watersketch

Report on the Case Study

Elbe – Hamburg

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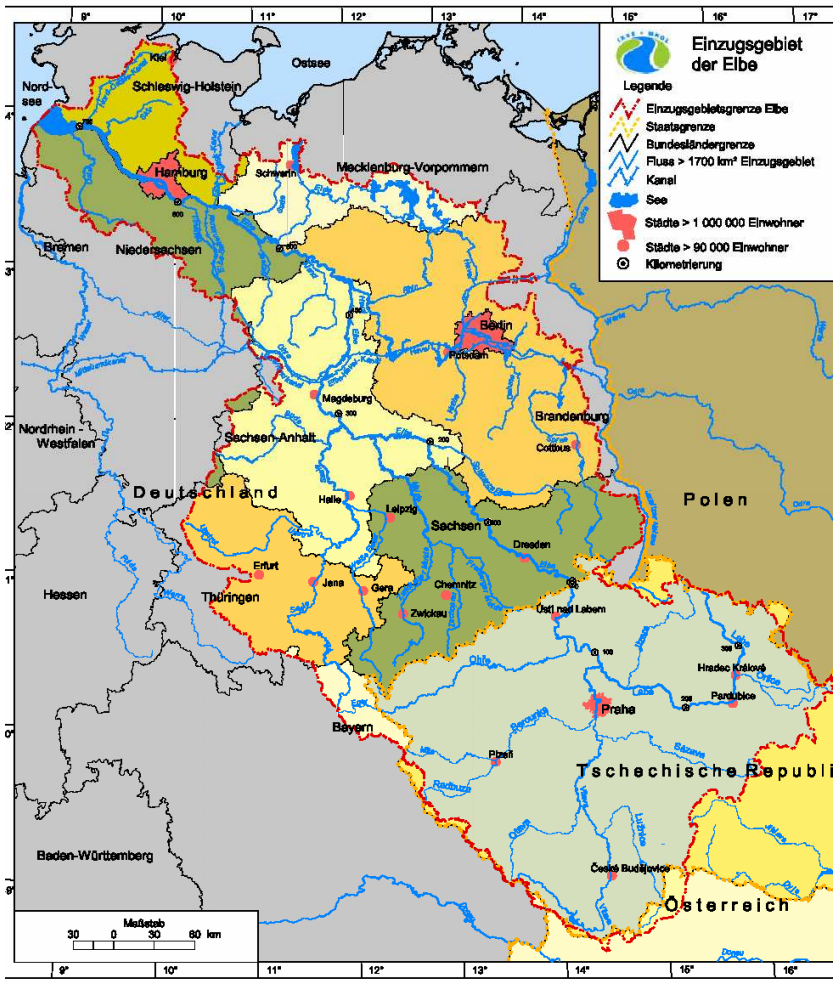
Introduction ELBE – River Basin 1



Length: > 1000 km

Catchment area: ~150.000 km²

Specifics

- Transboundary River
- Drains some major cities
- Drains area of former GDR
- German catchment comprises 9 Federal States
- With respect to the WFD: River part, estuary and coastal water
- Tidal effects up to 100 km upstream (north of Hamburg)

Introduction ELBE – River Basin II

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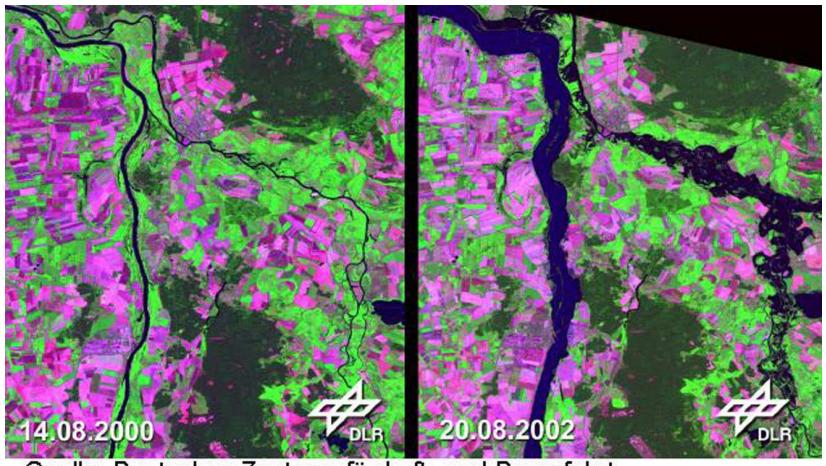

