BIOLOGICAL QUALITY ELEMENTS FOR TRANSITIONAL WATERS - FISH

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DFS-data were made available by RIVO

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WATER FRAMEWORK DIRECTIVE

River basin management

Hydromorphological, physico-chemical, biological status

Biological quality elements

(phytoplankton, macrofytes, macrofauna,fish)

Fish in transitional waters: Species composition & Abundance

TRANSITIONAL WATER

Water type "O2" (NL) or “T1”(D) = Eems-Dollard, Weser, Elbe

Definition according to WFD:

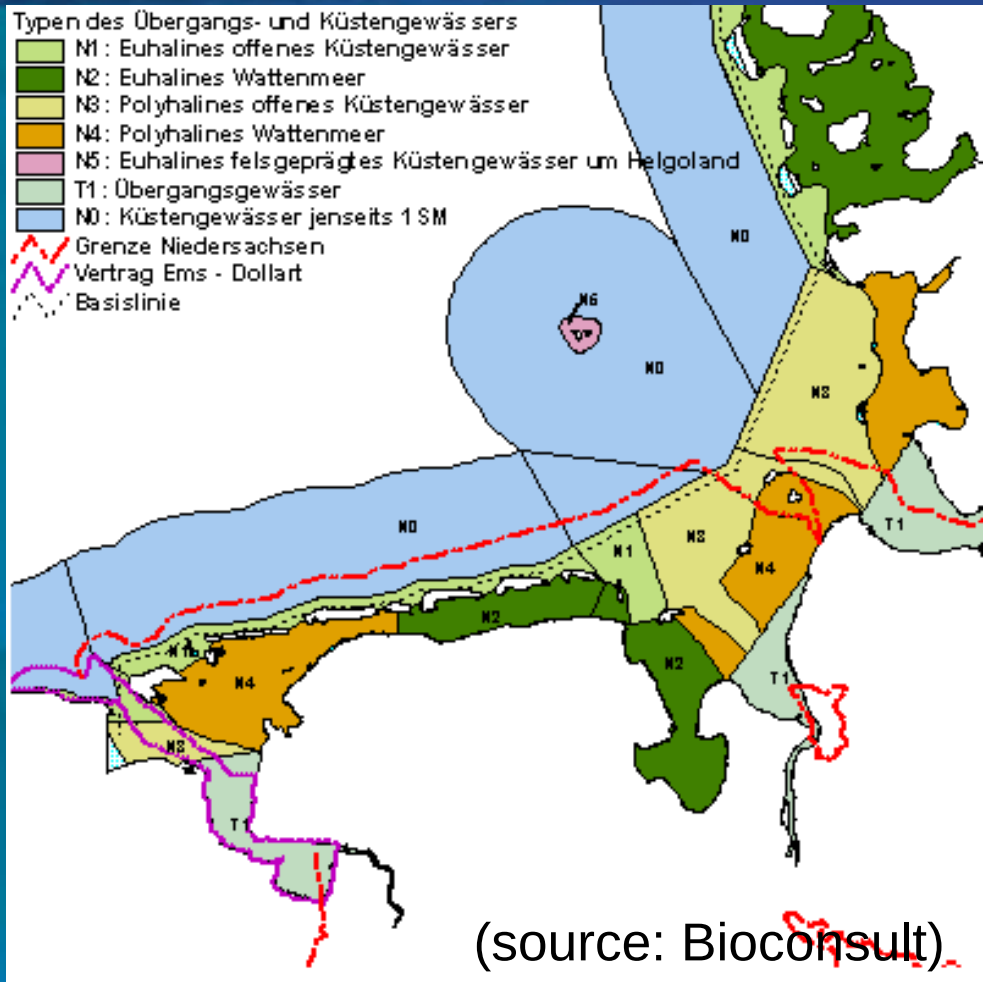
"…in the vicinity of a river mouth"

"…partly saline in character"

"…substantially influenced by freshwater”

Example of designation:

All are heavily modified (HMW)



(source: Bioconsult)

