zur Beweissicherung 2003 zur Anpassung der Fahrwinne der Unter- und Außenelbe an die Containerschifffahrt: Stand Mai 2004, Version 4.0.](#)
- Biomonitoring & Illustration, Daunicht, Birte and Dr. W. Daunicht, 2000-2001b: *Erfassung der Rastvögel und Überwinterer am Elbufer in Niedersachsen im Bereich des Gauensiekersands, Asselersands und Schwarztonnensand - Ist-Zustand, Bewertung und Prognose: Fachgutachten zur Umweltverträglichkeitsuntersuchung zur Variantenprüfung der Elbquerung der A20 Nord-West-Umfahrung Hamburg, Schutzguttiere*; commissioned by COCHETCONSULT).
- Federal Institute of Hydrology, 1999: *Handlungsanweisung für den Umgang mit Baggergut im Küstenbereich (HABAK-WSV)*.
- CIS Working Group 2.4 (COAST), 2003: [Guidance on Typology, Reference Conditions and Classification Systems for Transitional and Coastal Waters.](#)
- Cameron, W.M. and D.W. Pritchard, 1963: 'Estuaries'; in: M.N. Hill, ed.: *The Sea*; vol. 2; Wiley & Sons, New York: pp. 306 - 324.
- Christiansen, H., 2000: 'Verdriftungswege von Finteneiern mit Fundort Mühlenberger Loch (Zeitraum April / Mai 2000)'; unpublished report commissioned by the Hamburg State Ministry for Economic and Labour Affairs, Department for River and Port Engineering.
- Common Wadden Sea Secretariat, 1997: *Stade Declaration: Trilateral Wadden Sea Plan: Ministerial Declaration of the Eighth Trilateral Governmental Conference on the Protection of the Wadden Sea: Stade, 1997.*
- Common Wadden Sea Secretariat, 2002: *Esbjerg Declaration: Ministerial Declaration of the Ninth Trilateral Governmental Conference on the Protection of the Wadden Sea: Esbjerg, 31 October 2001.*
- Dalrymple, R.W., Zaitlin, B.A. and R. Boyde, 1992: 'A conceptual model for estuarine sedimentation'; *J. Sedimentary Petrology*; 62: pp. 1130 - 1146.
- Dyer, K.R., 1997: *Estuaries: A Physical Introduction*; 2nd edition; Wiley & Sons; New York: 195 pp.
- Garthe, S. and A. Mitschke, 1996: 'Das Ramsar-Gebiet "Mühlenberger Loch" - ein Süßwasserwatt im Elbästuar: 30jährige Entwicklung der Avifauna und Naturschutzbewertung'; *Naturschutz und Landschaftsplanung*; 28: pp. 75 - 79.
- Gaumert, T., 2000: [Die Entwicklung des Fischartenspektrums der Elbe mit Berücksichtigung der Neozoen-Problematik.](#)
- Grüttner, H., 1992: 'Deichschutz und Binnenentwässerung der schleswig-holsteinischen Elbmarschen'; in: Kramer, J. and H. Rohde, ed.: *Historischer Küstenschutz - Deichbau, Inselschutz und*

