Tidal River Development

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

The Interreg IVB North Sea Region Programme

TIDE Synthesis

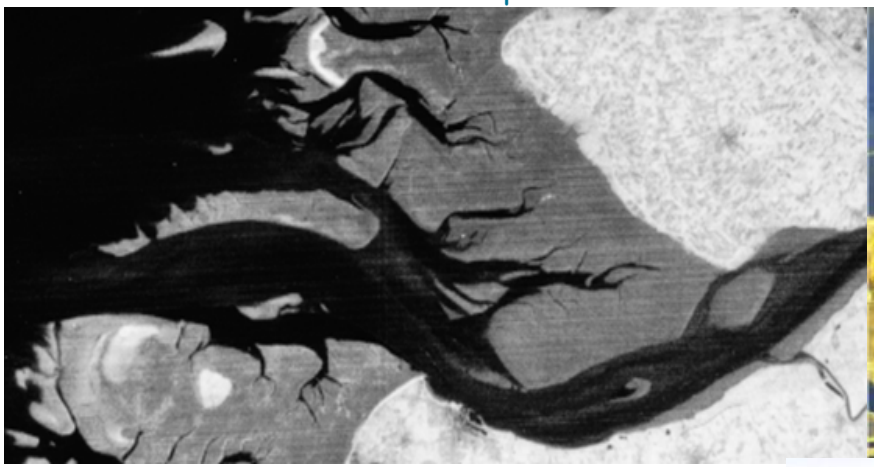
Overview on project results and main conclusions

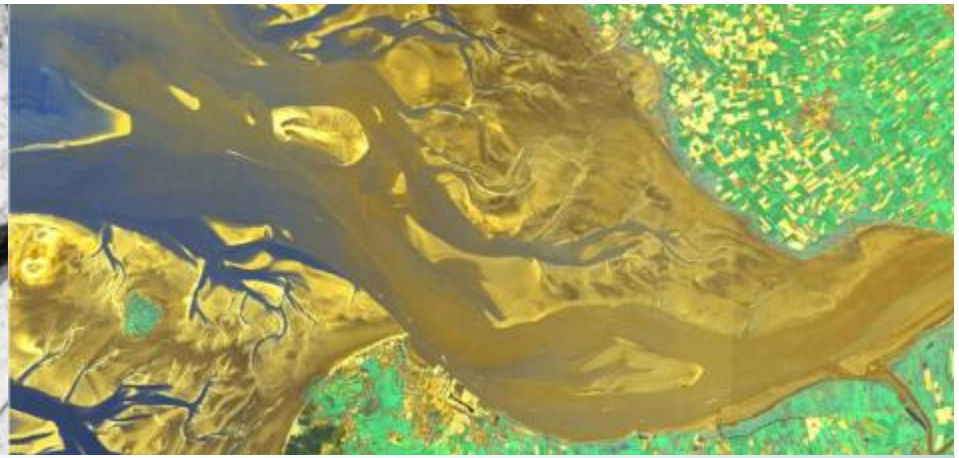
Tidal River Development

Estuaries are highly dynamic systems

Tidal River Development

Estuaries are changing…

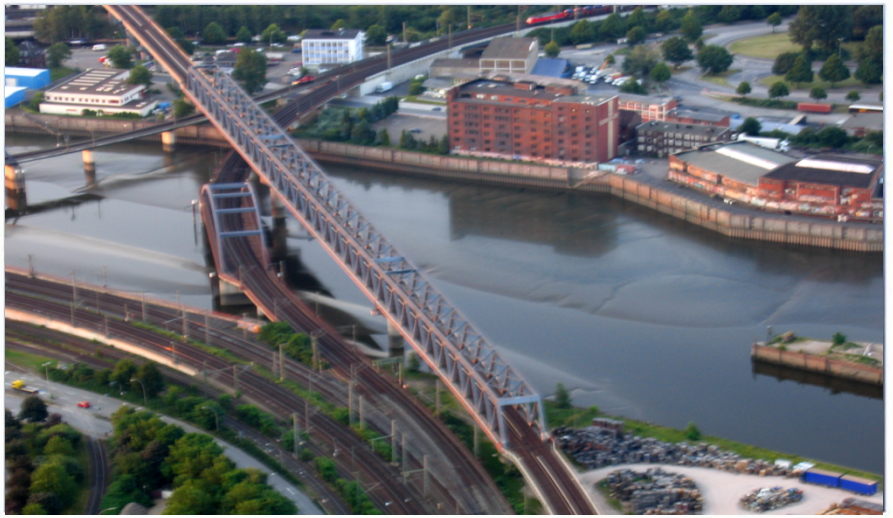




…and they are being changed

Tidal River Development

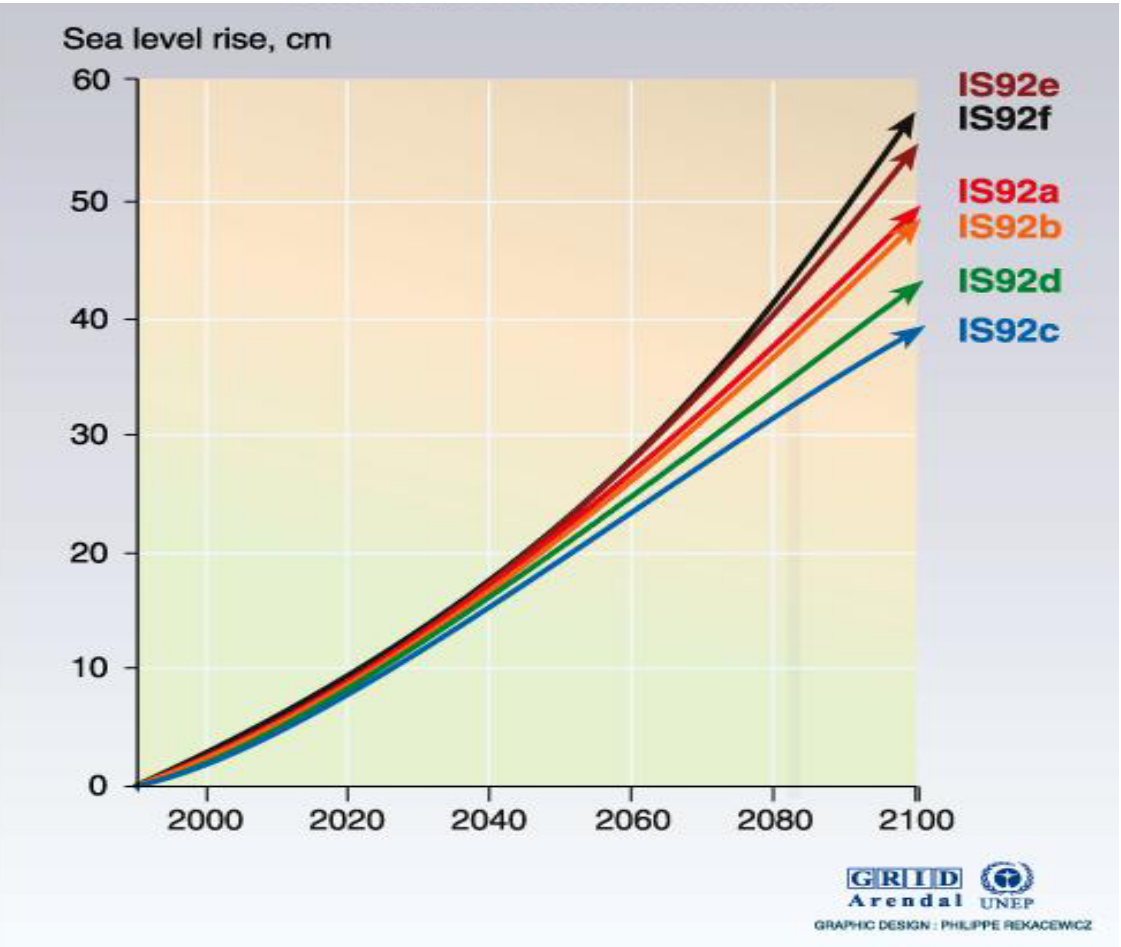
Challenge: sedimentation



Tidal River Development

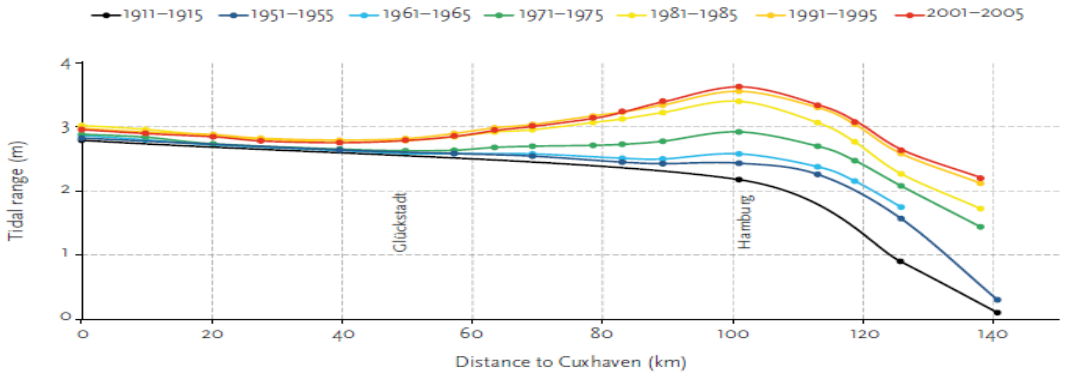
Challenge: climate change

- Sea level rise
- Gradient of water levels
- Freshwater discharge
- Salinity
- ...

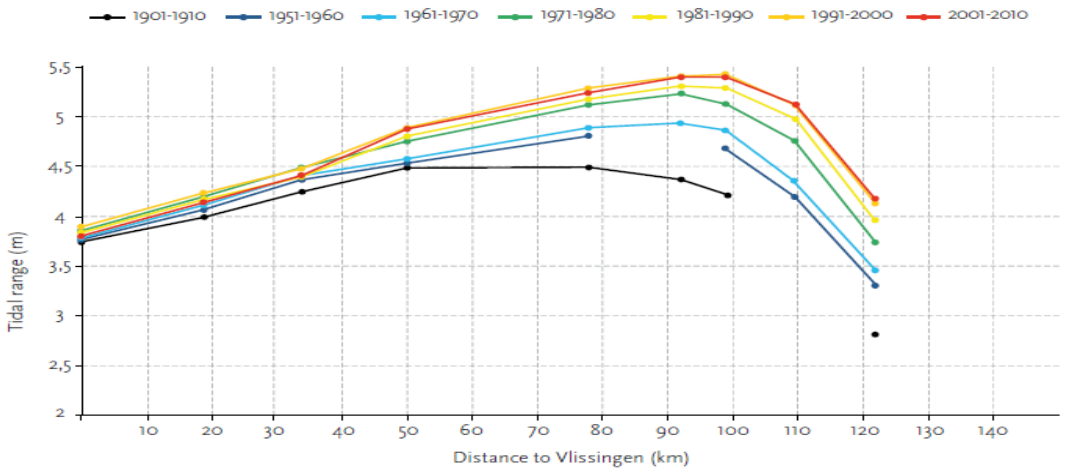


Changing Estuary: Tidal Range

- Development of the **tidal range** in the Elbe and the Scheldt during the last century