Quelle: Deutsches Zentrum für Luft- und Raumfahrt

Impact of the Elbe on Hamburg

Flood Risk: Concern for human safety due to high water levels/dam breaches etc

⇨ Contaminant Transport downstream

Introduction ELBE – River Basin II

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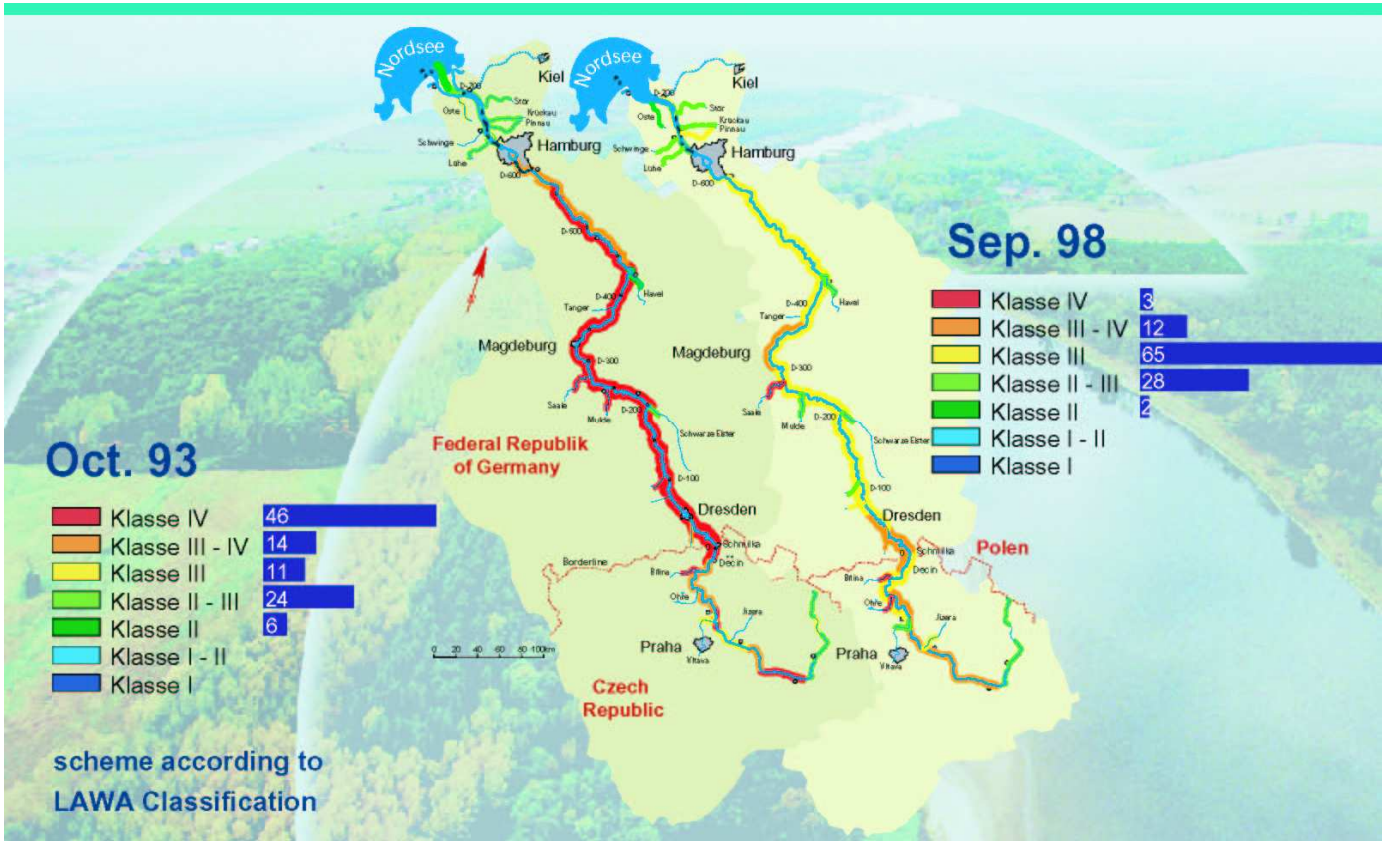
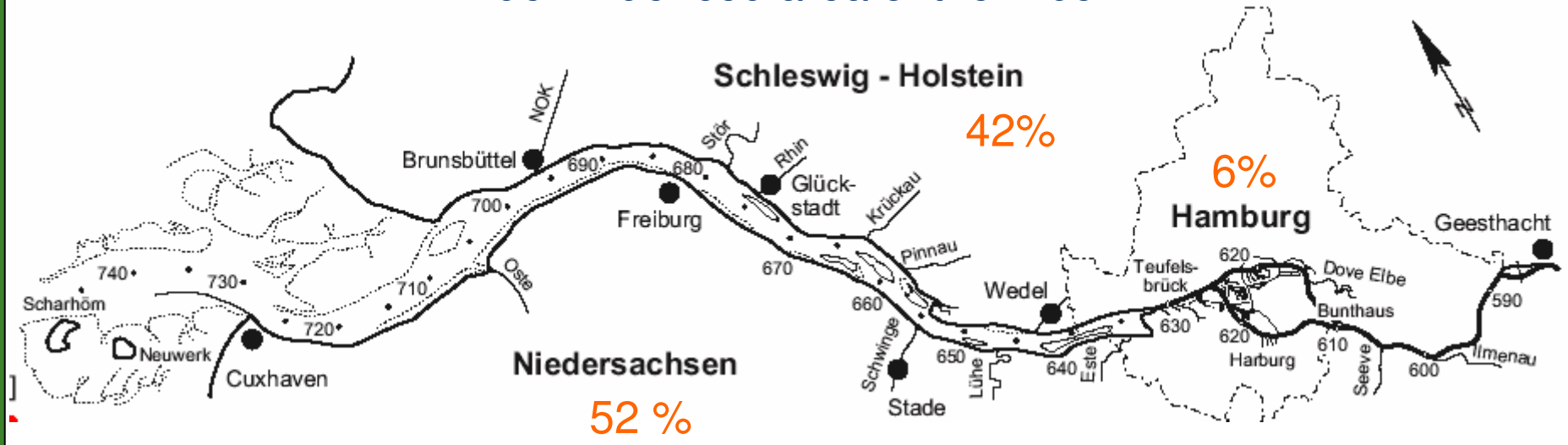


