

Policy and legal tools for ecosystem restoration in Flanders (Belgium)



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inbo



Research Institute
for Nature and Forest

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Belgium



30.530 km³

11 milj inhabitants

3 languages

7 governments

Flanders: 470/km²

Brussels: 7200/km²

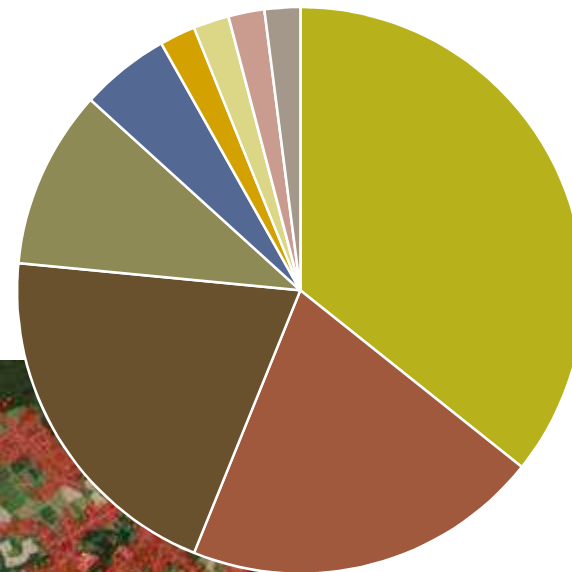
Wallonia: 210/km²

Environmental issues are regional competence

CCEP: Coordination Comite for Environmental Policy

Land use cover in Flanders

‘Urban network’



- cropland
- urban
- (production) grasland
- (production) woods
- (road)infrastructure
- water
- industry
- park & recreation
- other nature types

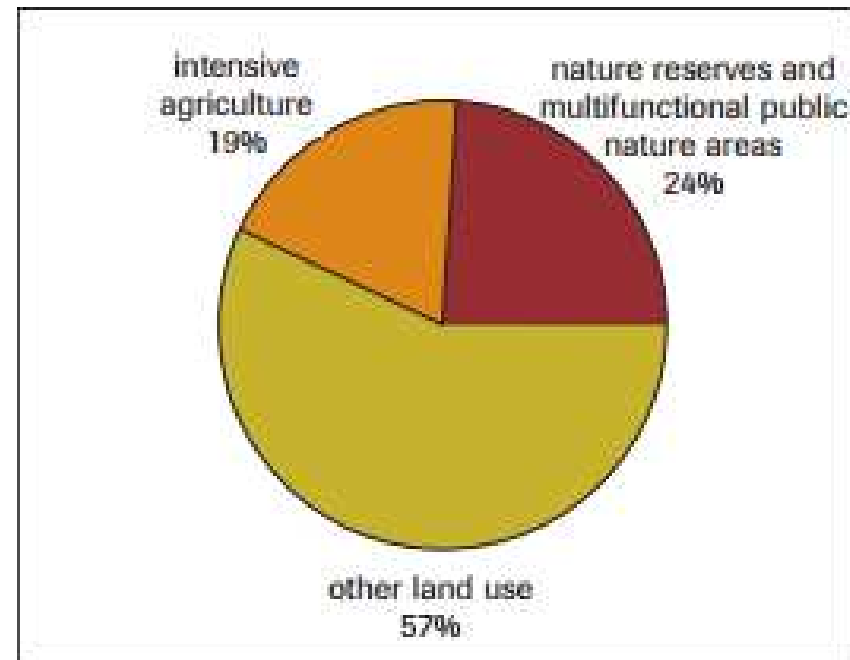
Policy framework for ecological restoration

🌀 Spatial planning and zonation maps

🌀 12 % with 'green' destination

🌀 Small and fragmented

Land use in 'green destination'



Policy framework for ecological restoration

- ❁ Flemish Ecological Network (1997-2003) part of Nature decree 1997

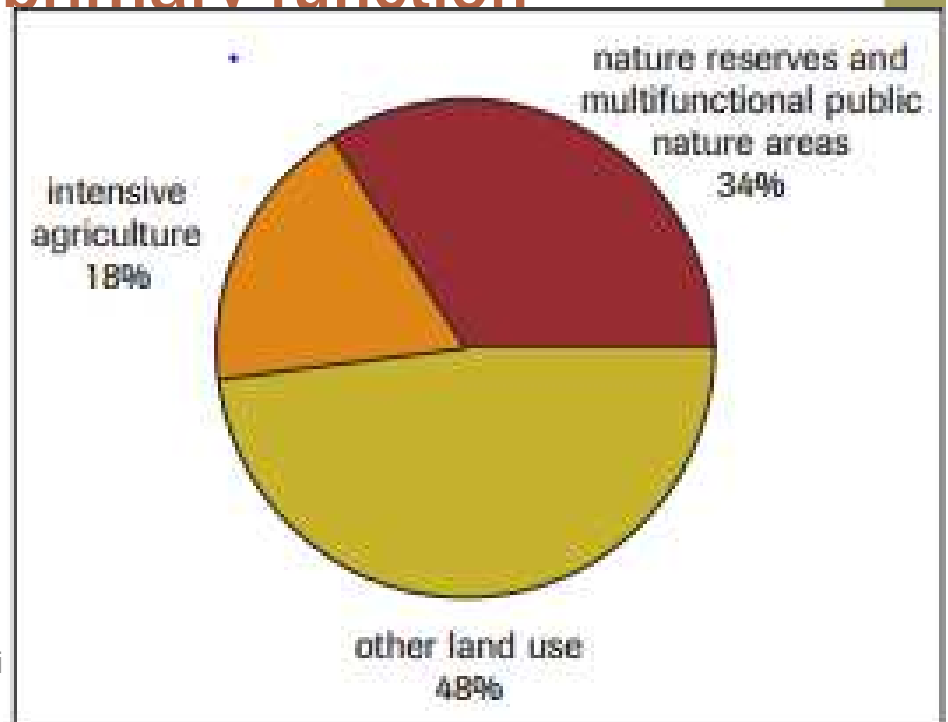
- ❁ VEN: 125.000ha of coherent interconnected network with nature as primary function

- ❁ IVON: 150.000ha multifunctional green space as support

- ❁ Designation in 2008:

VEN 70%, IVON 1%

Land use in VEN, 2008



Policy framework for ecological restoration

EU legislation

Natura 2000

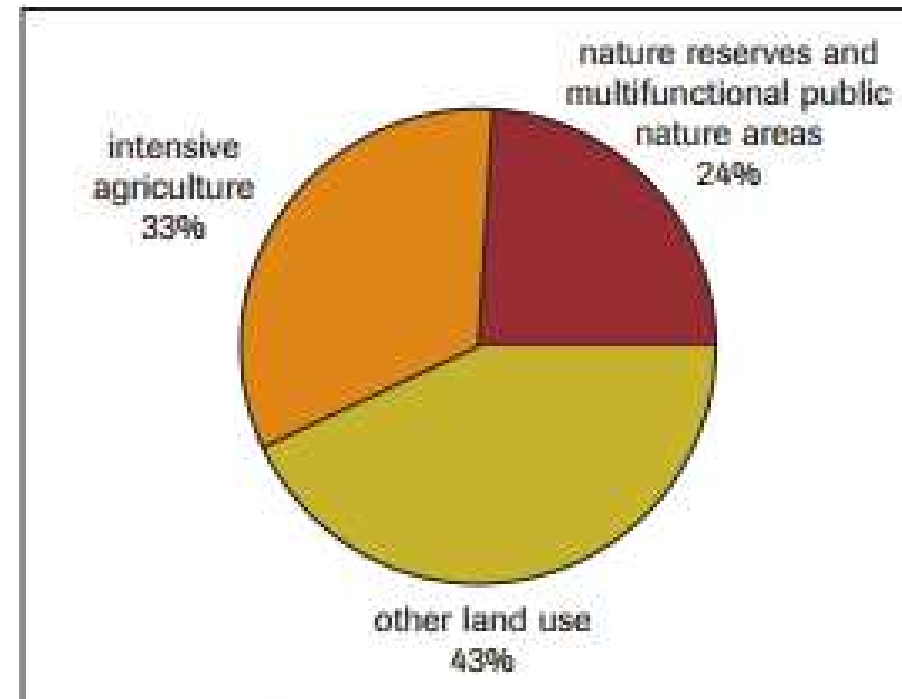
- Conservation goals (adopted april '14)
- Management plans

WFD

- GES/GEP

Ramsar convention

CBD



Land use in the Flemish Natura 2000 areas (2008)

Policy instruments for ecological restoration

🌀 Land acquisition for nature reserves

- 🌀 Subsidies for NGO's

- 🌀 Agency for Nature and forest has right of pre-emption in VEN (within price limits)

🌀 Management agreements and plans

- 🌀 Agreements between administrations

- 🌀 New Nature decree (april '14) Subsidies for NGO's, farmers, companies and private persons according to ambitions the plan

Policy instruments for ecological restoration

🌀 Article 6 of the habitats directive

- 🌀 Appropriate assessment
- 🌀 Mitigation
- 🌀 Compensation

🌀 Integration of large public works (win-win)

- 🌀 flood control
- 🌀 navigation
- 🌀 Road infrastructure
- 🌀 Port development
- 🌀 sand & gravel extraction