Elbe



Scheldt

Challenge: diverse uses

Brunsbüttel

Cuxhaven

Flood protection

Harbours

Glückstadt

Fisheries

Recreation and tourism

Shipping

Living

City

Hamburg

Nature protection

Industry

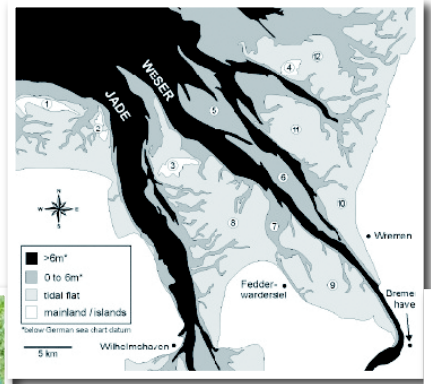
Harbour

Geesthacht

Tidal River Development

The TIDE Project:
Four North Sea Region Estuaries

Scheldt | NL,BE



Weser | DE

Elbe | DE

Humber | GB

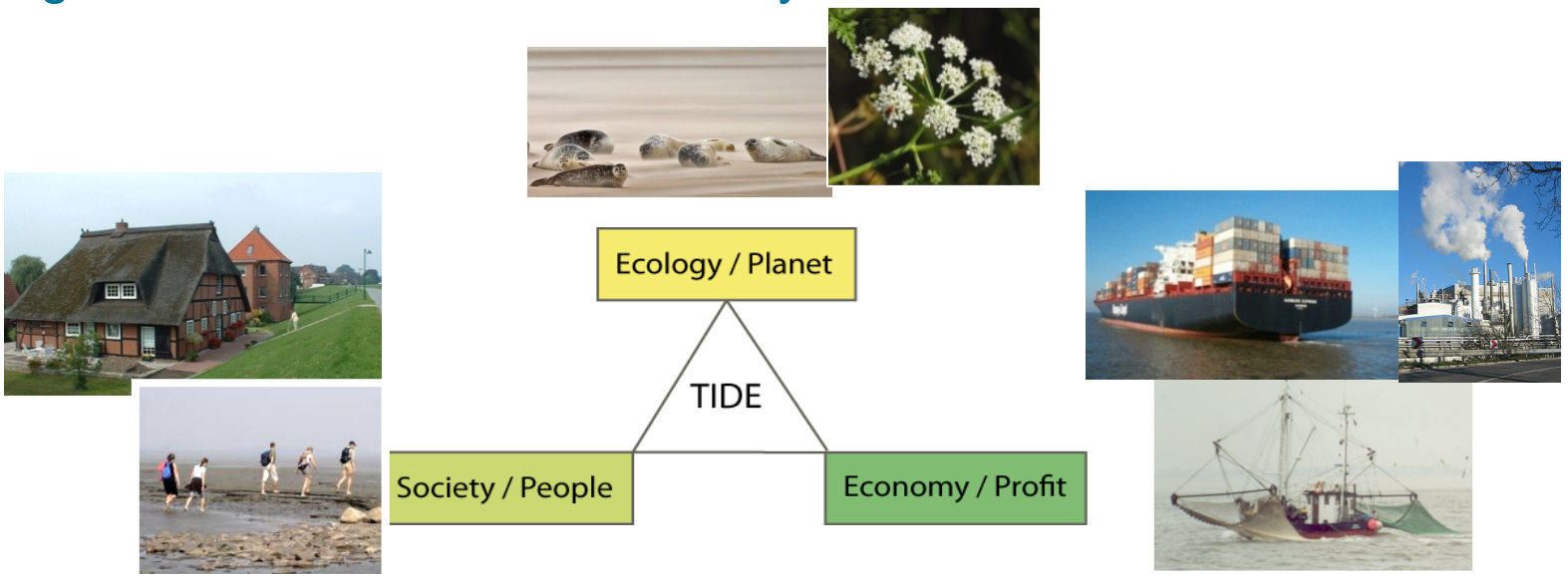
- 3.7 m €, 50% by ERDF financed
- INTERREG IV B North Sea Programme

The Interreg IVB North Sea Region Programme

Investing in the future by working together for a sustainable and competitive region

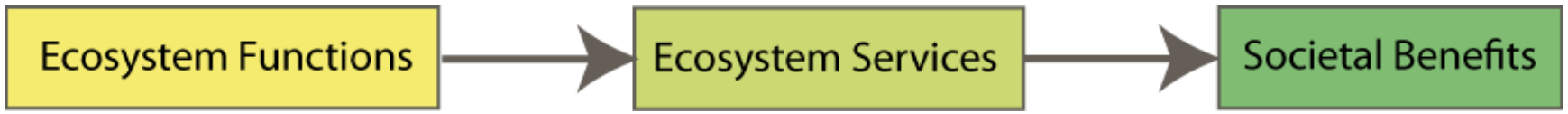
TIDE objectives

- improve estuarine understanding
- develop concrete **TOOLS** for estuary managers & stakeholders
- give recommendations for integrated management of estuaries
  (ecoloy, economy and society)
- taking into account the whole estuary



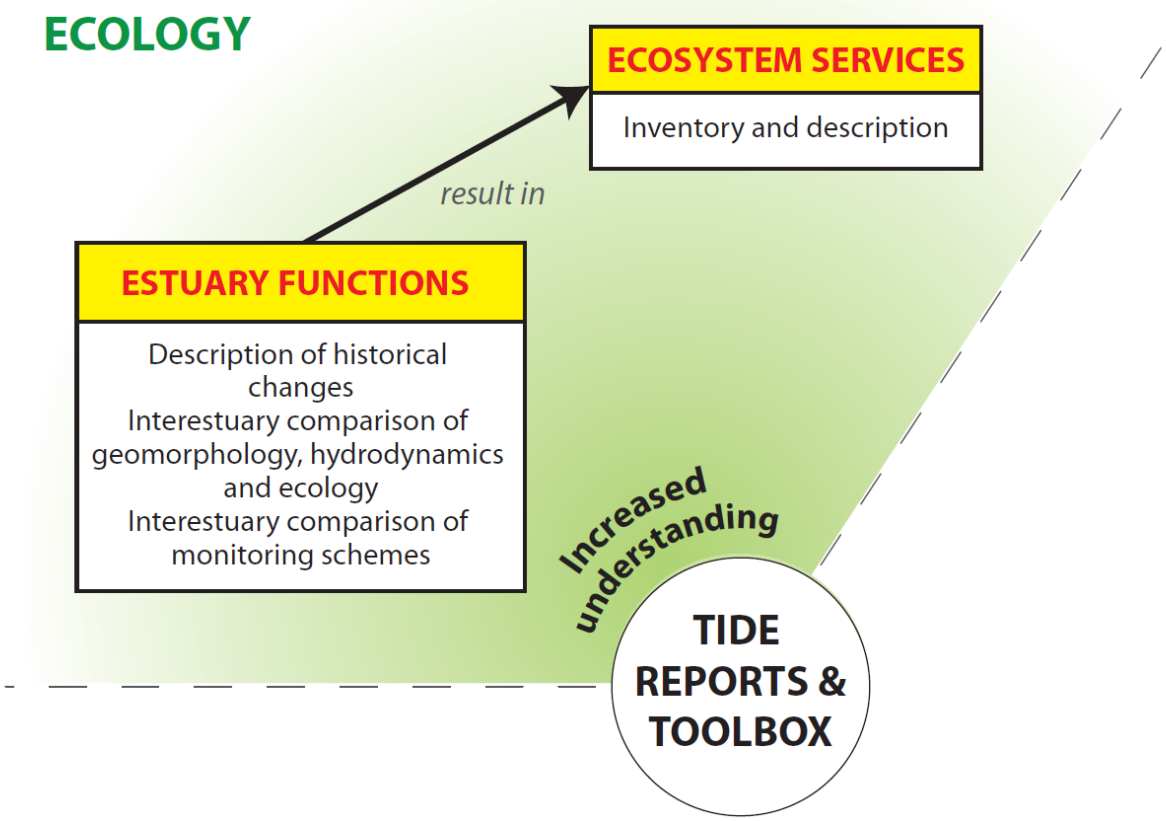
Ecosystem Services Approach

- TIDE work based on ecosystem service approach
- Explore underlying relations between ecosystem functions of estuaries, resulting ecosystem services & derived societal benefits
- Based on this knowledge - better understanding the way in which human interventions affect these interrelations