Contaminant Transport downstream: e.g. Mercury

LAWA-Classification: Also used for DM assessment in HH

Introduction Hamburg 1

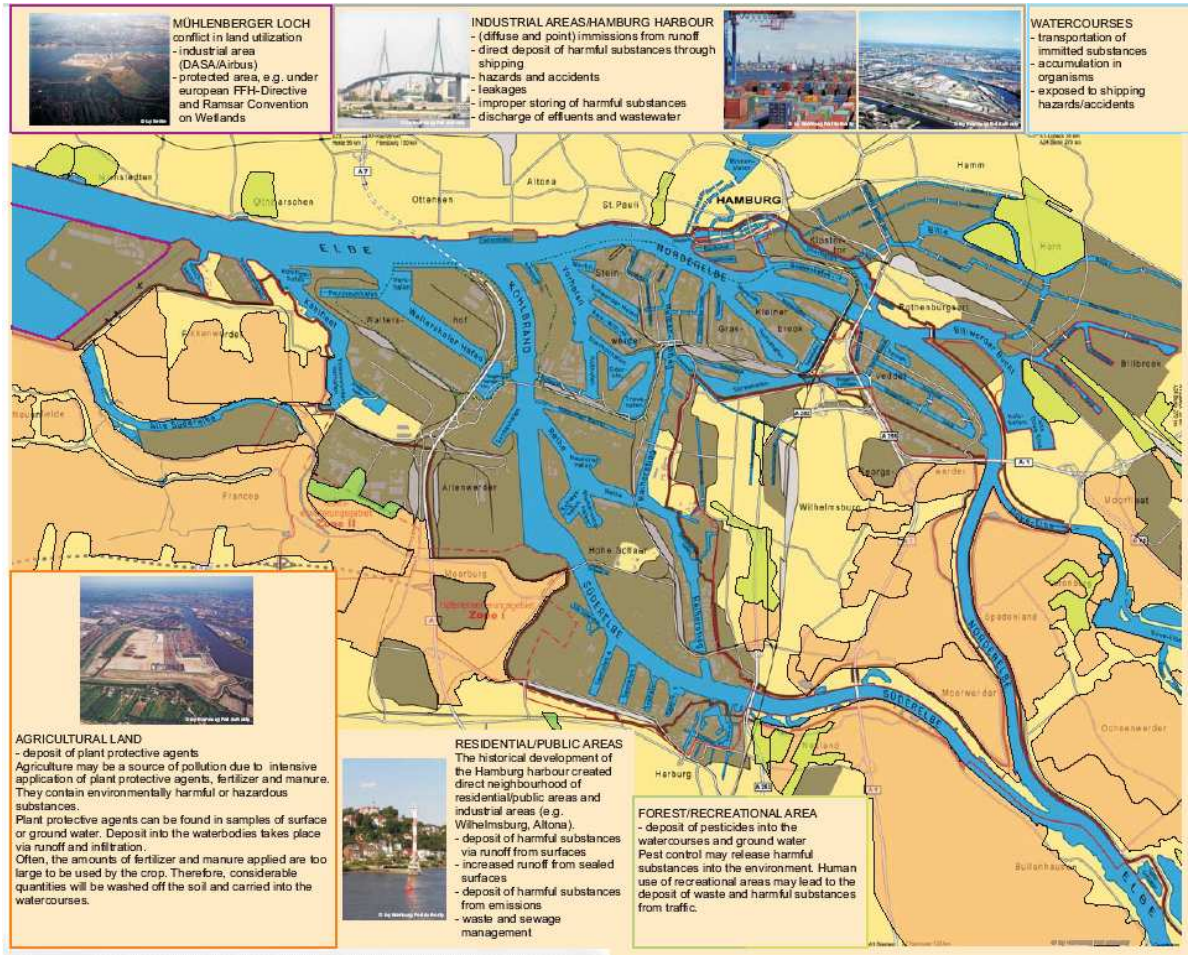
Tide-influenced area of the Elbe:



- No direct access to the North Sea
- Depending on specific water depth
- Hamburg comparatively rich comp.to NS
- Tensions

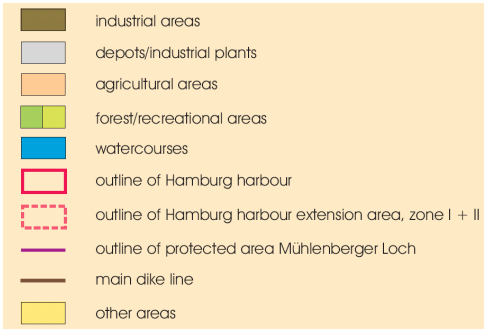
- Hamburg
- Germany‘s 2nd largest city
- 3rd largest industrial area
- Largest harbour in Germany
- 125.000 jobs

