

Flanders Bays

Safe, natural, attractive, sustainable, developing

Vlaamse Baaien

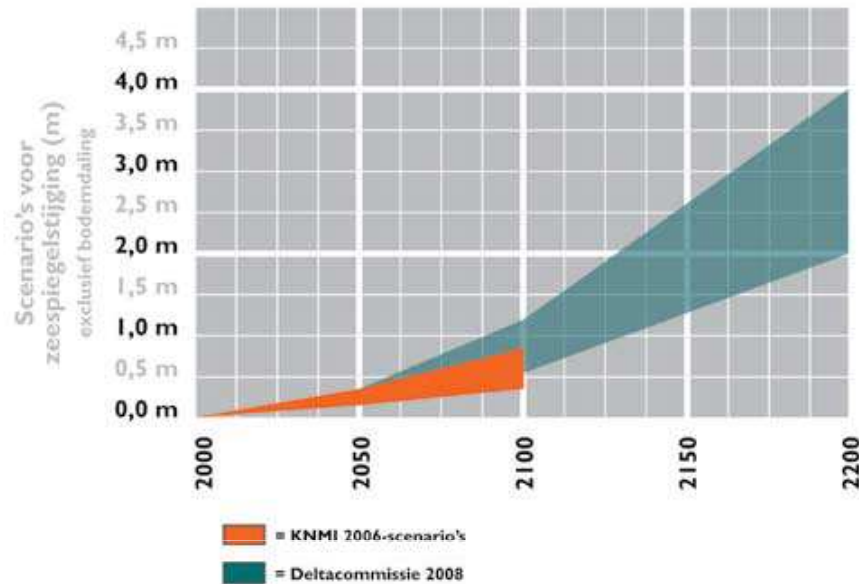
Veilig, natuurlijk, aantrekkelijk, duurzaam, ontwikkelend

Bart Verboomen, Baggerwerken Decloedt & Zoon
(DEME Group)

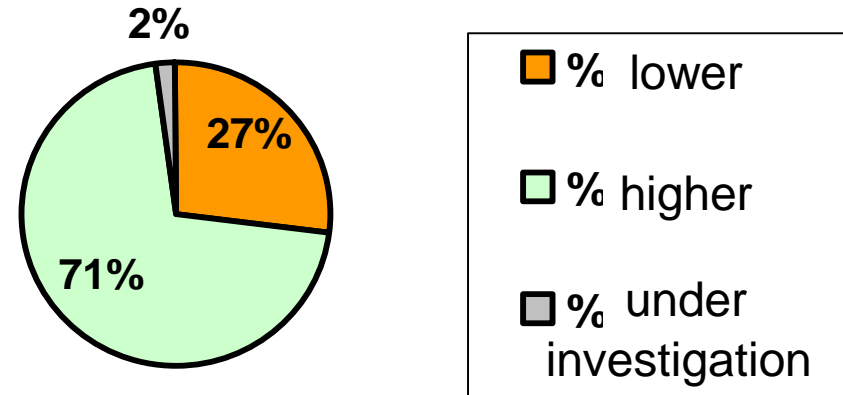
EUDA 16/11/2010



CHALLENGE : CLIMATE CHANGE – COASTAL PROTECTION



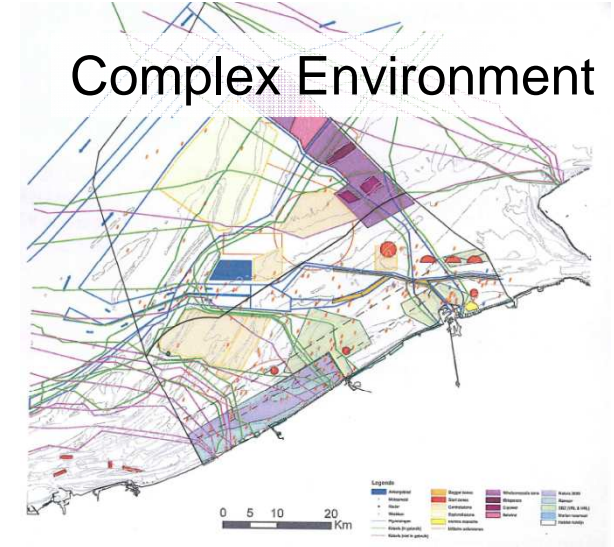
Safety level to a storm occurring once in thousand years



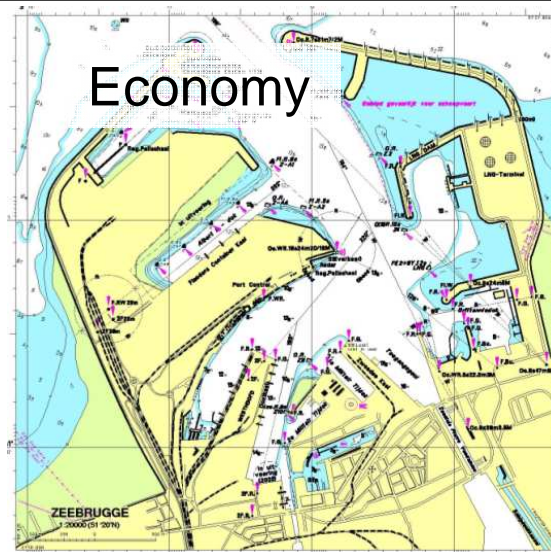
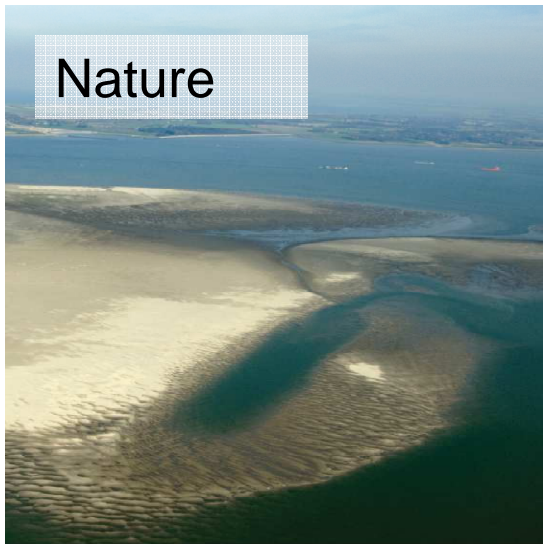
- Flanders Bays is a challenging plan from now to 2100 to protect the Belgian Coast and the Scheldt Mouth for severe storms and sealevel rise
- Based on worldwide experience of Expert Group of companies