Understanding TIDE

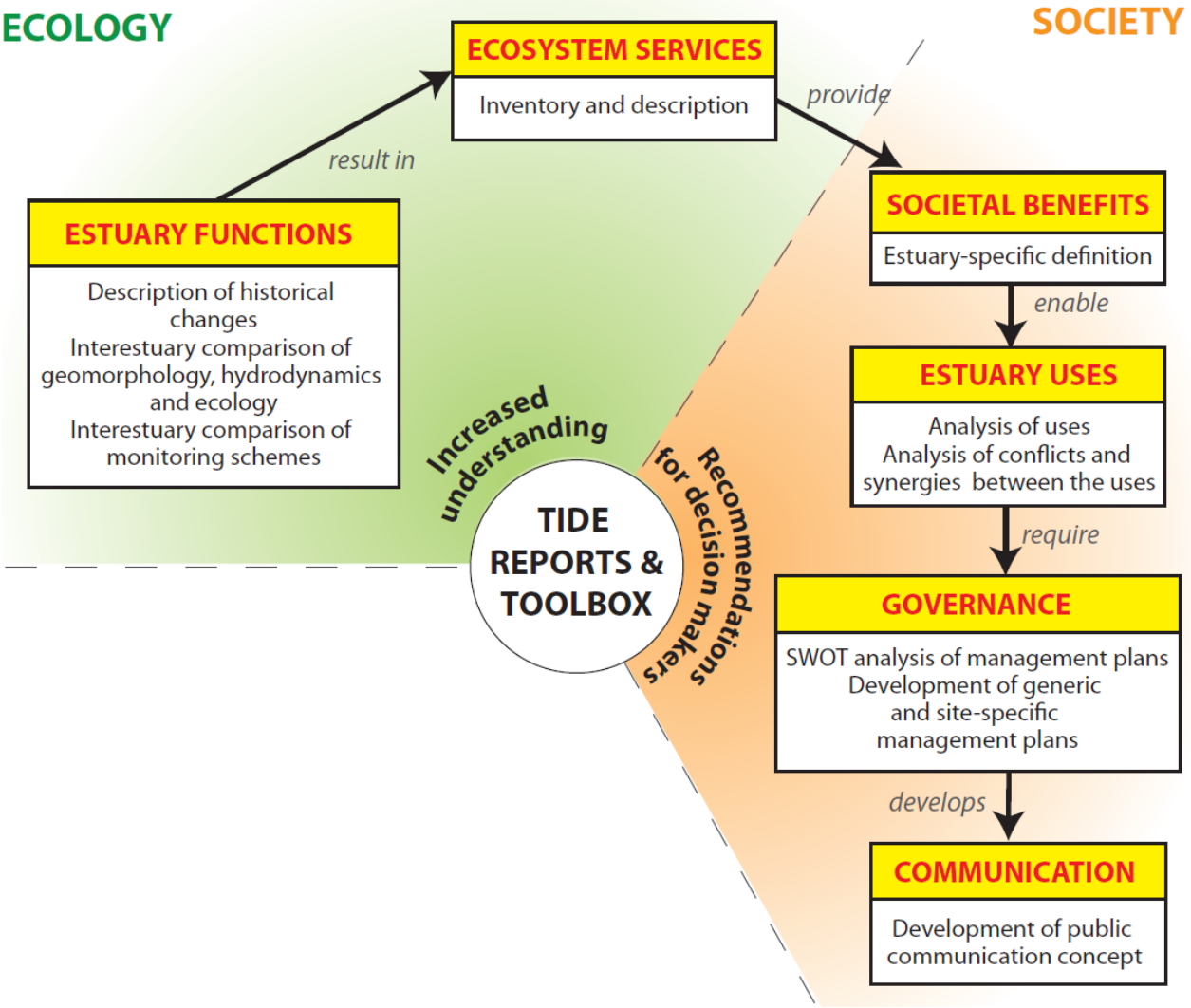
- Estuary understanding



Tidal River Development

Understanding TIDE

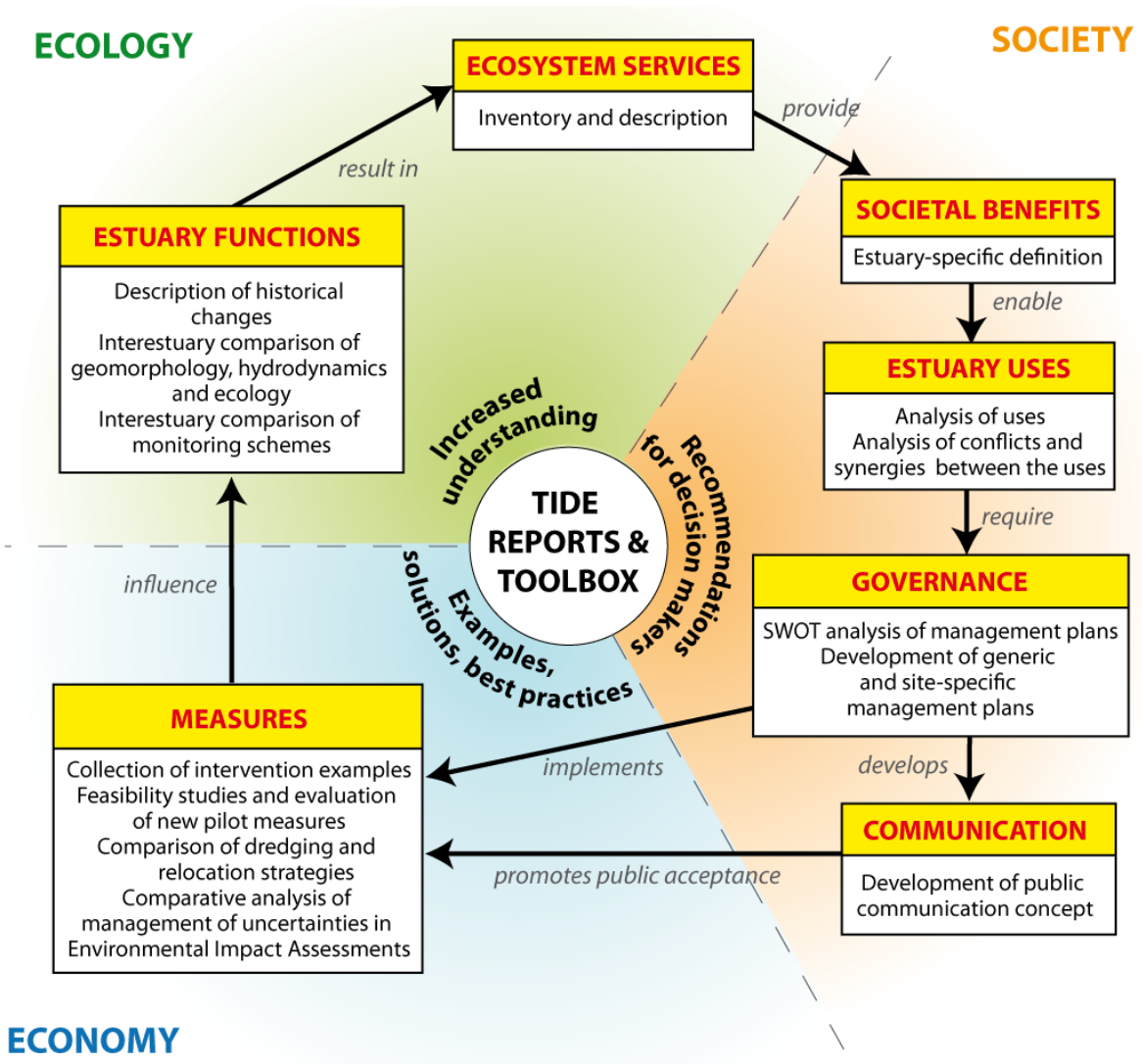
- Estuary understanding
- Tools for governance and communication



Tidal River Development

Understanding TIDE

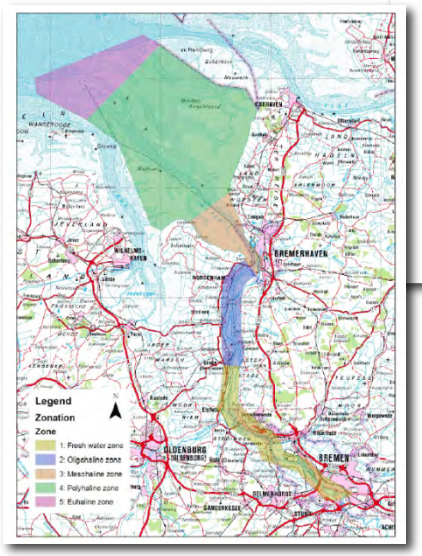
- Understanding estuarine functioning
- Tools for management and communication
- Management measures

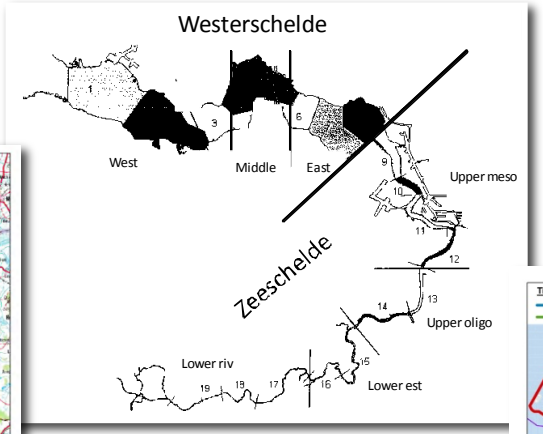


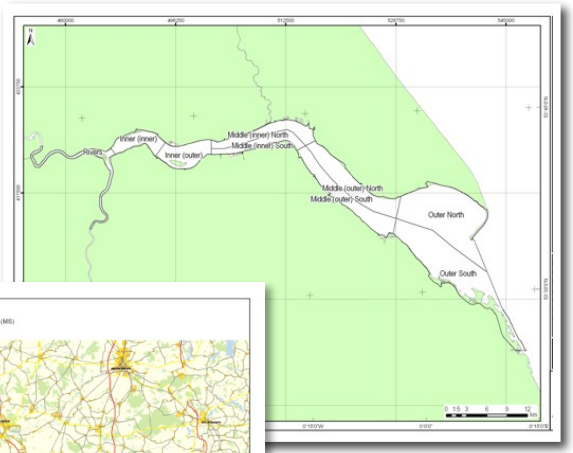
Tidal River Development

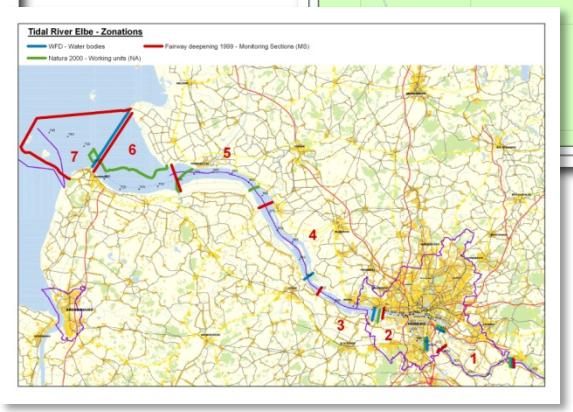
Estuary Zonations

- Zonation scheme for each estuary – based on salinity
- Use for inter-estuarine comparisons









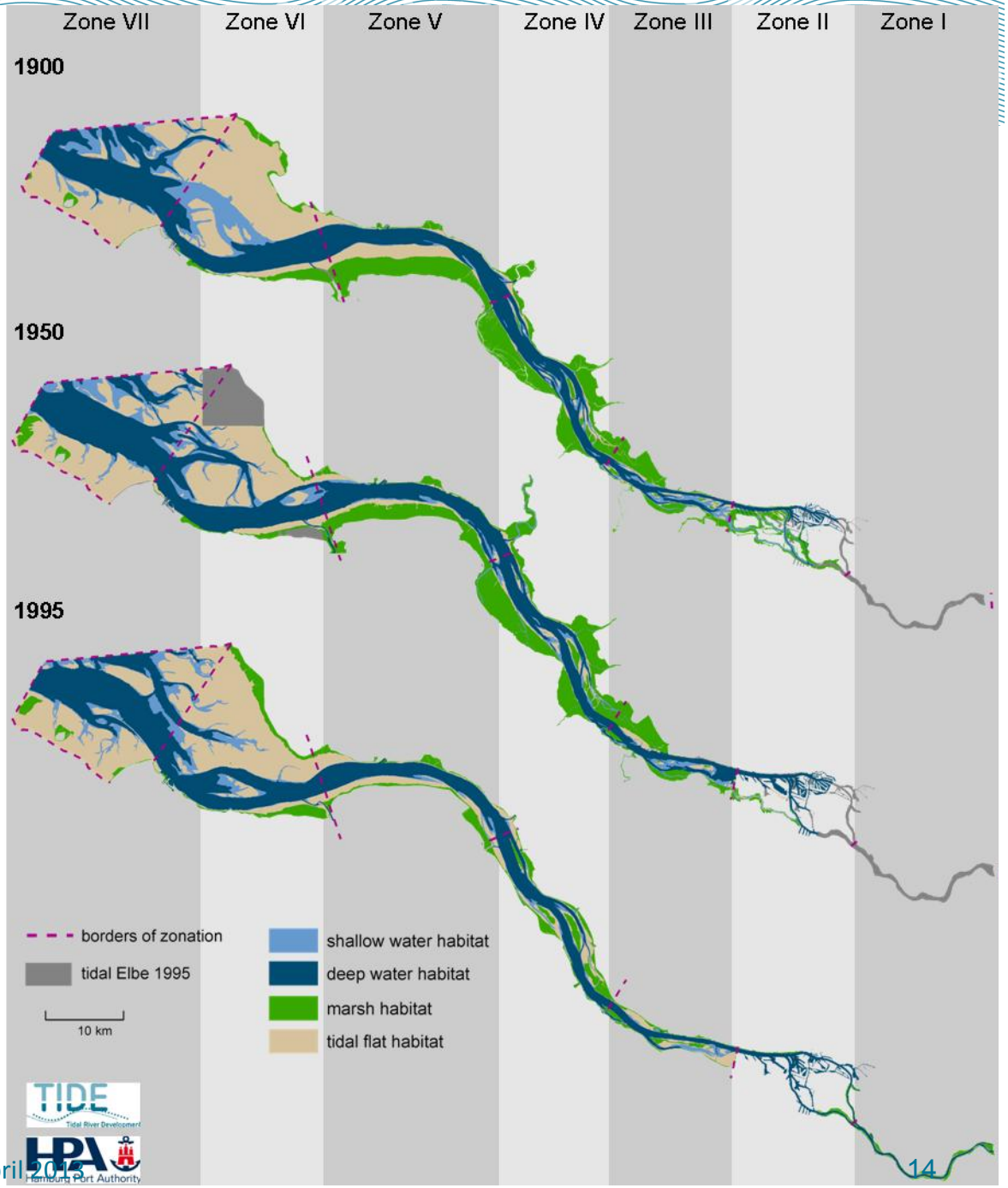
Tidal River Development

Historical development:

Describe & compare:

- Relevant changes & pressures
- Overview on human activities
- Tidal evolution
- Ecology
- Habitats

Habitat development Elbe



Estuary management

Inventory & SWOT Analysis Management Plans

- Legislative drivers
- Management plans in each estuary, e.g.WFD
- Recommendations

Location	Name of Plan	Focus / aims of the plans					SWOT				Status
		Conservation	Recreation	Flood Protection	Economy, Shipping & Ports	ICZM	Strength (Scope of Plan)	Weakness	Opportunities	Threats	
Elbe	Several plans inc River Basin Plan	x		(X)			Improving ecological status & inc. legally binding	No focus on tidal Elbe, non-holistic view on function	Cross-sector involvement & tie in to MSD	Focus on monitoring not functioning	Operational
Weser	River Basin Management Plan	x		x			Improving ecological status & inc. legally binding	No focus on tidal Weser, non holistic view on function	Trans-boundary and sets targets	Focus on monitoring not functioning	Operational
Scheldt	River Basin Management Plan	x	x	x	x	x	Integrated	Difficulties in bilateral integration & establishment of measures	Increased knowledge	Costs & no clear timetable	Pre-operational
Humber	River Basin Management Plan	x		x			Improving ecological status & inc. legally binding	Not multi-sectoral & no estuary focus	Integration of WQ & conservation strands etc	Not fully integrated	Operational
Notes											

Tidal River Development

Estuary management

Conflict matrix: Uses

Zone A

Category		Leave column blank	Landscape	Conservation			Archaeology	Access (e.g. Disturbance)			Flood/coast protection		Navigation			Ports & Harbours			Infrastructure	Industry					Agriculture
Category	HUMBER ESTUARY (OUTER ESTUARY): Actual Conflict Level Assessment per zone (all these cells are completed automatically so DO NOT populate)	Leave column blank	High value landscape feature	Protected area adjacent to system	Protected subtidal area	Protected intertidal area	Archaeology/History protected site	Recreational access on water	Recreational access on the banks & intertidal	Commercial	Defence set-back	Flood bank (dyke/gabion/wall)	Channel stabilisation	Dredging (channel deepening/ berth heads)	Vessel movement	Port land claim (intertidal/ subtidal)	Port related activity adjacent to system	Port activity on the intertidal/ subtidal area	Infrastructure on bed or in water column (e.g. pipes, cables, piers, marinas)	Tidal/current energy device	Water abstraction	Aggregate extraction	Industrial discharge	Industrial activity adjacent to system	Agricultural run-off
	Leave row blank																								
Landscape	High value landscape feature			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Conservation	Protected area adjacent to system		0		4	4	0	-2	-4	-2	0	0	0	0	0	-4	-6	0	0	0	0	0	0	-4	0
	Protected subtidal area		0	0		6	4	-8	-6	-8	0	0	0	-8	-6	-8	0	0	-8	0	0	0	0	0	-6
	Protected intertidal area		0	4	12		4	-4	-12	-8	0	-6	0	-8	0	-8	-5	0	-8	0	0	0	0	-4	-6
Archaeology	Archaeology/History protected site		0	0	0	0		0	-4	-2	-3	-4	0	-2	0	-4	-3	0	-4	0	0	0	0	-2	0
Access (e.g. Disturbance)	Recreational access on water		0	0	-8	-4	0		0	0	0	0	0	0	-4	0	0	0	0	0	0	0	0	0	0
	Recreational access on the banks & intertidal		0	-4	-6	-12	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Commercial		0	-2	-8	-8	0	0	0		0	0	0	0	-4	0	0	0	0	0	0	0	0	0	0
Flood/Coast protection	Defence set-back		0	-3	5	10	-3	0	-5	-3		5	0	0	0	3	-4	0	0	0	0	0	0	-3	0
	Flood bank (dyke/gabion/wall)		0	-4	-6	-12	0	0	12	4	0		0	0	0	0	5	0	0	0	0	0	0	8	0
Navigation	Channel stabilisation		0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0
	Dredging (channel deepening/ berth heads)		0	0	-8	-4	0	0	0	0	0	-4	0		8	0	0	0	0	0	0	0	0	0	0
	Vessel movement		0	0	-6	-6	0	-4	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0
Ports& Harbours	Port land claim (intertidal/ subtidal)		0	-4	-8	-8	-2	0	-4	0	0	0	0	0	0		6	0	0	0	0	0	0	2	0
	Port related activity adjacent to system		0	-6	-5	-10	-3	0	0	0	-4	0	0	0	0	0		0	0	0	0	0	0	0	0
	Port activity on the intertidal/ subtidal area		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0
Infrastructure	Infrastructure on bed or in water column (e.g. pipes, cables, piers, marinas)		0	0	-4	-4	-2	0	0	0	0	0	0	-2	-4	0	0	0		0	0	0	0	0	0

Zone B

		Leave column blank	Landscape	Conservation			Archaeology	Access (e.g. Disturbance)			Flood/coast protection		Navigation			Ports & Harbours			Infrastructure	
		Leave column blank	High value landscape feature	Protected area adjacent to system	Protected subtidal area	Protected intertidal area	Archaeology/History protected site	Recreational access on water	Recreational access on the banks & intertidal	Commercial	Defence set-back	Flood bank (dyke/gabion/wall)	Channel stabilisation	Dredging (channel deepening/berth heads)	Vessel movement	Port land claim (intertidal/subtidal)	Port related activity adjacent to system	Port activity on the intertidal/subtidal area	Infrastructure on bed or in water column (e.g. pipes, cables, piers, marinas)	Tidal/current energy device
	High value landscape feature			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Protected area adjacent to system		0		4	4	0	-3	-4	-2	0	0	0	0	0	-6	-8	-6		0
	Protected subtidal area		0	0		6	4	-10	-6	-8	0	0	0	-10	-6	-10	0	-10	-12	-8
	Protected intertidal area		0	4	12		4	-5	-12	-8	0	-6	0	-10	0	-10	-6	-10	-12	-4
	Archaeology/History protected site		0	0	0	0		0	-4	-2	-3	-4	0	-3	0	-3	-4	-3	-4	0
	Recreational access on water		0	0	-10	-5	0		0	0	0	0	0	0	-5	0	0	0	0	0
	Recreational access on the banks & intertidal		0	-4	-6	-12	0	0		0	0	0	0	0	0	0	0	0	0	0
	Commercial		0	-2	-8	-8	0	0	0		0	0	0	0	0	0	0	0	0	0
	Defence set-back		0	-3	5	10	-3	0	-5	-3		5	0	0	0	4	-5	4	0	0
	Flood bank (dyke/gabion/wall)		0	-4	-6	-12	0	0	12	4	0		0	0	0	0	6	0	0	0
	Channel stabilisation		0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0
Navigation	Dredging (channel deepening/berth heads)		0	0	-10	-5	0	0	0	0	0	-5	0		10	0	0	8	0	0
	Vessel movement		0	0	-6	-6	0	-5	0	0	0	0	0	0		0	0	5	0	0
Ports& Harbours	Port land claim (intertidal/subtidal)		0	-6	-10	-10	-3	0	-5	0	0	0	0	0	0		10	4	0	0
	Port related activity adjacent to system		0	-8	-6	-12	-4	0	0	0	-5	0	0	0	0	0		0	0	0
	Port activity on the intertidal/subtidal area		0	-3	-10	-10	-3	-4	-5	-3	0	0	0	0	-5	4	5		-5	-3
Infrastructure	Infrastructure on bed or in water column (e.g. pipes, cables, piers, marinas)		0	0	-6	-6	-4	0	0	0	0	0	0	-5	-6	0	0	-5		-4

Estuary management

Communication: Chances and risks

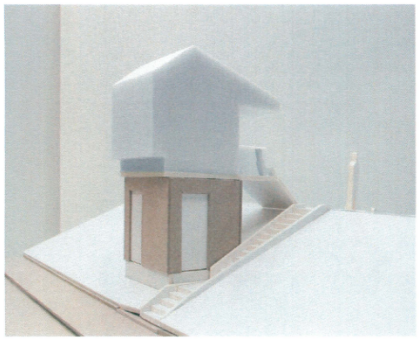
Interrogation of 800 people on their perception of the Elbe estuary

(Geesthacht, Harburg, Bergedorf, Stade, Uetersen, Brokdorf, Marne, … Friedrichskoog, Cuxhaven)

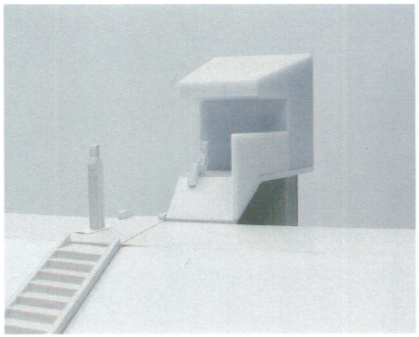
- How do you ´use´ the Elbe?
- What means nature for you?
- What kind of conflicts can occur?
- How important is the harbour?
- What are your wishes for the future of the Elbe?
- Quiz in order to get to know what people know on relevant Elbe subjects.
- ….

