Governing key flows in the Source to Sea continuum

Science paper for GEF/STAP

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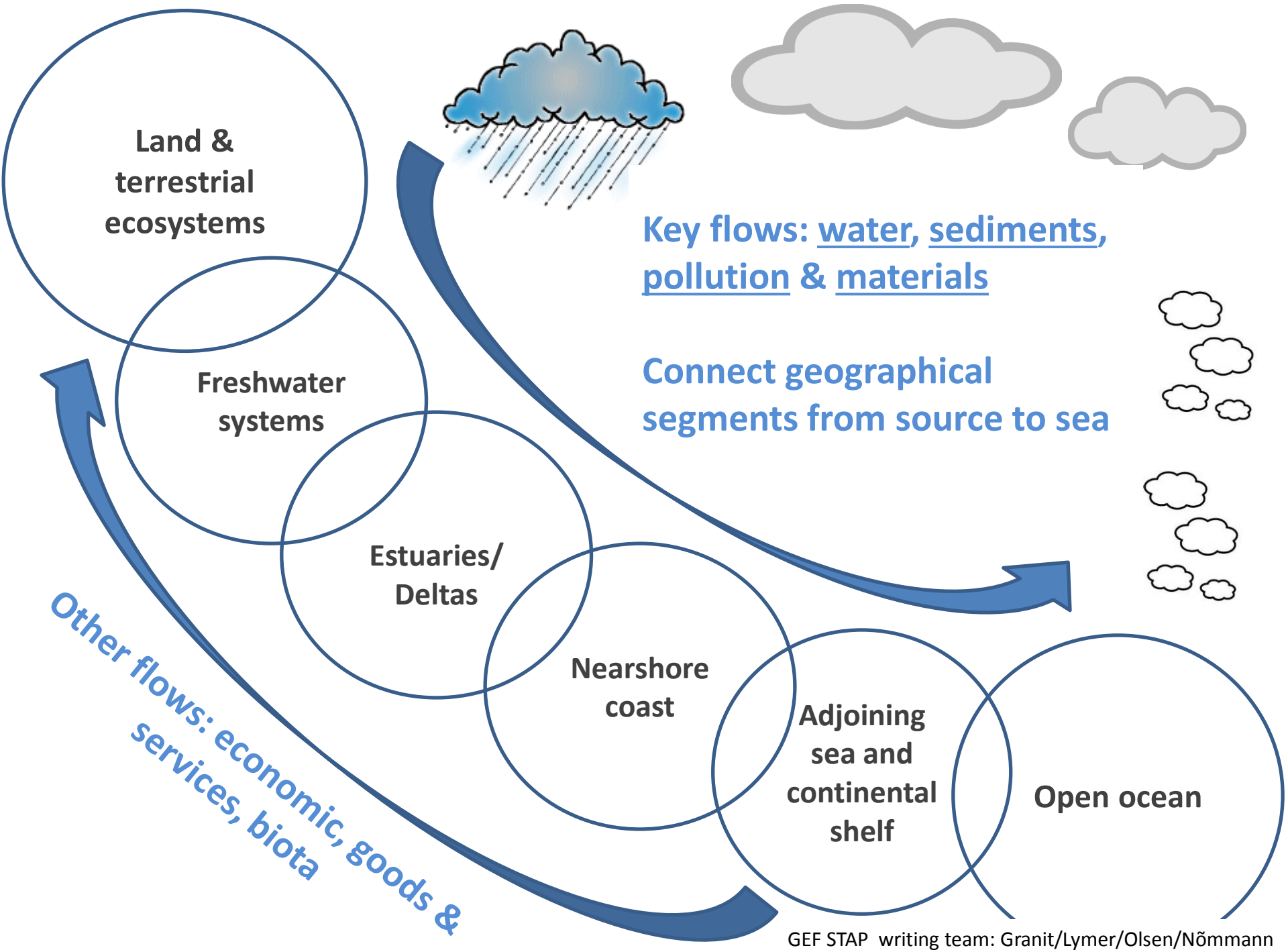