Introduction Hamburg

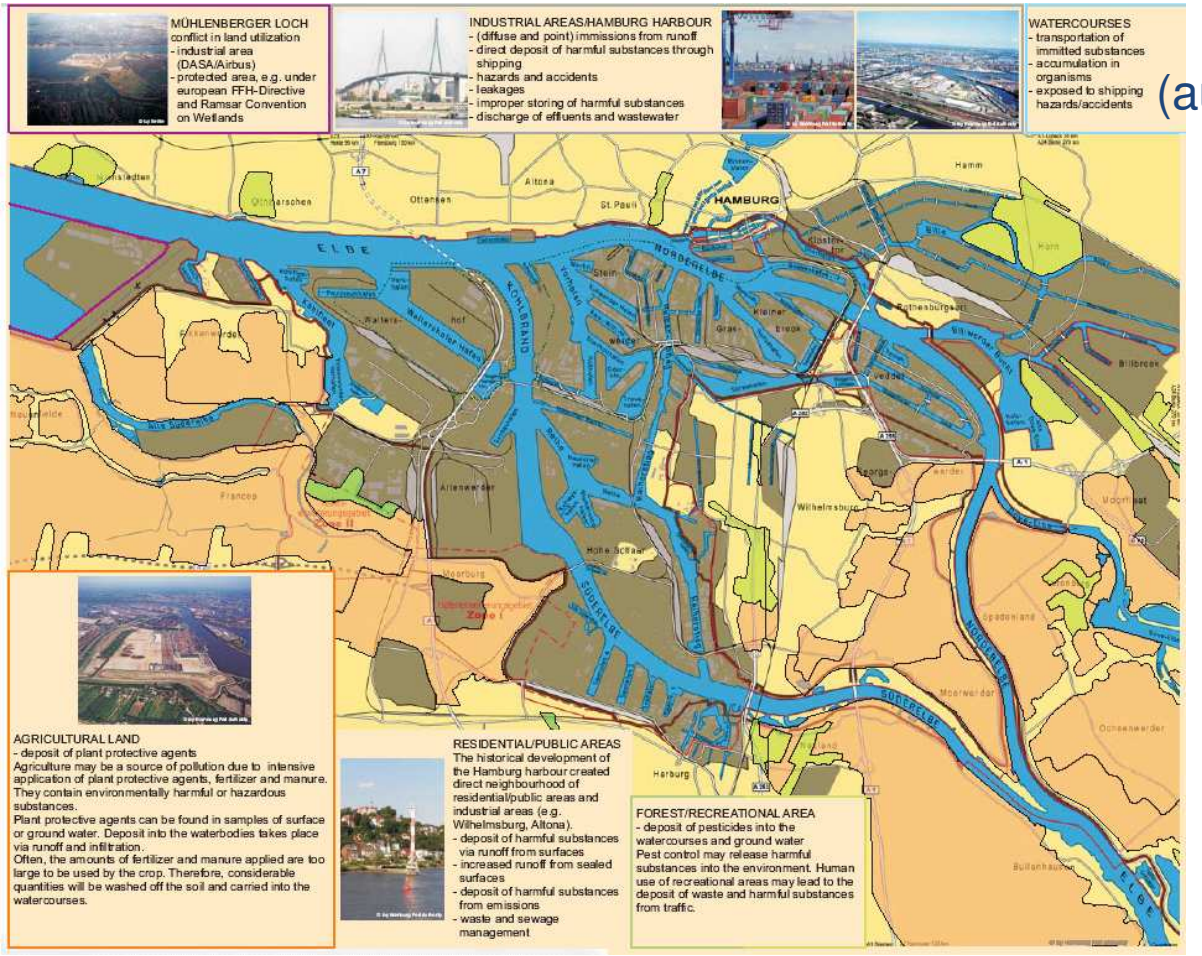


Open air space and buildings: 36%
Agriculture: 27%
Traffic area 12%
Lakes, rivers and canals 8%
Recreational areas 12%
Others 5%