Communication: Means for getting acceptance and knowledge building

Modellstudie



Straßenansicht



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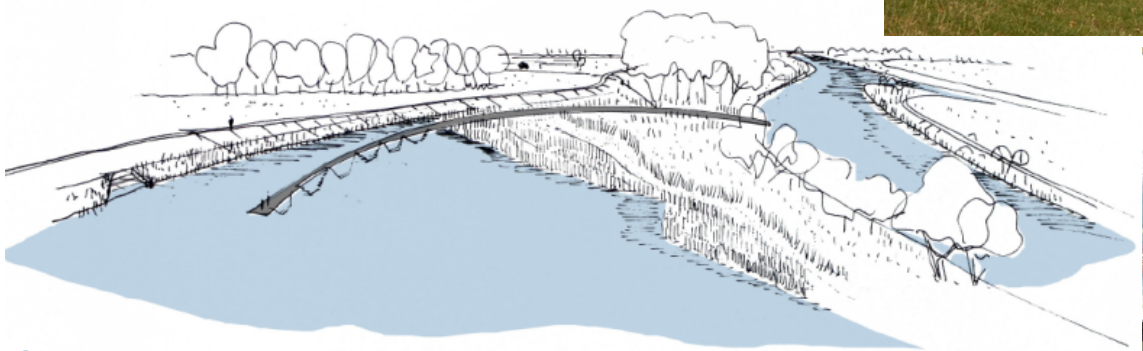


Create positive experience–

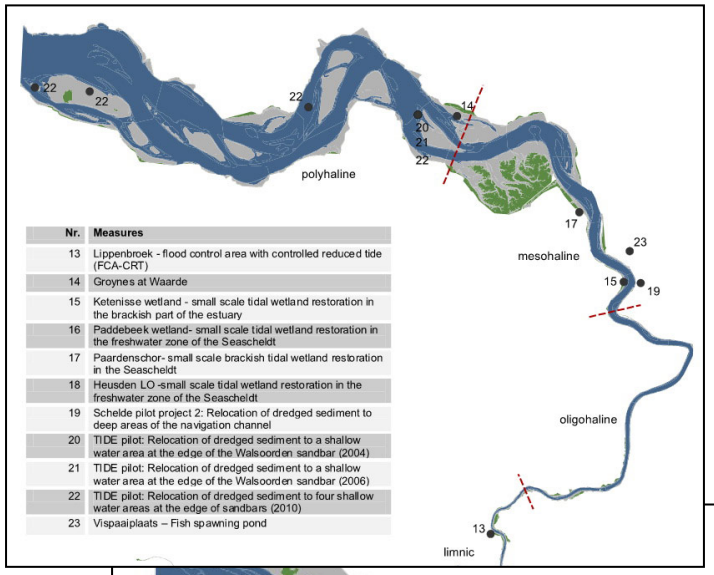
Create consciousness for tidal processes –

Communicate aims of the tidal Elbe concept

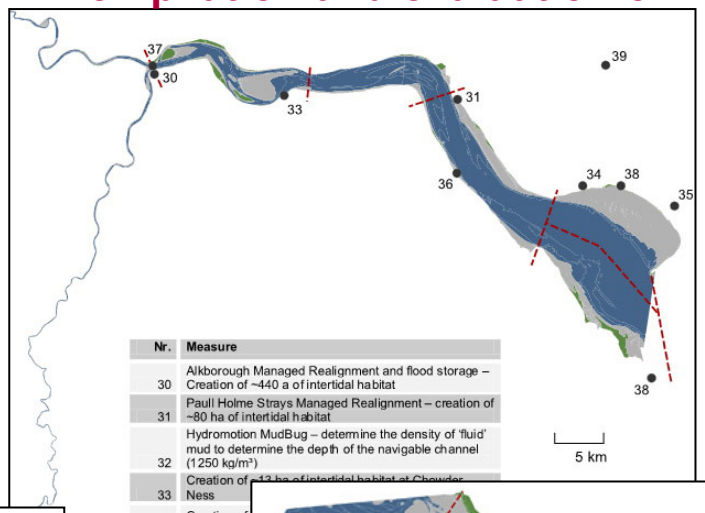
Tidal River Development

Measure database

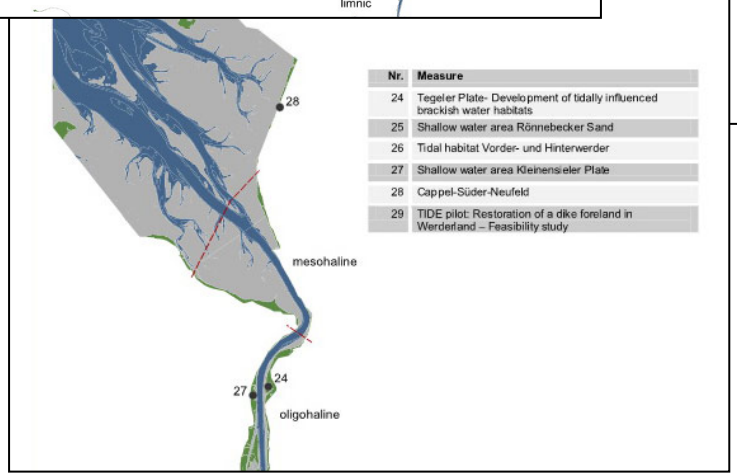
Compilation and evaluation of 42 measures



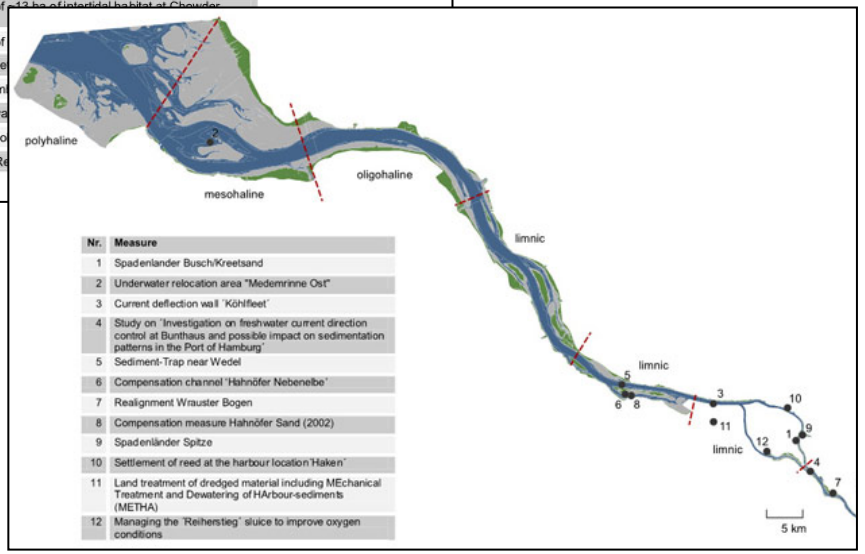
Nr.	Measures
13	Lippenbroek - flood control area with controlled reduced tide (FCA-CRT)
14	Groynes at Waarde
15	Ketenisse wetland - small scale tidal wetland restoration in the brackish part of the estuary
16	Paddebeek wetland- small scale tidal wetland restoration in the freshwater zone of the Seascheldt
17	Paardenschor- small scale brackish tidal wetland restoration in the Seascheldt
18	Heusden LO -small scale tidal wetland restoration in the freshwater zone of the Seascheldt
19	Schelde pilot project 2: Relocation of dredged sediment to deep areas of the navigation channel
20	TIDE pilot: Relocation of dredged sediment to a shallow water area at the edge of the Walsoorden sandbar (2004)
21	TIDE pilot: Relocation of dredged sediment to a shallow water area at the edge of the Walsoorden sandbar (2006)
22	TIDE pilot: Relocation of dredged sediment to four shallow water areas at the edge of sandbars (2010)
23	Vispaaiplaats – Fish spawning pond



Nr.	Measure
30	Alkborough Managed Realignment and flood storage – Creation of ~440 a of intertidal habitat
31	Paull Holme Strays Managed Realignment – creation of ~80 ha of intertidal habitat
32	Hydromotion MudBug – determine the density of 'fluid' mud to determine the depth of the navigable channel (1250 kg/m³)
33	Creation of ~13 ha of intertidal habitat at Chowder Ness
34	Creation of
35	Kilnsea We
36	South Hum
37	Training wa
38	Donna Noo
39	Turnstall Re



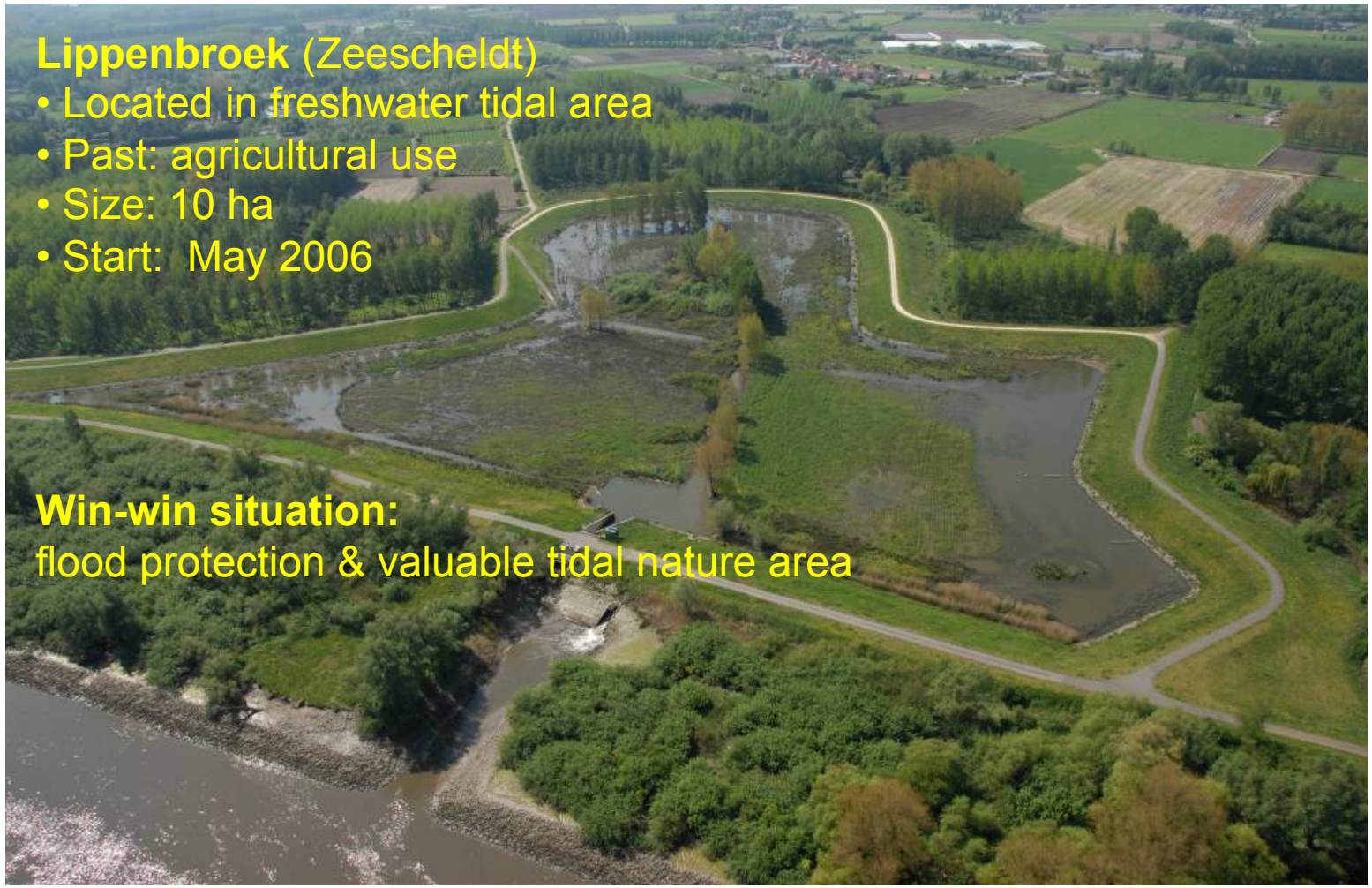
Nr.	Measure
24	Tegeler Plate- Development of tidally influenced brackish water habitats
25	Shallow water area Rönnebecker Sand
26	Tidal habitat Vorder- und Hinterwerder
27	Shallow water area Kleinensieler Plate
28	Cappel-Süder-Neufeld
29	TIDE pilot: Restoration of a dike foreland in Werderland – Feasibility study



