



NORTH SEA BALLAST WATER



European Union  The European Regional Development Fund

The Interreg IVB North Sea Region Programme



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



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Maritime Eco-Innovation Regional Opportunities from the International Arena



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Maritime & Marine activities contributes to our regional welfare

- Contributes to our economic prosperity
- Provides food and other resources
- Affects our Environment
- Provides fossil and renewable energy
- Is used for recreation

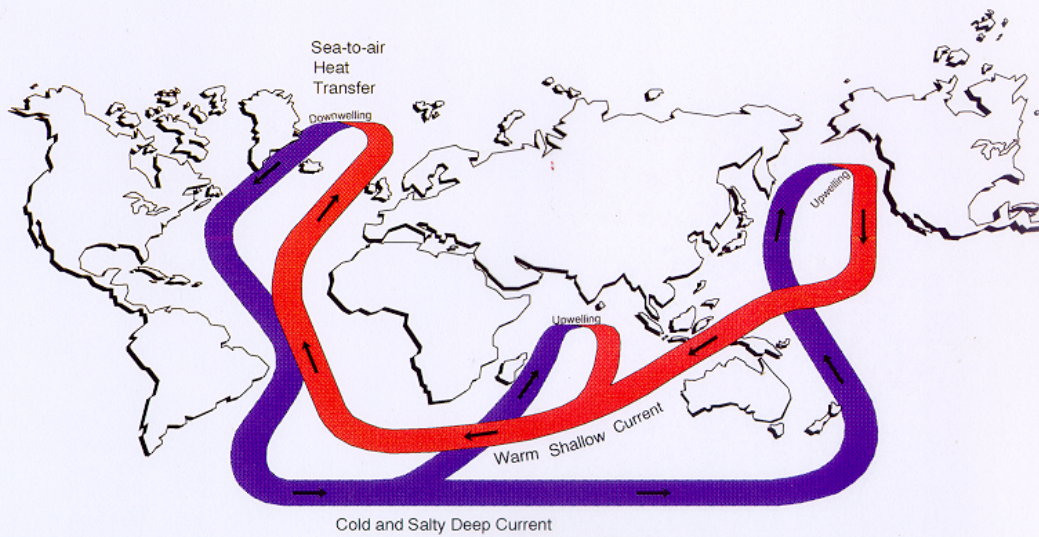
**They deserve a priority on the agenda of the North sea countries and region
- Hence the Interreg NSRP -**



Maritime & Marine Activities are global activities



Great Ocean Conveyor Belt



**Marine waters
flow, ever so
slowly, through all
oceans,
at the surface and
deep down**



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North sea Maritime & Marine activities are global

- Are driven by international organisations
- Affect many different public and private sectors
- Require transnational and cross-sectoral collaboration

How can Interreg NSRP offer a major contribution that benefits the region?

Lets have a look at some of the issues from the international arena

Solid Marine Pollution from Urban activities

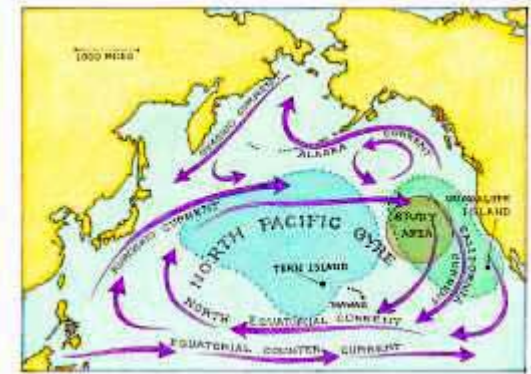
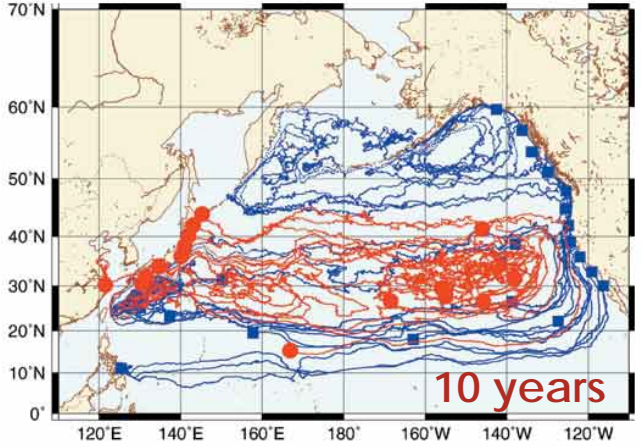
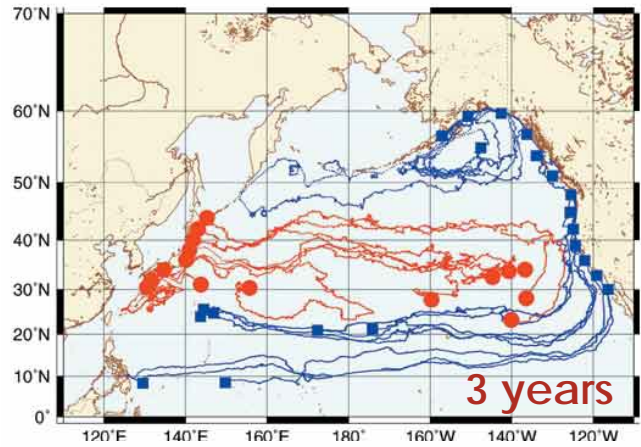
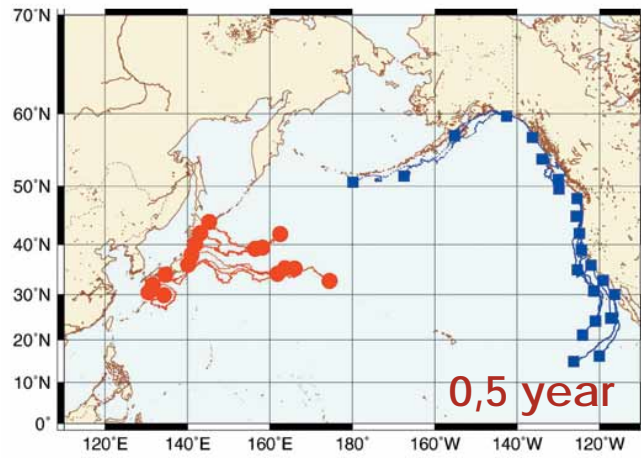
Plastic waste

Acts as a chemical sponge

Organisms from elsewhere

Travel along

The North Sea Urban (terrestrial) regions contribute as well!