10 % : Harbor related



Introduction Hamburg



Industries:
Mobile industry
(automobile, aviation, shipping)
Precision engineering
Mechanical engineering
Chemical production
Metal industry
Oil processing industry

- industrial areas
- depots/industrial plants
- agricultural areas
- forest/recreational areas
- watercourses
- outline of Hamburg harbour
- outline of Hamburg harbour extension area, zone I + II
- outline of protected area Mühlenberger Loch
- main dike line
- other areas

Conflicts in Hamburg

Arise from

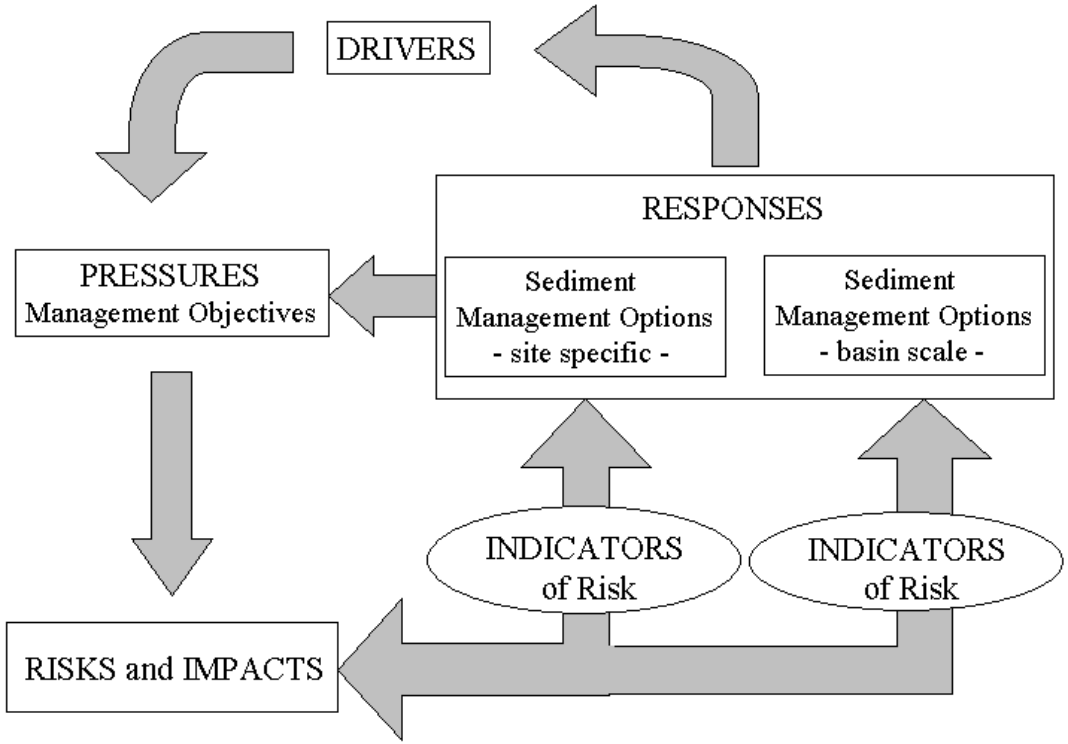
- Location within the Elbe River:
    - no direct access to the North Sea
    - Input of contaminants from upstream
    - Sedimentation in the harbour area
    - Competition with future deepwater harbour in Wilhelmshaven

- The Federal State system in Germany:
    - each Federal State is up to a certain point responsible for the realization of regulations
        harmonization of quality criteria along the Elbe River?
        The extent of the different „Länder authority“ prolongs negotiation processes

The DPRIR - Approach

Conflicts are connected to Drivers (social or societal forces) and different interests (objectives)

Meeting regulatory criteria
Maintaining economic viability
Ensuring environmental quality
Securing quality of human life



(From Joziasse et al., in prep)

Meeting regulatory criteria

Drivers and Challenges:

London and OSPAR Conv. And European Waste Directive:

Hamburg got up to 9 Mio m^3 DM/yr, contaminated, relocation being the preferred option. Consideration as waste impedes beneficial use.