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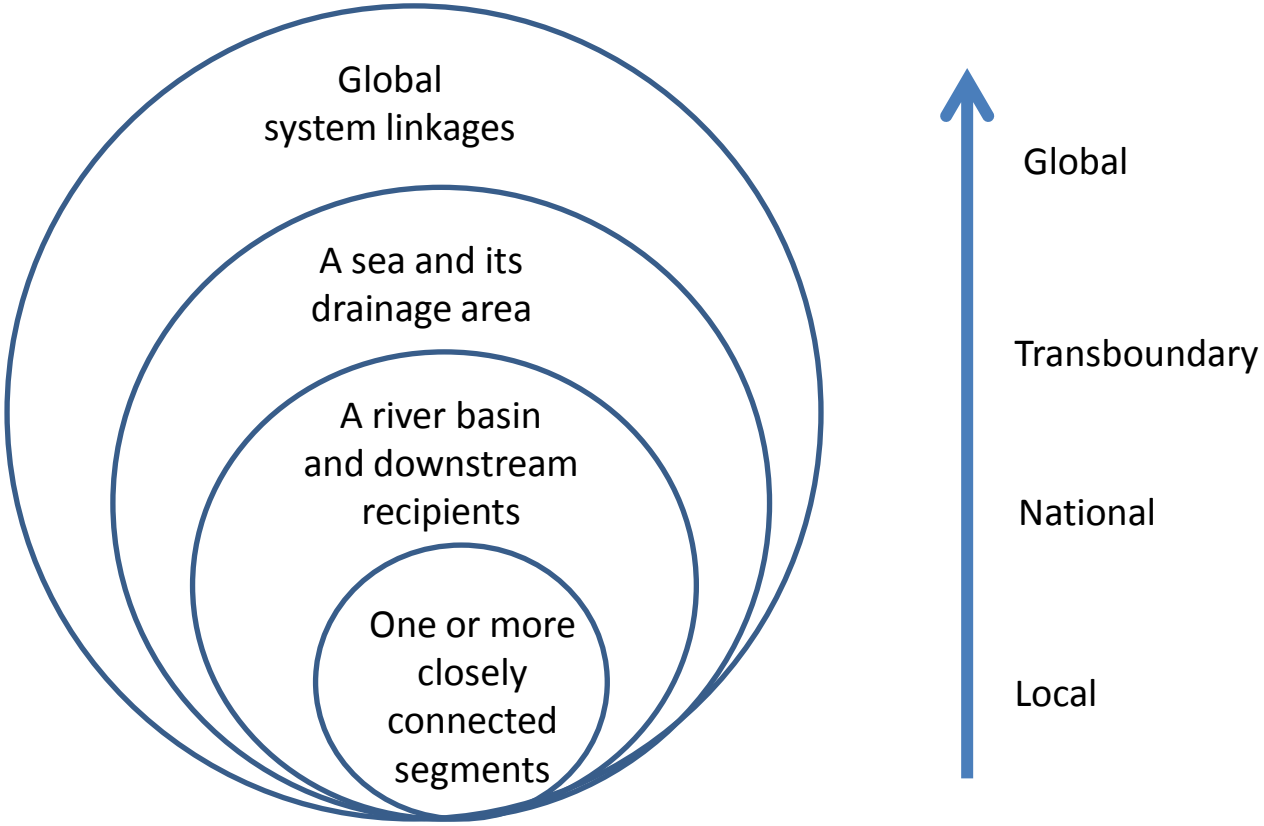
Source to sea linkages require coordinated governance and management responses at multiple scales



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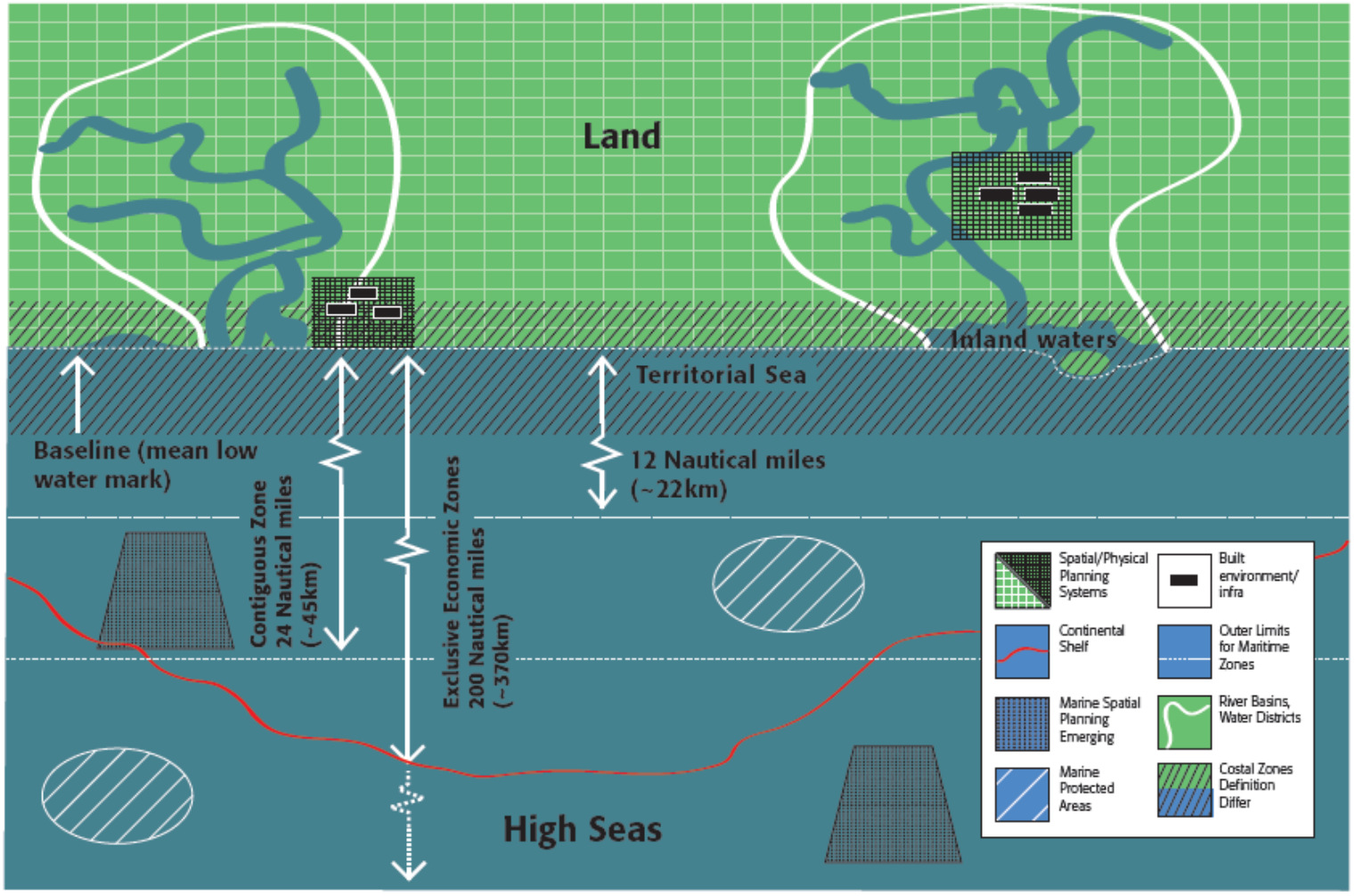
Currently overlapping or weak governance & management frameworks: IWRM, planning and building acts, ICM, UNCLOS, MSP....