DEFINITIONS FOR ECOLOGICAL STATUS

example: fish fauna

Very good

composition and abundance according to undisturbed state

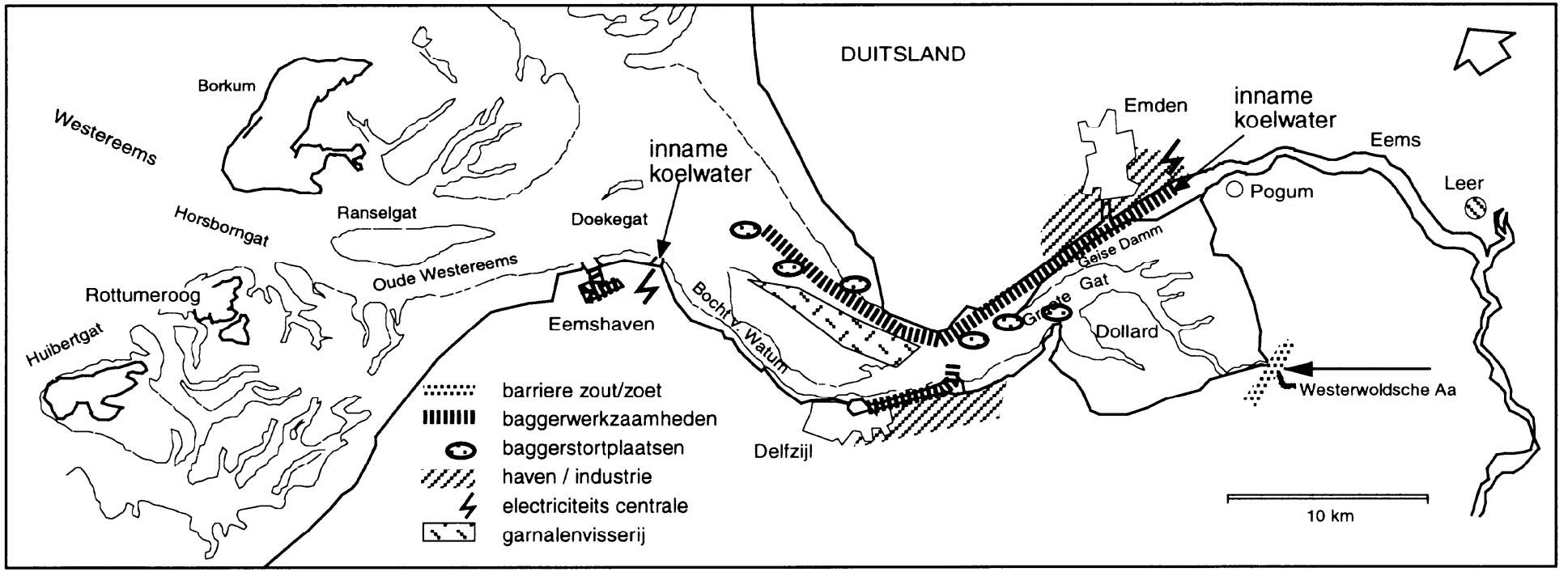
Good

Abundance of sensitive species shows light signs of disturbance compared to the type-specific conditions due to antropogenic effects on the fysico-chemical or hydromorphological quality elements

Moderate

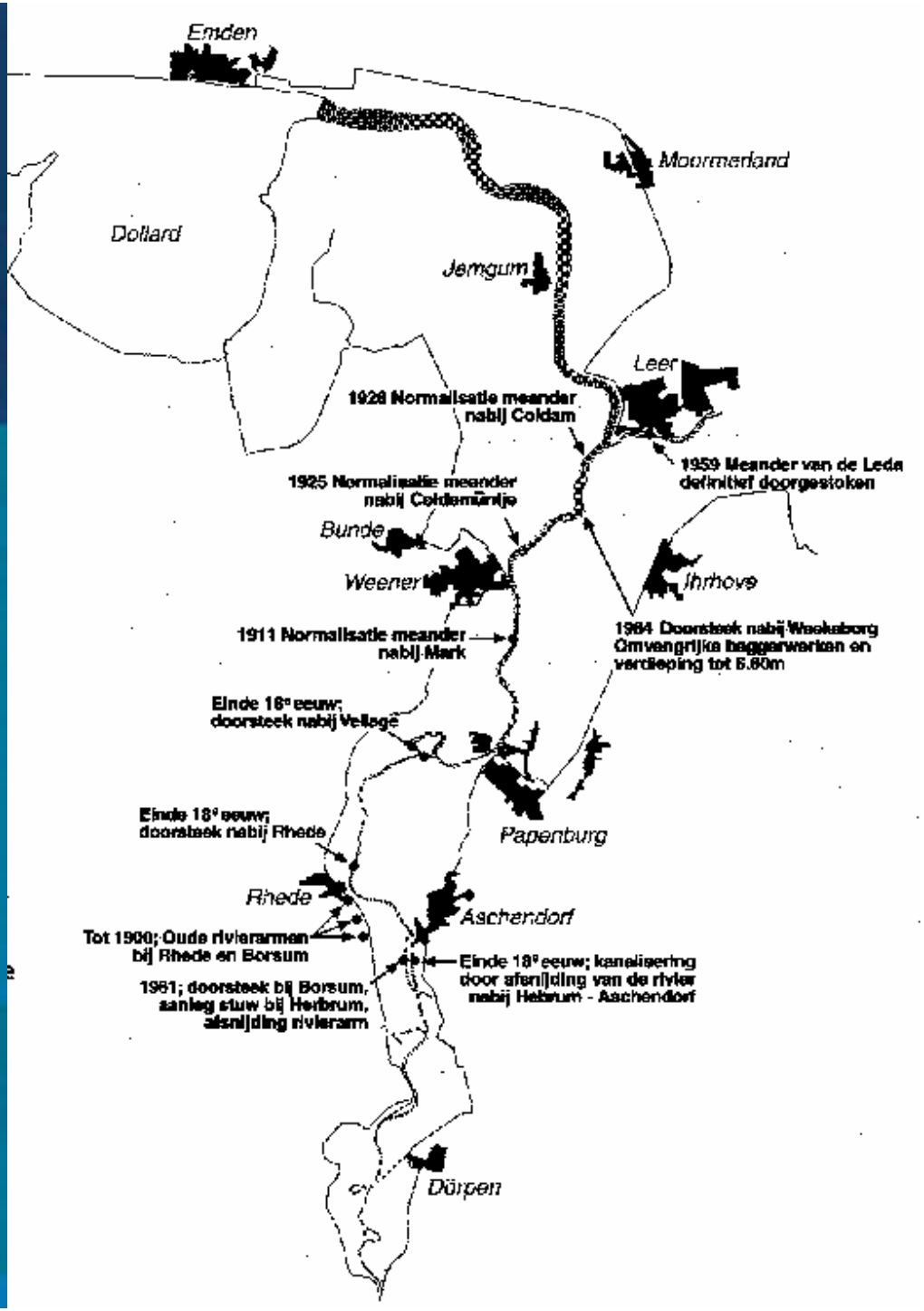
A moderate part of the type-specific sensitive species are missing due to antropogenic effects on the fys./chem. or hydromorph. quality elements