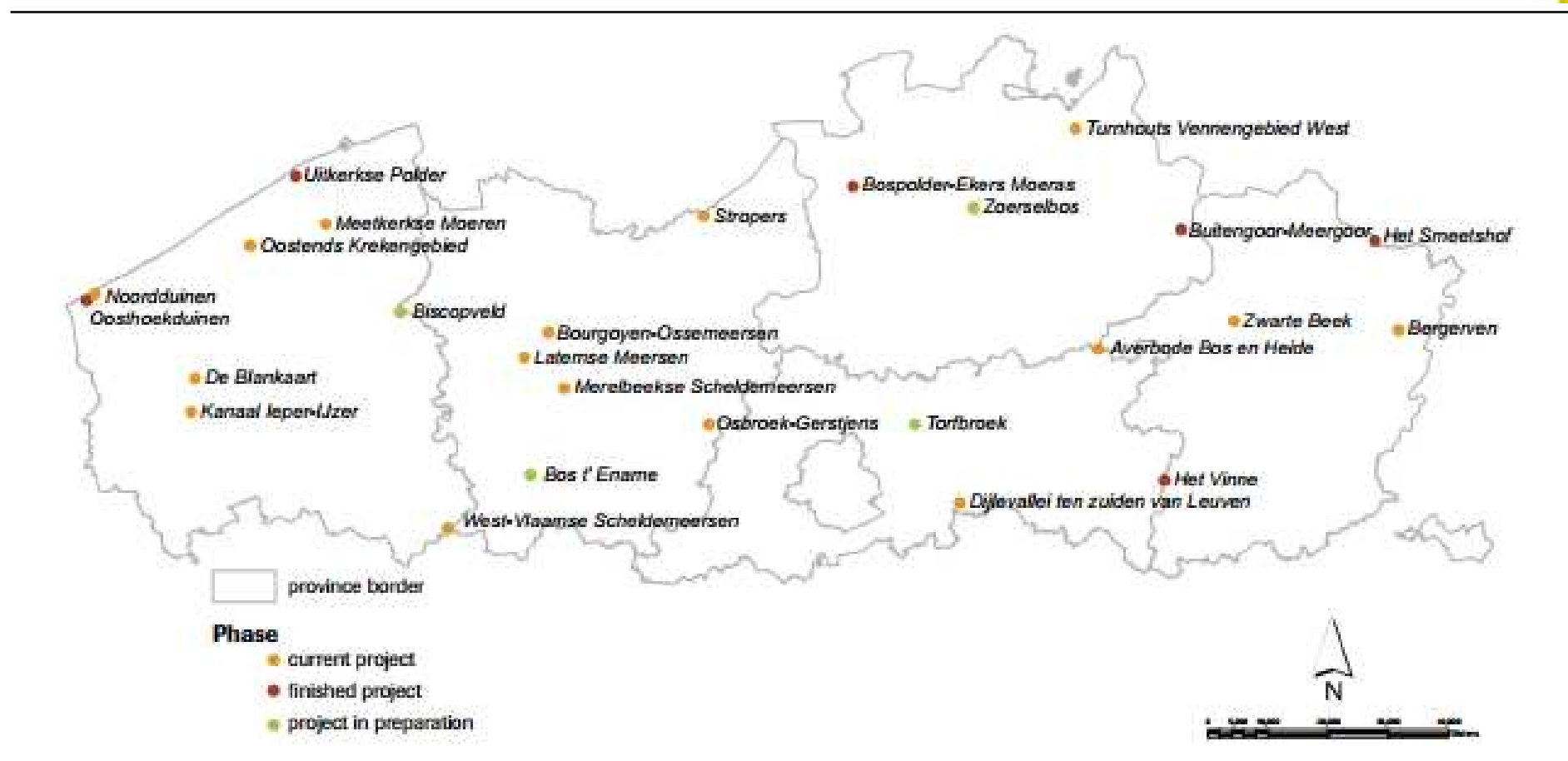
Policy instruments for ecological restoration

- 🌀 Land development schemes (Flemish Land Agency)
 - 🌀 Comprehensive land consoloditation: regrouping of agriculture parcels (insert small landscape elements)
 - 🌀 Land development: to facilitate transition from land use to spatial planning destination. (insert connectivity projects)
 - 🌀 Land development for nature (coordination between ANB-VLM)
 - 🌀 Agri-environmental agreements
 - 🌀 Local land bank to re-allocate rather than expropriate
- 🌀 EU life projects
- 🌀 Regional landscapes
 - 🌀 Collaboration between municipalities to promote nature recreation, education and conservation (small landscape elements)
 - 🌀 Public awareness and involvement

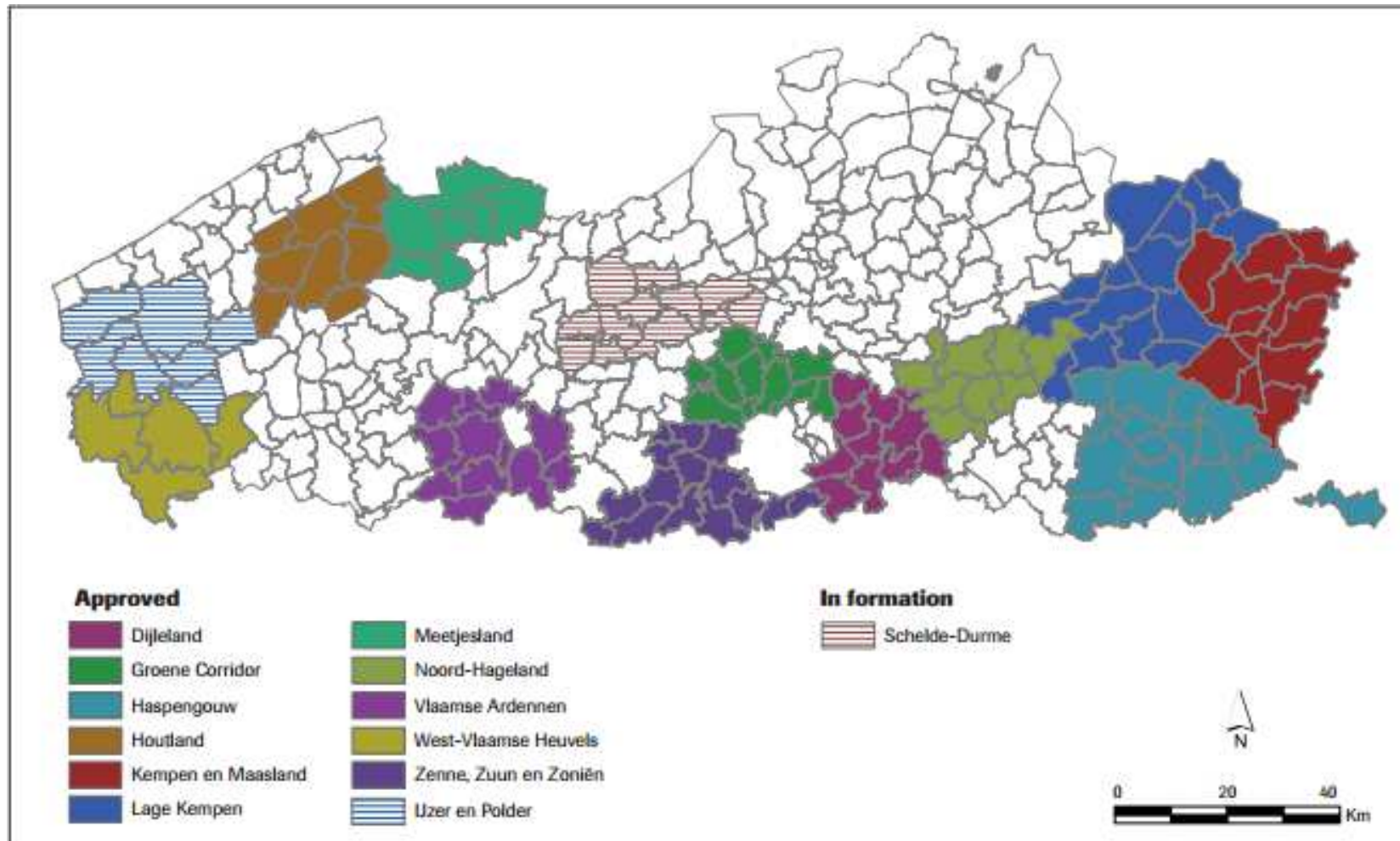
Comprehensive land consoloditation



Land development schemes for nature



Regional Landscapes



Policy instruments for ecological restoration

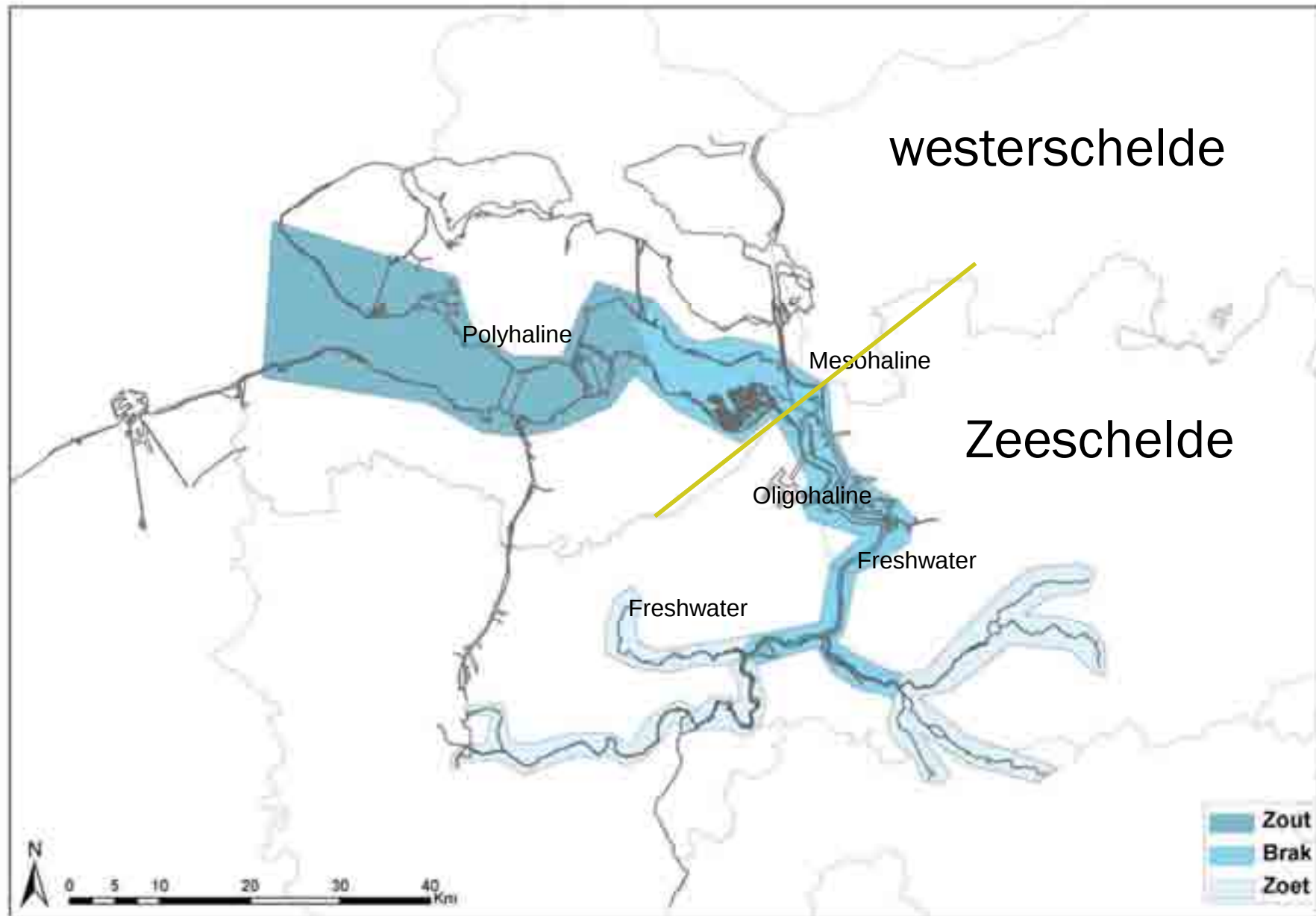
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- 🌀 Regional landscapes