- Binnenentwässerung an Nord- und Ostsee; German Association for Water Resources and Land Improvement (DVWK); Wittwer, Stuttgart.
- Kiel Institute for Landscape Ecology (KifL), 1998: 'FFH-Verträglichkeitsstudie für die geplante DA-Erweiterung im Mühlenberger Loch (Freie und Hansestadt Hamburg)'; unpublished report commissioned by BFUB Hamburg GmbH.
  - Kiel Institute for Landscape Ecology (KifL), 2004: 'Erhaltungs- und Entwicklungsziele für die Gebiete von Gemeinschaftlicher Bedeutung im Ästuar der Elbe'; unpublished report commissioned by the Hamburg State Ministry for Economic and Labour Affairs, Department for River and Port Engineering and the North German Länder HD Steering Group.
  - Kiel Institute for Landscape Ecology (KifL), 2004: 'Vorläufiger Konventionsvorschlag für eine länderübergreifend einheitliche Meldepraxis des Lebensraumtyps [1130] [Ästuarien] an der Unterelbe'; unpublished report commissioned by the North German Länder HD Steering Group.
  - Kafemann, R., Thiel, R. and A. Sepulveda, 1996: 'Die fischereiökologische Bedeutung der Nebenstromgewässer der Unterelbe'; *Arch. Hydrobiol.*; Suppl. 110 (Unters. Elbe-Ästuar 7): pp. 199 - 214.
  - Kiesewetter, B., Holsten, B., Baumung, S. and C. Lutz, 1997: 'Bedeutung der Elbe als Rastgebiet für durchziehende, rastende oder überwinterte Vogelarten - Ist-Zustand, Bewertung und Prognose'; in: *Umweltverträglichkeitsuntersuchung zur Anpassung der Fahrrinne der Unter- und Außenelbe an die Containerschifffahrt - Materialband VI: Schutzgut Tiere und Pflanzen, Terrestrische Lebensgemeinschaften - Anhang 5*.
  - Kötter, F., 1961: 'Die Pflanzengesellschaften im Tidegebiet der Unterelbe'; *Arch. Hydrobiol.*; Suppl. 26(1); Stuttgart: pp. 106 - 184.
  - McLusky, D.S. and M. Elliot, 2004: *The Estuarine Ecosystem*; 3rd edition; Oxford University Press.
  - Mitschke, A., 1997: 'Zur vogelkundlichen Entwicklung der Hamburger Elbbucht "Mühlenberger Loch" von 1992 bis 1997'; *Hamburger Avifaun. Beitr.*; 29: pp. 163 - 181.
  - Nehring, S., 2000: [Ästulare: Das Habitat für eingeschleppte Makroinvertebrate](#)
  - Neumann, M., 2002: 'Gebietsauswahl für Rundmaul- und Fischarten des Anhangs II der FFH-Richtlinie in der von der schleswig-holsteinischen Landesregierung beschlossenen Natura 2000-Gebietskulisse'; unpublished report commissioned by the State Agency for Nature and Environment of the Land Schleswig-Holstein.
  - Oslo-Paris Convention (OSPAR): [Convention for the Protection of the Marine Environment of the North-East Atlantic](#).
  - Perillo, G.M.E., 1995: *Geomorphology and Sedimentology of Estuaries: Definitions and Geomorphologic Classifications of Estuaries; Development in Sedimentology*, 53, Elsevier; Amsterdam; 471 pp.
  - Planungsgruppe Ökologie und Umwelt Nord (PÖUN), 1998: 'Umweltverträglichkeitsstudie zur Anpassung der Fahrrinne der Unter- und Außenelbe an die Containerschifffahrt'; unpublished study commissioned by the Federal Waterway and Shipping Administration, the Hamburg Waterway and Shipping Office and the Hamburg State Ministry for Economic and Labour Affairs, Department for River and Port Engineering; Hanover.
  - Spieker, J., Obst, G., Köhler, S. and G. Ramm, 2001: [Vorstudie zur Klärung der Relevanz der Gewässerflora \(Makrophyten, Angiospermen, Großalgen\) für die Bewertung des ökologischen Zustands im Teileinzugsgebiet Tideelbe: Endbericht, 21.12.2001](#); report commissioned by ARGE Elbe, WFD Working Group.
  - Ssymank, A., Hauke, U., Rückriem, C. and E. Schröder, 1998: *Das europäische Schutzgebietssystem NATURA 2000 - BFN-Handbuch zur Umsetzung der Fauna-Flora-Habitat-Richtlinie und der Vogelschutz-Richtlinie*; Schriftenreihe für Landschaftspflege und Naturschutz; 53; Bonn Bad Godesberg.
  - Wolff, W. J., 1999: 'Exotic invaders of the meso-oligohaline zone of estuaries in the Netherlands: Why are there so many?'; *Helgoländer Meeresunters.*; 52: pp. 393 - 400.

## **7 Activities required to implement the concept**

### **7.1 Changes to the current monitoring programme**

### **7.2 Working steps required**

#### **Priorities**

- Coordination of monitoring in terms of the methods applied between Bremen, Mecklenburg-Vorpommern, Lower Saxony, Schleswig-Holstein and Hamburg (harmonisation of monitoring network, monitoring frequencies and methods)
- Specification and surveying of study areas or transects
- Data management: standards set by the EU, support provided, standards set and evaluation carried out by BfN, GIS and Land databases, updating of Standard Data Forms
- Evaluation with a view to management plans and/or necessary measures

## Footnotes

- (1)** Marine Strategy Framework Directive; Directive 2008/56/EC of 17 June 2008. This also applies to transitional waters and coastal waters covered by Directive 2000/60/EC, where pertinent aspects of the protection of the marine environment not dealt with in Directive 2000/60/EC are at issue.
- (2)** Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.
- (3)** Article 11 (monitoring of habitats and all species listed in Annexes II, IV and V) imposes the obligation to monitor the conservation status of all habitats (listed in Annex I) of Community interest. In consequence, this provision is not limited to NATURA 2000 areas, but habitat types outside the Habitat Directive areas are also to be included in the monitoring as appropriate.
- (4)** Article 17 governs the performance of reporting obligations. The Habitats Directive imposes binding obligations concerning the submission of reports to the European Commission (Articles 11 and 17).
- (5)** EC Water Framework Directive; Directive 2000/60/EC. The coastal waters subject to ecological assessment under the WFD extend 1 nautical mile beyond the baseline.
- (6)** The monitoring requirements under TMAP were specified in the Wadden Sea Plan ([Sylt, 2010](#)) (see also [TMAP Manual, section 2](#)).