SIGNIFICANT ANTROPOGENIC PRESSURE



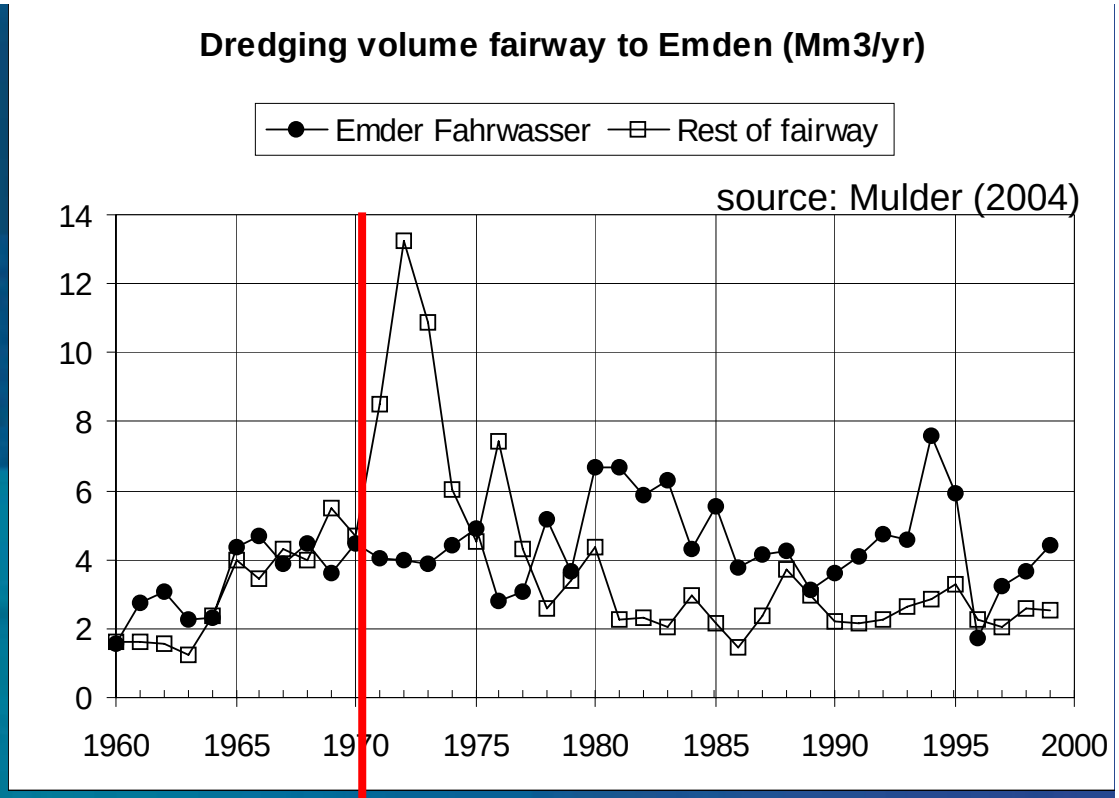
PRESSURES

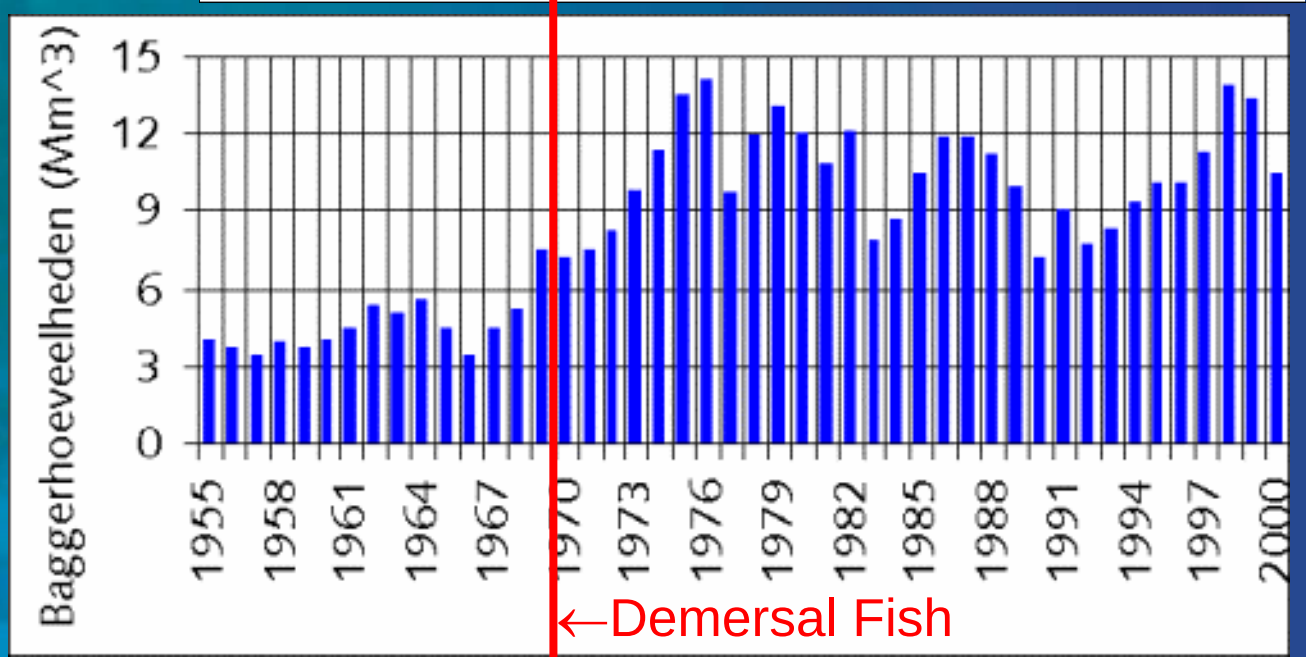
canalisations



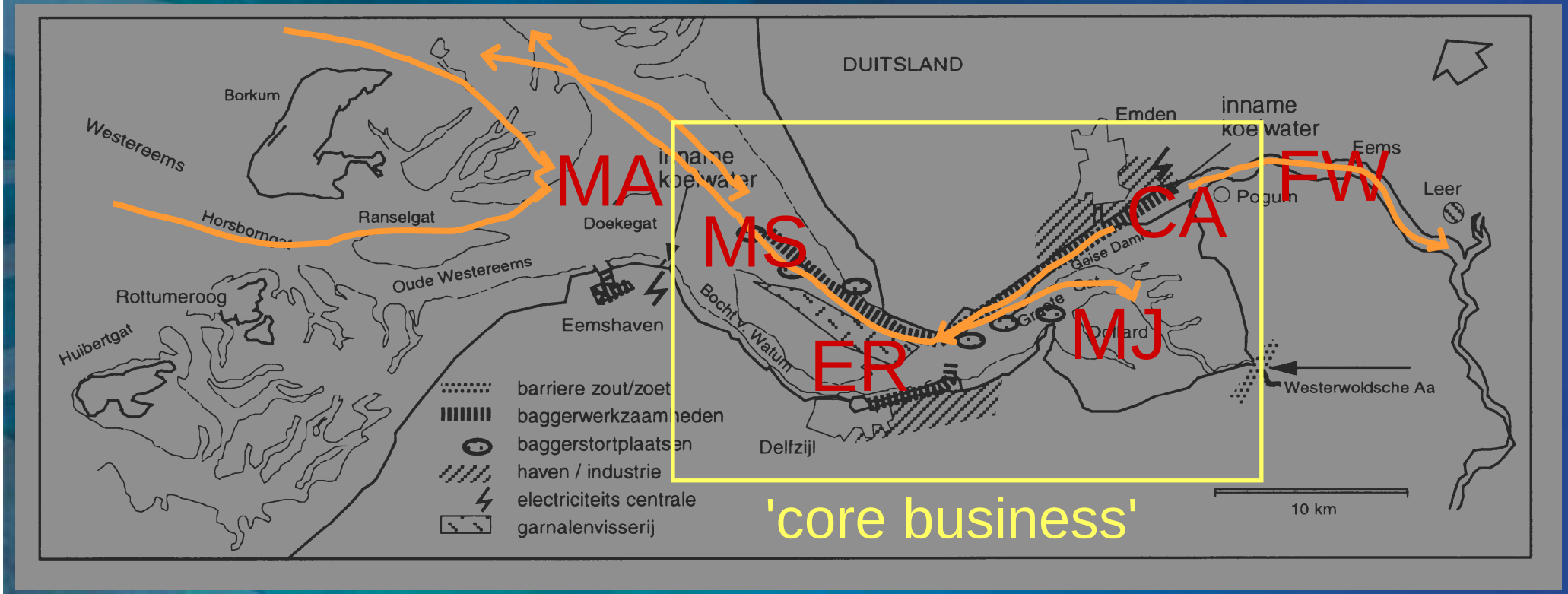
PRESSURES

dredging





ECOLOGICAL GUILDS



METRIC 1: Nr of DIADROMOUS SPECIES

migration through estuary
spawning in fresh water or in sea/ocean
juveniles may accumulate in transitional water

Diadromous fish are sensitive to:
•physical barriers (dams, sluices)
•loss of spawning habitat (upstream)
•water quality (oxygen)
•fishery activities

Presence (of juveniles) is sufficient for transitional water, presence of spawning populations should be determined upstream, because the main bottlenecks (barriers, water quality, habitats) are also upstream

No existing structural monitoring!

METRIC 2: NUMBER OF RESIDENT SPP.

dependent of estuary (?)
adaptations to dynamic environment, a.o. reproduction
many benthic species, habitat related
accumulation of toxic substances due to residency
year-round presence

METRIC 3: NUMBER OF NURSERY SPP.

dependent of estuary during relatively short period
some commercial North Sea species (herring, cod, plaice)
transport of juveniles to estuary is crucial
potential impact of North Sea fishery (e.g. cod)

METRIC 4: NUMBER OF SEASONAL SPP.