Some examples

☛ The Schelde estuary

☛ Port of Antwerp

The Schelde estuary



Schelde Estuary Rehabilitation plan

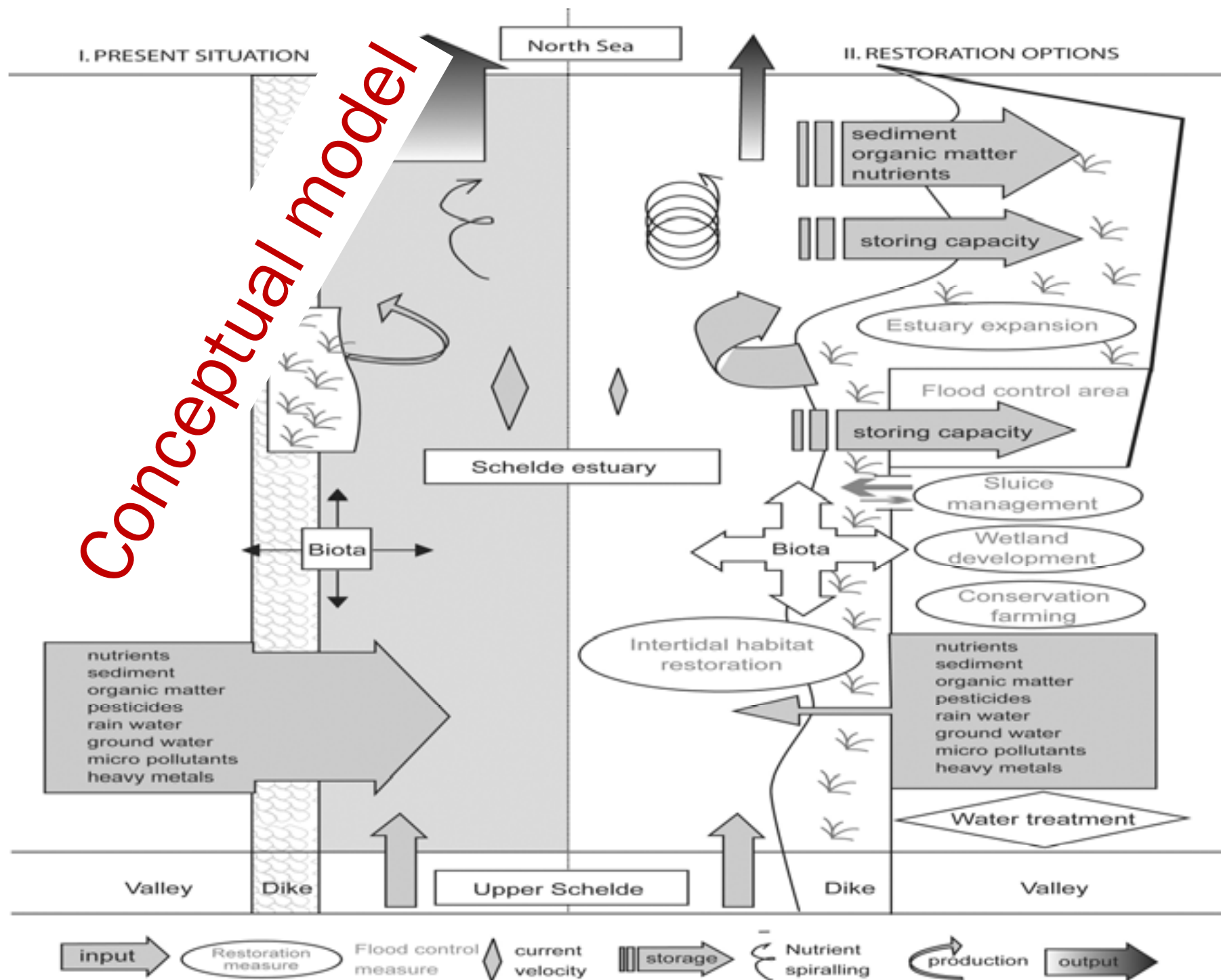
1999 Rehabilitation vision for the Zeeschelde, part of agreement with NGO following implementation of SIGMA flood control plan (Flanders)

- Conceptual restoration model based on problem analysis
- Identification of potential restoration sites
- Definition of restoration measures, combined with flood control measures

I. PRESENT SITUATION

II. RESTORATION OPTIONS

Conceptual model



Schelde Estuary Rehabilitation plan

3 scenario's defined

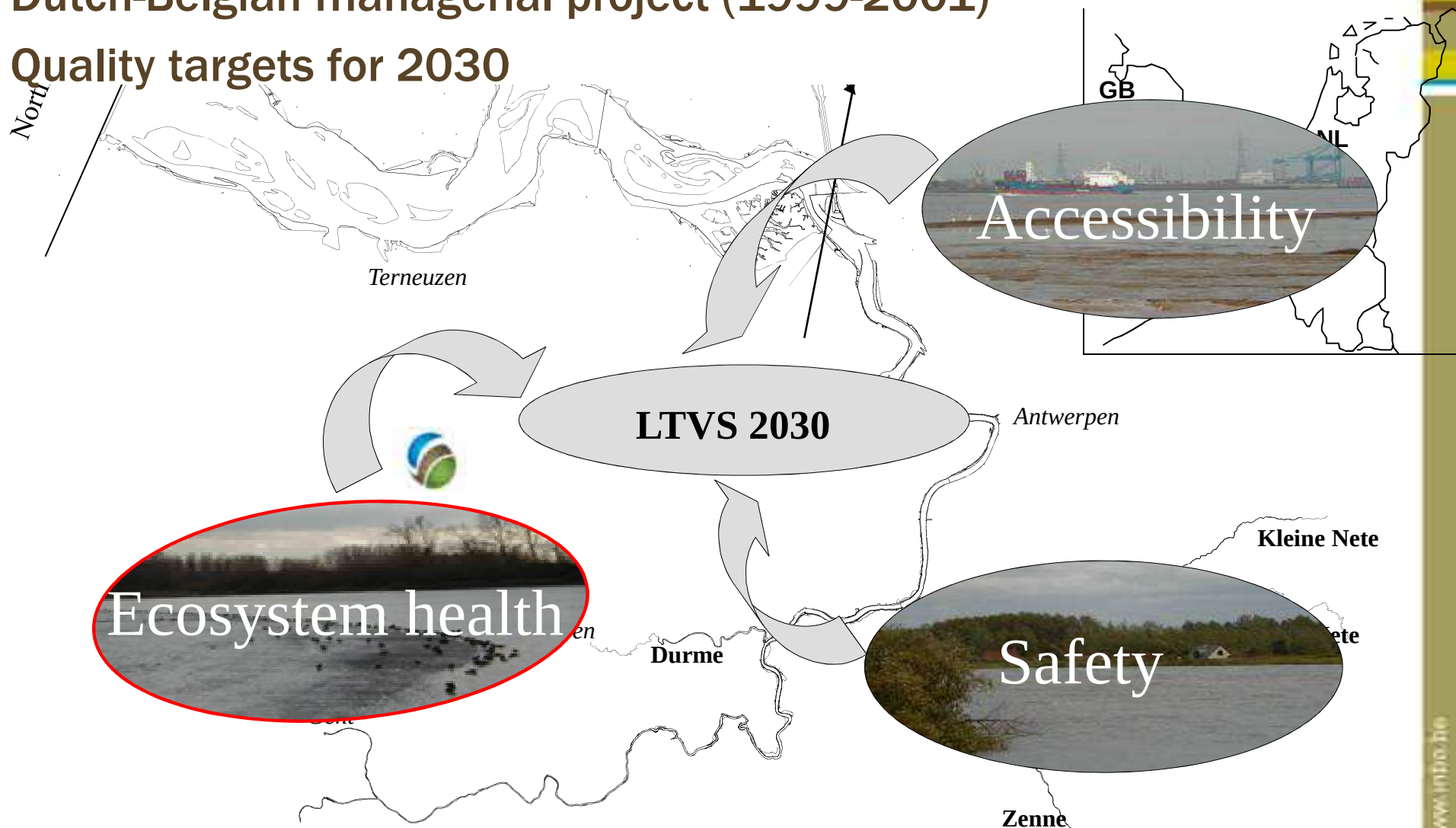
- Estuarine development
- Alluvial enhancement
- Basic ecological quality

No financial plan

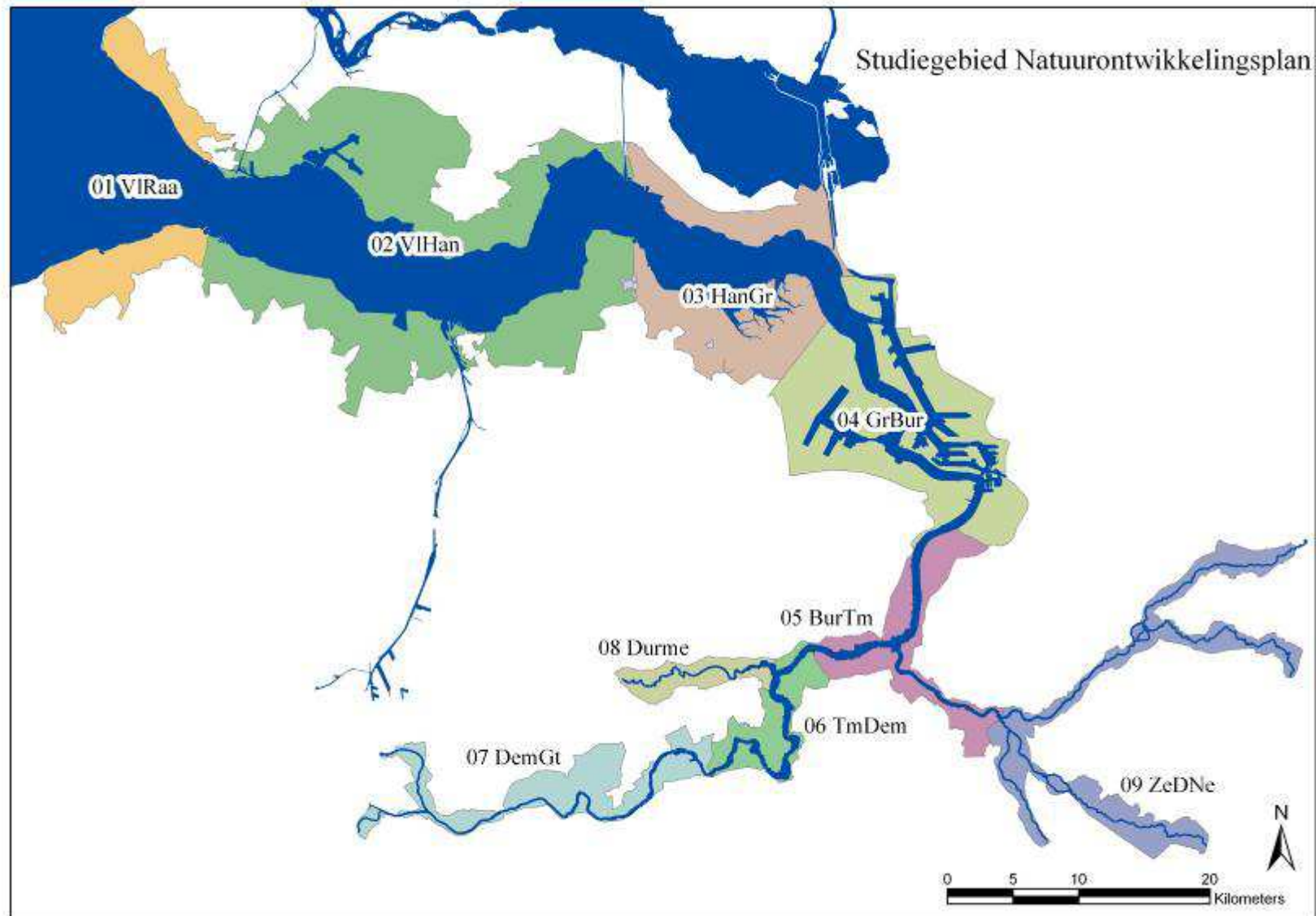
Long term Vision For the Schelde (LTVS)