Nr.	Measure
1	Spadenlander Busch/Kreetsand
2	Underwater relocation area "Medemrinne Ost"
3	Current deflection wall 'Köhlfleet'
4	Study on 'Investigation on freshwater current direction control at Bunthaus and possible impact on sedimentation patterns in the Port of Hamburg'
5	Sediment-Trap near Wedel
6	Compensation channel 'Hahnöfer Nebenelbe'
7	Realignment Wrauster Bogen
8	Compensation measure Hahnöfer Sand (2002)
9	Spadenländer Spitze
10	Settlement of reed at the harbour location 'Haken'
11	Land treatment of dredged material including MEchanical Treatment and Dewatering of HArbour-sediments (METHA)
12	Managing the 'Reiherstieg' sluice to improve oxygen conditions

Pilot Projects: Westerscheldt

Flood control area with controlled reduced tide



Management measures

Humber: Managed Realignment

Alkborough Flats

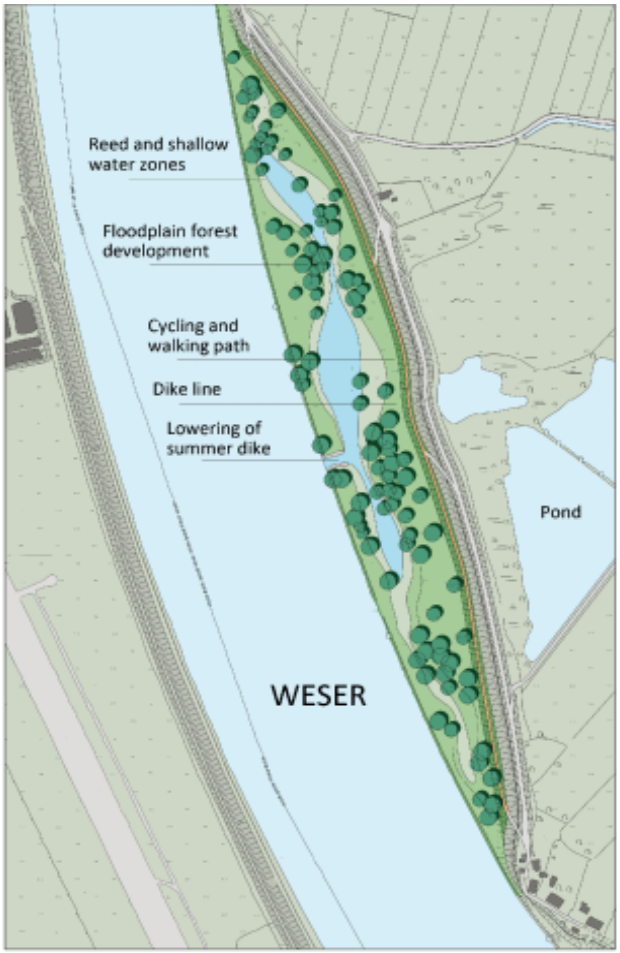
- Aims:
  1.reduce water levels in upper estuary
  2. compensate for habitat losses
- Situated in upper estuary
- Breached in Sept 2006
- 440ha - biggest MR site on Humber
- 10 year monitoring programme started in Sept 2007

Pilotprojects: Weser

´Restoration of riverbanks´

Characteristics:

- 13 ha area
- Approx. 0,03 m above mTHW
- Approx. 4 m tidal amplitude
- Overflow dam (summer dyke)
- Main dyke has to be enforced
- Agricultural use (greenlands)
- Natura 2000 areas adjacent



TIDE Outcomes compact

1. Scientific exchange and building up of expertise

→ Compilation of informationen on Elbe, Humber, Schelde and Weser estuaries:

- characteristics und function of estuaries,
- historical development of estuaries
- management-Instruments und Framework
- catalogue of evaluated measures

→Identification of similarities and differences:

- TIDE estuaries have certain basic prozesses, structures and demands in common, but each estuary is unique in its functional characteristics and dynamics.

→ Improved understanding of basic processes, structures and demands

→ Defined zonation approach appropriate for estuarine comparison

TIDE Outcomes compact

2. Recommendations

- Successful integrated management requires to understand the functioning of the estuarine system and to consider it as a whole when decisions have to be taken or management measures implemented (holistic approach).
- The Ecosystem Service Approach is a useful approach for decision makers as it shows the economic value of certain estuarine benefits. However, due to the complexity of estuaries the application of the approach is not simple.
- A successful implementation of management plans and measures requires an appropriate communication strategy.
- The success of any management strategy or measure depends on an appropriate monitoring strategy, i.e. integrated, cost-effective and fit-for-purpose.

TIDE Outcomes compact

3. Practical tools

- recommendations e.g. concerning communication strategies,
- certain methodologies related to hydromorphological topics,
- templates which can be download e.g. a conflict matrix
- a generic roadmap and decision support system ´EPSS ´
- an app for the estimation of birds disturbance to be downloaded,
- a catalogue of evaluated management measures
- examples of good practice e.g. morphological disposal along sandbars.

Quintessence of TIDE

Successful integrated and sustainable management of estuaries requires

- **the close cooperation between all legitimate stakeholders**
- **in a transparent process**
- **based on agreed aims and**
- **a good understanding of sound science**

Access TIDE outcomes via an interactive website, the TIDE toolbox

→ see next presentation Dr. Kirsten Wolfstein

Tidal River Development

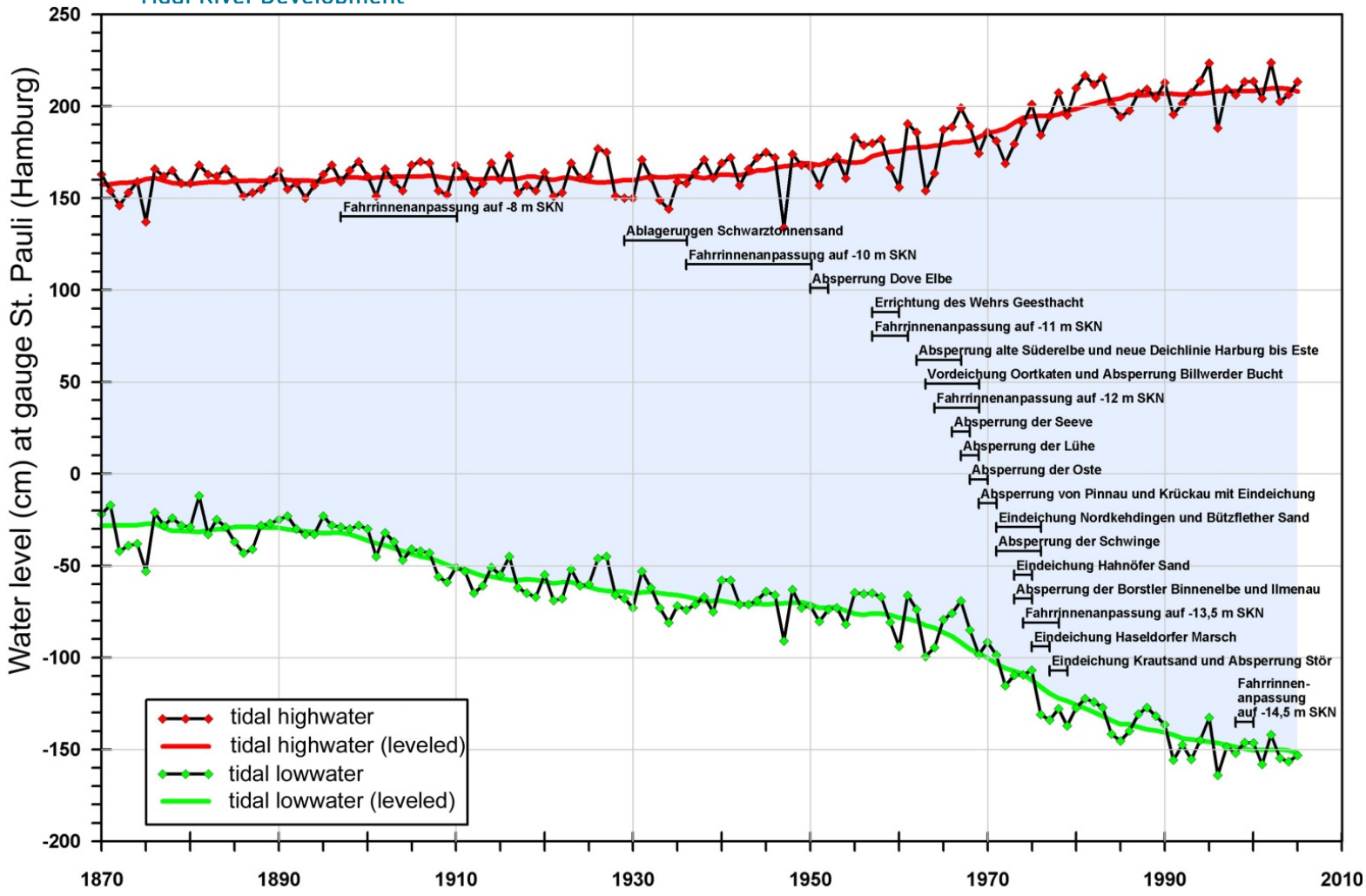
Thanks for your attention !

Tidal River Development

Reserve

Tidal River Development

Changing Estuary: Tidal Range



Tidal River Development

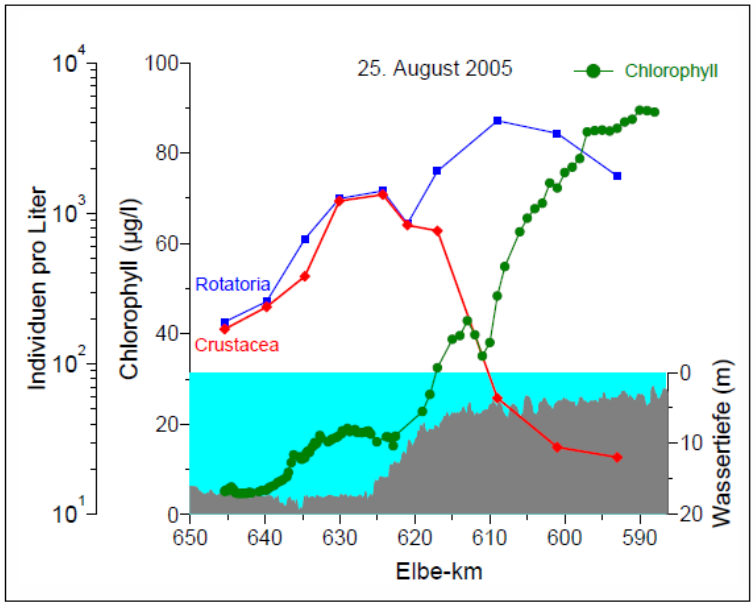
Ecosystem Services

1. Overview of ecosystem services (ES) - interestuarine comparison
2. ES importance / spatial distribution
3. Link to inventory of habitats/zone
4. Integration of ES to management perspectives & measures