Wynne, 2008

Distribution of plastics Through the ocean
NOAA, 2008

Plastic is perceived as food. Stomach of a Starved Albatros



Maritime Pollution

Oil, Chemicals, Waste, Air

Operational Oil Discharge



Oil - disaster



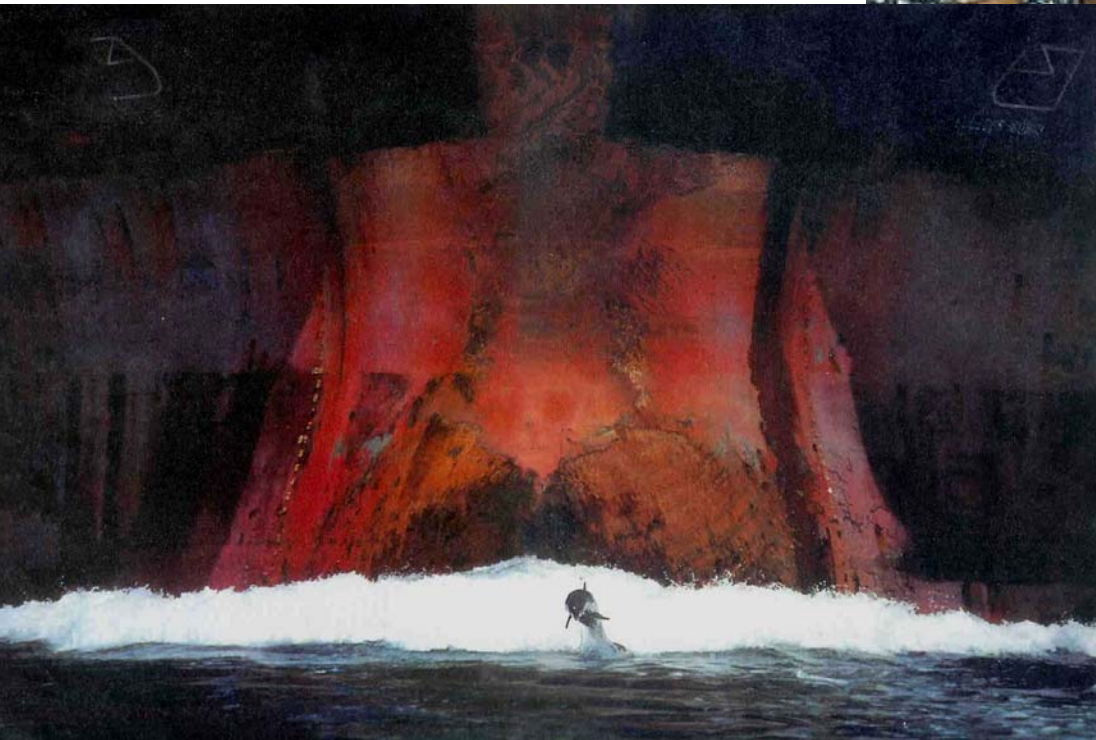
Slachtoffer

Pollution source on a ship

Anti-fouling

Separate IMO Convention bans all organotins from ships (18/09/08):

- Scientific Rationale
- Innovative Industry
- Docking Period
- Early EU Mandatory (01/01/08)



**Early realisation through
Transnational and
Cross-sectorial
corporation**

End of life of a ship? Important source of income and of pollution in upcoming markets