Dutch-Belgian managerial project (1999-2001)

Quality targets for 2030



Schelde estuary restoration plan



Problem analysis

Zone in the estuary

problems	01 VIRa	02 VHar	03 HanGr	04 GrBur	05 BurTm	06 TmDen	07 DemGr	08 Durme	09 ZeDNe	10 strSc
Goal										
Buffer discharge	0	0	0	0	+	+	++	++	++	++
tidal energy dissipation	+	++	++	++	++	+	+	+	+	0
Multiple channelsystem	0	++	++	0	0	0	0	0	0	0
Optimise natural habitat processes	++	++	++	++	++	++	++	++	++	0
minimise turbidity	0	+	+	++	++	++	+	++	+	0
Optimise C cycle	0	0	0	0	0	0	0	0	0	++
Optimise N cycle	0	0	+	+	+	++	++	++	++	++
Optimise O cycle	0	0	0	+	++	++	+	++	+	++
Optimise Pcycle	0	0	0	0	0	0	+	+	+	++
Optimise Si cycle	+					++	++	++		0
Optimise primary production	0	+	+	++	++	++	+	++	+	0
Optimise conditions for zooplankton	0	+	+	+	++	++	++	++	++	0
Optimise conditions for zoobenthos	+	++	++	++	++	++	++	++	++	0
Optimise fishmigration	0	+	+	+	+	+	++	++	++	++
Shallow low dynamic water mudflats	+	++	++	++	++	++	++	++	++	0
Lower flats dynamics	+	++	++	++	++	++	++	++	++	0
Tidal marshes	0	++	++	0	0	0	0	0	0	0
Set back tidal marsh succession	+	++	+	+	++	+	++	+	++	0
Non-tidal wetland	+	++	++	++	++	++	++	0	0	0
	0	0	0	+	+	+	++	+	++	0

Spatial planning of measures

Code	Measure	Measures per Zone in the estuary	diff_av	diff	turb	C	Z	O ₂	P	S	pimprod	zoopl	benthos	is	veg	habitat
Grens - Burcht																
M2.1	sluice		0	1	1	1	1	0	1	1	2	1	2	2	2	2
M2.2	managed realignment		0	2	1	1	1	0	1	1	2	1	2	2	2	2
M2.3	lowering raised sites			1	1	0	1	1	1	1	1	1	1	1	2	2
M2.4	sluice		0	1	1	1	1	1	1	1	2	1	2	1	2	1
M2.5	occasional sluice management													1	2	2
M4.1	inland wetland						1		1	?					2	1
Burcht - Temse																
M1.09	tidal marsh fixation						2						2		1	2
M2.1	breach		0	2	2	1	1	2	1	2	2	2	1	1	2	2
M2.2	realignment		0	2	2	0	1	2	1	2	2	2	1	2	2	2
M2.3	lowering raised site			1	1	0	1	2	1	2	1	2	1	1	2	2
M2.4	FCA-CRT		0	1	1	1	1	2	1	2	2	2	1	1	2	1
M2.5	occasional sluice management													2	2	2
M4.1	inland wetland						1		1	?					2	1
M4.2	inland management						1		1						1	
Temse - Dendermonde																
M1.09	tidal marsh fixation						2						2		1	2
M2.1	breach		1	2	2		2	2	1	2	2	2	2	2	2	2
M2.2	realignment		1	2	2		2	2	1	2	2	2	2	2	2	2
M2.3	lowering raised site		1	2	2		2	2	1	2	2	2	2	2	2	2
M2.4	FCA-CRT		1	2	2		2	2	1	2	2	2	2	1	2	2
M2.5	occasional sluice management		1	1	1		1	1	1	1	0	0	0	1	1	2
M3.1	lateral connection		0	1	1		1	1	1	1	1	1	1	2	1	2
M3.4	banks with terraces						2						2		1	2
M3.5	alternative bank reinforcement						2						2		1	2
M4.1	inland wetland		1				1		1	?					2	1

selection of measures

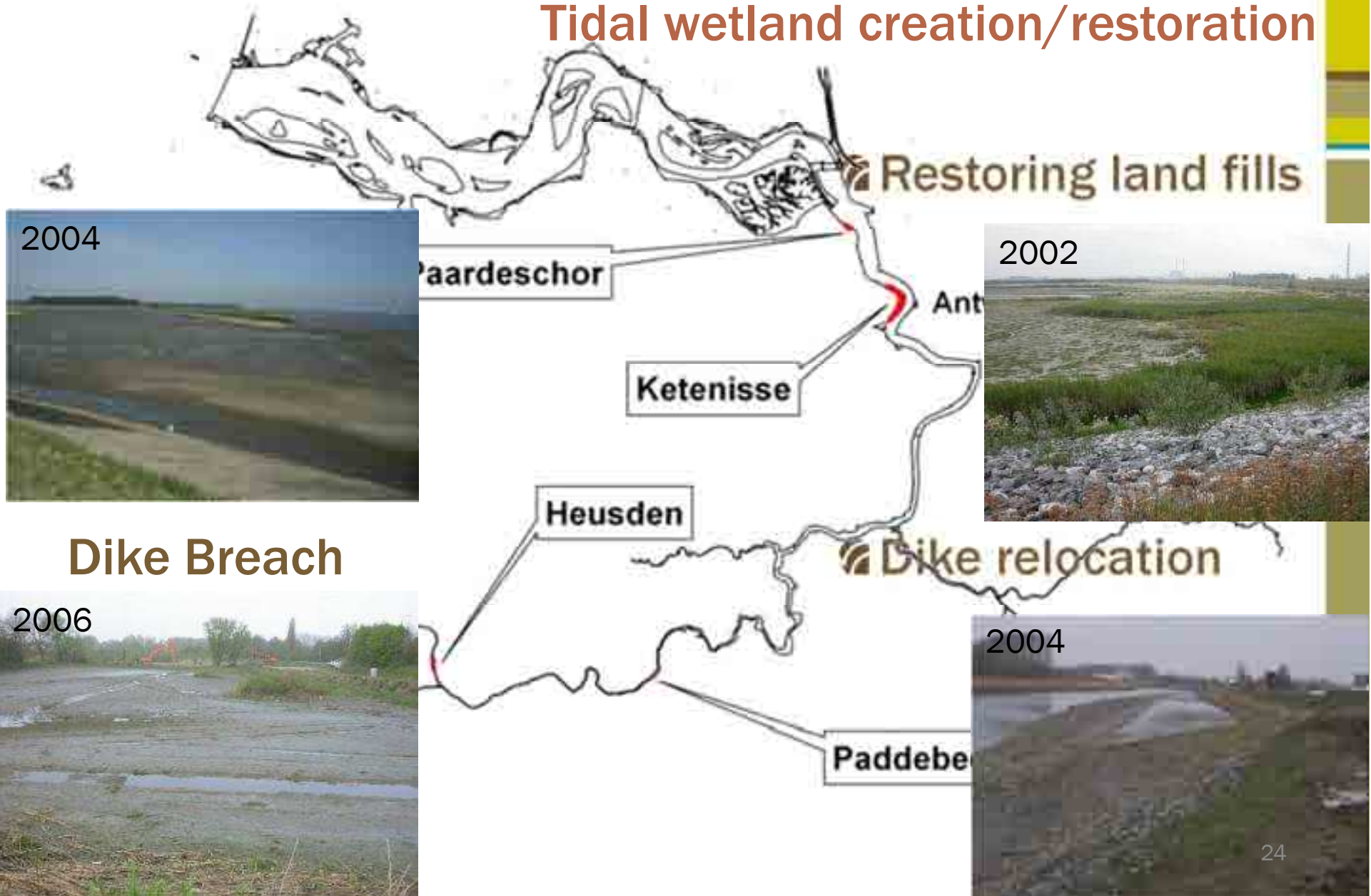


Adapted dike management

« soft » protection instead of « hard engineering »

selection of measures

Tidal wetland creation/restoration



Dike breach: Sieperdaschor



Land fill removal: Paardeschor

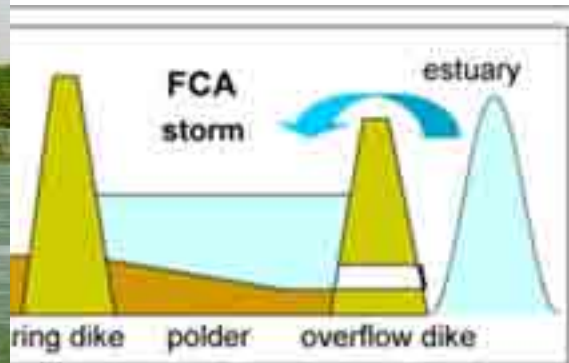


selection of measures

Wetland creation: Brakke kreek Doel



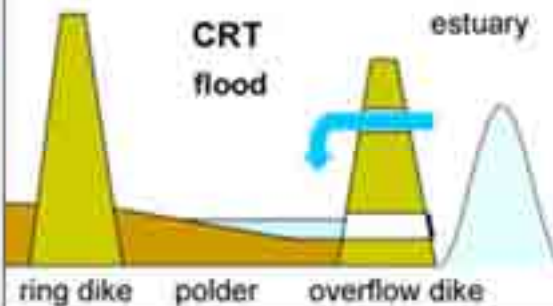
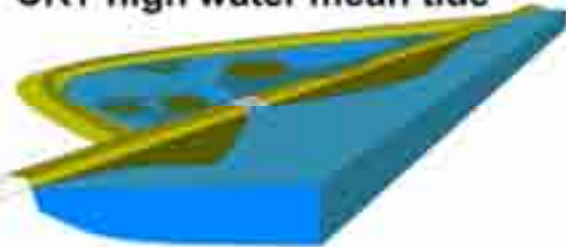
Integration with flood control



Flood Control Area

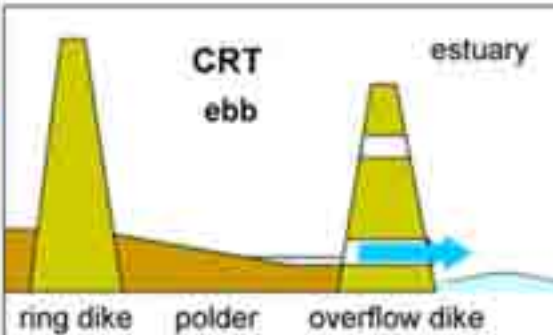
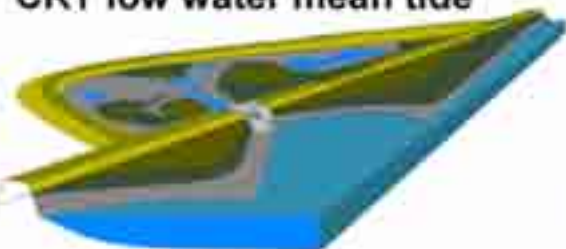
FCA

