STAP Research paper

A conceptual framework for governing and managing key flows in a source-to-sea continuum

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Sri Lanka

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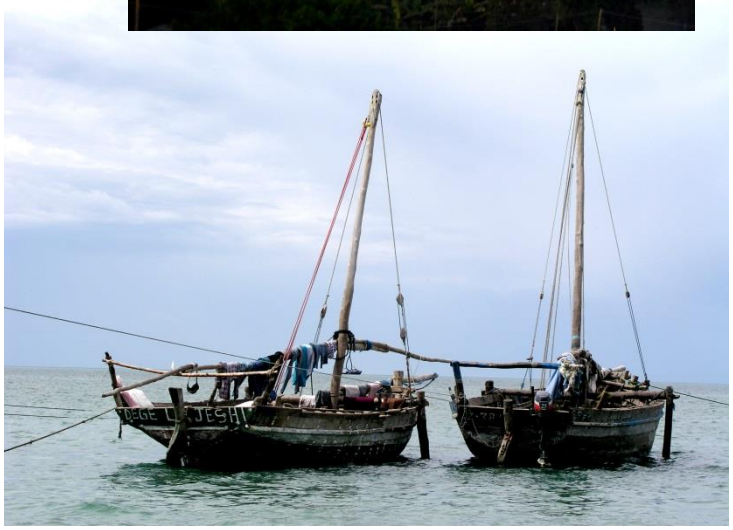


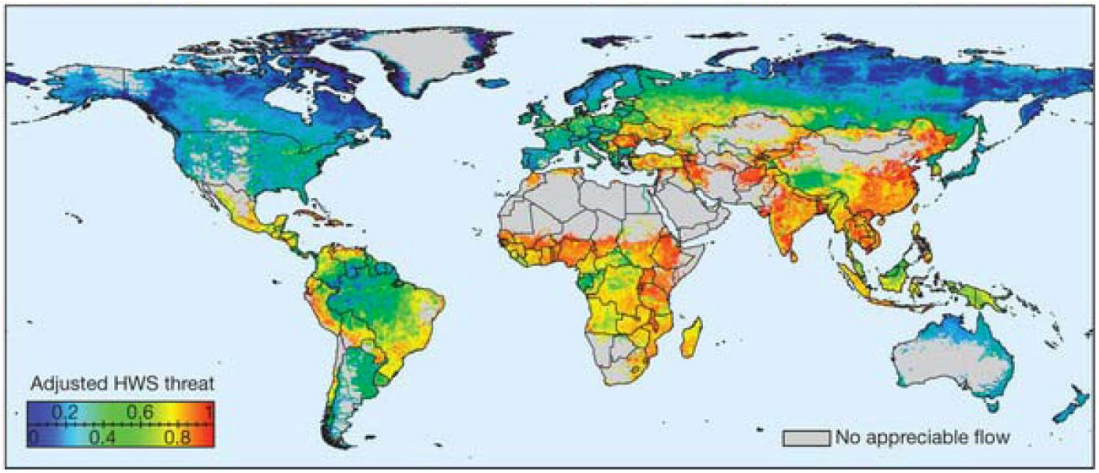
Overview of presentation

1. The global S2S commons under threat
2. What to do differently?
3. A conceptual framework
4. Draft recommendations to the GEF partnership

The global S2S commons under threat

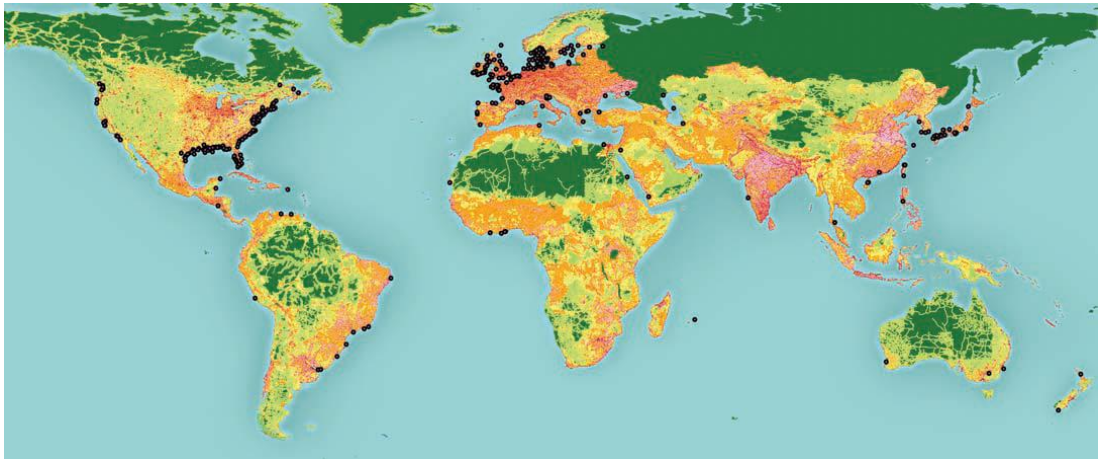
Fresh and coastal zone water systems are rapidly degrading at a global scale