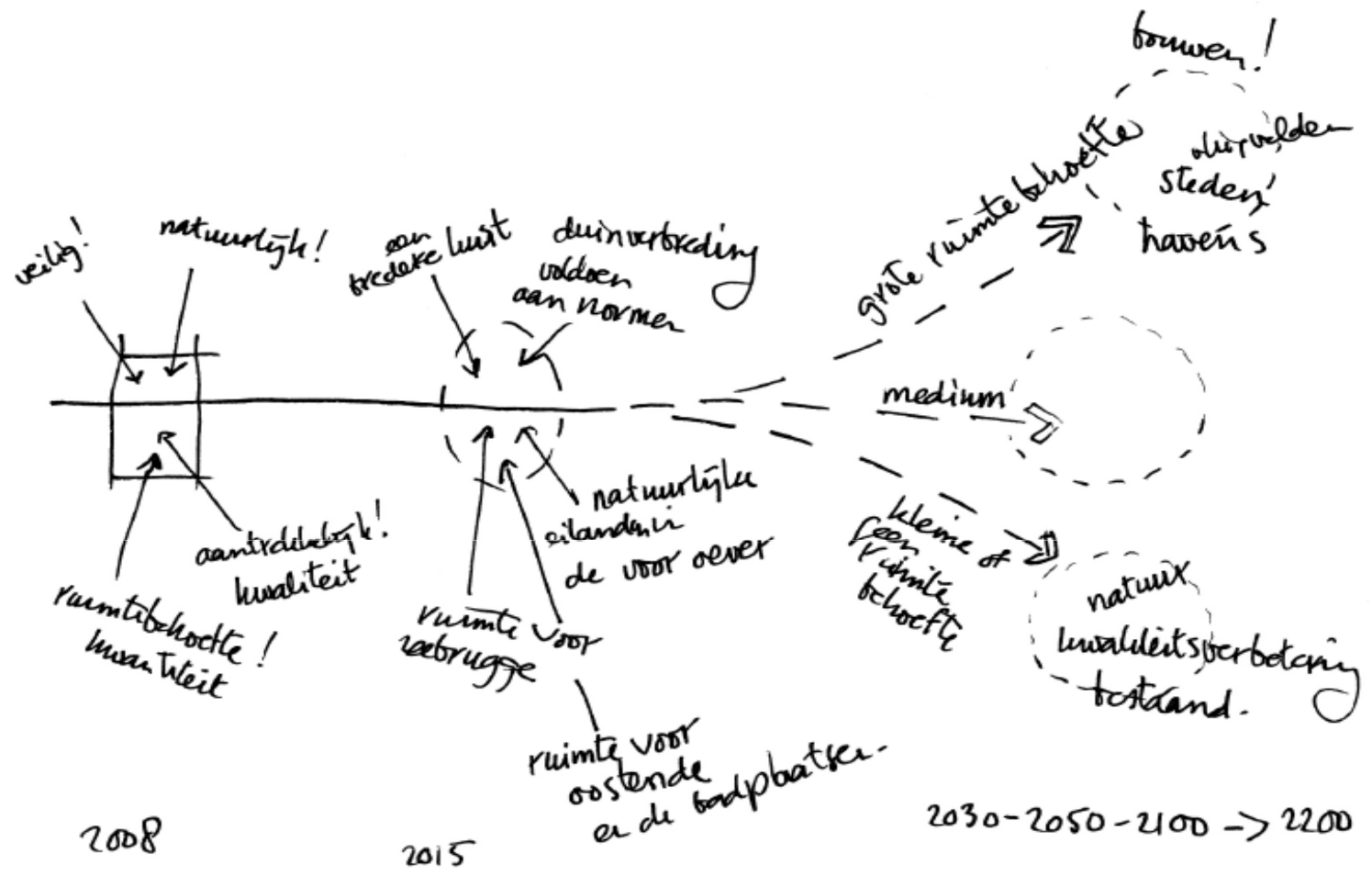
SUSTAINABLE DEVELOPMENT FOR TODAY'S CHALLENGES








Flanders Bays

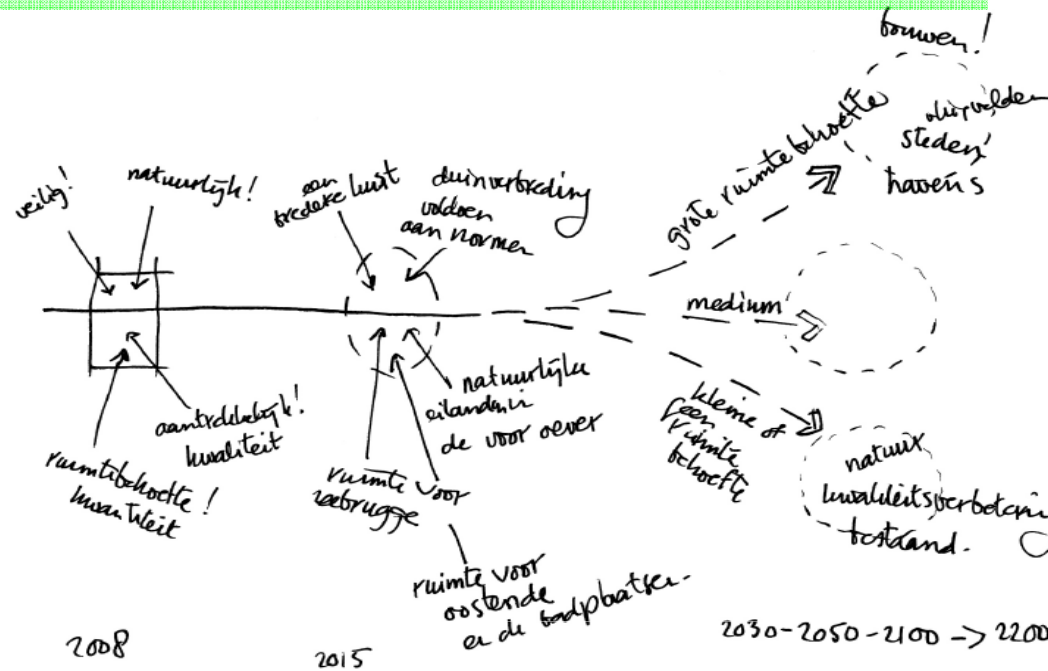


FLANDERS BAYS : INTEGRAL LONG TERM VISION



				
Safe	Natural	Attractive	Sustainable	Developing

FLANDERS BAYS : INTEGRAL LONG TERM VISION



- No Regret : Preserve Ecosystem, Preserve Investment
- No Sustainable Development without the Guarantee of Safety
- Economical apply ecosystem and forces of nature