CRT high water mean tide



Flood Control Area under
Controlled Reduced Tide

CRT low water mean tide



FCA-CRT

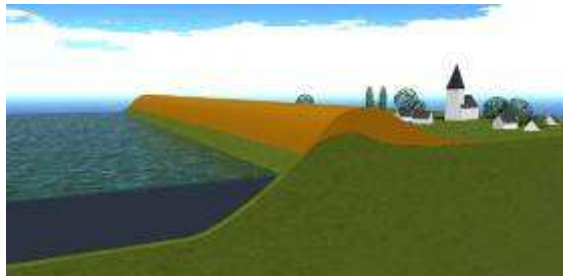
Integration with flood control

Flood control



Habitat creation

🌀 Dike fortification

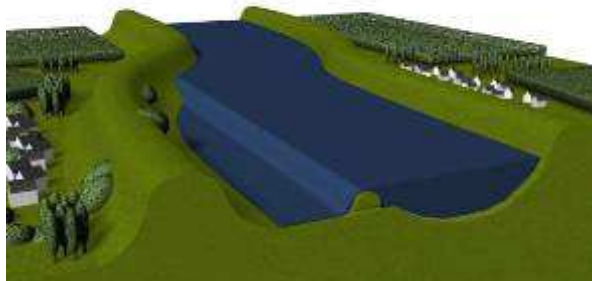


🌀 Tidal wetlands

🌀 realignment

🌀 FCA-CRT

🌀 Flood control area (FCA)