- 80% of the world's population is exposed to high levels of threat to human water security (HWS)



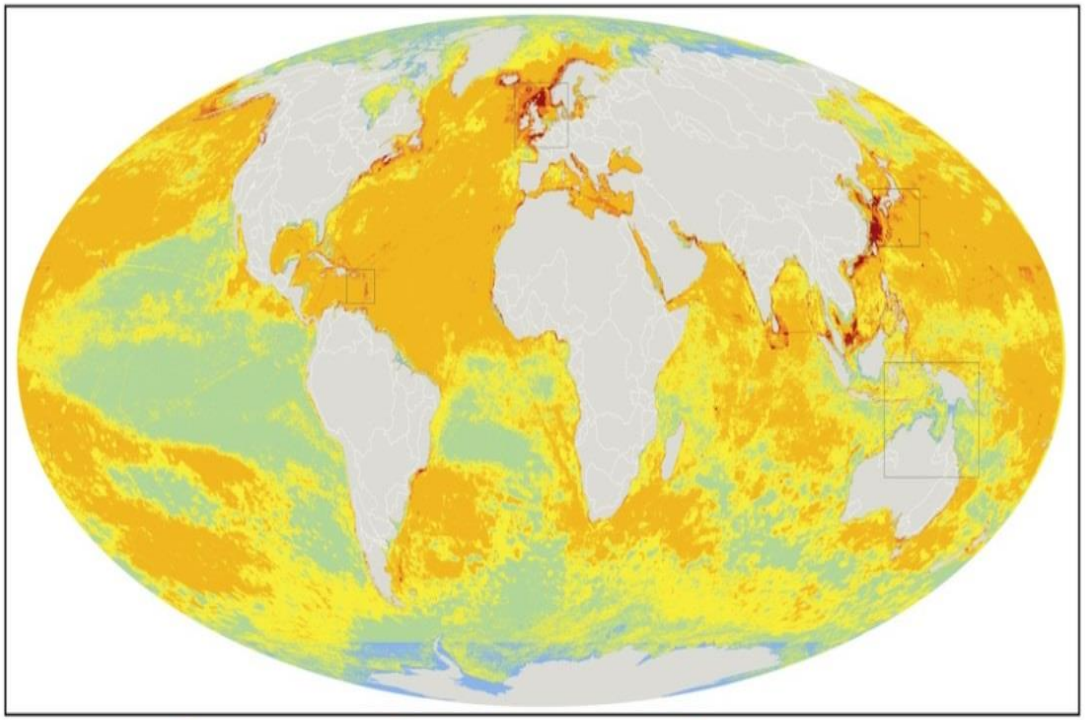
(Vörösmarty et.al., 2010)

- Dead zones in coastal oceans have spread exponentially since the 1960s

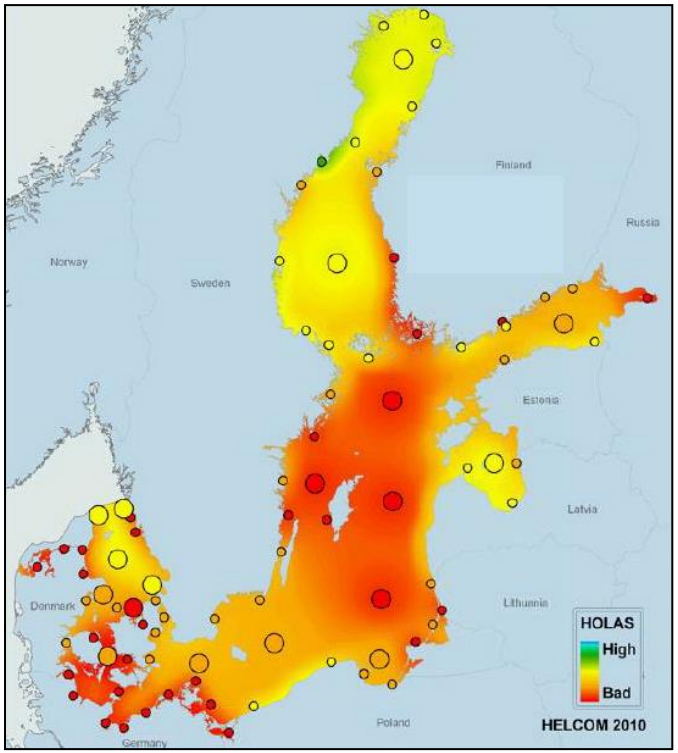


(Robert J. Diaz & Rutger Rosenberg, 2008)