Granit et al, 2012

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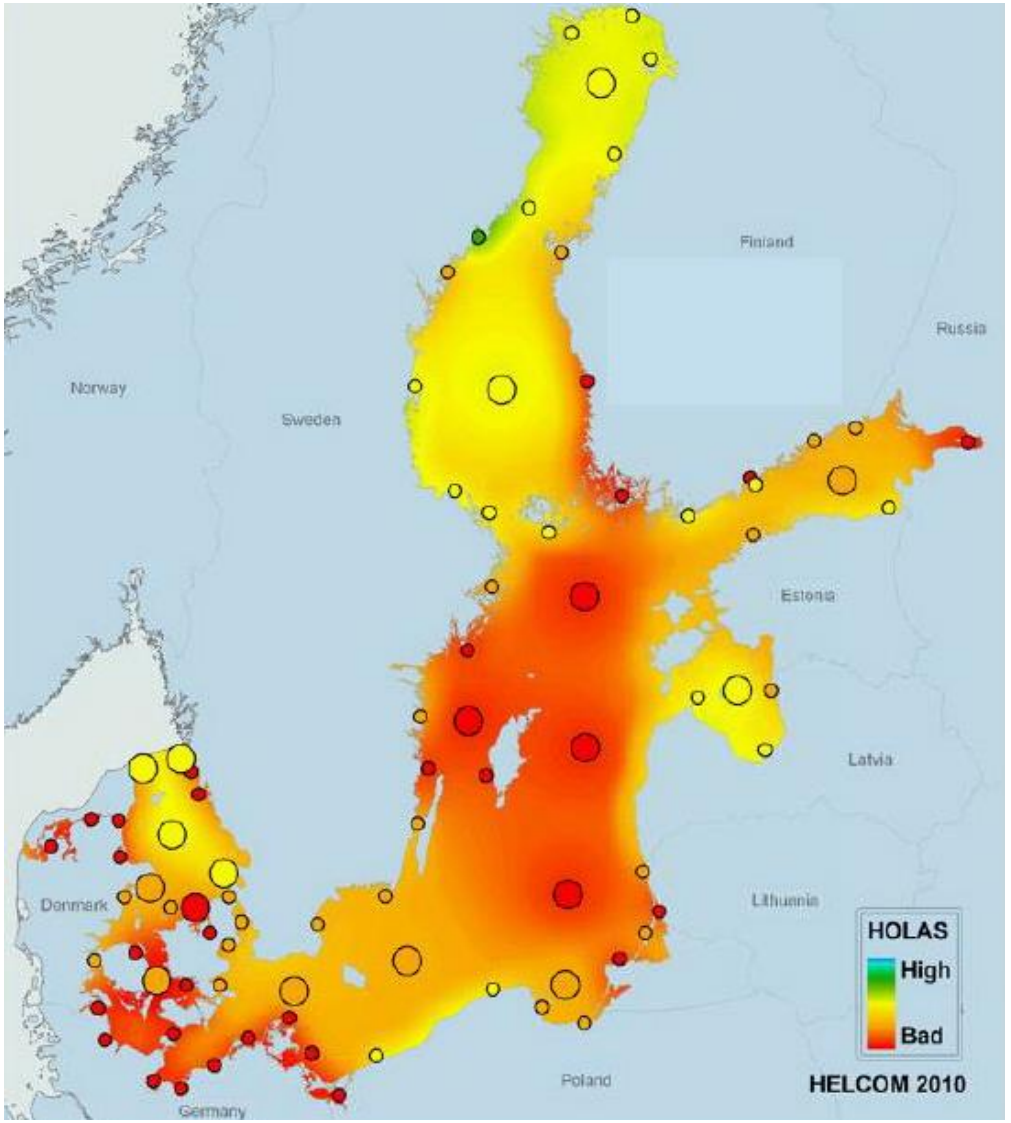
Illustrative examples of what's at stake