🌀 Inland habitat

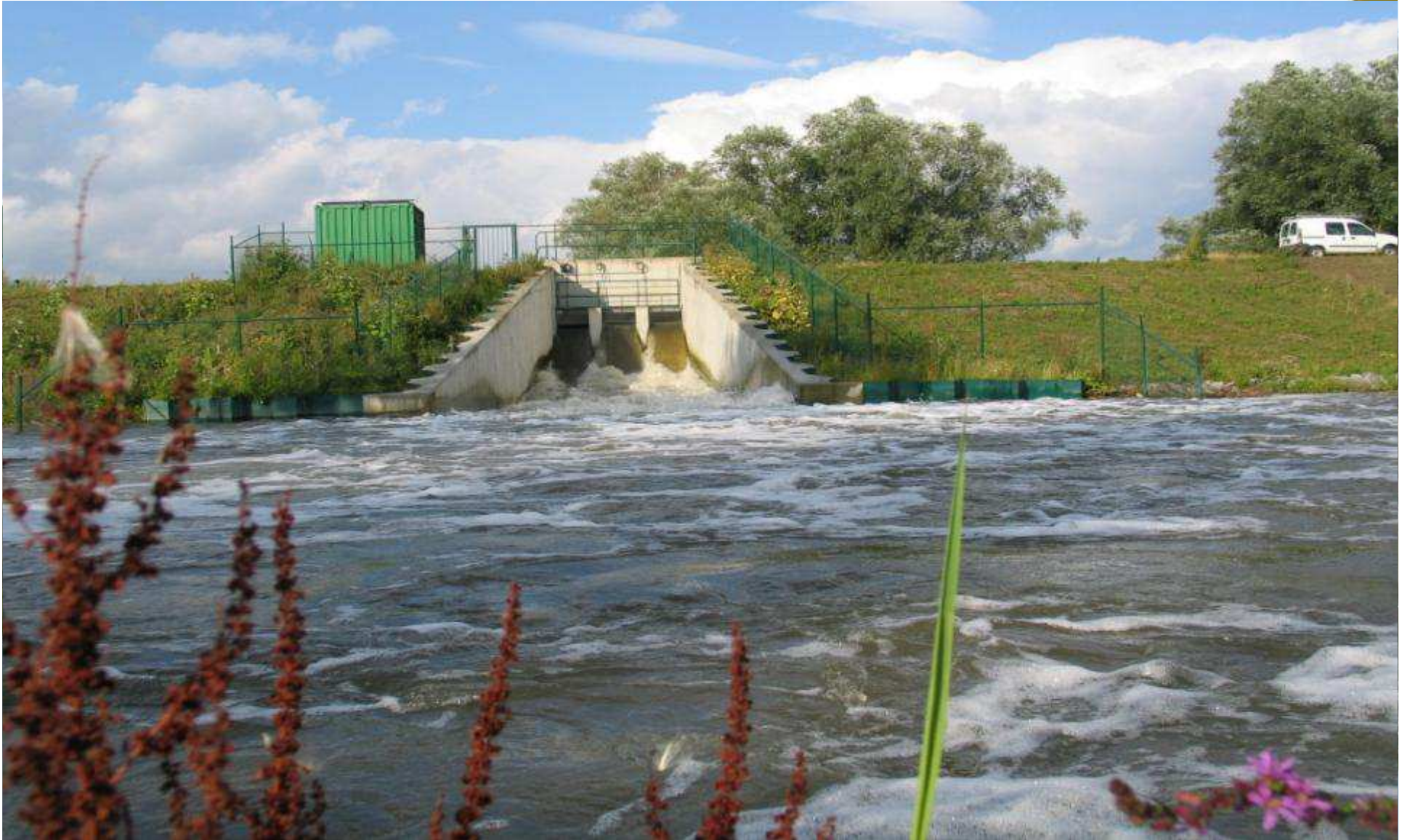
🌀 wetland

🌀 FCA-Wetland



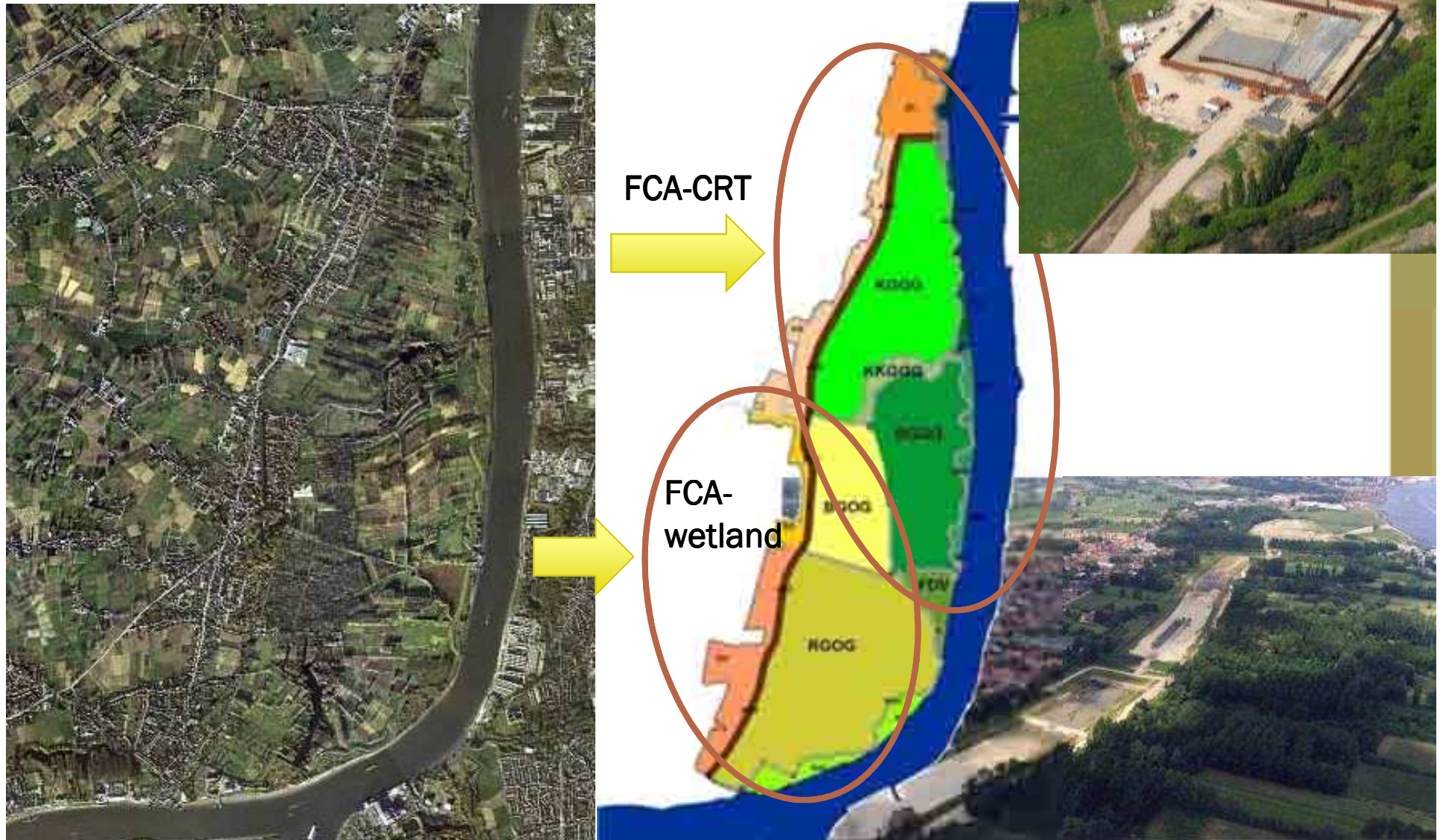
Integration with flood control

FCA- CRT Lippenbroek

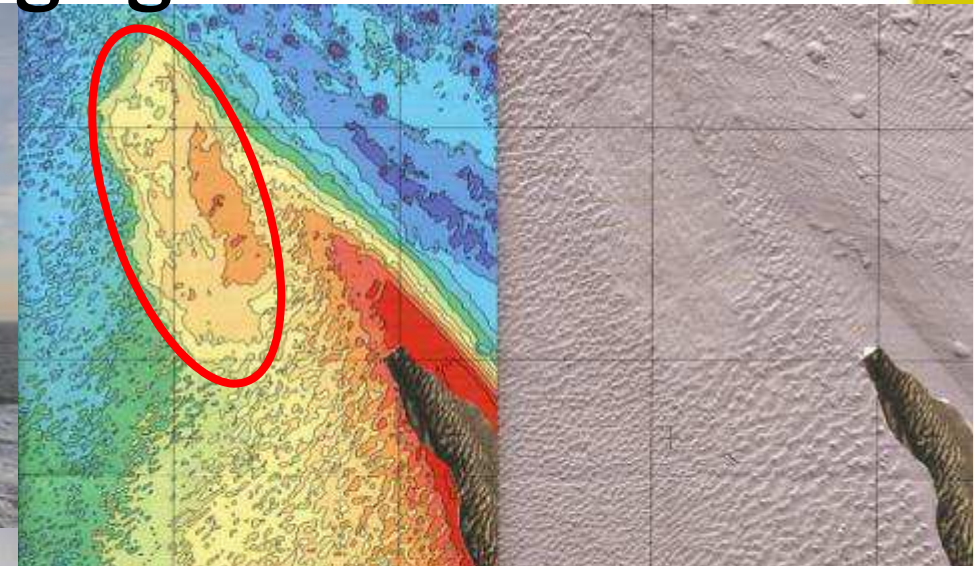


Integration with flood control

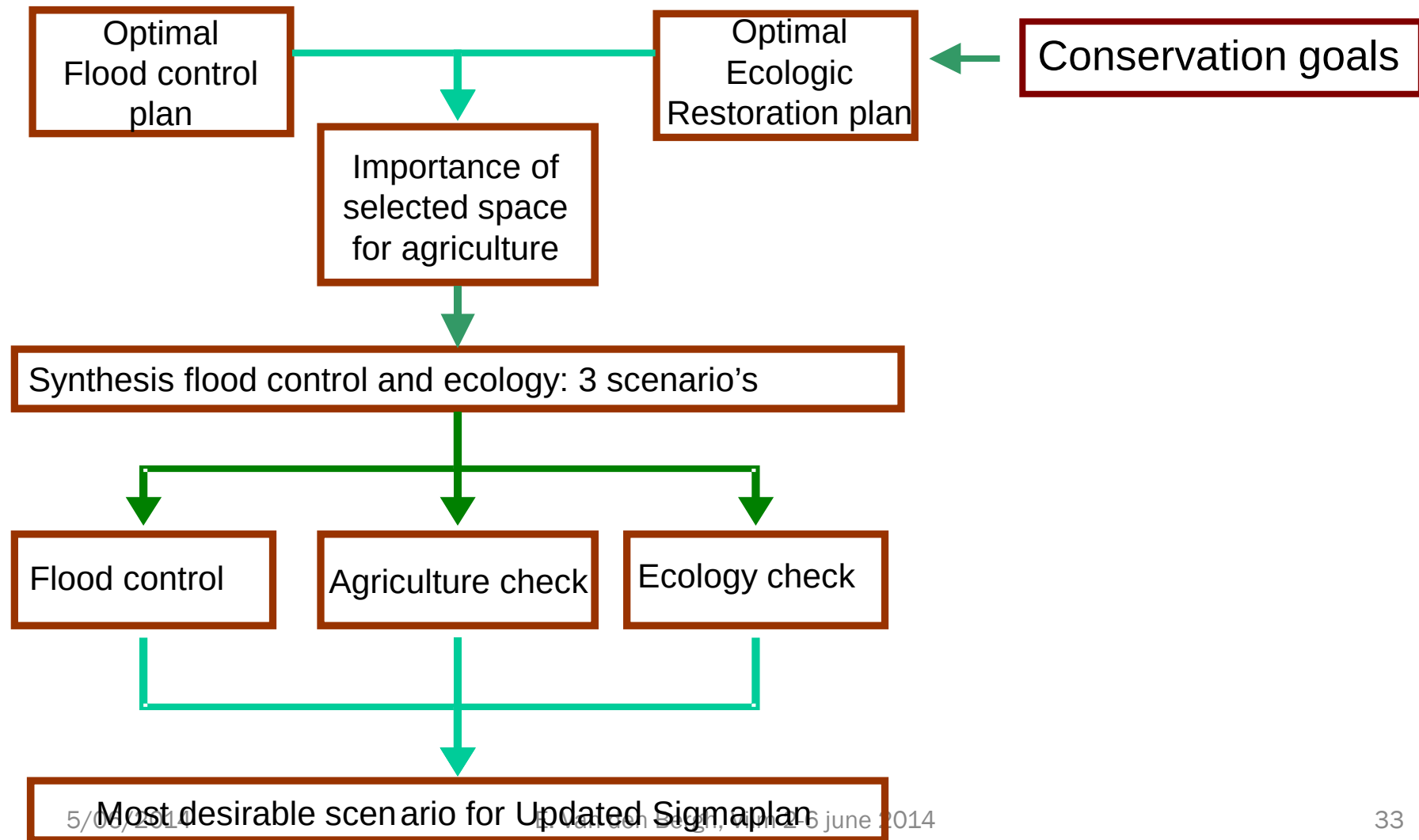
Kruibeke-Bazel-Rupelmonde

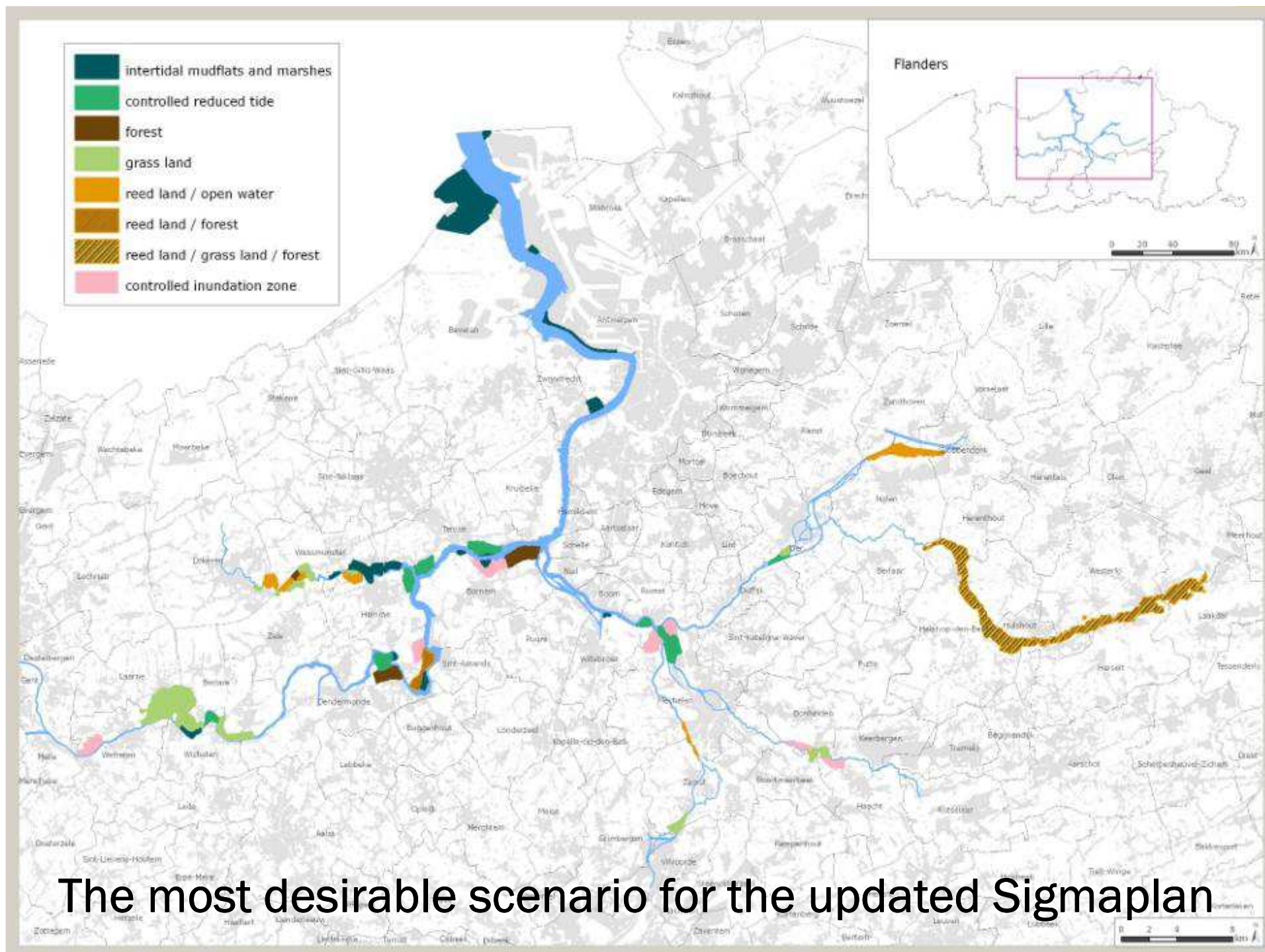


Integration with accessibility: morphological dredging"



Updated Sigmaplan: Flemish part of LTVS: Integration of ecological rehabilitation and flood control



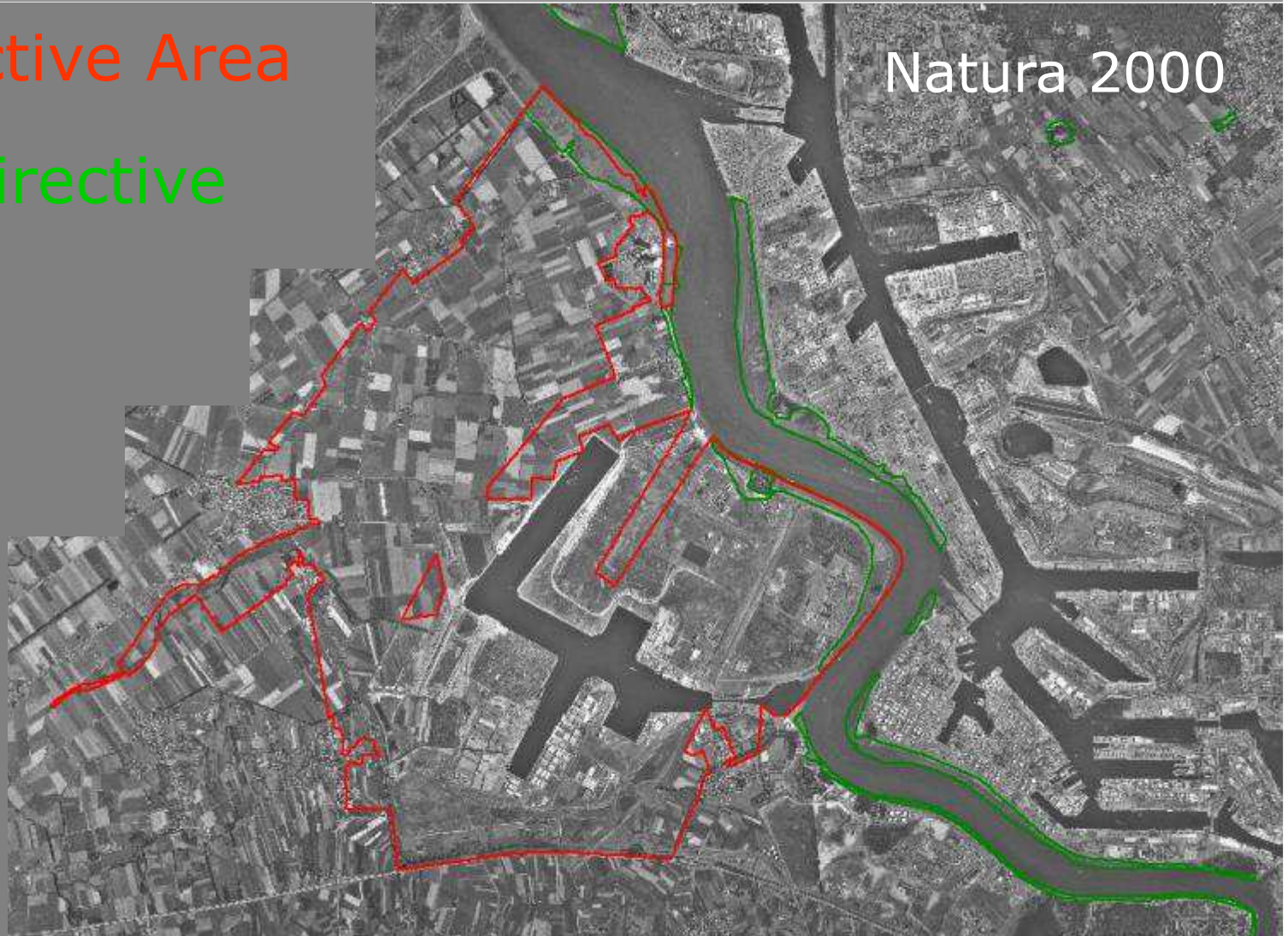


Port of Antwerp: Natura 2000

Bird Directive Area

Habitat Directive
Area

Natura 2000



Port of Antwerp: infrastructure works & compensation

Right bank of the Schelde (Antwerpen)