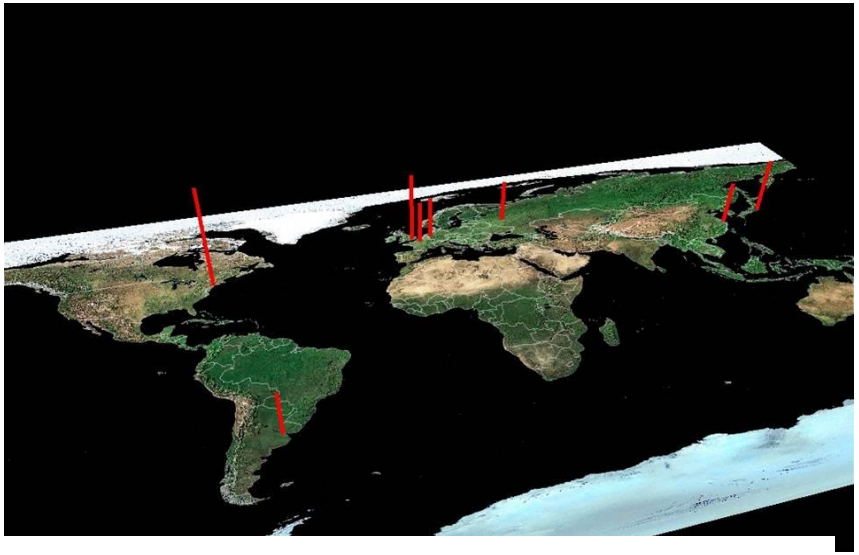
Virtually no marine area globally is unaffected by anthropogenic activities



(Based on Halpern et al, 2008)



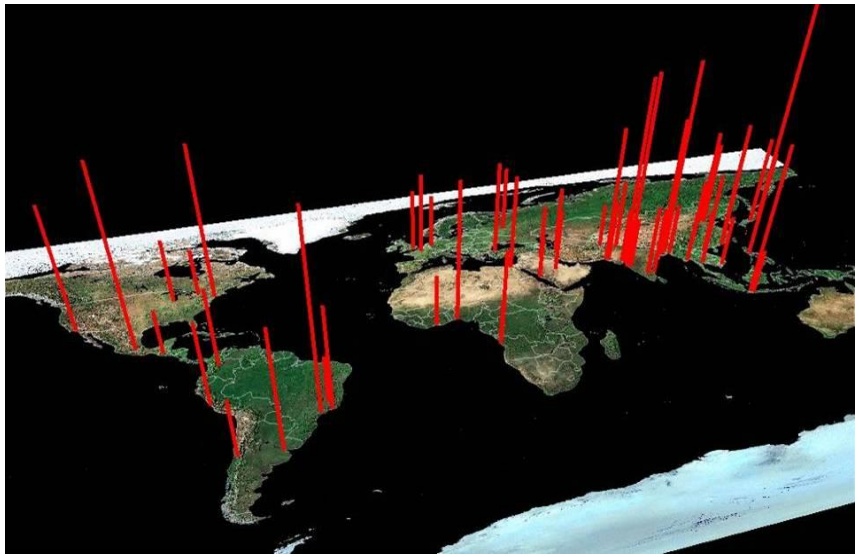
Drivers – eg. urbanization & consumption patterns