"None of the open basins of the Baltic Sea has an acceptable ecosystem health status"

- *Biodiversity*
- *Hazardous substances*
- *Eutrophication*

- Maritime activities
- Climate change



HELCOM, 2010, Ecosystem Health of the Baltic Sea 2003–2007: HELCOM Initial Holistic Assessment. Balt. Sea Environ. Proc. No. 122

Water and sediment flows - too much or too little?

Too much Flood risk, smothering of coastal habitats, land slides,..

Too little Delta starvation, erosion,..

Eg. Amur Darya, Syr Darya & Aral Sea, Colorado river & delta, Yellow river & Bo Hai sea, Nile river & Mediterranean

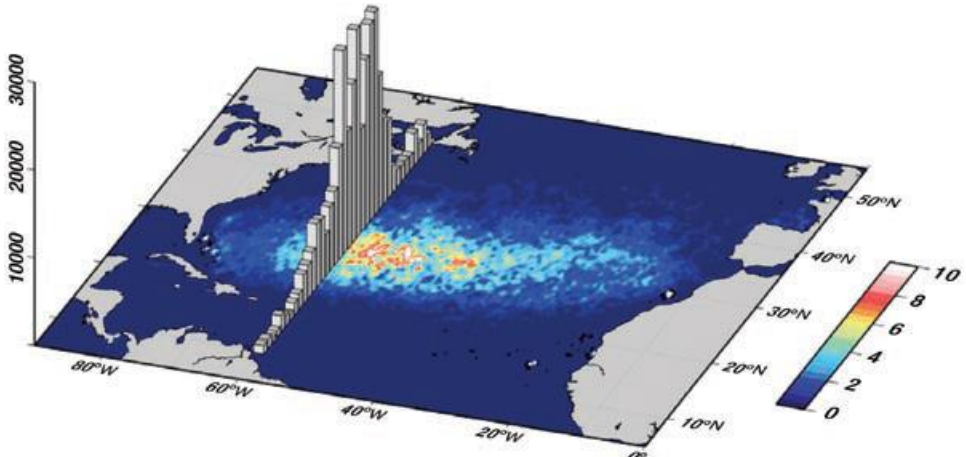
Yellow river delta 1989 (NASA, Landsat)

Yellow river delta 2009 (NASA, Landsat)

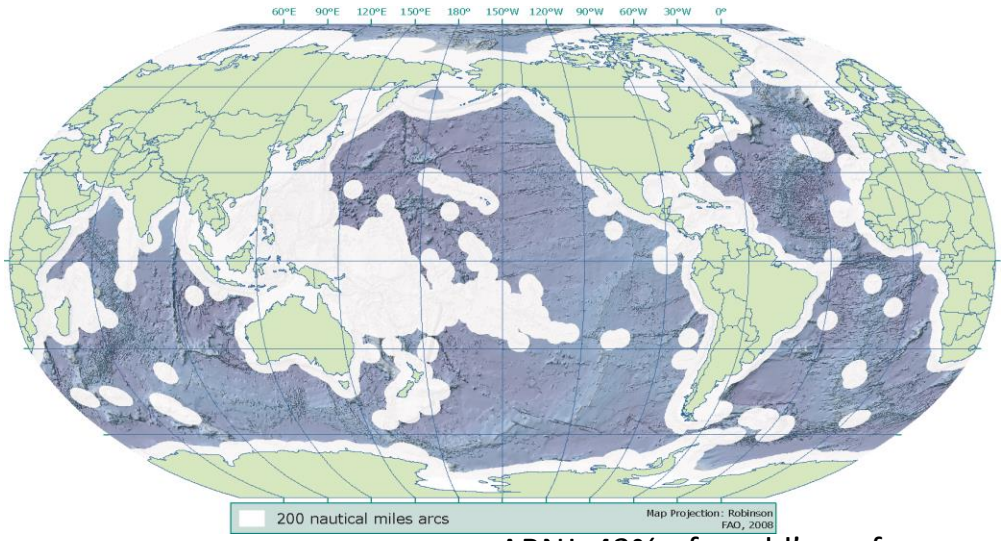
Pollution flows to oceans & the Areas Beyond National Jurisdiction (ABNJ) - Marine debris