Safe



Natural



Attractive



Sustainable



Developing

FLANDERS BAYS : INTEGRAL LONG TERM VISION



Vlaamse Kust



00 | KUSTREDDINGSPLAN
Waterbeheersingswerken langs/leer de kust

NU STARTEN START TUSSEN NU EN 2020 START TUSSEN 2020 EN 2050 LANGE TERMIJN, TOT 2100



01 | KUSTBESCHERMING DOOR OPHOGING VLAAMSE BANKEN
Smeibank, Nieuwpoortbank, Middelkerkebank, Oostendebank, Wenduinebank, Startzone S1



02 | EILANDEN VOOR DE VLAAMSE KUST
Eiland Nieuw Ter Streep (Oostendebank)
Marine natuurontwikkelingszone
Eiland Wandelaar

Vlaamse Oostkust



03 | HAVEN VAN ZEEBRUGGE
Buitenhaven Zeebrugge I
Achterhaven Zeebrugge
Buitenhaven Zeebrugge II



04 | STRAND KNOKKE-HEIST / ZWIN
Baai van Heist
Natuurreservaat Baai van Heist
Jachthaven en Marina Heist
Strandmeer Knokke-Heist
Reservaat Zwin
Tijlgingang Zwin
Uitbreiding tijgebied Zwin



05 | JACHTHAVEN BLANKENBERGE
Nieuwe havenmond Blankenberge
Blankenberge Nieuw-Strand



06 | MARIENE RESIDENTIE BLANKENBERGE - ZEEBRUGGE / STRAND AAN LAGUNE



07 | HAVEN VAN OOSTENDE
Voorhaven en achterhaven
Oostende offshore diensthaven - fase 1
Oostende als Centrum voor Duurzame Energie - fase 2

Vlaamse Westkust



08 | NIEUWPOORT EUROPEES ZEIL- EN WATERSPORTCENTRUM
Watersportinfrastructuur
Natuurreservaat Uzermonding
Maritieme uitbouw

Duurzame mariene projecten

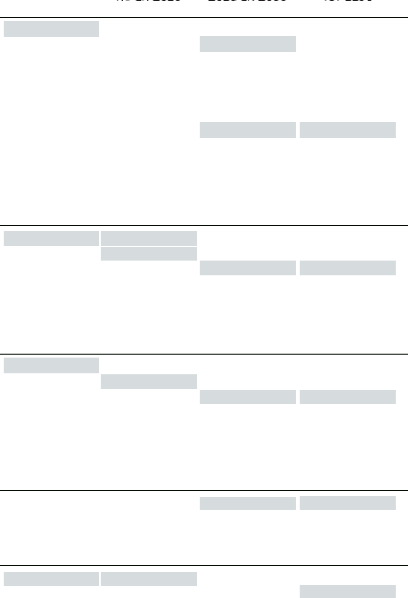


09 | MULTIFUNCTIONEEL EILAND (SCHULHAVEN, OFFSHORE DIENSTEN)