Megacities 1950

>5 million people

UN Population division

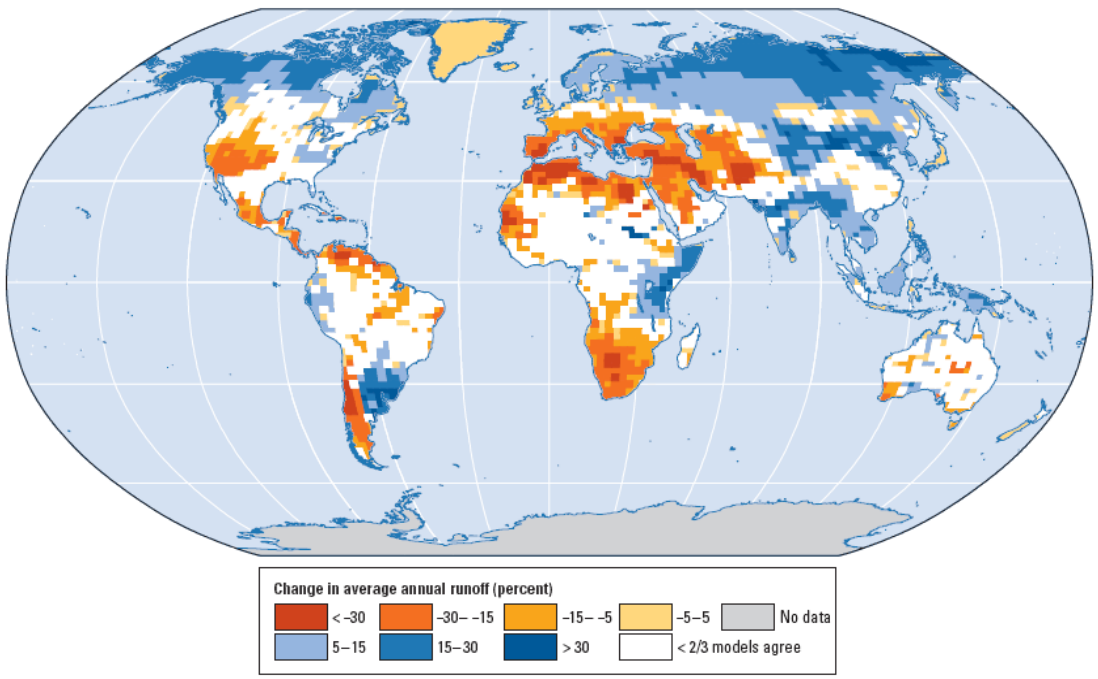


Megacities 2015

Driver - climate change
4 degrees warmer world in 2050?

- 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

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



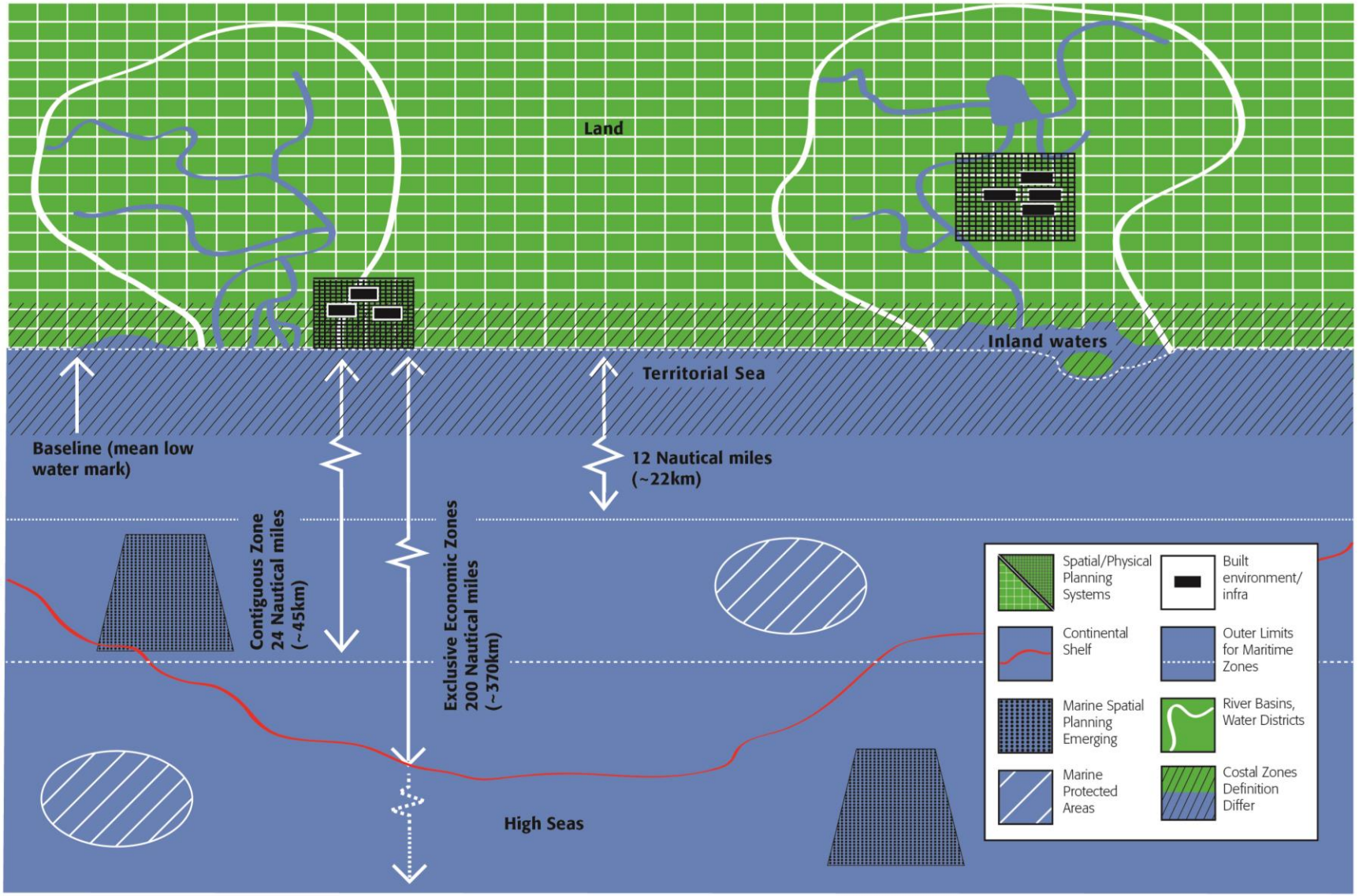
Sources: Milly and others 2008; Milly, Dunne, and Vecchia 2005.