- 45% of all species of marine mammals & 21% of all species of sea birds are affected by ingestion or entanglement

- The number of species of fish affected has roughly doubled since 1997



Average plastic concentration as a function of latitude
(Law et al 2010. Science 329, 1185-1188; STAP, 2011. Marine Debris as a Global Environmental Problem



ABNJ, 43% of world's surface

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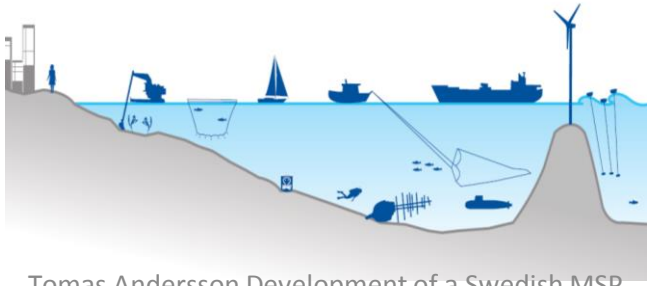
Material flows
Moving from land to the coast and sea

- Demand for land for housing, industry & recreation along the coasts is growing
  - Land reclamation
  - Artificial islands, expansion of sea ports and terminals
  - Aquaculture

- Technology development, new opportunities for exploitation of marine space
  - Cheaper dredging technologies
  - Large-scale infrastructure development projects
  - Natural gas pipelines, submarine power cables, off-shore windfarms, seabed mining



Tomas Andersson Development of a Swedish MSP

Drivers in the S2S continuum needs to be understood and defined

BaltSeaPlan Vision 2030

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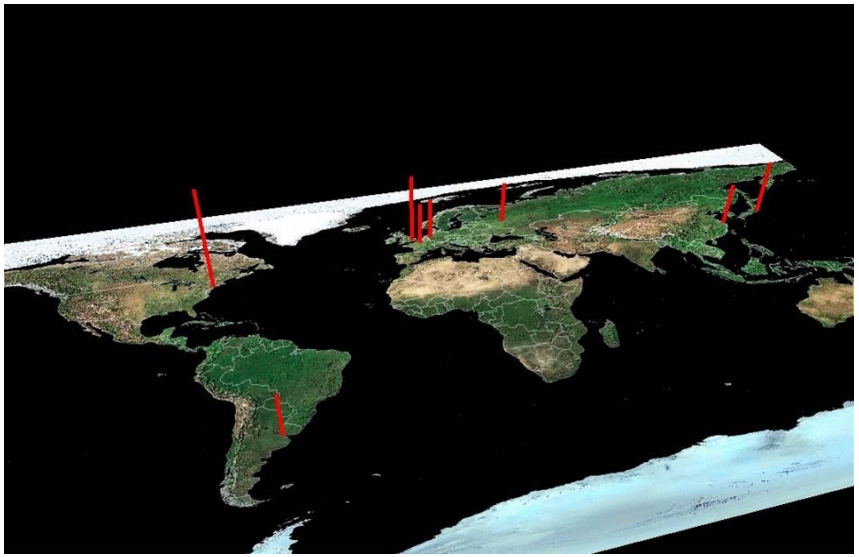
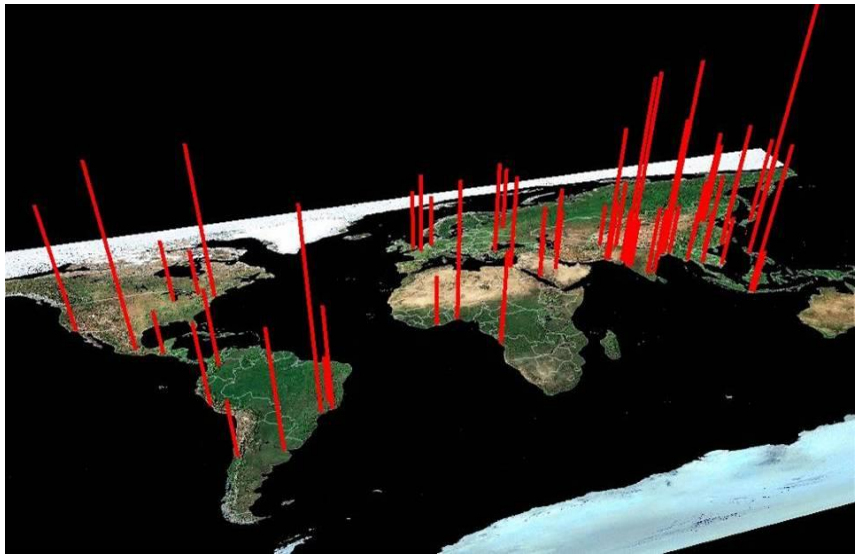
Urbanization & consumption patterns



Megacities 1950

>5 million people

UN Population division



Megacities 2015

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Economic development

Green investment

S2S

To support blue growth

Green economy

a vision to guide policy and planning

concerns a wide range of issues including energy, sustainable consumption and production, waste processing, etc