Boat-Building Near Flatford Mill, een olieverf uit 1815

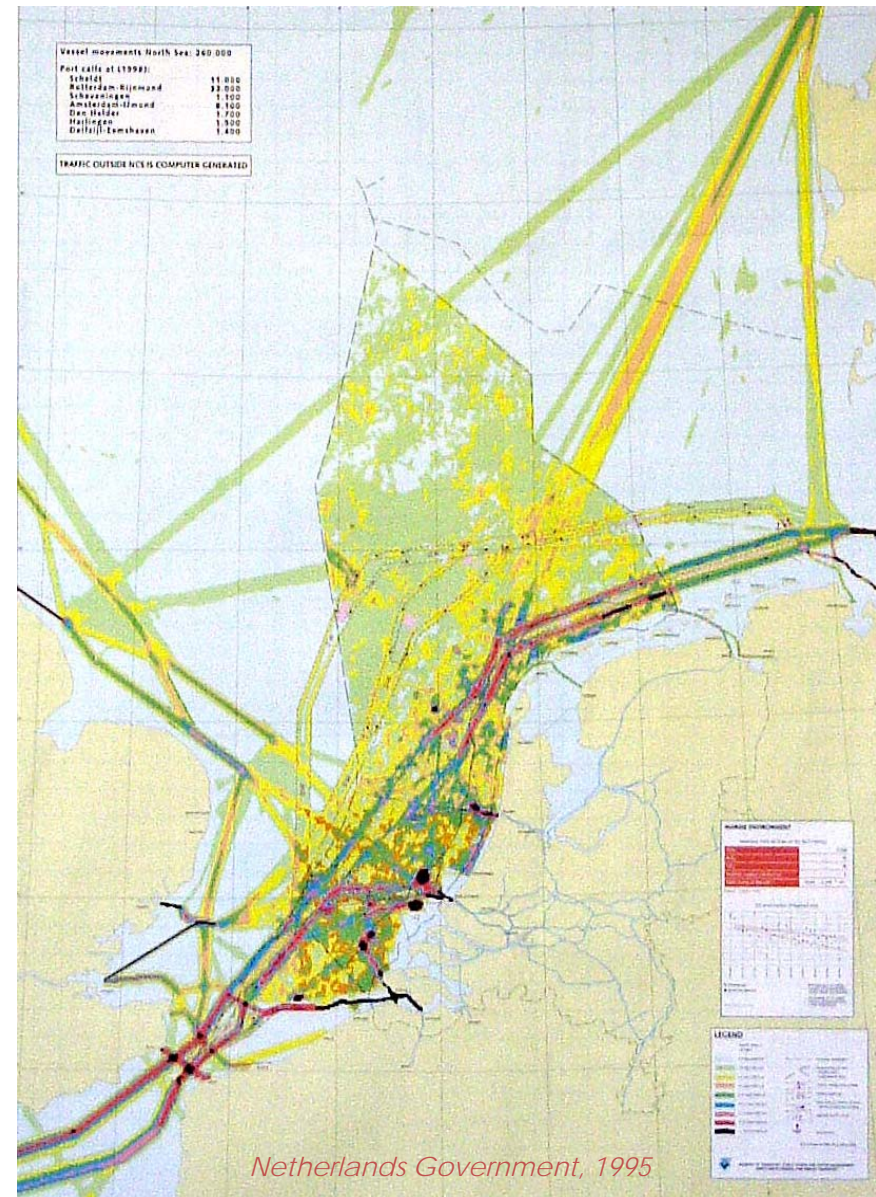
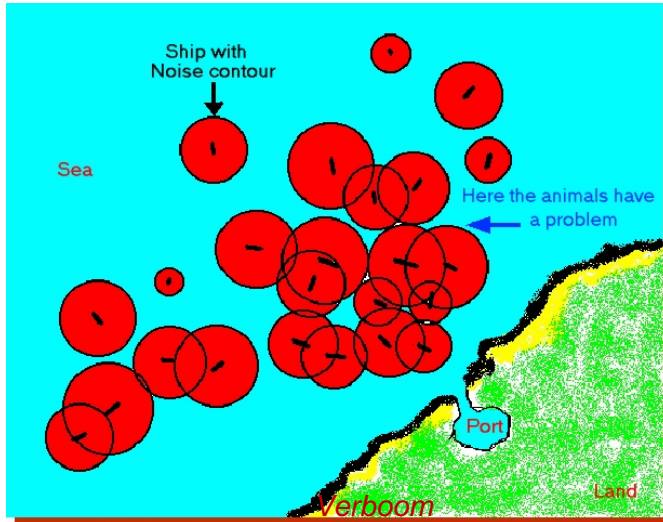


Ship repair



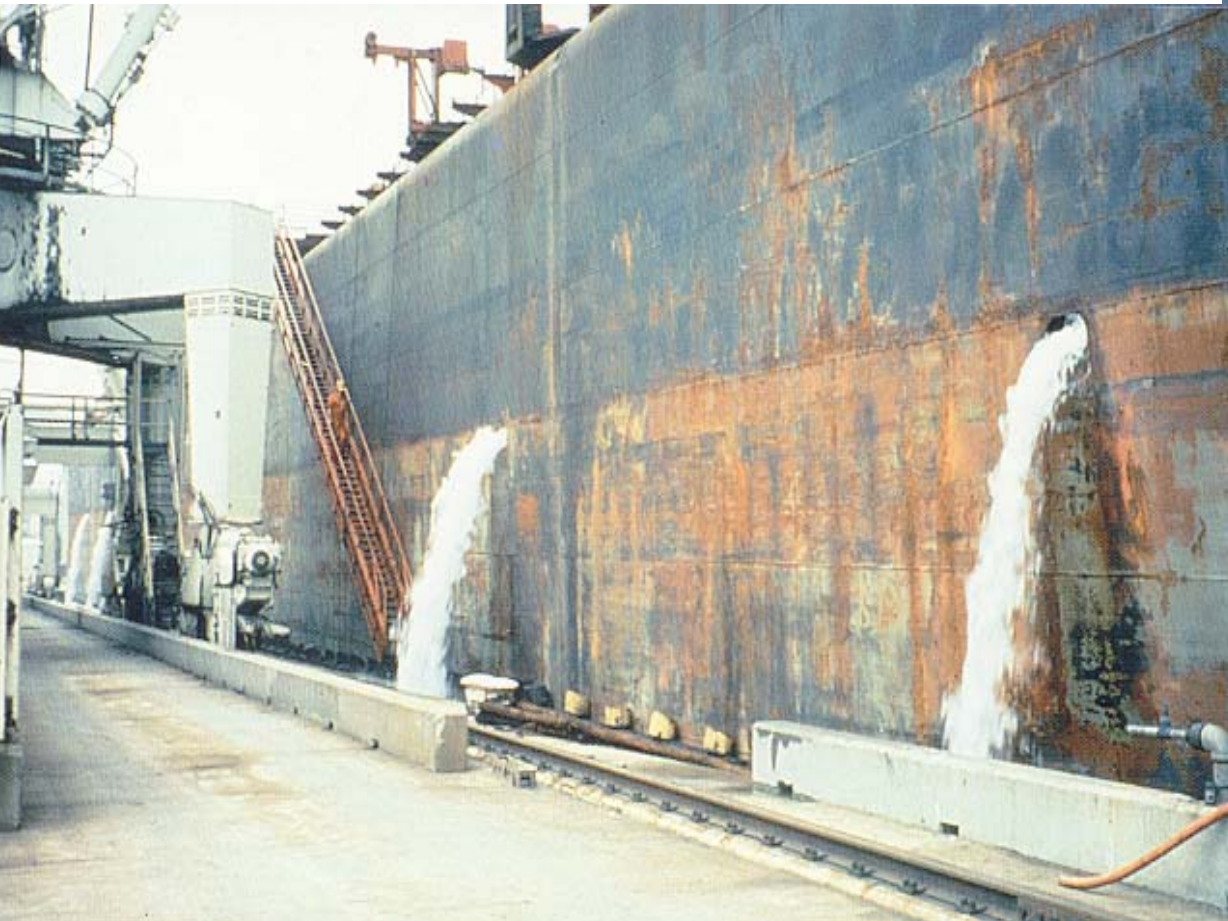
And our responsibility too!