1. Europe container terminal (1987)
2. Container terminal North (1994)

Left bank of the Schelde (Antwerpen)

3. Verrebroekdok (1996)
 4. Deurganckdok (1998)
- NGO complaint about the lack of compensation
 - Cumulative with historical deficit

Strategic planning for the port of Antwerp

SPPA

- **INTEGRATIVE PROCESS**
- **Future planning for port development**
- **Including N2000 implementation**
 - Compensation for port development including
 - historical deficit
 - Compensation matrix including responsibilities
 - Conservation goals
 - Planning of conservation goals in space and time, including temporary nature



Compensation matrix

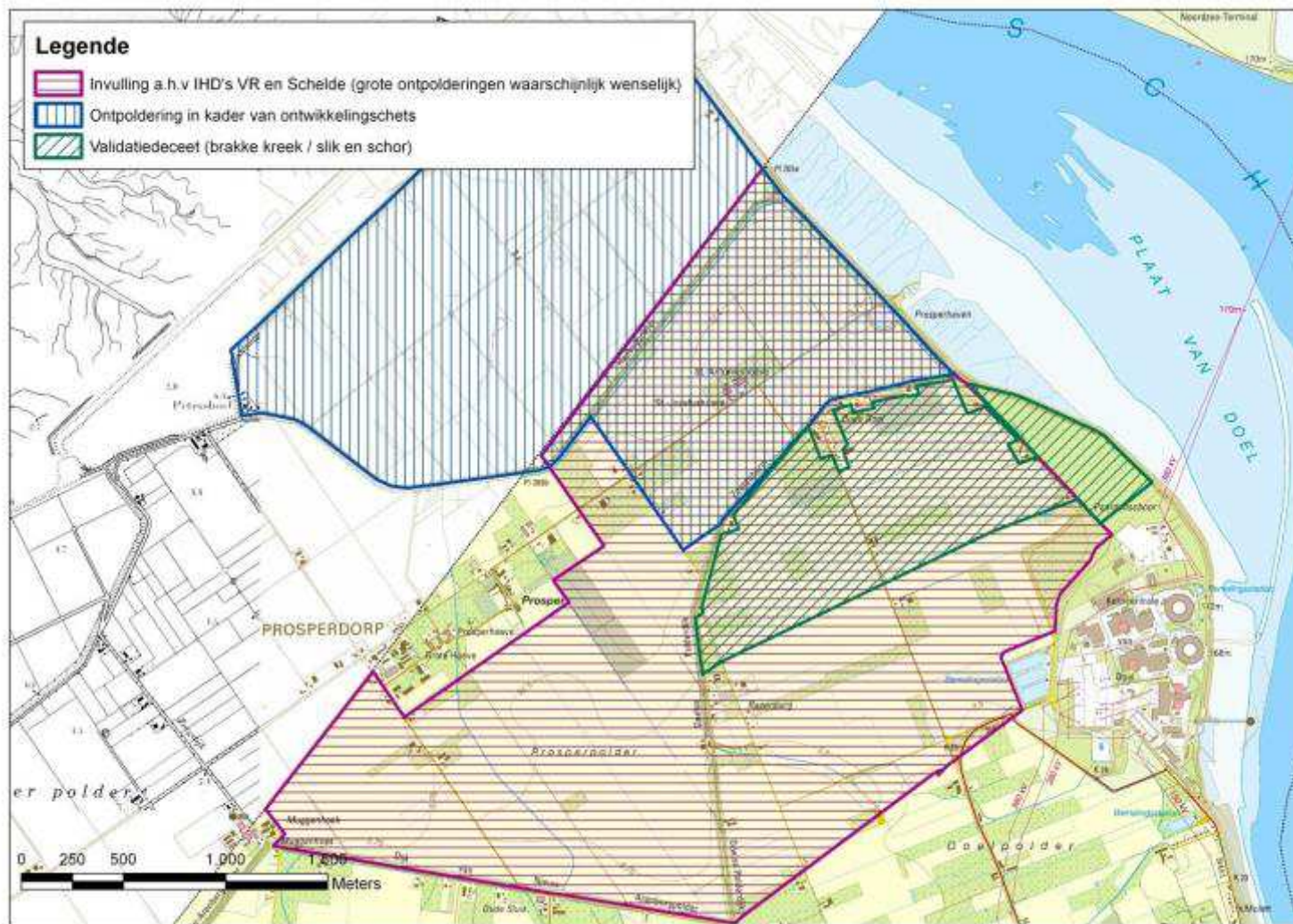
pioneering situations	Gedempt deel Doeldok (Z2)	200 ha	74 ha	
	Opgespoten MIDA (Z2)		77 ha	
	Vlakte Zwijndrecht (Z2)		57 ha	
reed	Zoetwaterkreek in ecologisch deel Buffer –ZW-B (Reservatiestrook buffer)	25 ha	17,8ha	
	Watergangen en -randen(Z2)		10 ha	s
intertidal marshes & mudflats	Aanleg kreek in ecologisch deel buffer – N (reservatiestrook buffer)	25 ha	36 ha	
	Afgraven Paardenschor (Natuurgebied)		14,5 ha	
wet meadows	Doelpolder-Noord (valleigebied)	250 ha	71 ha	
	Putten West (ZTA-gebied)		52 ha	
	KBR – ontwikkeling natte weilanden		ca. 150 ha	
	Doodijk (natuurgebied) en Ecologisch			