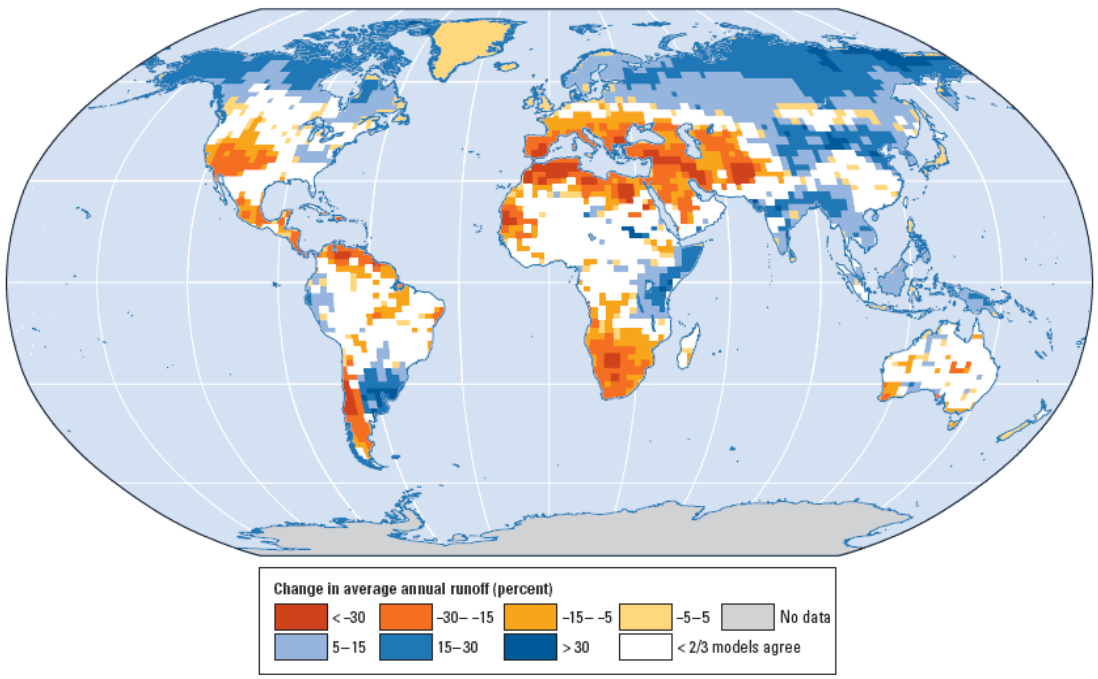
Blue economy

Strategies are being developed by countries across the globe to support sustainable growth in marine and maritime sectors like aquaculture, tourism, marine transport, ocean energy, seabed mining, etc.

Climate change (4 degrees warmer world in 2050?) Will impact the key flows in the S2S continuum

- Stronger heat waves
- Changing precipitation patterns
- Increased water scarcity
- Increased flood risk
- Increased frequency of tropical cyclones
- Biodiversity & habitat loss
- Ocean acidification
- Damage to coral reef ecosystems
- Sea-level rise
- Crop patters will change
- Health risks

Map 3.1 Water availability is projected to change dramatically by the middle of the 21st century in many parts of the world



Sources: Milly and others 2008; Milly, Dunne, and Vecchia 2005.

Note: The colors indicate percentage changes in annual runoff values (based on the median of 12 global climate models using the IPCC SRES A1B scenario) from 2041–2060 compared with 1900–1970. The white denotes areas where less than two-thirds of the models agree on whether runoff will increase or decrease. Runoff is equal to precipitation minus evaporation, but the values shown here are annual averages, which could mask seasonal variability in precipitation such as an increase in both floods and droughts.

Based on World Bank 2012, GEF/STAP, 2012, IPCC 2015, etc

A proposed theory of change to better address Source to Sea linkages

1. Understand the context in the connected segments of the S2S system

- Development priorities (drivers, pressures, uses) & ecosystem status, vulnerability and value
- The flows between segments & their inter-linkages
- Governance, past, current and future – the governance baseline

2. Establish overaching governance goals for the S2S system, segments & sectors accordingly with stakeholders - coordination