Ramsar Convention, Habitats D., Wild Birds D.

In favour of expending industries, Hamburg sacrificed 700 ha of a freshwater wadden area, Ramsar Site and SPA and SCI, with compensation measures of doubtful success.

SEA –Directive:

Deepening of the Elbe River: Integration of public opinion in the decisions making process is mandatory, but public is largely opposed to those plans.

Meeting regulatory criteria

Water Framework Directive:

- majority of contaminants come from upstream.
- Communal and industrial WWTP in Hamburg emit less than diffuse sources.
- Diffuse sources: mainly agriculture (Schleswig-Holstein, Niedersachsen)

Prognosis:

Surface waters will mostly not reach QC of the WFD

Ground water will reach QC of the WFD to 30 to 50 %

A good ecological status will not be reached because of morhphological modifications which serve to secure human life

Consequence:

Most of the tide-influenced Elbe will be classified as Heavily modified water body.

Maintaining economic viability

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Drivers: Stabilization of societal income / public employment / regional importance

Challenges in Hamburg and consequences

- Competition with other deep water harbours Elbe deepening
- Expansion of industrial areas Mühlenberger Loch
- Consideration of DM as Waste (European Waste Directive)
- High costs of disposal of (contaminated and increasing) DM

Maintaining economic viability

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QC for Elbe Sediment/DM classification:

Metall	Klasse I	Klasse I-II	Klasse II	Klasse II-III	Klasse III	Klasse III-IV	Klasse IV
Hg	0,2-0,4	<0,5	<0,8	<5	<10	≤25	>25
Cd	0,2-0,4	<0,5	<1,2	<5	<10	≤25	>25
Pb	25-30	<50	<100	<150	<250	≤500	>500
Cu	20-30	<40	<60	<150	<250	≤500	>500
Zn	90-110	<150	<200	<500	<1000	≤2000	>2000
Cr	60-80	<90	<100	<150	<250	≤500	>500
Ni	10-30	<40	<50	<150	<250	≤500	>500
As	3-5	<10	<20	<40	<70	≤100	>100

Old LAWA system, still used by Hamburg

Metall	Klasse I	Klasse I-II	Klasse II	Klasse II-III	Klasse III	Klasse III-IV	Klasse IV
Hg	≤0,2	≤0,4	≤0,8	≤1,6	≤3,2	≤6,4	>6,4
Cd	≤0,3	≤0,6	≤1,2	≤2,4	≤4,8	≤9,6	>9,6
Pb	≤25	≤50	≤100	≤200	≤400	≤800	>800
Cu	≤20	≤40	≤80	≤160	≤320	≤640	>640
Zn	≤100	≤200	≤400	≤800	≤1600	≤3200	>3200
Cr	≤80	≤160	≤320	≤640	≤1280	≤2560	>2560
Ni	≤30	≤60	≤120	≤240	≤480	≤960	>960
As	≤10	≤20	≤40	≤80	≤160	≤320	>320

New LAWA system, used in the Elbe Catchement (=IKSE-System)

Comparison of different Quality Targets

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Tabelle 3: Schadstoffgehalte in Oberflächenproben in Bullenhausen zwischen 1994 und 2004 im Vergleich mit verschiedenen Zielvorgaben (Schadstoffgradient stromauf-bis stromabwärts von HH: ◢ abnehmend, ▲Peak in HH, ━ keine Veränderung)

Blau umrahmt: Die seit 2000 gültigen ARGE-Elbe Zielvorgaben.