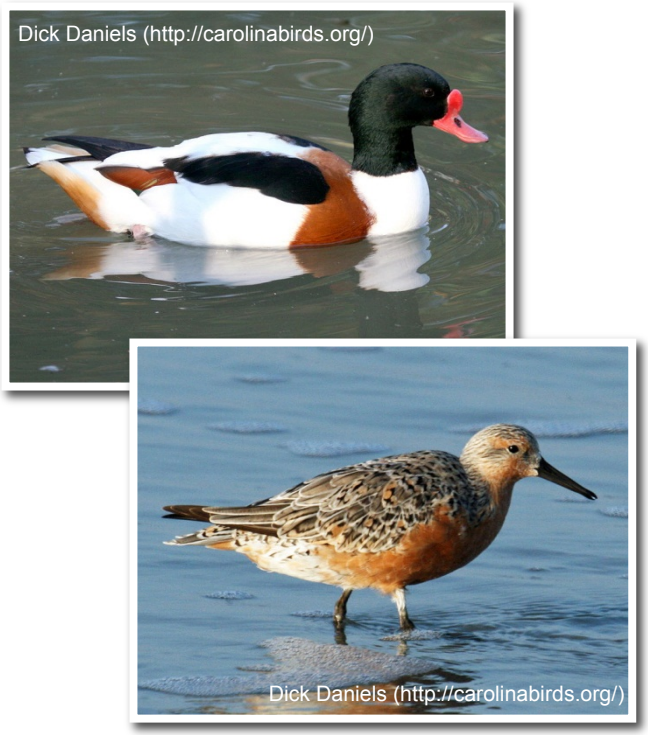
	Present time			
SERVICES	Freshwater	Oligohaline	Mesohaline	Polyhaline
Food: Plants	HPA:VI, BN:I, LK:UI; SB	HPA:VI, BN:I, SB:LI	HPA:VI, SB:I, NB:LI	HPA:I, BN,SB:UI
Food: Animals	BN:I, HPA;LK:LI	BN; SB:I, HPA:LI		
Water for household use	HPA;LK: VI; SB: LI			
Water for industrial use	LK:VI; HPA;BN;SB:I			
Water for agricultural use			HPA:VI, BN:LI	
Water for energy use				
Water for navigation				
Raw materials: Renewable soil materials: sand				
Raw materials: Renewable soil materials: clay		SB:LI; HPA:UI	SB:LI; HPA:UI	
Raw materials: Platform	HPA;SB;BN:VI; LK:LI			
Raw materials: Plants	BN:I; HPA: LI	BN:LI; HPA:UI	BN:LI; HPA:UI	
Raw materials: Animals				
Genetic resources			HPA,BN: VI; SB:LI	HPA:DK; BN:VI; SB:I
Medicinal resources				
Ornamental resources				
Air quality regulation: Removing harmful particles				
Air quality regulation: Air-water exchange	HPA: I; SB:UI			
Air quality regulation: Biogeochemical reactions due to activity of organisms				
Climate regulation: Carbon sequestration and burial				
Climate regulation: Water thermodynamic regulation	BN,LK:I, SB:LI, HPA:DK	BN:I, SB:LI, HPA:DK	BN:I, SB:LI, HPA:DK	BN:I, HPA:DK
Climate regulation: Heat exchange regulation	BN:VI, LK:LI; HPA:DK	BN:VI, HPA:DK	BN:VI, HPA:DK	BN:VI, HPA:DK
Regulation extreme events or disturbance: Flood water storage	BN:I; HPA:LI	BN:I; HPA:LI	BN:I; HPA:LI	
Regulation extreme events or disturbance: Peak discharge buffering	BN:I; HPA:UI			
Regulation extreme events or disturbance: Water current reduction				
Regulation extreme events or disturbance: Wave reduction				
Regulation extreme events or disturbance: Sound buffering				
Water quantity regulation: drainage of river water	HPA;BN;LK:VI; SB:I	HPA;BN:VI; SB:I		
Water quantity regulation: prevention of saline intrusion				
Water quantity regulation: dissipation of tidal and river energy				
Water quantity regulation: landscape maintenance	BN:VI; LK:I; HPA:DK	BN:VI; HPA:DK	BN:VI; HPA:DK	BN:VI; HPA:DK
Water quantity regulation: transportation				
Water quality regulation: transport of pollutants and excess nutrients				
Water quality regulation: reduction of excess loads coming from the catchment				
Erosion and sedimentation regulation by water bodies				
Erosion and sedimentation regulation by biological mediation	LK:I; BN;SB;HPA:LI		BN: I; HPA;SB: LI	BN: I; HPA;SB: LI

Interestuarine comparison: water quality

- Impact of increasing tidal range on tidal marsh ecosystems.
- Tidal parameters influencing amplification of the tide.
- Impact of load of nutrients on ecological functioning.
- Limiting factors primary production.
- Heterotrophic or autotrophic system?
- Differences between the estuaries and why?



Carrying Capacity & Management for Birds



- Approach to developing conservation goals and habitat needs for waterbirds
- Consideration of physical and biological requirements: feeding, roosting, breeding areas, anthropogenic effects, ...
- Assessment of actual carrying capacity based on current usage levels, trends for species/estuaries/ zones, and suppressors.
- Interestuarine carrying capacity comparison per zones and key species

Tidal River Development

Management measures

Collection of practical measures

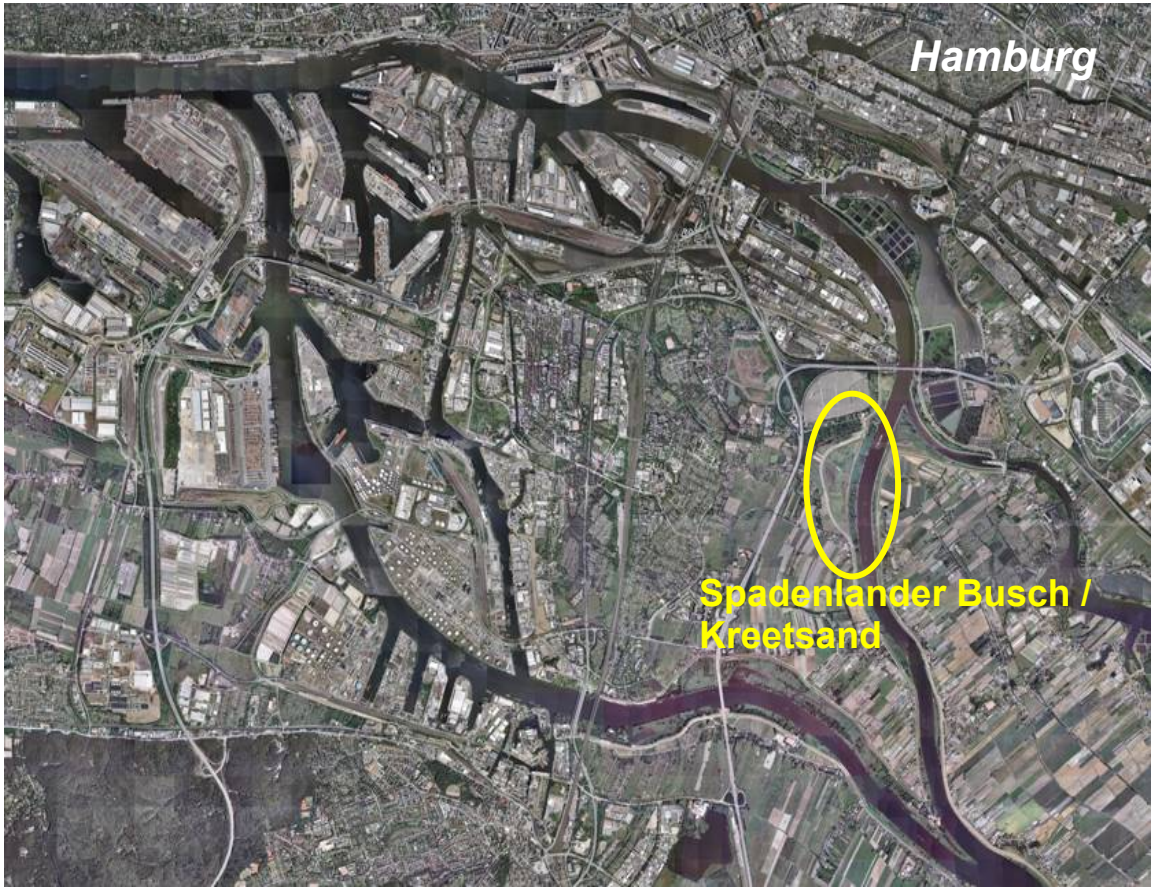
TIDE Measure Types			Measures in total	Elbe	Scheldt	Weser	Humber
Development Targets	Hydrology/ Morphology	Measure to reduce tidal energy, tidal range, tidal asymmetry and tidal pumping effects	6	2	1	2	1
		Measure for flood protection	5	-	3	-	2
		Measure to improve morphological conditions	6	6	-	-	*
		Measure to decrease the need for dredging	5	4	-	-	1
	Biology/ Ecology	Measure to develop and/or to protect specific habitats	24	5	10	5	4
		Measure to develop and/or protect specific species	7	2	1	-	4
		Other measure to develop natural gradients and processes, transition and connection	13	4	4	5	*
		Measure to prevent introduction of or to fight invasive specie	-	-	-	-	*
	Physical/chemical Quality Parameters	Measure to reduce pollutant loading (point and diffuse sources)	1	1	-	-	*
		Measure to reduce nutrient loading (point and diffuse sources)	-	-	-	-	*
		Measure to improve oxygen conditions	2	1	1	-	*
		Measure to reduce physical loading (e.g. heat input by cooling water entries)	-	-	-	-	*
		Other measure to improve self-purifying power	-	-	-	-	*
		Other development target(s).	8	-	6	-	2

*more measures expected

Management measures

Elbe: Spadenlander Busch

Tidal Volume: New shallow water area



Catalogue of measures: Pilot Kreetsand

Management measures

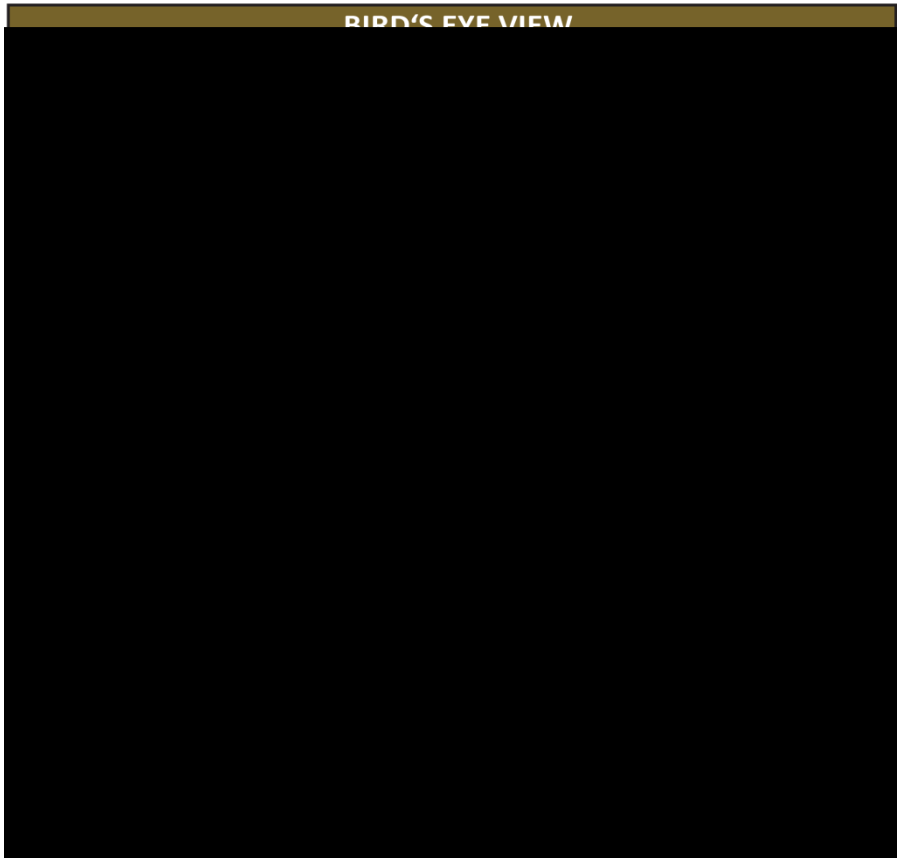
Westerscheldt: Alternative disposal strategy