10 | INFRASTRUCTUUR MARITIEME ENERGIEWINNING
Windenergie
Getijdenergiecentrale

NU STARTEN START TUSSEN NU EN 2020 START TUSSEN 2020 EN 2050 LANGE TERMIJN, TOT 2100



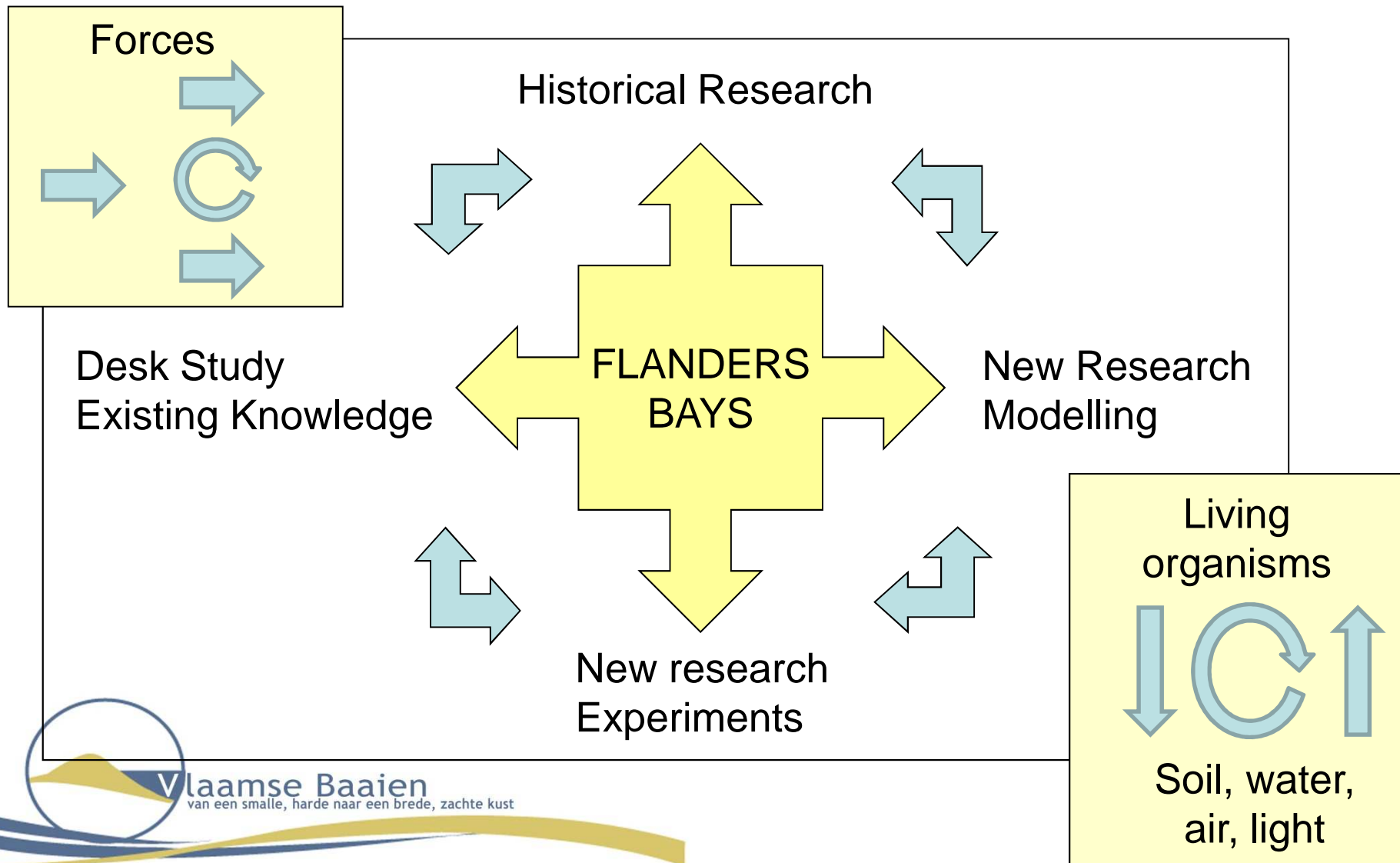
FLANDERS BAYS : ECOSYSTEM APPROACH / FORCES OF NATURE

UNDERSTAND

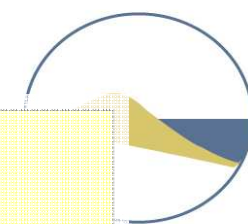
RESOURCES

CO-OPERATE

WIN



FLANDERS BAYS : APPROACH



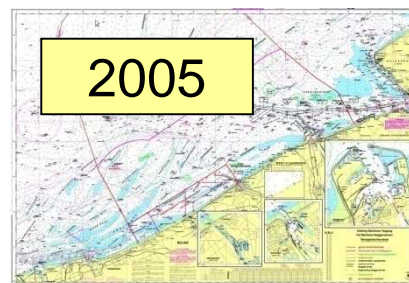
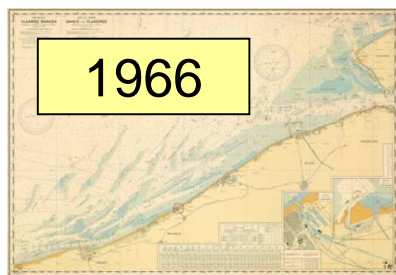
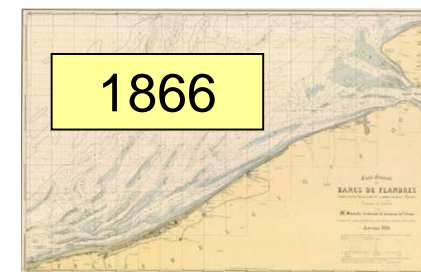
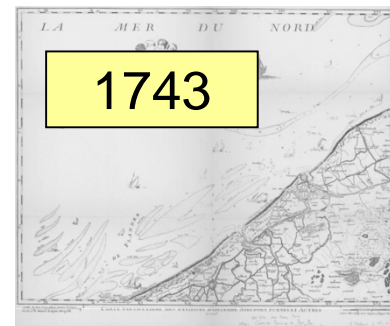
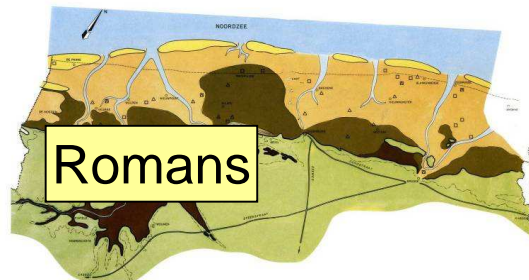
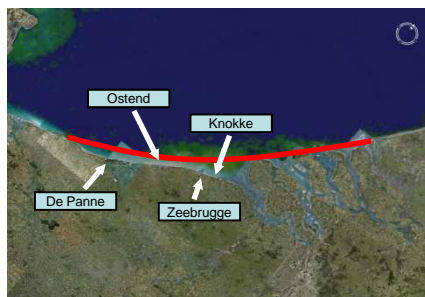
UNDERSTAND

RESOURCES

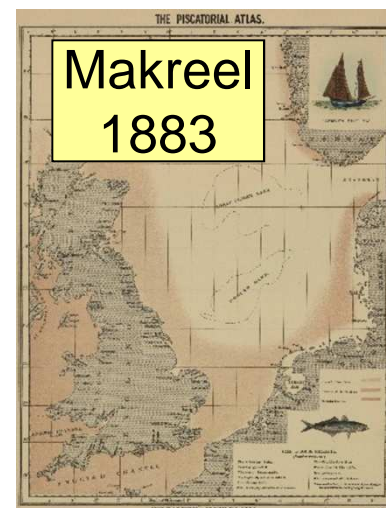
CO-OPERATE

WIN

HISTORICAL RESEARCH

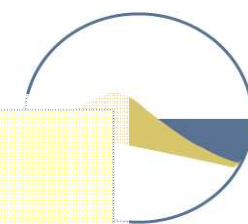


Morphology / Hydrodynamics



Fish Population

FLANDERS BAYS : APPROACH



UNDERSTAND

RESOURCES

CO-OPERATE

WIN

DESK STUDY

- UGhent
- UAntwerp
- VLIZ
- ILVO
- BMM
- MDK
- CLIMAR
-

Duurzaam beheer van de zand- en grindwinning op het Belgisch Continentaal Plat

Gestion durable de l'extraction du sable et gravier sur le Plateau continental de la Belgique

economie

Workshop CLIMAR
4 december 2008

De kust op maat van het klimaat

Synthesis report on the effects of dredged material disposal on the marine environment (licensing period 2006-08)

Report by BMM, KVOF, ACF en oMFF, conform art. 10 of the R.D. of 12 March 2000 delimiting the procedure for licensing of disposal in the North Sea of certain sediments and materials. BL/2006/01

Marine Geology

Changes of sedimentological patterns and morphological features due to the disposal of dredge spoil and the regeneration after cessation of the disposal activities in the North Sea

by V. Van Lancker

ABSTRACT

The disposal of dredged material in the North Sea has led to a significant change in the sedimentological and morphological features of the continental shelf. This change is the result of the disposal of dredged material in the North Sea. The disposal of dredged material in the North Sea has led to a significant change in the sedimentological and morphological features of the continental shelf. This change is the result of the disposal of dredged material in the North Sea.