Avoidance of man-made sound hampered in crowded shipping areas



Shipping density
 = 45 Ships/Day

Ballast water: transfers alien organisms



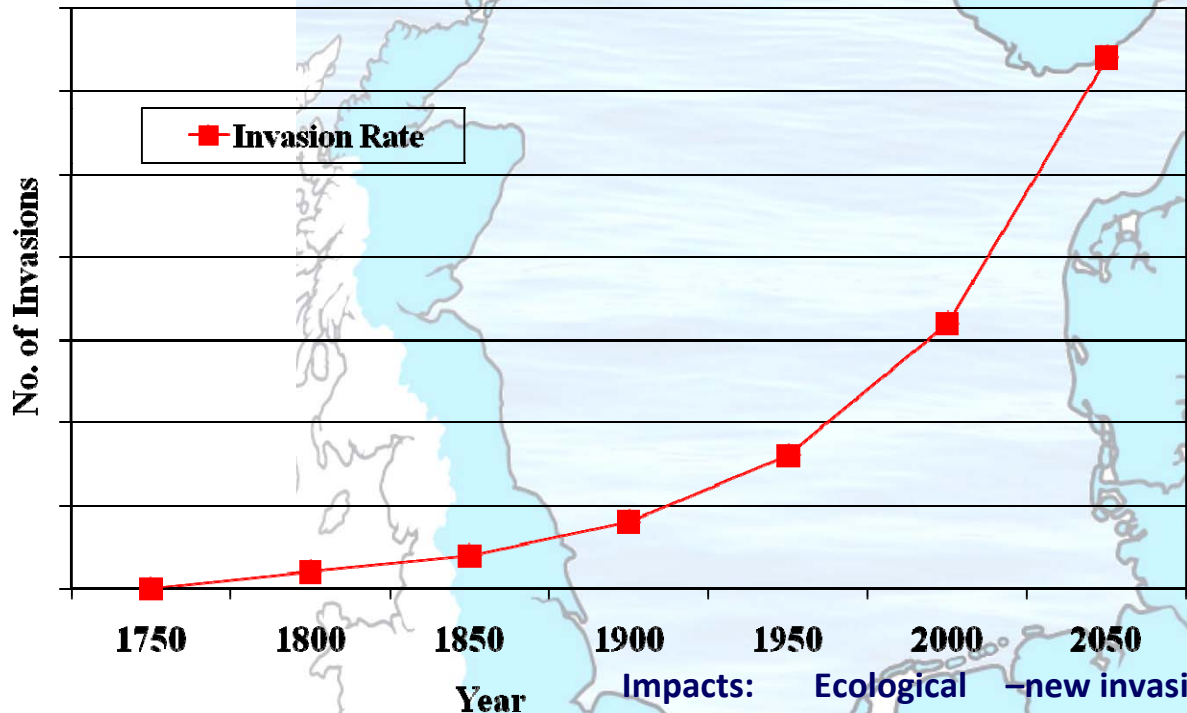
Discharged Ballastwater
3 * 10 billion tons/year
(30 billion litres)



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Ballast water transfer: billions of tonnes/year

Contains > 7,000 species of microbes, plants and animals



Increasing number of non-indigenous species in our coastal regions

Impacts:

Ecological

–new invasion every 9 weeks

Economical –losses in 100s * 10⁹ USD/year

Human health

–Paralytic shell fish poisoning

–Cholera outbreaks

Collapsed ecosystems

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Outstanding Maritime issues

Shipping:

- Pollution: *MARPOL (Annexes per Category)*
- Anti-fouling Organotins: *Separate IMO Convention*
- Ballast Water: *IMO BWM Convention*
- Bio-fouling: *on IMO Agenda*
- Under-Water Noise: *on IMO Agenda*
- Ship Strike with Whales: *on IMO Agenda*
- Ship recycling: *Convention on the Safe and Environmentally Sound Recycling of Ships (15 May 2009)*





Outstanding non-maritime issues

- Fossil energy;
 - CO2 sequestration: London Convention/London Protocol, OSPAR, National programs, EU FP7
- Renewable energy;
 - Under water noise, **Awareness is lacking**
- Land-based and Recreational: Regional Frameworks: OSPAR, HELCOM
 - Plastic waste; **Awareness is emerging**
- Protection of Marine and Coastal Areas: IMO, UNEP, IUCN (*IGO*), EU, OSPAR (*Regional*), SAR (*NGO*)



The international policy arena

- IGOs, NGOs and Scientists raise awareness
- IMO, EMSA and other EU and regional programs and frameworks develop international policies
- They have to balance multiple uses, protection of the marine environment and bio-diversity as well as economic prosperity

Such bodies need response and support from (innovative industries,) the scientific and the technological community to meet the challenges associated with emerging regulations



Maritime industry

- Major economic interests in a strongly competitive and global market
- Ample technical expertise for innovation
- Good lobby to ensure their interests

How can they innovate to protect the environment while remaining competitive?



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Science

- In-depth understanding of environmental issues and ecosystem impact
- Fundamental knowledge that has potential for innovation, yet needs development
- Strong interest in scientific relevant issues and questions from society
- Maintain their research capacity and integrity

How can scientific knowledge be translated into and in support of innovation, environment and society



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Typical triple helix



At an international level



Issues of concern

- **Regulations on public private collaboration**
- **Return of investment for private parties**
- **Proper ownership of results to guarantee:**
 - **accessibility;**
 - **facilitate and ensure its proper use;**
 - **exploitation**



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The Ballast Water Opportunity project

Ballast Water - IMO Response:

Mandatory IMO Instrument

Ballast water Management Convention (IMO, 2004)

Phase out BW exchange

Enter: (as of 2009-2016)

BW treatment on board ship

- Aim to reduce the amount of viable organisms in BW discharge

Entry into Force: 30 States, 35 % of world tonnage.