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

GEF STAP writing team: Granit/Lymer/Olsen/Nõmmann

Overlapping or weak governance & management frameworks IWRM, Planning and building acts, ICM, UNCLOS,MSP ....



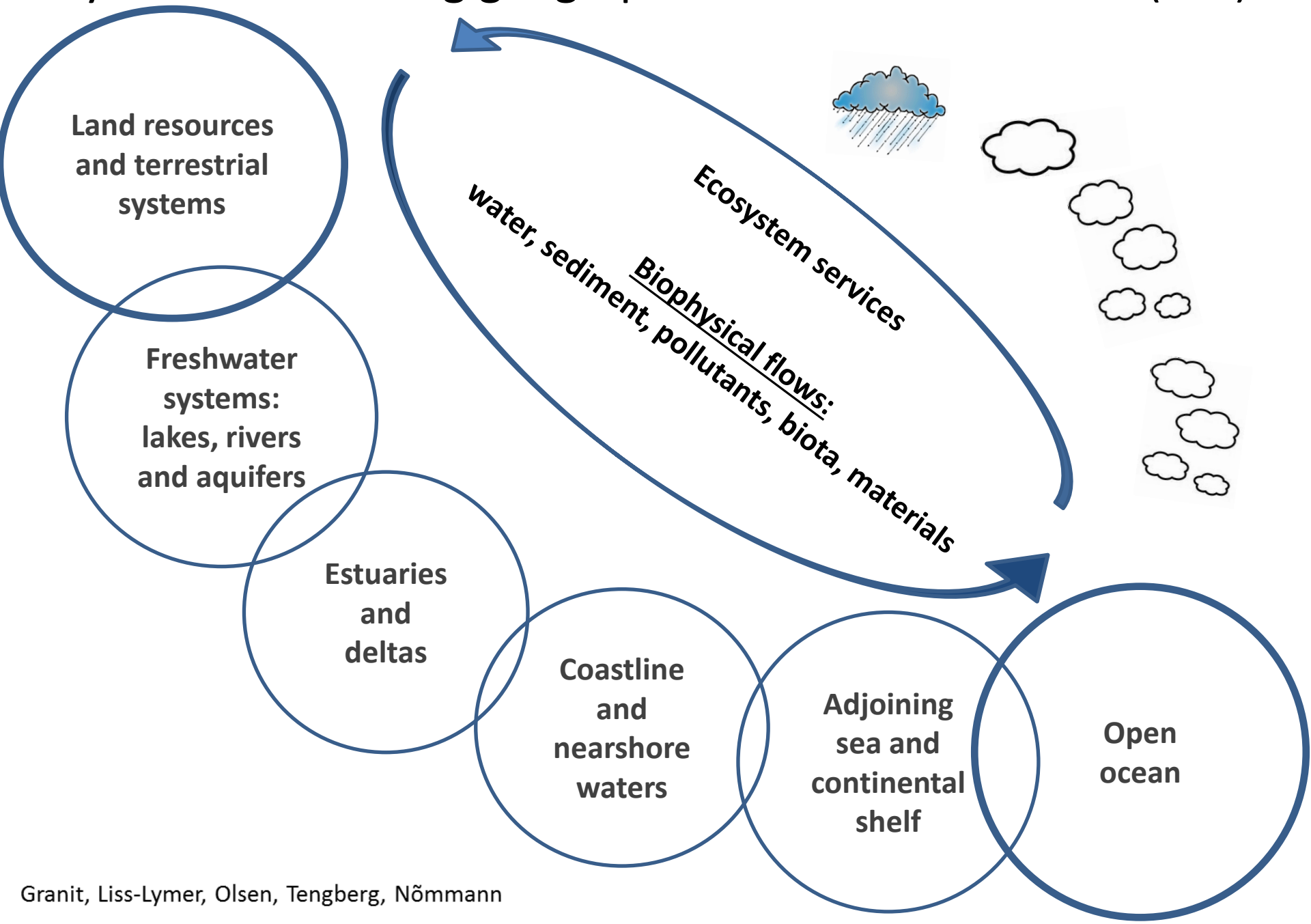
Granit et. al. 2014

What to do differently?

Based on a review of GEF and non-GEF initiatives

GEF projects targeting river basins, lake basins, aquifers, large marine ecosystems and S2S oriented projects such as ridge-to-reef and integrated coastal and river basin management

Key flows connecting geographies from source-to-sea (S2S)



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2030 SDG Agenda & S2S

- **Overarching**
  - Goal 1 on ending poverty
  - Goal 13 on combating climate change
- **Landscapes**
  - Goal 15 on sustainable use of terrestrial ecosystems
- **Urban, catchment, coast**
  - Goal 6 on sustainable management of water and sanitation for all
  - Goal 7 on sustainable and modern energy for all
  - Goal 9 on building resilient infrastructure
  - Goal 11 on making cities and human settlements resilient and sustainable
- **Marine space**
  - Goal 14 on sustainable use of the oceans, seas and marine resources