- Define management strategies

3. Adopt an outcome oriented approach to guide process and monitor progress of the governance system

- Linkages to eg. the SDG agenda

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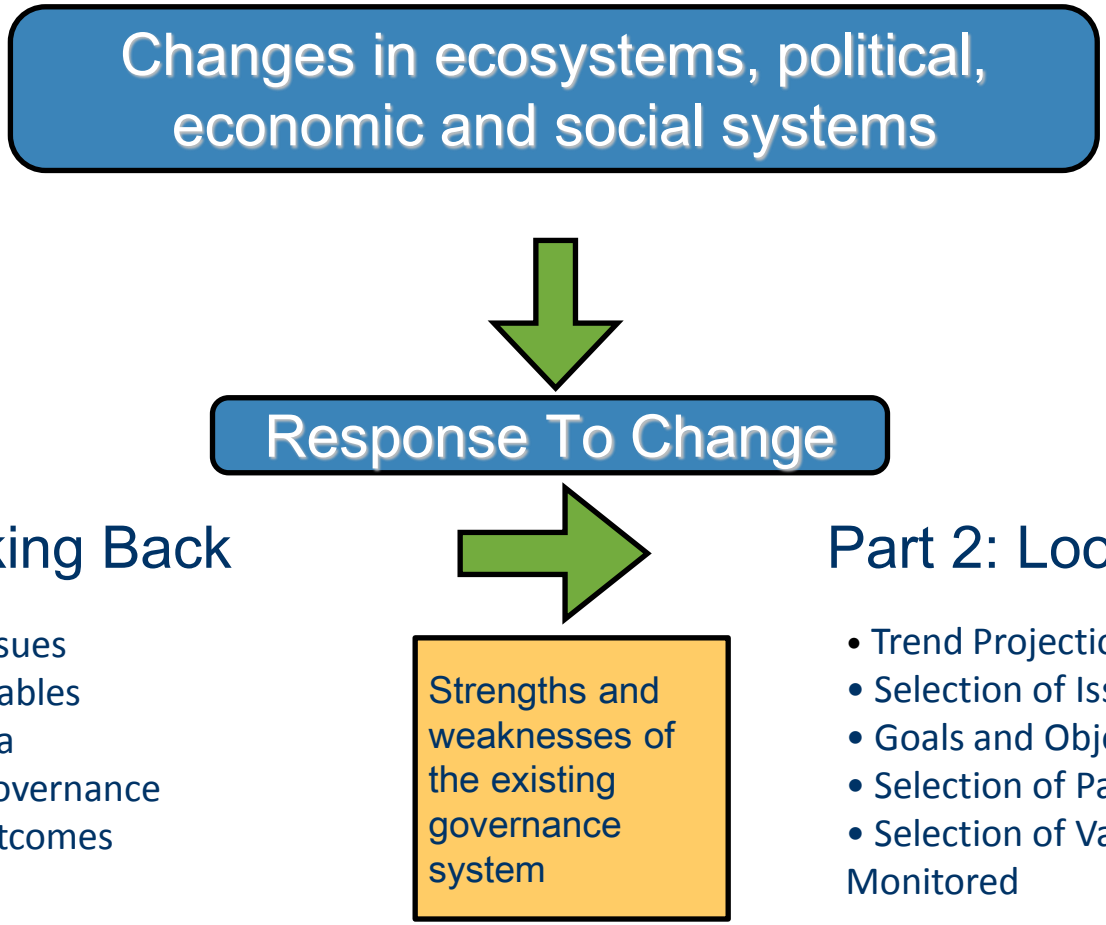
The"Governance Baseline"
to support transformations in the S2S system