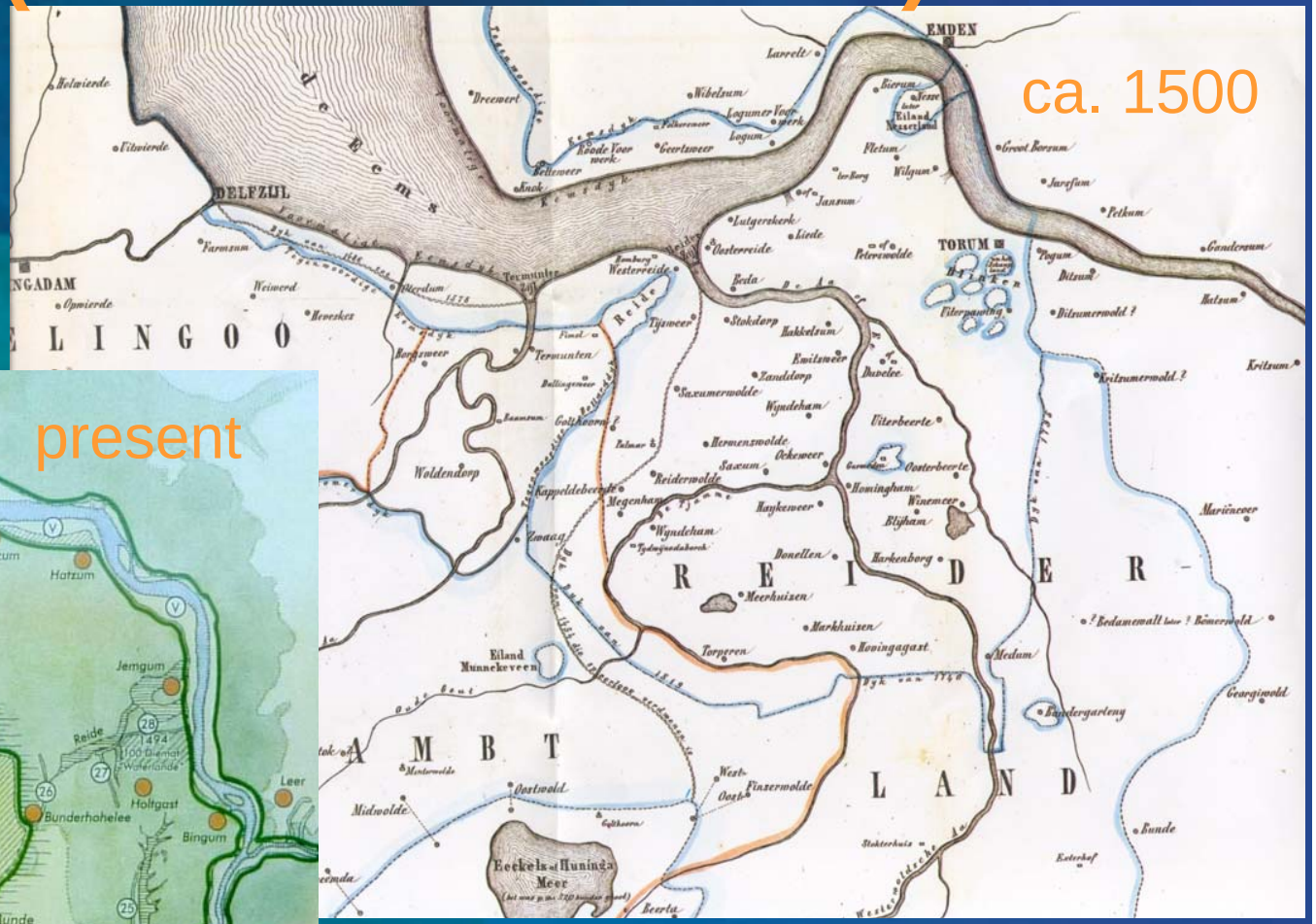
dependent of estuary during very short period
for reproduction (garfish, anchovy) or
for feeding (sprat)
only if circumstances are suitable

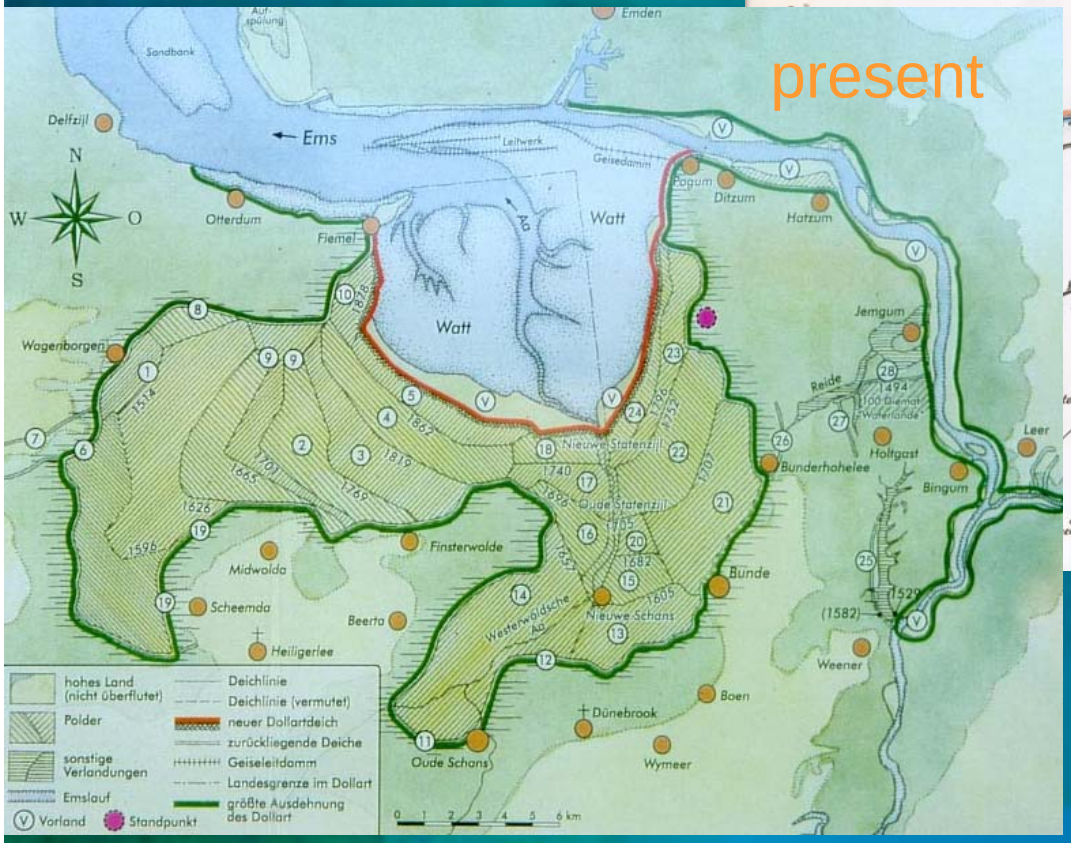
REFERENCE DATA ON FISH

- Historical data
  - Eems-Dollard
    - Stratingh & Venema (1855) very qualitative
    - Lohmeijer (1907) qualitative
  - Westerschelde
    - Selys-Longchamps (1842)
    - Poll (1945, 1947) (cited in Breine et al., 2002)
- Geographical reference
  - no data on undisturbed estuaries in Europe
- Models
- Expert judgement

REFERENCE ("undisturbed state")

when was that??