Water and sediments

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, Orange river & Benguela

Yellow river delta 1989 (NASA, Landsat)

Yellow river delta 2009 (NASA, Landsat)

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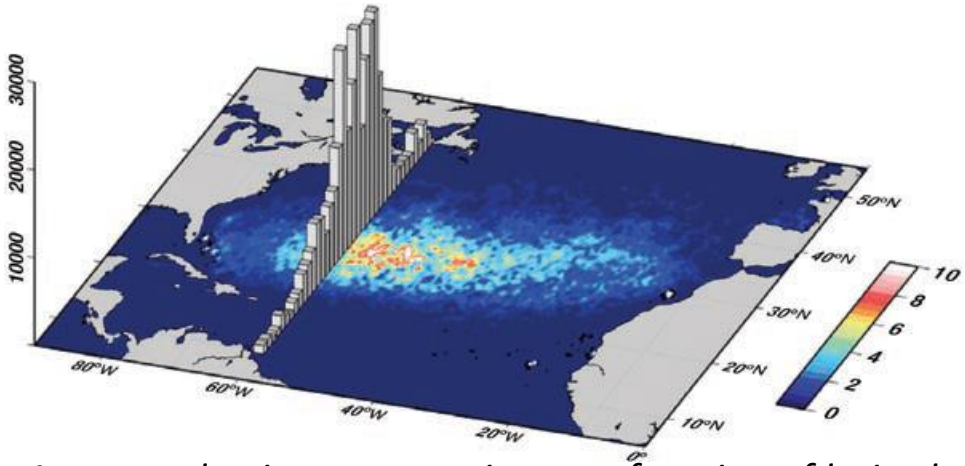
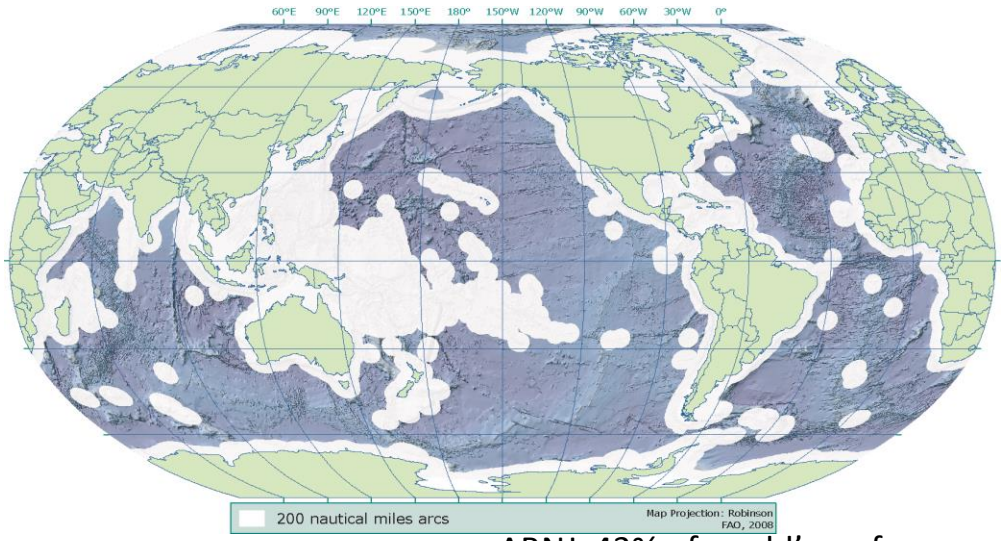
Pollutants

- Eutrophication
- Marine debris
- Environmentally persistent contaminants
- Solid waste and marine litter



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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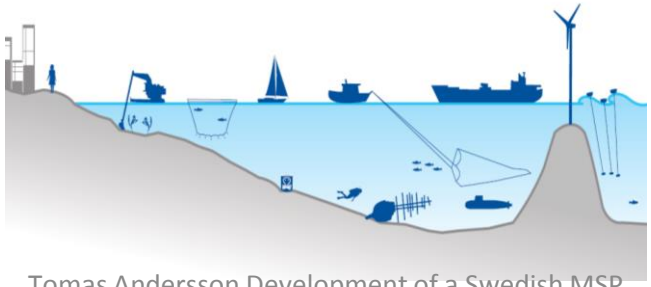
Biota

- Alterations in S2S interact to reduce biodiversity and ecological integrity
- Dams and other impediments risk disrupting biota flows of fish
- fragmentation of habitats

Materials

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

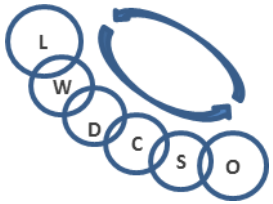
- Technology development, new opportunities for exploitation of marine space
  - Cheaper dredging technologies
  - Large-scale infrastructure development projects
  - Natural gas pipelines, submarine power cables, off-shore windfarms, seabed mining