Major Components of Parts 1 and 2 of a Governance Baseline

Adapted from Olsen, Page, Ochoa 2009

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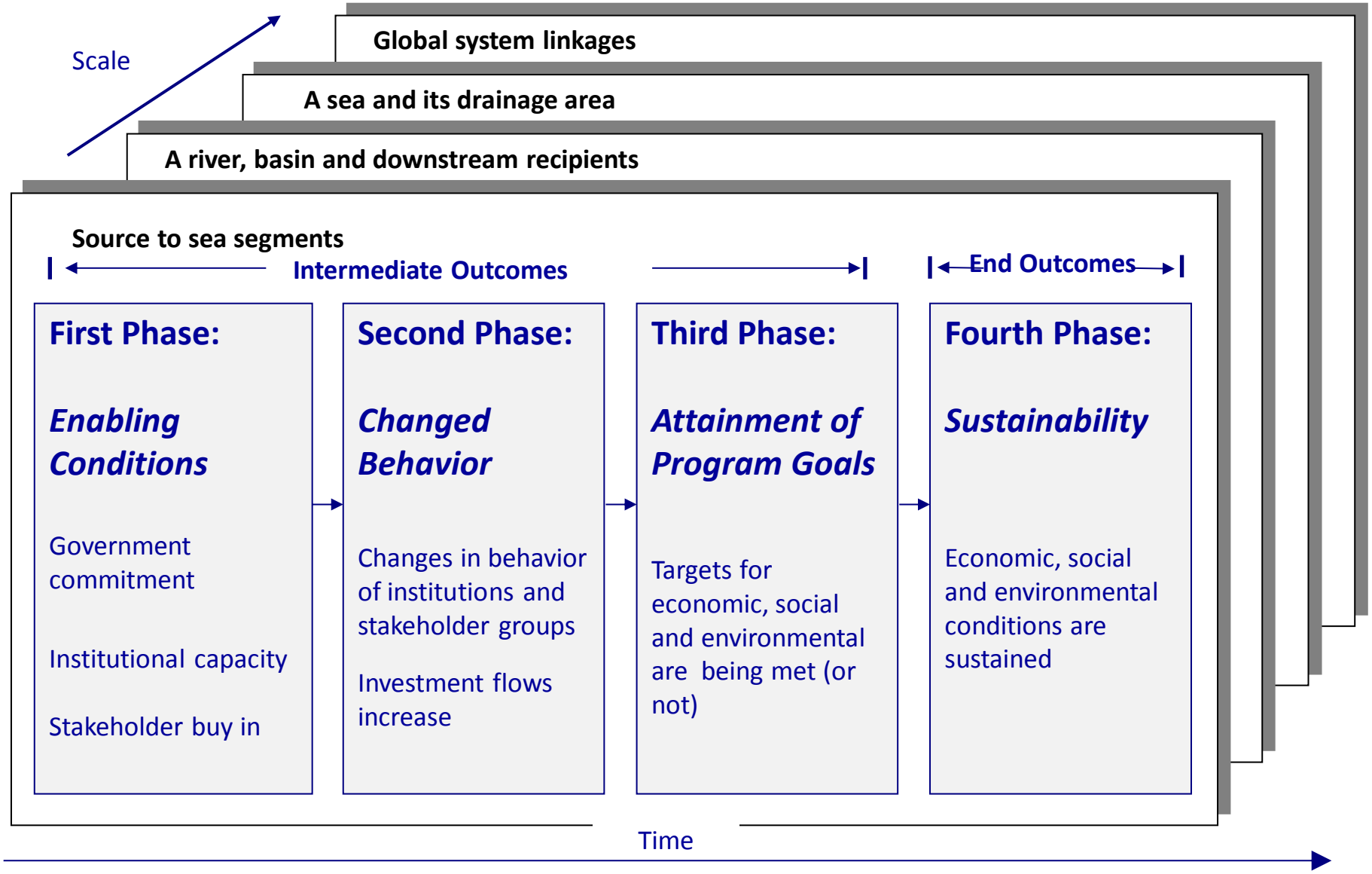
Define & monitor outcomes in different transition phases over time – links to SDG



Modified from: Olsen et al., 2006

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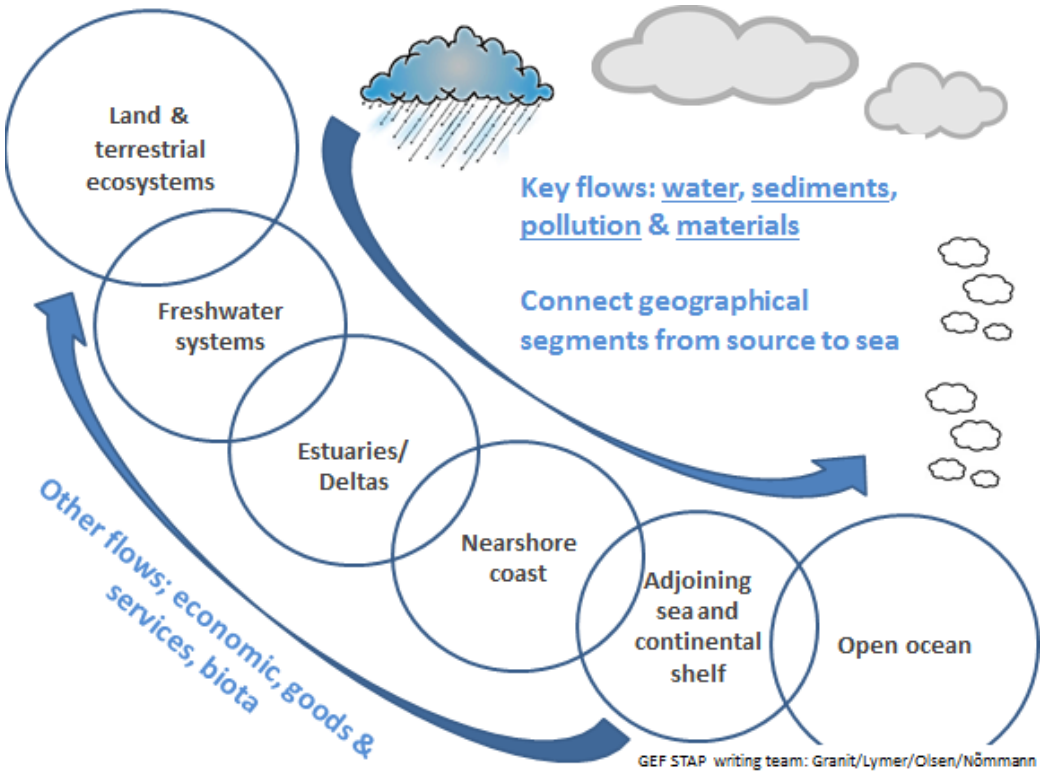

Thanks to
Source to Se Action Action Platform
The GEF