Harmonisation of plans

SPPA: Meadowbirds

LTVS: tidal wetland

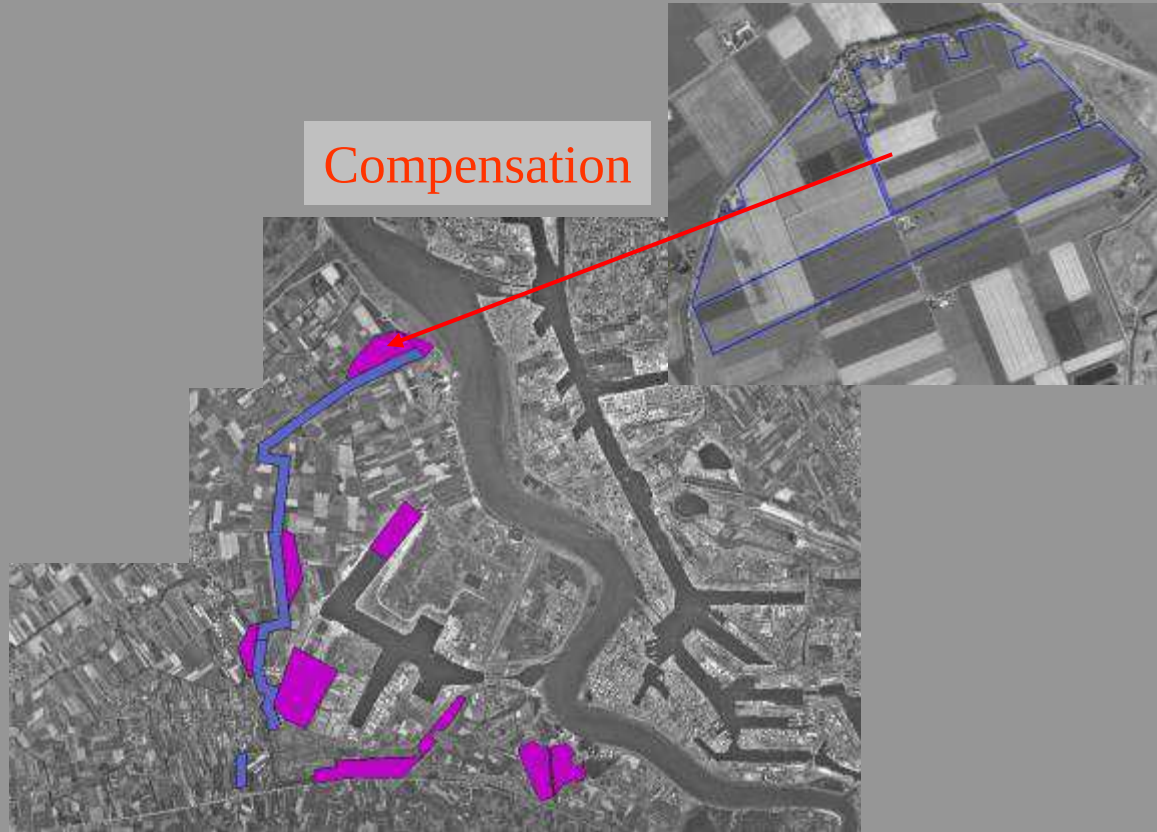
SIGMA: harmonisation





Wet and structure rich meadows: Doelpolder Noord

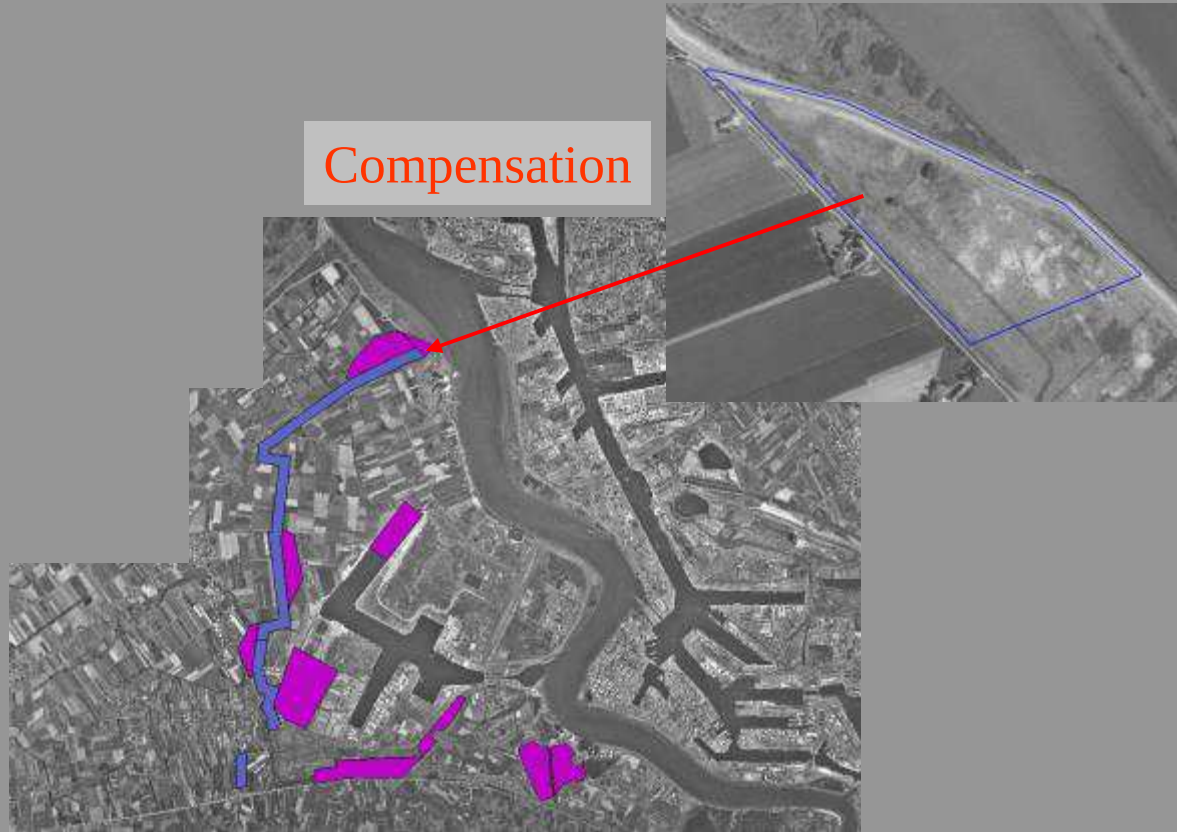
Compensation



Intertidal mudflats & marshes: Paardenschor



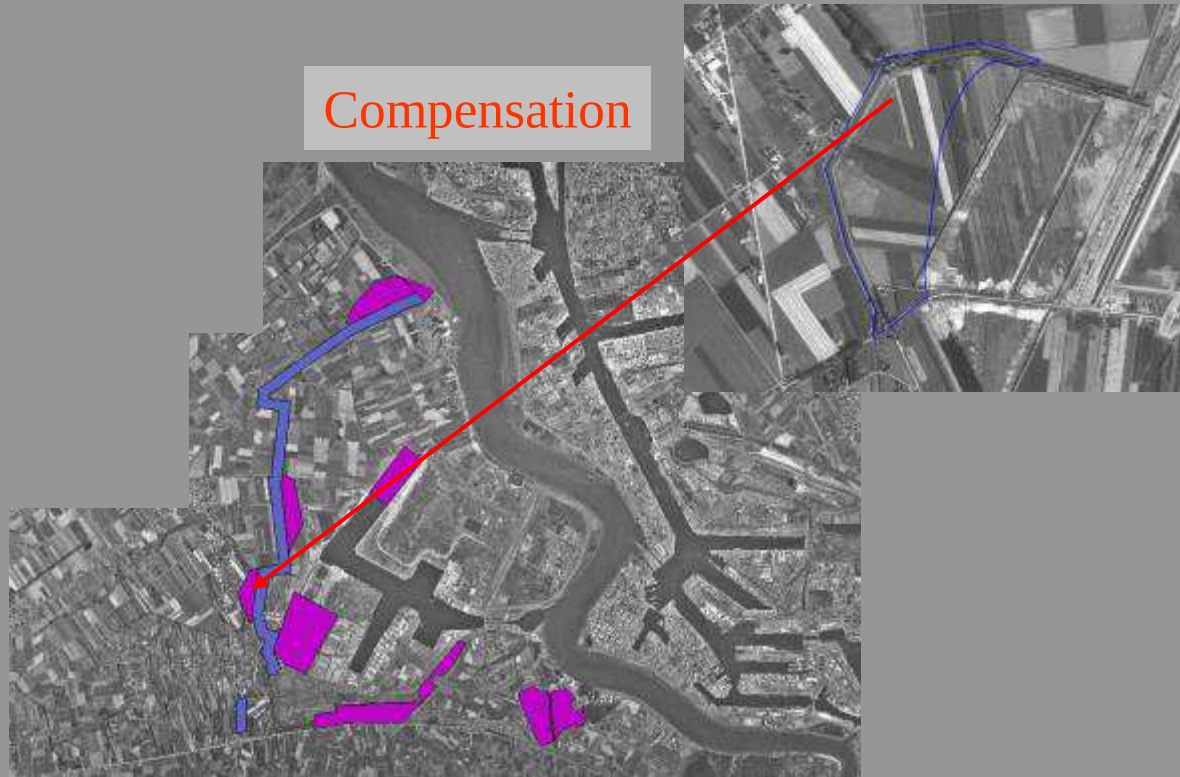
Compensation



Open water & Wet and structure rich meadows: Drijdijck

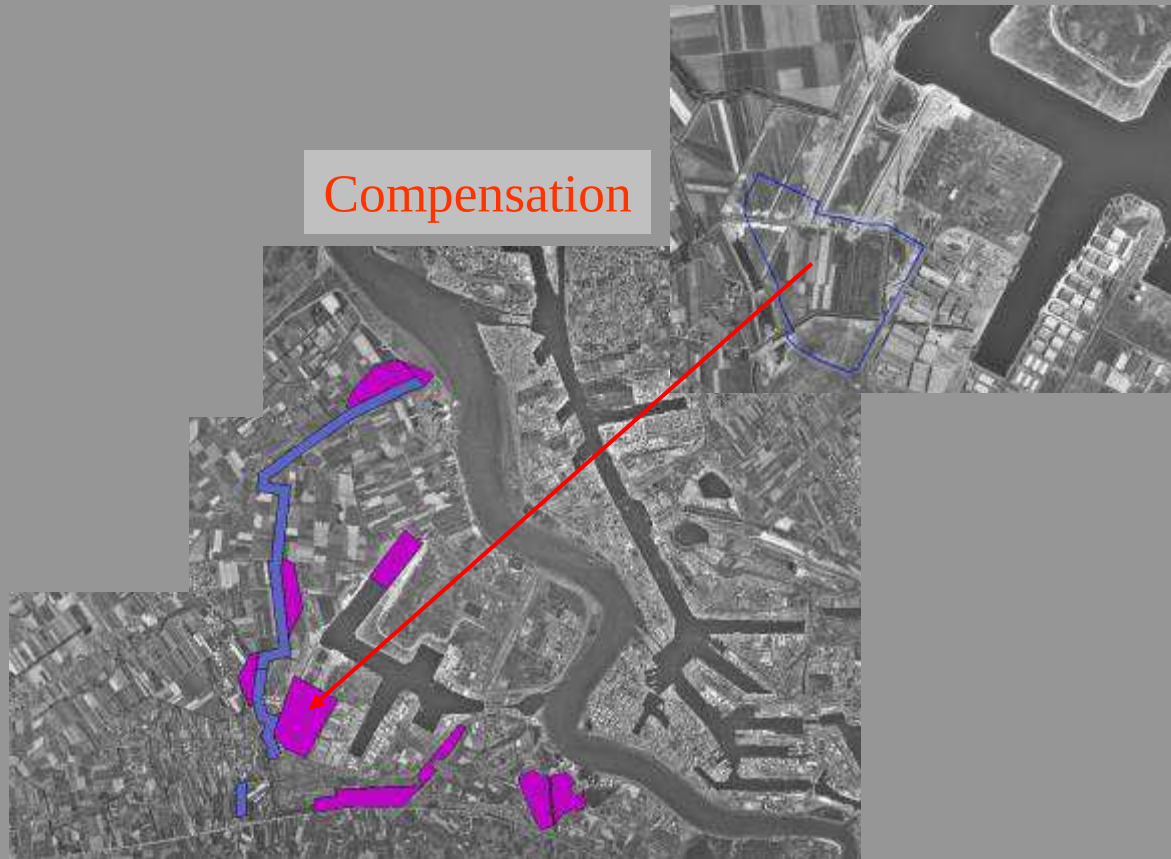


Compensation



Open water Verrebroekse Plassen

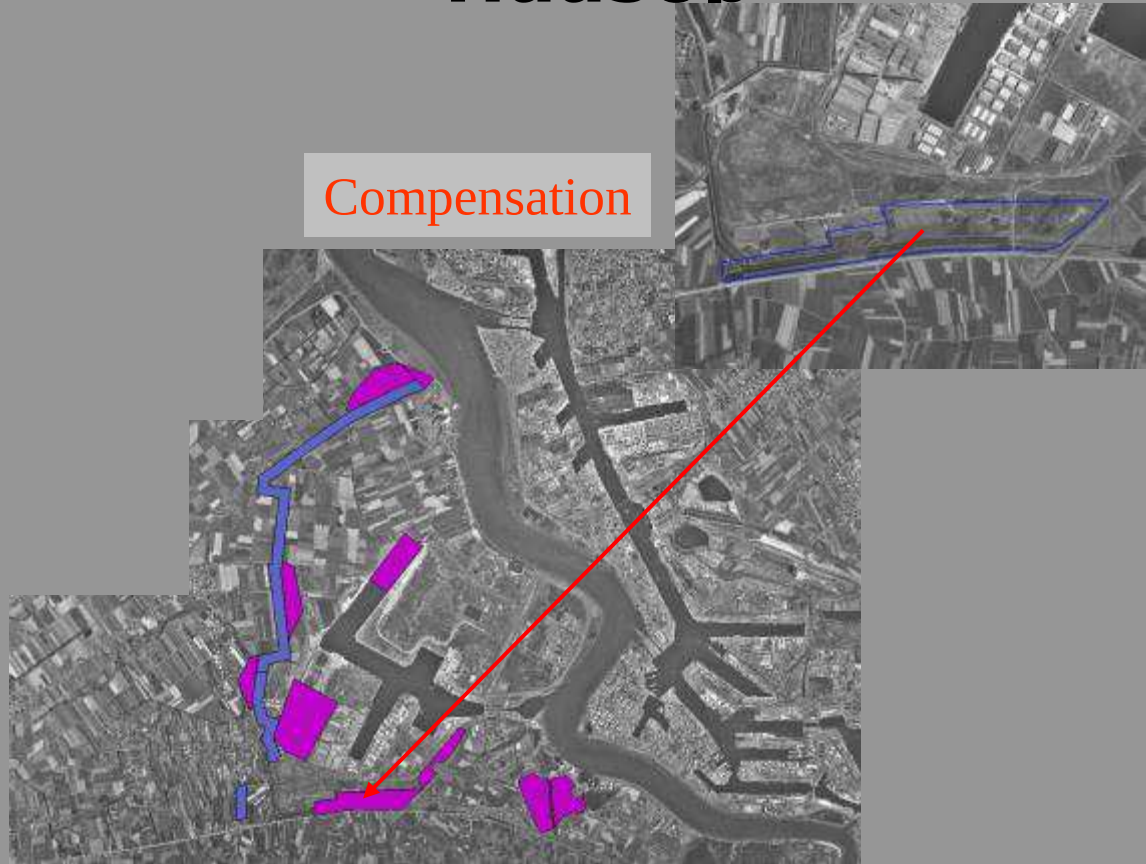
Compensation



Open water & Reed Haasop



Compensation



Pioneering situations Vlakte van Zwijndrecht

Compensation