REFERENCE SPECIES LIST

Acipenser sturio Alosa alosa Alosa fallax Anguilla anguilla Gasterosteus aculeatus Lampetra fluviatilis Osmerus eperlanus Petromyzon marinus Salmo salar Salmo trutta	CA n=10	Clupea harengus Dicentrarchus labrax Gadus morhua Limanda limanda Merlangius merlangus Pleuronectes platessa Scophthalmus maximus Scophthalmus rhombus Solea solea Trigla lucerna	MJ n=10
Agonus cataphractus Ammodytes tobianus Aphia minuta Coregonus oxyrinchus Liparis liparis Myoxocephalus scorpius Pholis gunnellus Platichthys flesus Pomatoschistus microps Pomatoschistus minutus Syngnathus acus Syngnathus rostellatus Zoarces viviparus	ER n=13	Belone belone Cyclopterus lumpus Dasyatis pastinaca Engraulis encrasicolus Sprattus sprattus	MS n=5

N=38

PRELIMINARY SELECTION OF METRICS

WFD-obligation: species composition & abundance
Relation between metric (indicator) and pressure

Category	Metric
Species composition	nr diadromous spp.
Species composition	nr. resident spp.
species composition	nr. marine juv. spp.
Species composition	nr. seasonal spp.
Abundance	density diadromous (smelt)
Abundance	density resident (eelpout?)
Abundance	density marine juvenile (flatfish, herring?)

Compare species composition with Reference Species List

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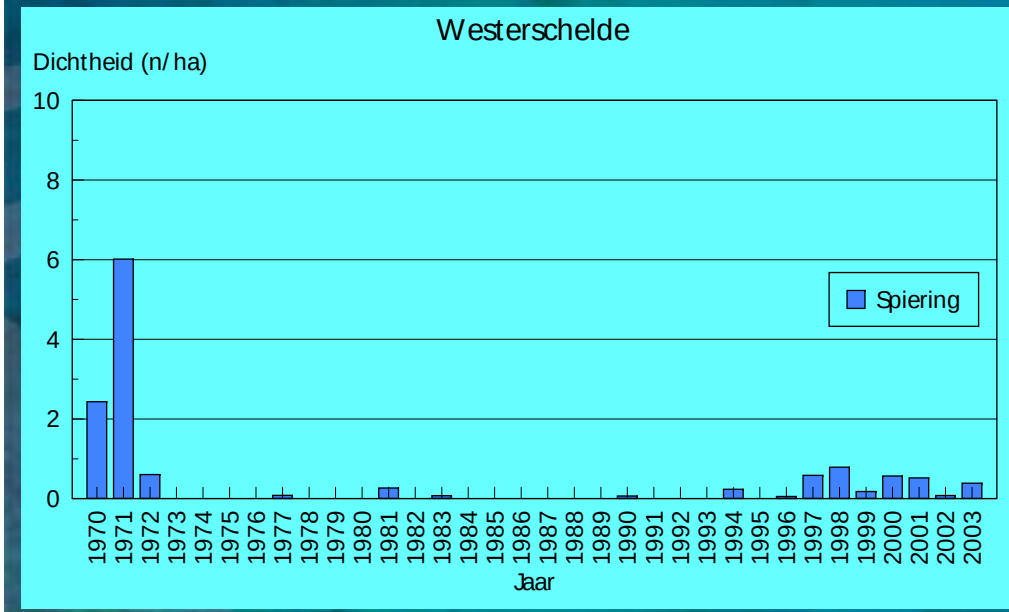
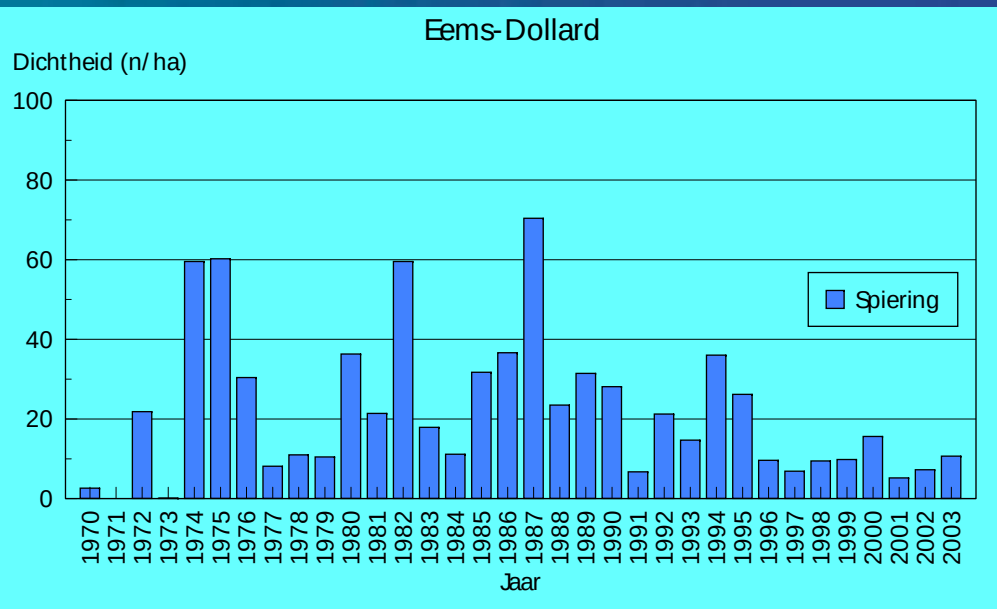
METRIC 5: ABUNDANCE OF CA SPP.

typespecific species = smelt (*Osmerus eperlanus*)