NOORDZEE – SYMPOSIUM 2007

Kustverdediging in Vlaanderen: van hard naar zacht

MD&K – afdeling Kust
ir. Tina Mertens

Milieueffectenrapport voor de extractie van mariene aggregaten op het BDNZ

Zeegevaar VZW
AMZ – Afdeling Kust en Maritieme Toegang

04/09332/BD - 05/10274/BD

Januari 2006

ECOLAS NV
Lange Nieuwstraat 43
2000 Antwerpen

Studiedag

Beheer van kust en zee: beleidsondersteunend onderzoek in Vlaanderen

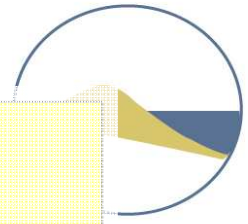
9 november 2001
Thermae Palace Oostende

VLIZ Special Publication 4
2001

Vlaams Instituut voor de Zee



FLANDERS BAYS : APPROACH



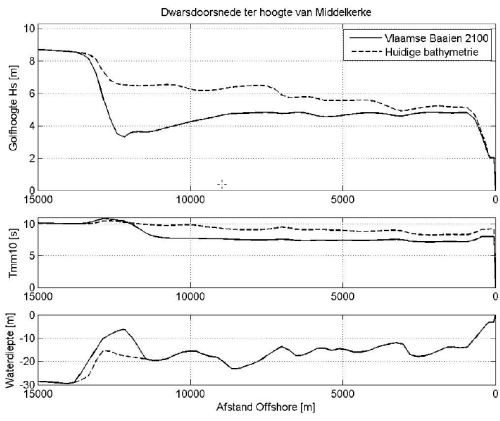
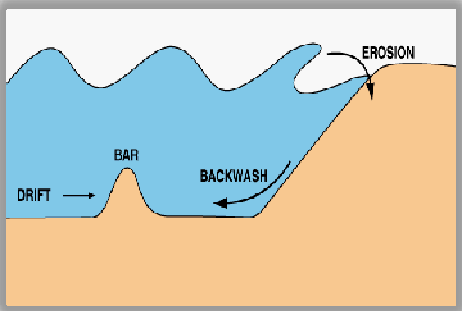
UNDERSTAND

RESOURCES

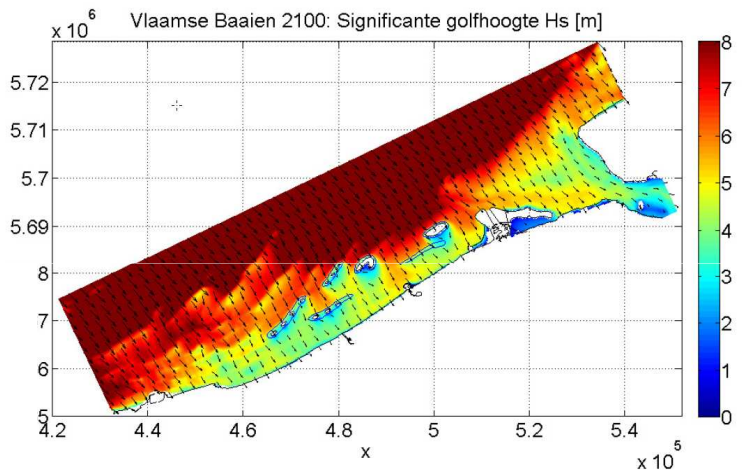
CO-OPERATE

WIN

NEW RESEARCH : MODELLING



Figuur 5-1: Langs een doorsnede loodrecht op de kust ter hoogte van Middelkerke wordt de afname van de golffluogte en golfperiode door de eilandengroep (volle lijn) vergeleken met de huidige situatie (gestippelde lijn).



Figuur 4-2: Overzicht van de berekende golffluogte (H_s) langs de Vlaamse kust tijdens een superstorm met een terugkeerperiode van eens in de 10.000 jaar voor het ontwerp van de Vlaamse Baaien

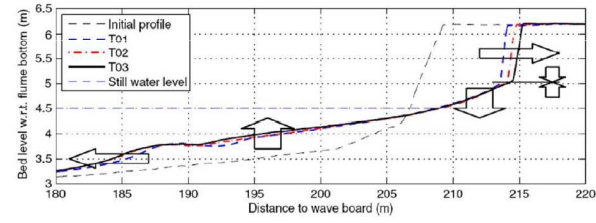
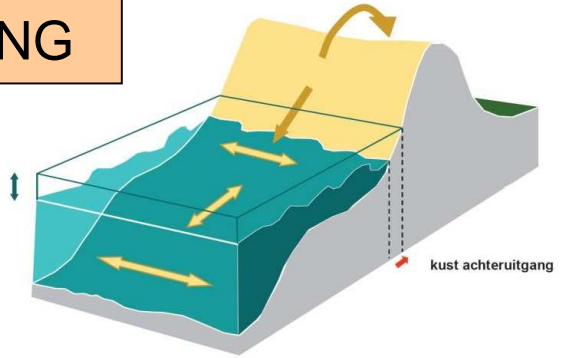
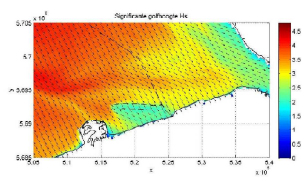


Fig. 3. Comparison of measured bed profiles after 6 hours (model scale) in Tests T01, T02 and T03 and indications of qualitative effects of wave period on erosion profile.



- Natural coastal protection system using large volumes of sand
- Natural grain size for dynamic dune management