Ratified to date: 18 States, 15.36% (figures May 2009)





Ballast Water

Scale of BW Discharge

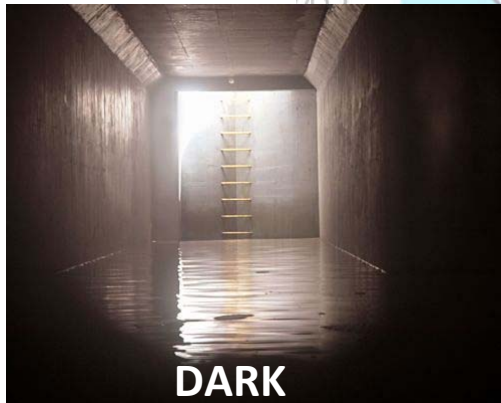
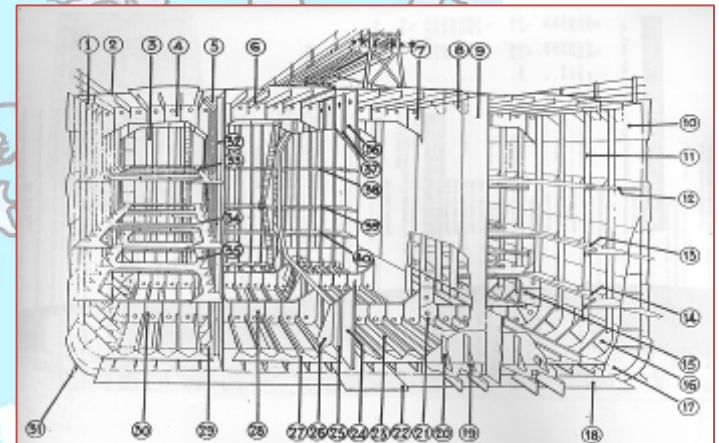
- $3 * 10^9$ tonnes/year
- = 10^{12} litres
- (*Conservative Estimate*)

Discharges in

- ecologically productive
- densely-populated coastal zones and port areas

Stow-away POCKETS

often ANOXic

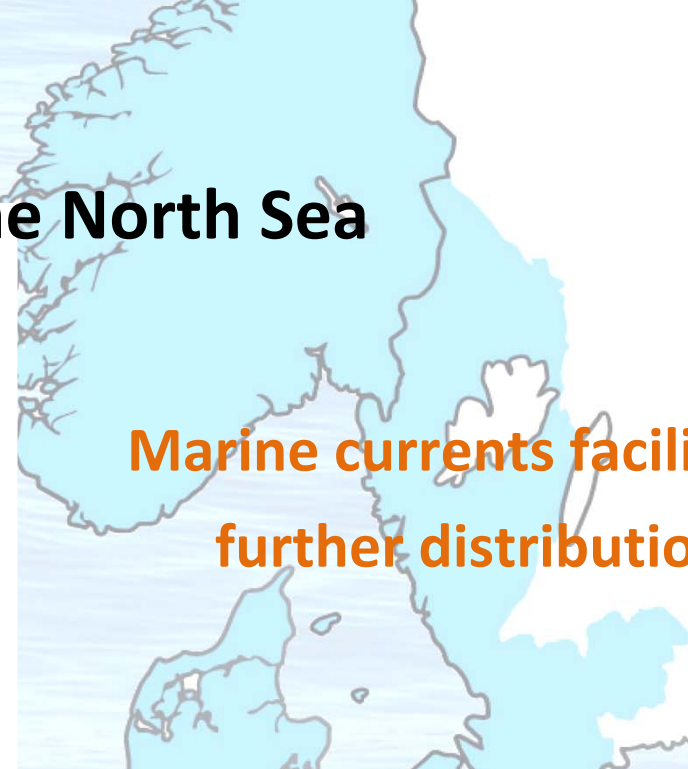
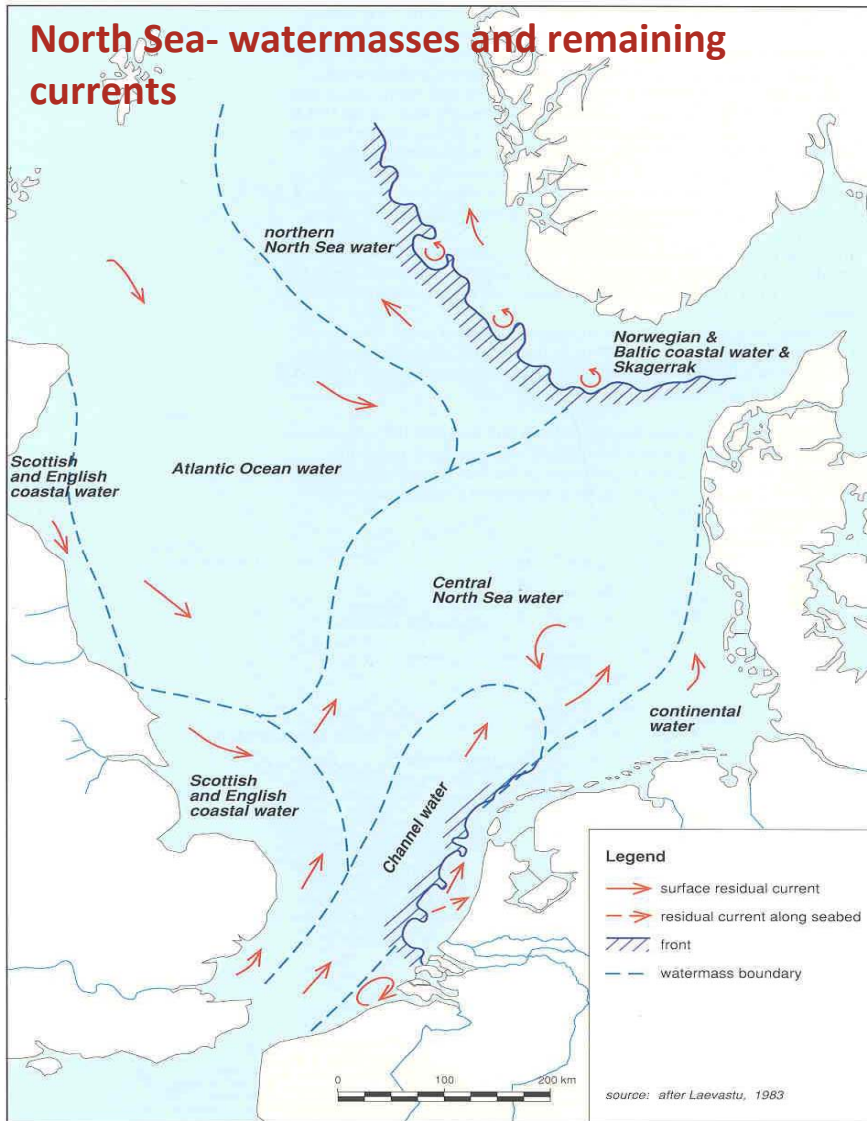