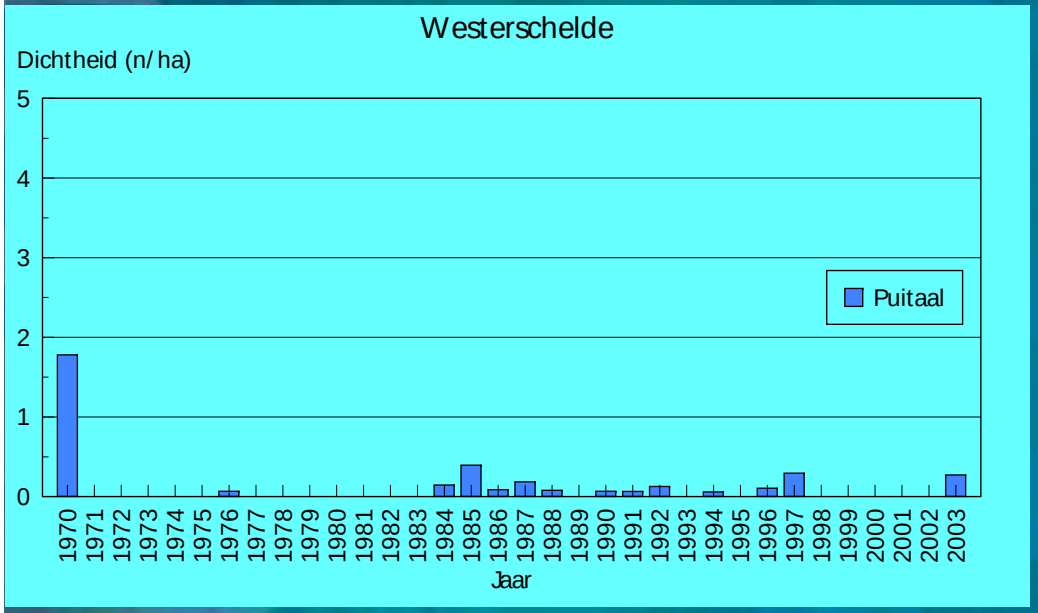
Westerschelde

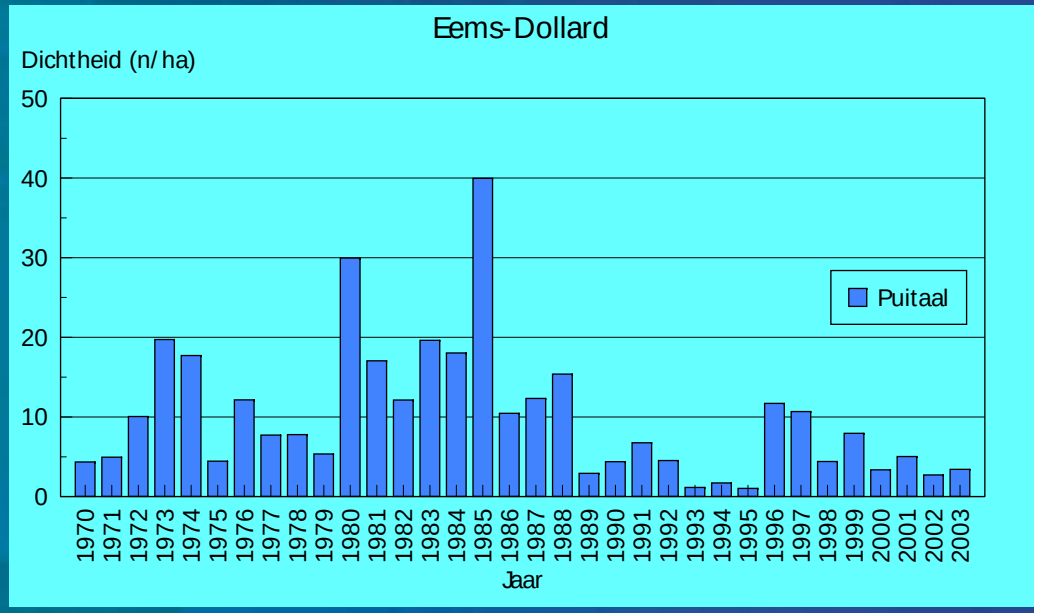
Eems-Dollard

N.B. different Y-axes!

METRIC 6: ABUNDANCE OF ER SPP.

e.g. eelpout (*Zoarces viviparus*)