FLANDERS BAYS : APPROACH

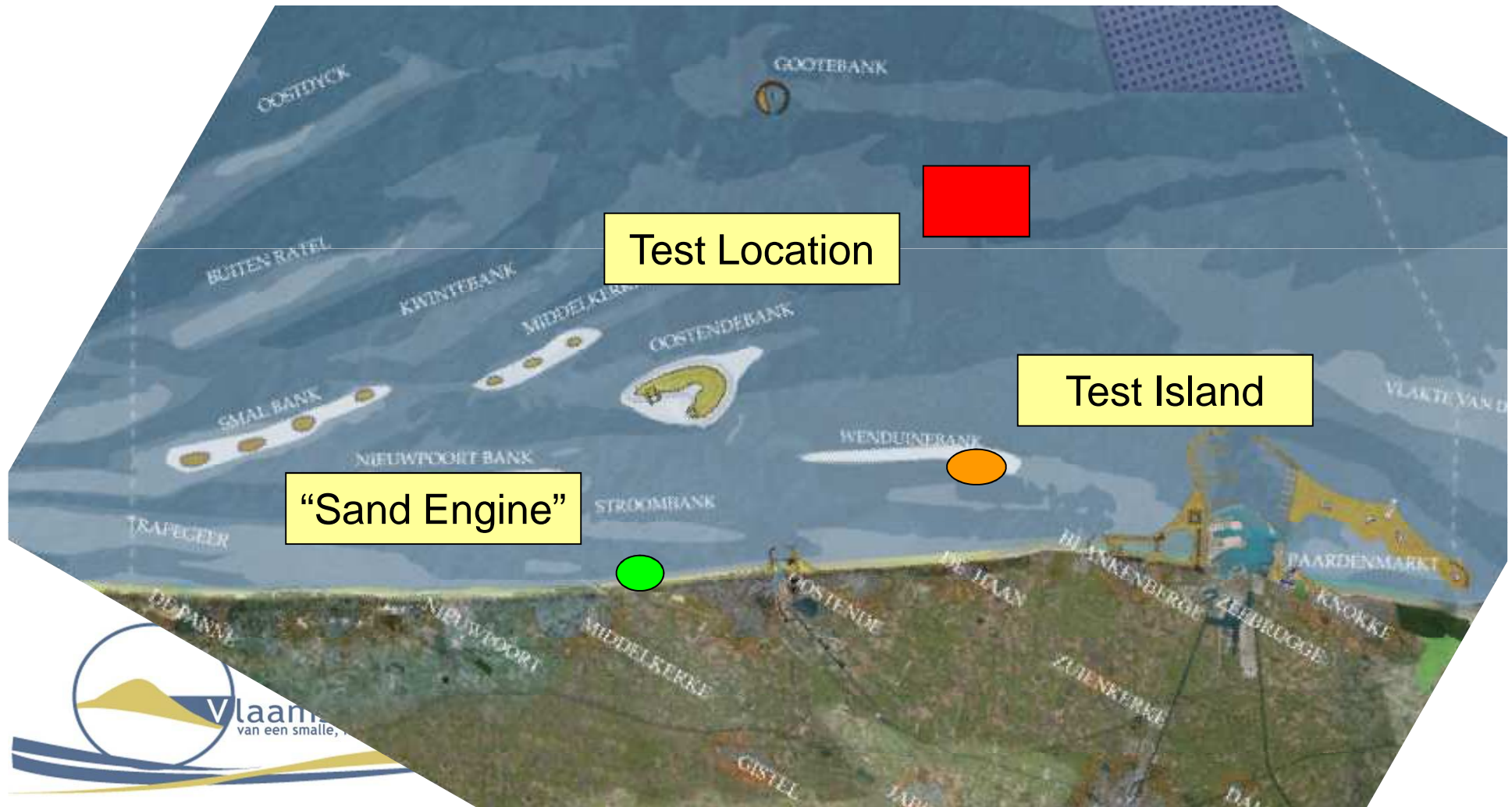
UNDERSTAND

RESOURCES

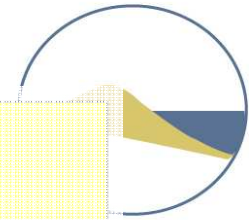
CO-OPERATE

WIN

NEW RESEARCH : EXPERIMENTS



FLANDERS BAYS : APPROACH



UNDERSTAND

RESOURCES

CO-OPERATE

WIN

NATURAL RESOURCE - TECHNIQUES

Example

Resource	Win economical	Win societal	Win ecological
Maint. Dredge Dumpsites	+++	++	+++
'Exploratiezone'	--	+	--
Silt	+/-	-	+
Clay	+	-	-

Flanders Bays

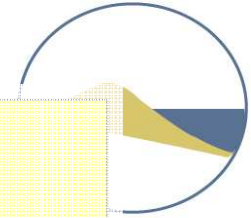
Solutions / Methods are designed to maximise the ecosystem's approach and use of natural forces



Dredging Techniques : GHG, Turbidity, Contaminants Spread, ...



FLANDERS BAYS : APPROACH



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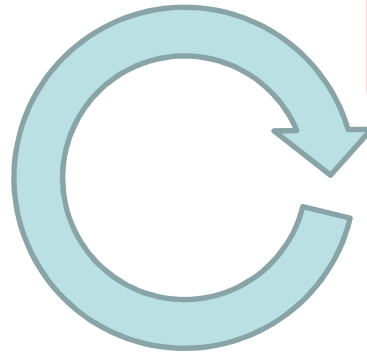
CO-OPERATION

Private sector

- Contractor's approach and experience

Research Institutes

- knowledge



Government/Authorities

- Legislation
- permits
- fundamental research

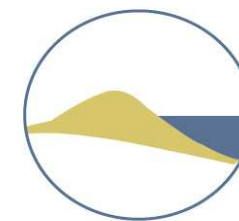
Financial partners

- Creative financial solutions

Integrated approach and large scale vision allows for economical use of ecosystem's approach and forces of nature. Co-operation will lead to successful win-win-win situations.

Vlaamse Baaien

Veilig, natuurlijk, aantrekkelijk, duurzaam, ontwikkelend



03 |
Haven van
Zeebrugge



04 |
Strand van
Knokke-Heist en Zwin





00 | Kustbeschermingsplan



05 | Jachthaven van Blankenberge

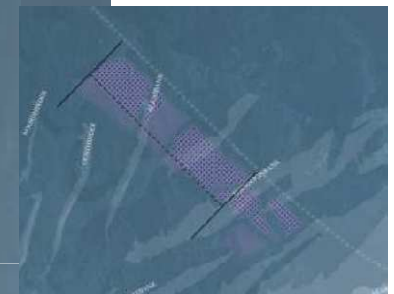


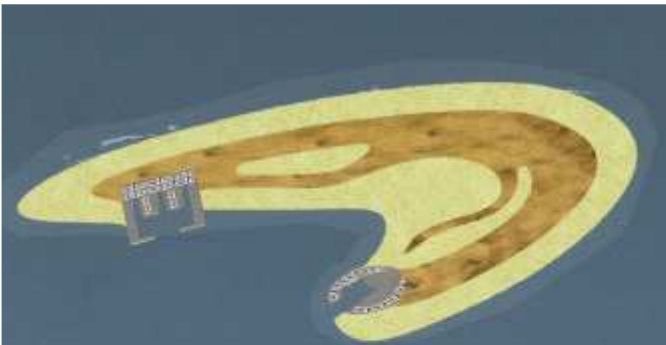
06 | Mariene residentie van Blankenberge en Zeebrugge - Strand aan lagune