DARK

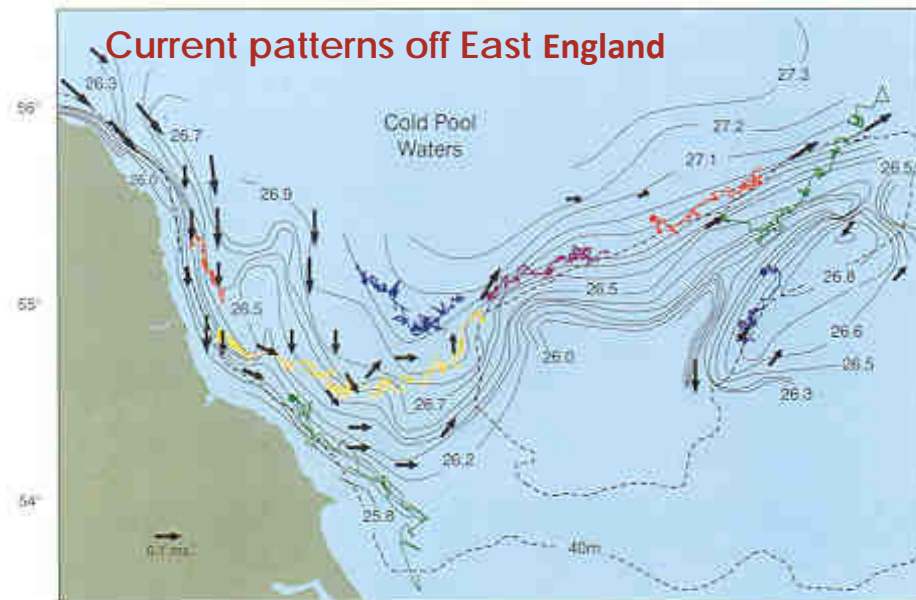


Impact in the North Sea

North Sea- watermasses and remaining currents



Current patterns off East England

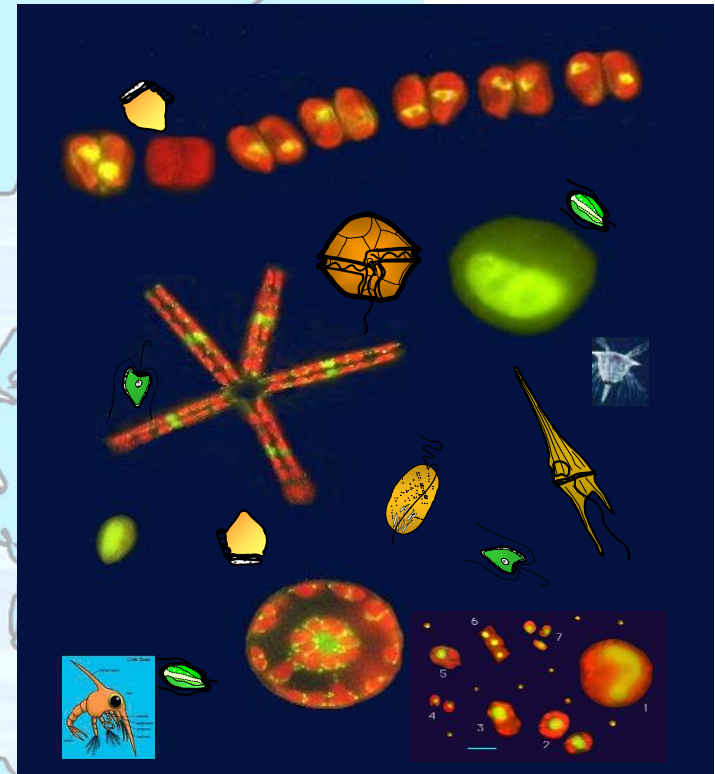




Science

- Knowledge on marine species & ecosystem processes
- Long-standing tradition in cooperating with policy makers and industry
- Obligation to inform and support society

They can support public and private stakeholders





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NIOZ



The Ballast Water Pilot Test Bed



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BUNDESAMT FÜR
SEESCHIFFFAHRT
UND
HYDROGRAPHIE

Gouvernement

Wish to implement the convention,

But:

- How to test BWM treatment systems
- How will this stand up in court
- How to detect (non) compliance
- How to evaluate the implementation of the BWM-convention





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Transnational Collaboration

- **Collaboration on testing of BWM systems**
- **Co-operation on development of legislation**
- **Detection Requirements for compliance monitoring and enforcement**

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- **Which systems will help us to comply?
Early introduction may lead to a competitive advantage**