Westerschelde

Eems-Dollard

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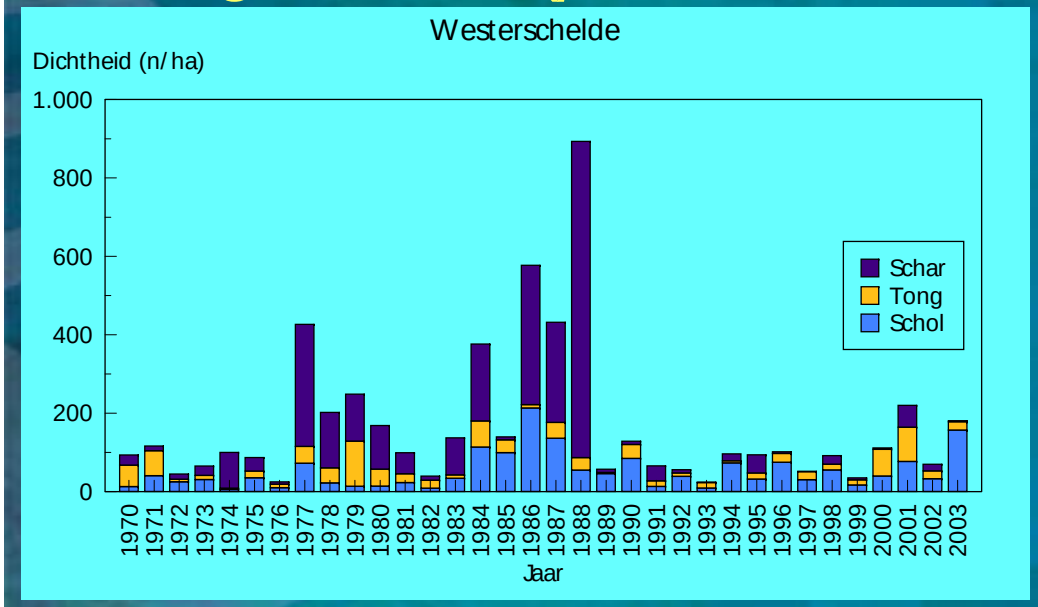
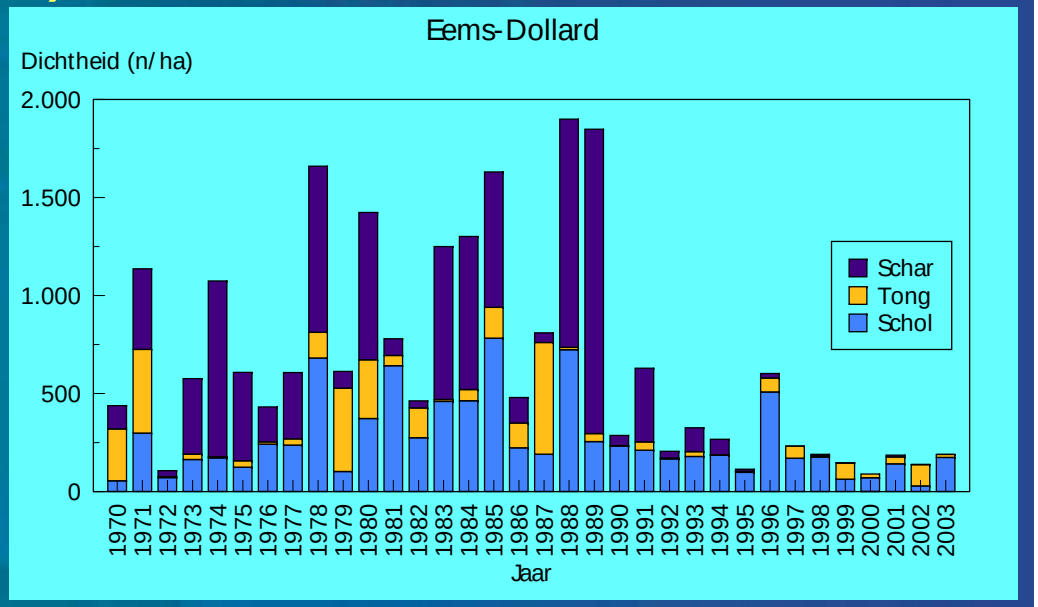
METRIC 7: ABUNDANCE OF MJ SPP.

e.g. flatfish (*plaice, sole, dab*)





Westerschelde

Eems-Dollard

N.B. different Y-axes!

Monitoring advice

WFD, Habitats Directive

Wadden Sea, Estuaries

Current programs

Gaps, Adaptations
& Additions

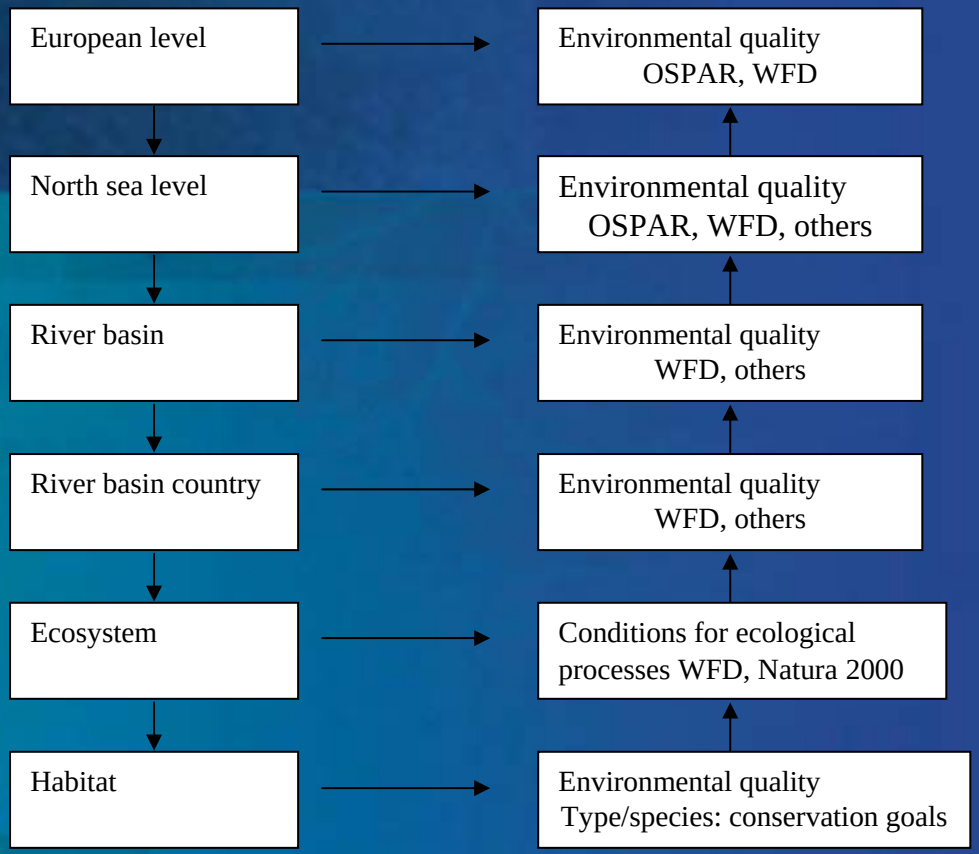


Fig. 1. Hierarchical integration of conservation objectives depending on the spatial scale (adapted from Wolfstein and Van Den Bergh, 2004)

Terms of reference

Development of a trilateral fish monitoring program;
Based on trilateral targets to be developed (QSR 2005)