Tomas Andersson Development of a Swedish MSP

Ecosystem services

- The Millennium Ecosystem Assessment
  - provisioning services
    - water supply for domestic use, industry, energy and food production
  - water-regulating services
    - water regulation and storage for flood and drought control, water purification, disease regulation and navigation
  - cultural services
    - spiritual and religious values
  - support services,
    - a habitat for ecosystems, nutrient dispersal and recycling



A conceptual framework

Global system linkages

A sea and its drainage area

A river basin and downstream recipients

Characterizing the source-to-sea system

Drivers
e.g. unsustainable resource use, development needs

Pressures –
transmitted via key flows: water, sediment, pollutants, biota, material and ecosystem service flows

State of segments and system as a whole

Land resources and terrestrial systems
Freshwater systems
Estuaries and deltas
Coast and nearshore waters
Adjoining sea and continental shelf
Open ocean

Impacts
Economic, social and environmental

Governance and management response

Defining the appropriate scale

Engaging key stakeholders

Assembling a governance baseline

Defining a theory of change – grouped into four orders of outcomes

First Order: Enabling conditions
Support for common objectives, institutional capacity

→

Second Order: Changed behaviour
Among institutions, stakeholders, investment flows

→

Third Order: Attaining programme goals
Economic, social and environmental targets met