- **Support in development BWMS, especially without using Active substances**

- **What is required for monitoring compliance?**

MAHLE

HAMANN  AG


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Envio Water GmbH & Co. KG



Cross-sectorial collaboration

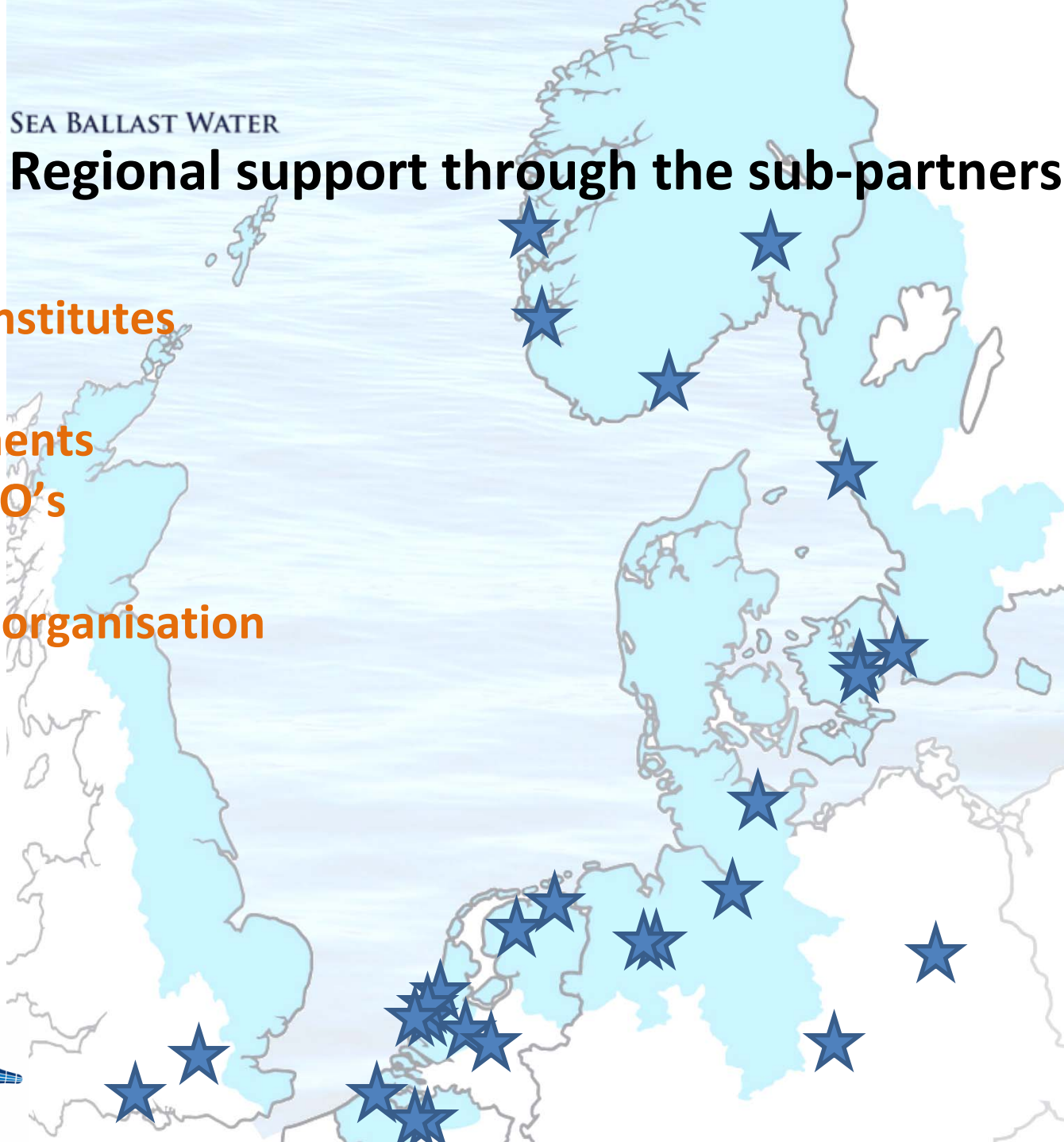
- Speed up and enhance development BWM-systems
- Stimulate acceptance with ship owners resulting in a competitive advantage
- Facilitate harmonised implementation



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Regional support through the sub-partners