10 | Infrastructuur voor mariene energiewinning

10





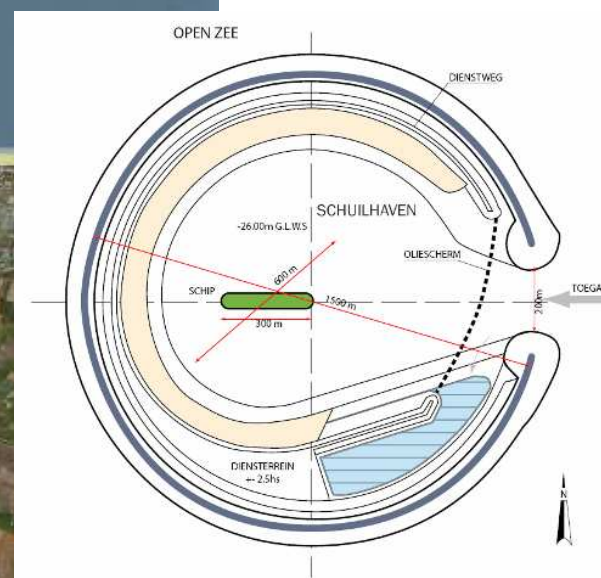
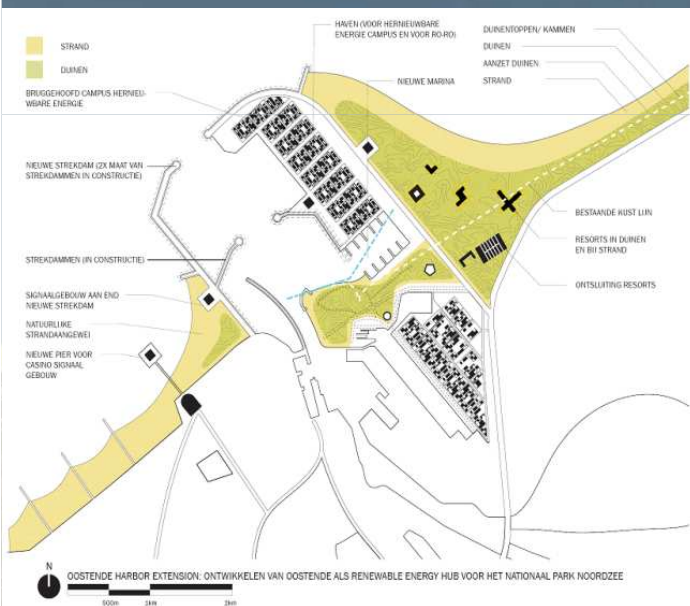
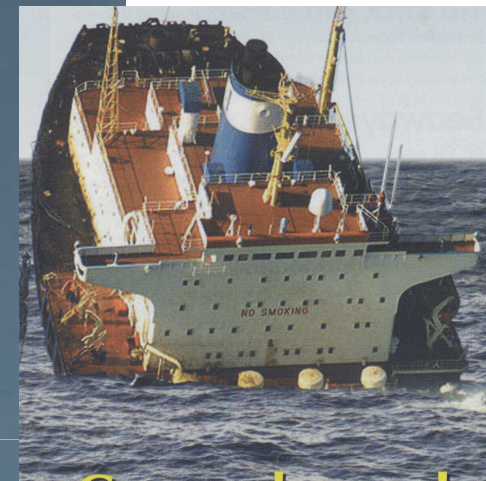
09