Knowlege transfer

1. Relocating dredged sediments along sandbars
   - create ecologically valuable habitat
   - improve distribution of ebb and flood flows

   → **WIN-WIN- Situation**

2. Evaluation of concept applicability to other estuaries

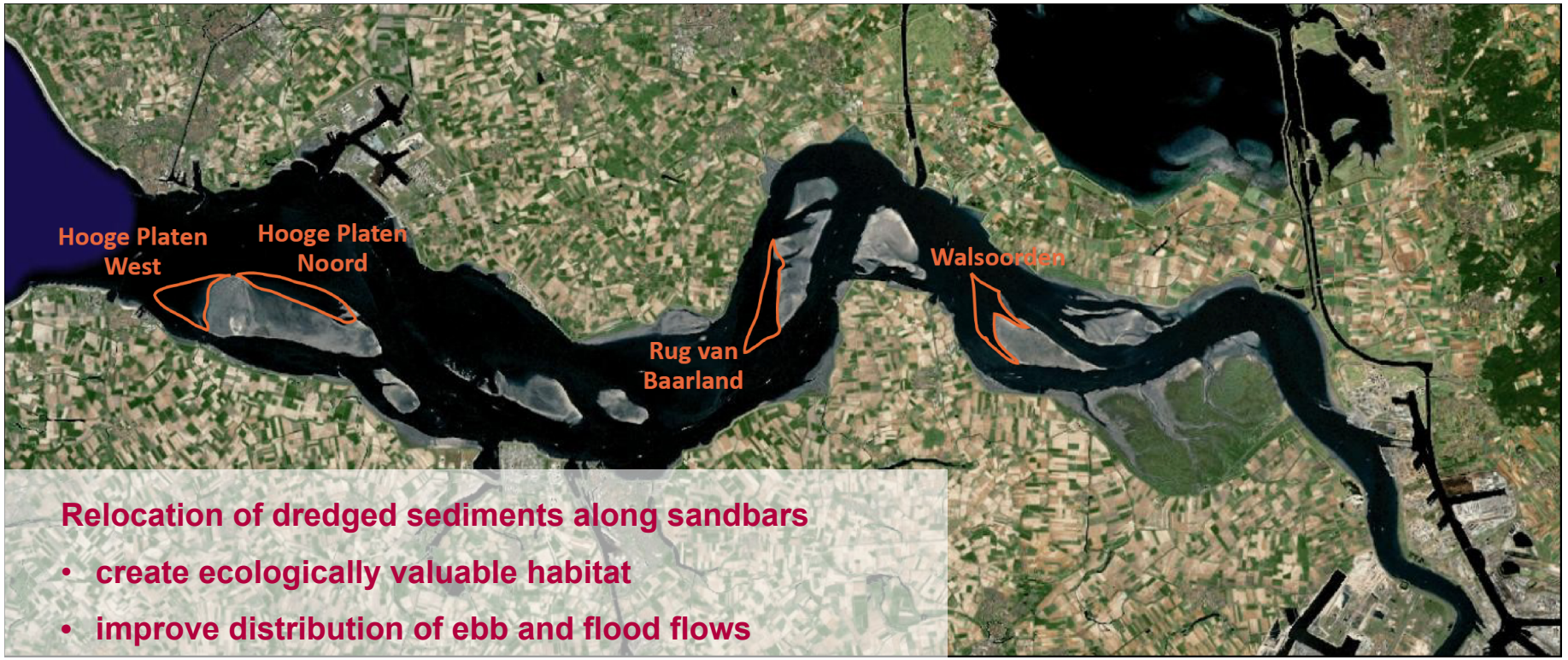


Tidal River Development

Management measures

Westerscheldt Alternative disposal strategy

Win-win for Sedimentmanagement and nature ?



Relocation of dredged sediments along sandbars

- **create ecologically valuable habitat**
- **improve distribution of ebb and flood flows**

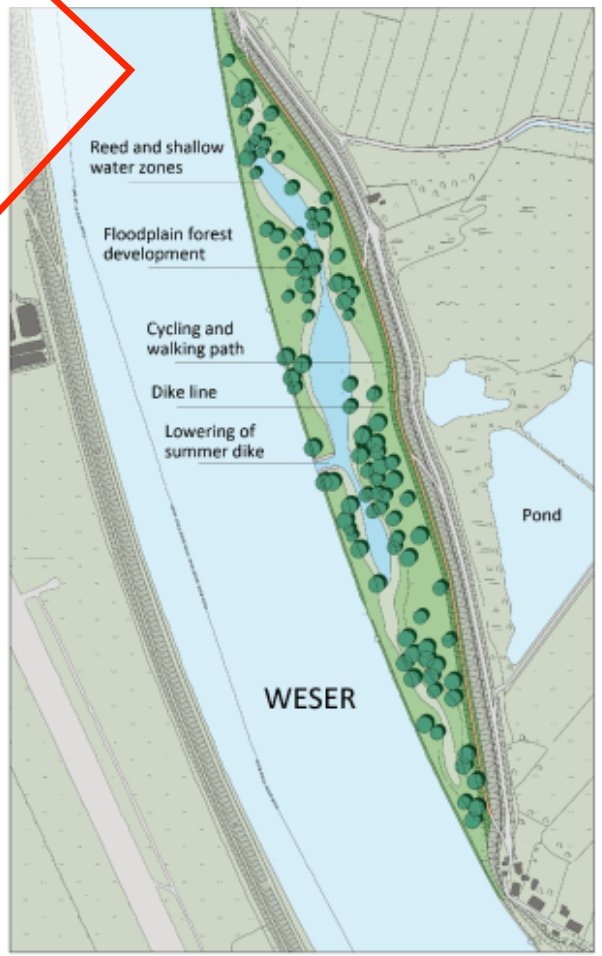
Pilotprojects: Weser

´Restoration of riverbanks´

Planned realisation:

- Present state: feasibility study
- Base of the enforced dyke will be shifted several meters to forelands.
- Parts of measure may be used as a compensation measure due to intended main dyke enforcement according to national impact regulation).
- Feasibility study is part of pilot project – goal: improvement of tidal Weser ecological conditions.

Gibt's hier ein schöneres Bild ?



SBUV - "Lebensader Weser"
M. 1:4000
W2 - Auwaldentwicklung im Bereich des Wardervorlandes
BIO CONSULT. Schuchardt & Scholle GbR

Management measures

Online Database

Tidal River Development

Pastorengate – Rebuilding of river flats and shallow water areas

Description of the issue and measure:

The tidal influence on the implementation area was increased by the nature-orientated remodelling of the outer area of an old tidal gate (Sielanlage) and its surrounding area. Here, different tidal influenced lakes and residual water pools were created. To control the tidal influence, an in- and outlet structure with a mechanism for damming was built. The implementation area was completely left to natural succession.

Status of the measure:

The measure was implemented in 1990.

Monitoring:

The aim of the monitoring programme was to control, if the development targets have been achieved after 10 years. It included a documentation of the development of tidal reed beds and riparian perennial plants (Uferstaudenfluren) within four transects, a vegetation mapping (reed beds, softwood floodplain forests), a mapping of the whole spectrum of vascular plants in the surrounding areas of the water-formed riparian habitats, a mapping of birds, limnological monitoring with mapping of the aquatic fauna (benthic invertebrate fauna, macrophytes, fish fauna and fry) and its migratory behaviour, mapping of abiotic factors like terms of sedimentation and suspended loads, chemical and physical characteristics of the water body (temperature, oxygen content, pH-value, conductivity) and of the sediments (mineral oil and heavy metal content).

Estuary: Weser

Country: Germany

Responsible Authority:
Stadtwerke Bremen

Aktueller aus toolbox ?

Initial assessment of effectiveness and sustainability:

The targets of the compensation measure Pastorengate have already been achieved satisfactorily (MEYERDIRKS & SCHIRMER 2002). The development targets are the preservation and restoration of typical landscape and vegetation elements, the toleration of the natural dynamics within the river system and the promotion of the establishment of river flats and tidal reduced shallow water areas as a condition for the resettlement of typical flora and fauna at the river Weser (with focus on floodplain forests and reed beds as well as aquatic invertebrates). The target achievement is high.

Conflicts and synergies:

The Waterways and Shipping Administration of the Federal Government was concerned aubout possible additional dredging material.

Lessons learned:

In Bremen, it was the first time of re-building river flats and shallow water areas at the Weser. Because of not having the expert knowledge, it was an experiment. At least, the implementation was positive for fauna and landscape. But becaues of the shortage of space the effects on flora were very small. The problem were too many development targets on too little space. The aggradation went faster than projected. Because the rework to maintain the development targets is too expensive, the implementation area is left to free succession and is partly getting terrestrial again.

Costs: 50000-250000 €

Measure survey *(link)*

Downloads:

Zwischenbericht_1992.pdf
Dazwischenbericht_1994.pdf
Abschlussbericht_1999.pdf

Links:
www.pastorengate.de
www.kompensation.de
www.stadtwerke.de

Tidal River Development

Management measures

Online Database

- Comprehensive information on measures & evaluation

  → Download of reports

  → Interesting links

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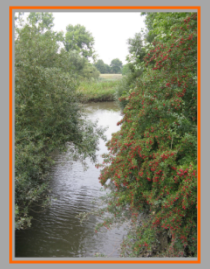

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TIDE Toolbox

Website for estuary managers & stakeholders:

Easily accessable, practical presentation of TIDE results
(reports, glossary, management issues, ..)

- Better understanding of estuaries
- Information for integrated estuary management
- Catalogue of measures
- Compilation of Dredging strategies
- Tools
- Links to other projects

Tidal River Development

Hamburger Abendblatt

http://www.abendblatt.de/hamburg/kommunales/article115517925/Hollaender-warnen-vor-der-Elbvertiefung.html

23.04.13, 07:09 NEUE STUDIE

Holländer warnen vor der Elbvertiefung

Umweltverbände sehen ihre Position gestärkt. Hafenwirtschaft warnt: "Steigbügelhalter für Konkurrenz". Gutachter von der Delft University of Technology sehe die Elbe schon jetzt in einem kritischen Zustand.

Von Axel Tiedemann

„Dutch warn against Elbe deepening“

Foto: © Frank Peters/Frank Peters Fotografie

Alexander Porschke vom Nabu Hamburg weist auf Gefahren für die Elbe hin, die laut einer niederländischen Studie entstehen können