Science institutes
Experts
Governments
IGO's NGO's
Ports
Shipping organisation



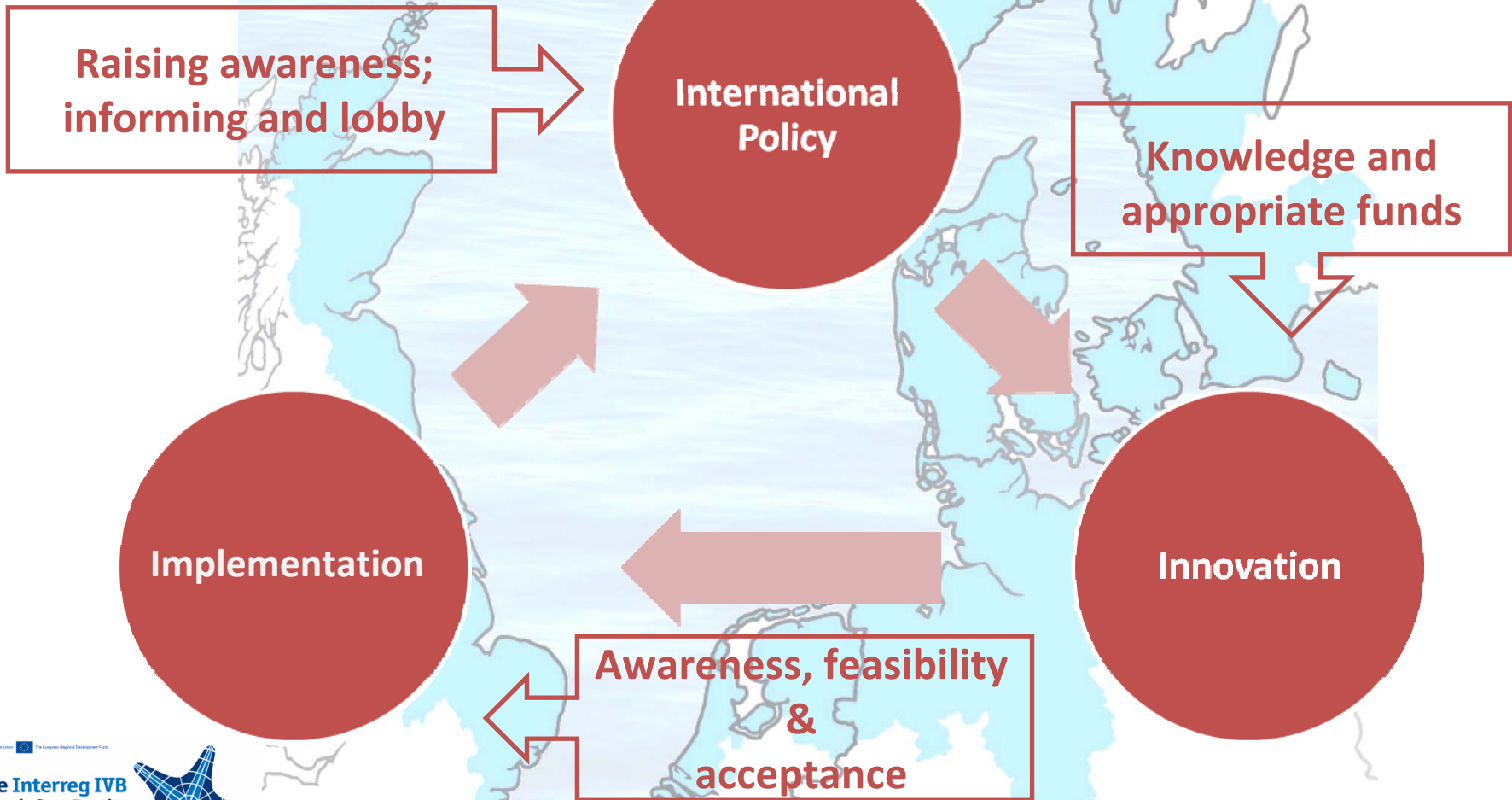


Mutual benefits

- **Cohesion: Harmonisation of legislation and control -> better accessibility (Interreg)**
- **Competitive advantage for shipping industry through innovation (Lissabon)**
- **Environment: reduce impact of maritime activities (Gothenburg)**
- **Increase of research facilities (Lissabon)**
- **Improve the influence of the North Sea Region (Interreg)**

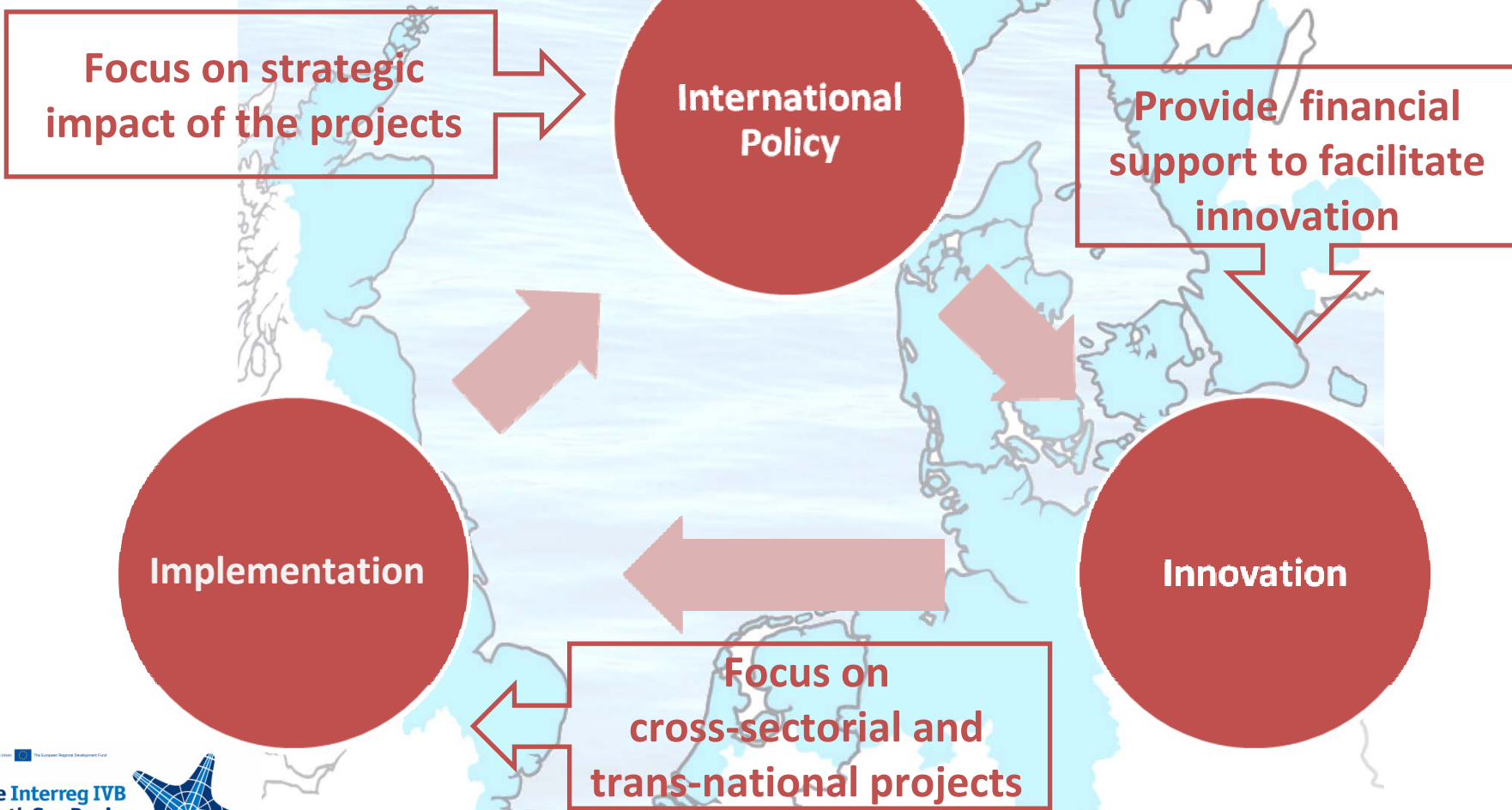


How to stimulate Maritime & Marine Eco-innovation





Contribution from Interreg





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Thank You

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