07 |
Haven van
Oostende

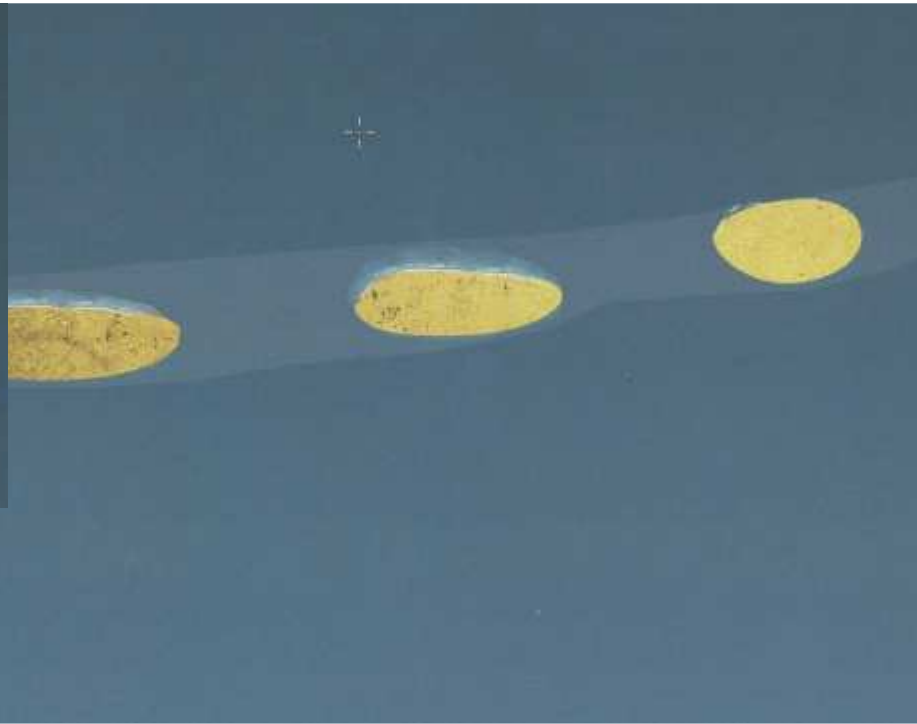


09 |
Multifunctioneel
eiland





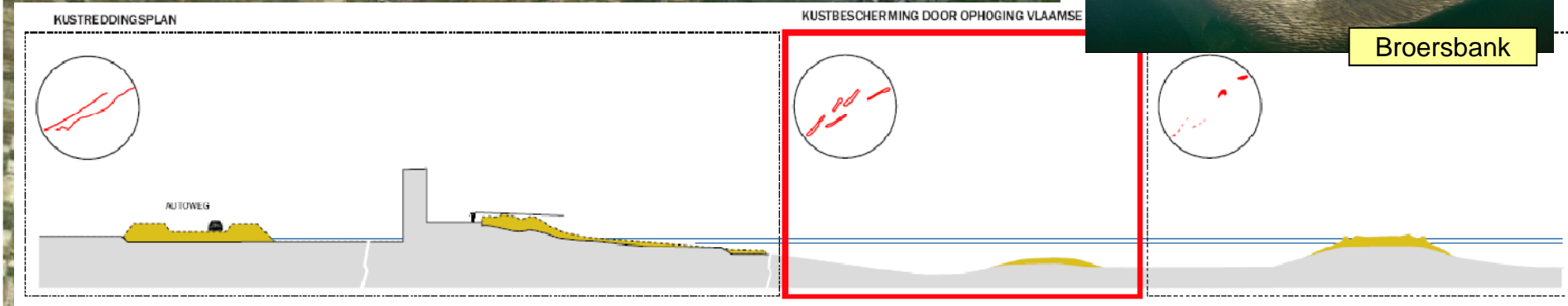
01 |
Kustbescherming
door ophoging
Vlaamse Banken



- 1cm/year elevation of the banks = 50 cm in 2050
mastering the wave-attack and protecting the coast
- Combining forces of nature through history to shape coastal protection and coastal structures



Broersbank





02 |

Eilanden voor de
Vlaamse Kust



08 |

Europees
Zeil- en Water-
sportcentrum
te Nieuwpoort



02



- Opportunities for nature development, tourism, energy
- Island and marine natural development

08



FLANDERS BAYS : “City of the Sea”



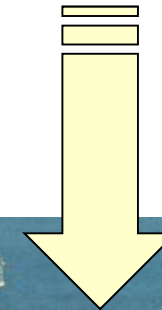
Green Ports examples

- **ESBJERG (Denemarken)**
 - Operating base for the Danish oil- and gas industry
 - Construction, maintenance, rescue & supply for 80 turbines
- **EASTERN ENGLAND - Lowestoft and Great Yarmouth**
 - 500 companies employ ca. 15 000 people
- **BREMERHAVEN / CUXHAVEN / EMDEN**
 - zone for offshore windenergy, production sites, test sites
 - More than 700 new jobs in the last 3 years
- **IJMUIDEN**
 - Service port for oil- and gas industry in the Southern North Sea

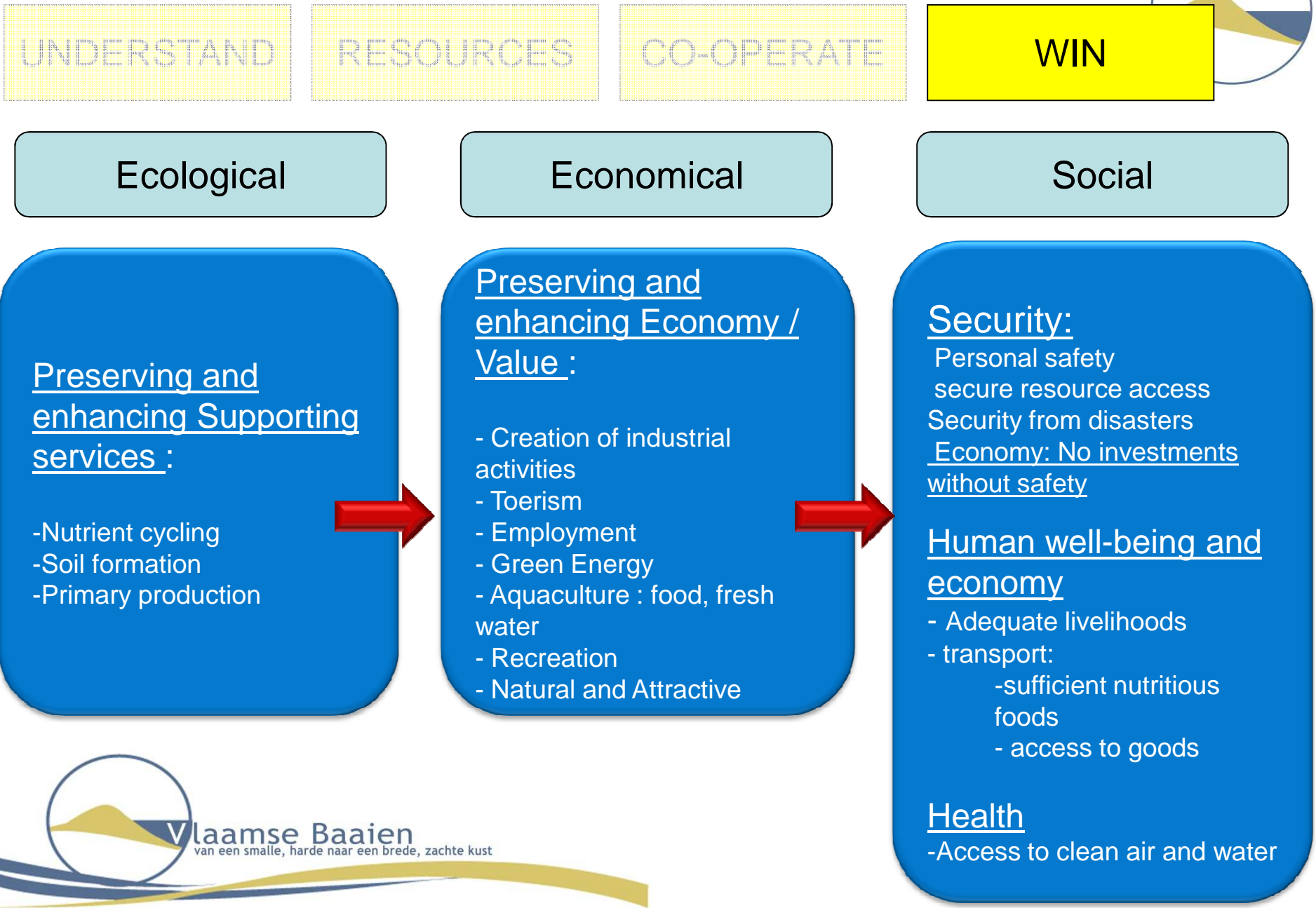


Dredging Contractors

- Highly skilled people
- Multi disciplinary approach
- Highly technological vessels
- Highly skilled operators



FLANDERS BAYS : COASTAL PROTECTION AND HEALTHY ECOSYSTEM



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