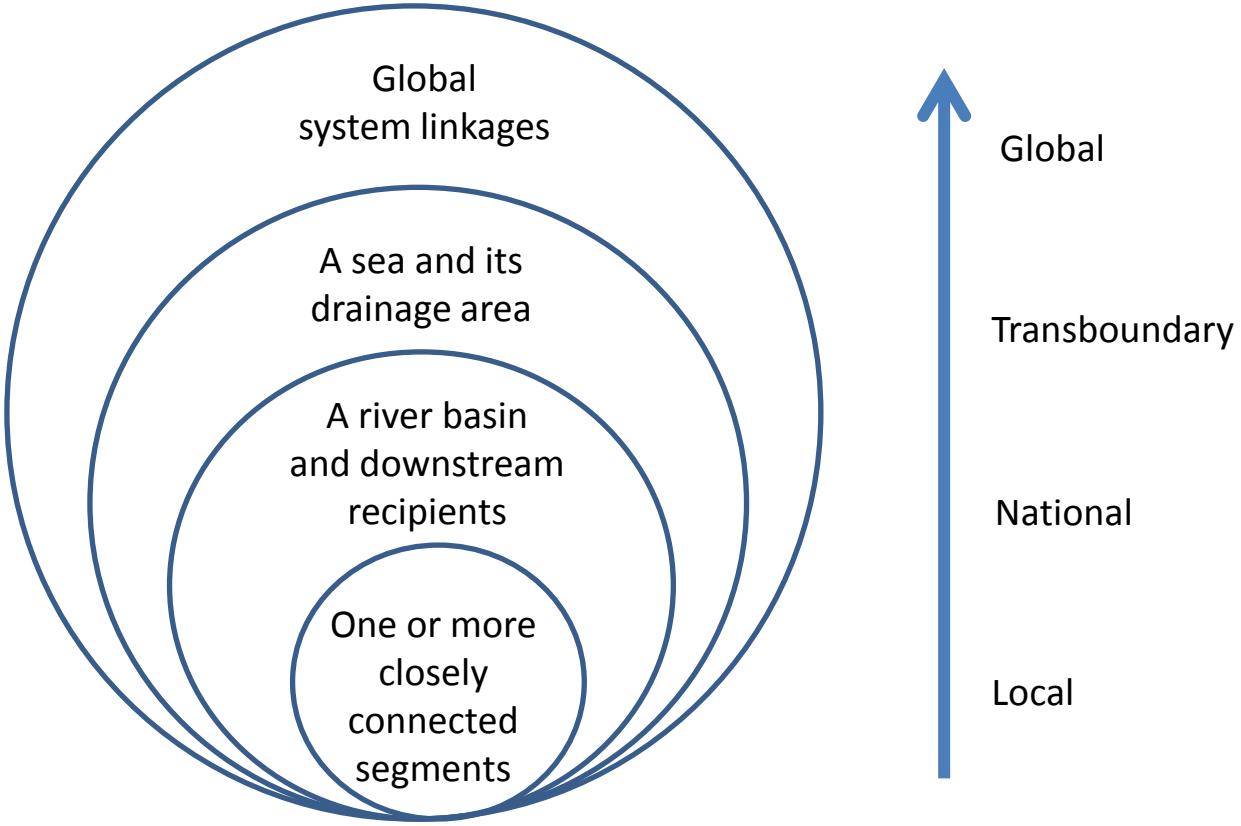
→

Fourth Order: Sustainability
Sustainable development, green and blue growth

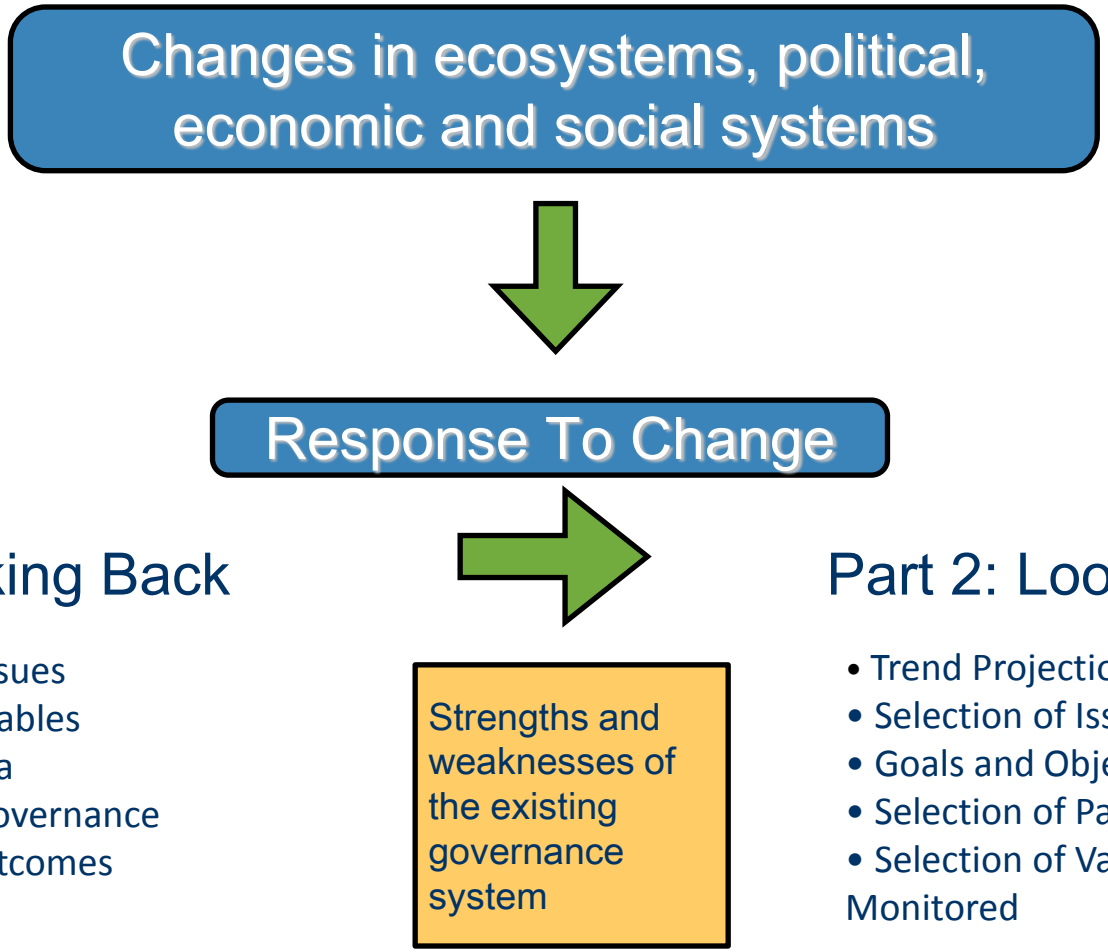
Characterizing the system

- Identifying the issues & flows segment by segment or for the system as a whole
- Identifying the drivers and pressures
- Analysing the governance and management decisions taken to date
- A variety of methodologies and tools can be applied

Defining the appropriate scale



Undertaking a Governance Baseline



Major Components of Parts 1 and 2 of a Governance Baseline

Adapted from Olsen, Page, Ochoa 2009

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Engaging key stakeholders

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.

A theory of change - orders of outcome

1st order	**Creation of the enabling conditions for a source-to-sea governance initiative** • agreeing on long-term goals for the S2S system • governmental commitment • supportive constituencies • adequate capacity
2nd order	**Changed behaviours of resource users** • reduce stress on the source-to-sea system • increase collaboration among institutions
3rd order	**Achievement of 1st order goals** • Verify against a data driven monitoring program
4th order	**A more sustainable and resilient source-to-sea system** • blue and green growth opportunities materialize • achieving select SDG targets and goals

Draft recommendations to the GEF partnership

1. More systematic consideration of key source-to-sea flows in TDAs and SAPs or other planning tools
2. Ensure planned action is informed by a thorough understanding of the governance dimensions
3. Engage key stakeholders along the S2S continuum early in the planning processes and continuously
4. Apply a robust, coherent theory of change from upstream to downstream and ensure data, M&E
5. Link thematic and geographic areas across GEF focal areas to build stronger multifocal interventions
6. Develop an integrated approach pilot (IAP)
7. Invest in targeted research to close knowledge gaps on the S2S commons

Thanks

GEF STAP

SEI

SIWI

Source-to-sea Action Paltform

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