Überschreitungen in % der Daten: nie<5% | 5%<teilweise<50% | 50%≤häufig<90% | 90%≤immer

Kontaminante in TS	Mittel-wert <20 µm	Min	Max	Mittel-wert gesamt	Min	Max	Trend gesamt	ARGE-Elbe[2] alt	IKSE (A)[3]	IKSE (L)[4]	BLAK QZ[5] (A)[3]	BLAK QZ (L)[4]	HABAK RW_1	WRRL[6]
in Fraktion								HM<20µm, O<2mm					HM,O<20µm	HM,O<2mm
Hg (mg/kg)	4,8	2,7	8,3	3,2	2,1	6	◢	0,8	0,8	0,8	0,8	1	1,0	
Cd (mg/kg)	9,4	7,8	12	6,1	3,7	8,9	◢	1,2	1,2	1,5	1,2	1,5	2,5	
Pb (mg/kg)	142	110	210	84	53	120	◢	100	100	100	100	100	100	
Cu (mg/kg)	165	120	280	95,5	62	142	◢	60	80	80	80	60	40	160
Zn (mg/kg)	1509	1000	2600	932	590	1400	◢	200	400	200	400	200	350	800
Cr (mg/kg)	133	87	210	76	43	130	━	100	320	150	320	100	150	640
Ni (mg/kg)	64	46	95	38	24	61	◢	50	120	60	120	50	50	
As (mg/kg)	46	38	66	30	22	38	◢	20	40	30				40
TBT (µg Sn/kg)[7]	37,1	16	65,5	19,6	10,6	27	▲	25	25	25				
TeBT (µg/kg)[8]				50,4	19,5	155	▲							40
DBT^+ (µg/kg)[6]				43,6	15,1	98	▲							100

(From Heise et al, in prep)

Ensuring Environmental Qual.

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Drivers: Environmental Ethics, Demand of recreational areas

Challenges – originating in Hamburg and consequences

Need to expand industrial areas Mühlenberger Loch, opposed to Ramsar C., Habitats D.,

Discharges caused by industry TBT, historic contamination (Cu), WFD?

Management limitation at low O_2-levels Relocation of DM prevented

Challenges – orginating elsewhere:

Supplementing list of QC with Elbe-specific Cont. harmonization? Not in place

Contaminant Transport downstream polluter pays principle? Does not work.

Monitoring programmes in addition to WFD problems with other Federal states (Schleswig Holstein): Do not agree

Securing quality of human life

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Drivers:
Public welfare, public safety

Challenges:

Flood control measures lead to assignment as HMWB

Flood control may oppose Elbe River Deepening ....

Increase in current velocity with deepening may endanger fishermen

Conclusion

The main conflicts in Hamburg originate from co-existence of different interests confined to a relatively small place (economical interests, human life concerns) due to the Federal system, which limits the number of alternatives.

Additionally, the system of Federal states‘ authorities impedes harmonization of monitoring programmes (Inclusions of Elbe-specific substances, sequence of monitoring)

Economical objectives have been shown to be weighted higher than ecological ones in Hamburg, raising public concern.

Non-compliance with WFD will be due to

a) Contaminant input from upstream. Here PPP will have only limited success because of legacies of the GDR past.
b) Morphological modifications and structures that serve to protect human life

Workshop on 30th of June

Workshop on 30th of June

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"The role of the WFD for river basin planning to achieve sustainable use of watercourses"

Watersketch-Workshop

Hamburg
June 30th 2005

Policy concepts and national regulations – a process of harmonisation and interdisciplinary collaboration

Is a new authority needed?
How to improve interactions among researchers, managers, and decision makers?
Is the holistic approach of the WFD realisable at the present state?
Can institutional changes facilitate the implementations of the WFD?

Workshop on 30th of June

Evaluation of strategies to monitor chemical and ecological water quality

How can we harmonise monitoring plans?
How can we interpret a relationship between chemical and ecological data?
Are sediments under the scope and necessary?
Is the holistic approach of the WFD realisable at the present state?

Hamburg
June 30th 2005

Workshop on 30th of June

watersketch

"The role of the WFD for river basin planning to achieve sustainable use of watercourses"

Integration of quality data for a multicriteria decision tool

Can we aggregate the raw data or do we have to derive indicators?
How do we handle the variability of the data?
How do we deal with controversial results in decision making?
What are the requirements of decision makers and managers?

Thank you for your attention

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