LMEs and International Waters 4th Replenishment Strategy 2007-2010

IOC 9th Consultative

Paris, France

Kenneth Sherman

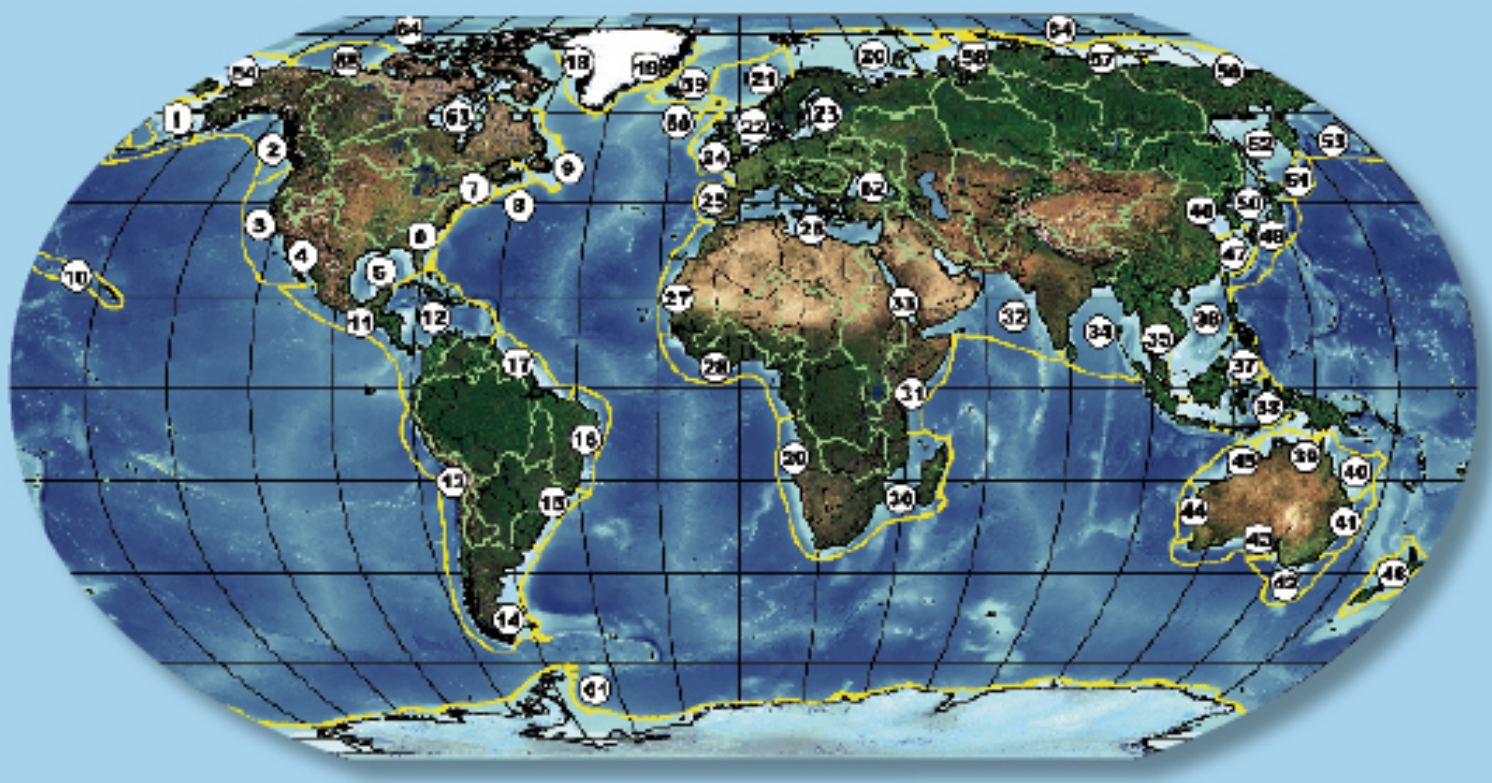
International Waters TAG

- Angela Cropper – Trinidad (STAP)
- Benedito Braga - Brazil
- Stephen Boateng – Ghana
- Anjan Datta – GPA (convention equivalent)
- Kenneth Sherman – U.S.
- Al Duda – GEF Secretariat

GEF International Waters Focal Area

- Bottom-up approach; build capacity & trust for States to work together toward recovery & sustainability
- Resolves and prevents conflicts
- Addresses cross-border water-related concerns
- Contributes to human well being and poverty reduction—livelihoods, food security, water-related heath concerns; Large Marine Ecosystems (LMEs) alone contribute $11 tril/yr to global economy

Large Marine Ecosystems of the World and Linked Watersheds



1 East Bering Sea
2 Gulf of Alaska
3 California Current
4 Gulf of California
5 Gulf of Mexico
6 Southeast U.S. Continental Shelf
7 Northeast U.S. Continental Shelf
8 Scotian Shelf
9 Newfoundland-Labrador Shelf
10 Insular Pacific-Hawaiian
11 Pacific Central-American Coastal
12 Caribbean Sea
13 Humboldt Current
14 Patagonian Shelf
15 South Brazil Shelf
16 East Brazil Shelf
17 North Brazil Shelf
18 West Greenland Shelf
19 East Greenland Shelf
20 Barents Sea
21 Norwegian Shelf
22 North Sea
23 Baltic Sea
24 Celtic-Biscay Shelf
25 Iberian Coastal
26 Mediterranean Sea
27 Canary Current
28 Guinea Current
29 Benguela Current
30 Agulhas Current
31 Somali Coastal Current
32 Arabian Sea
33 Red Sea
34 Bay of Bengal
35 Gulf of Thailand
36 South China Sea
37 Sulu-Celebes Sea
38 Indonesian Sea
39 North Australian Shelf
40 Northeast Australian Shelf-Great Barrier Reef
41 East-Central Australian Shelf
42 Southeast Australian Shelf
43 Southwest Australian Shelf
44 West-Central Australian Shelf
45 Northwest Australian Shelf
46 New Zealand Shelf
47 East China Sea
48 Yellow Sea
49 Kuroshio Current
50 Sea of Japan
51 Oyashio Current
52 Okhotsk Sea
53 West Bering Sea
54 Chukchi Sea
55 Beaufort Sea
56 East Siberian Sea
57 Laptev Sea
58 Kara Sea
59 Iceland Shelf
60 Faroe Plateau
61 Antarctic
62 Black Sea
63 Hudson Bay
64 Arctic Ocean

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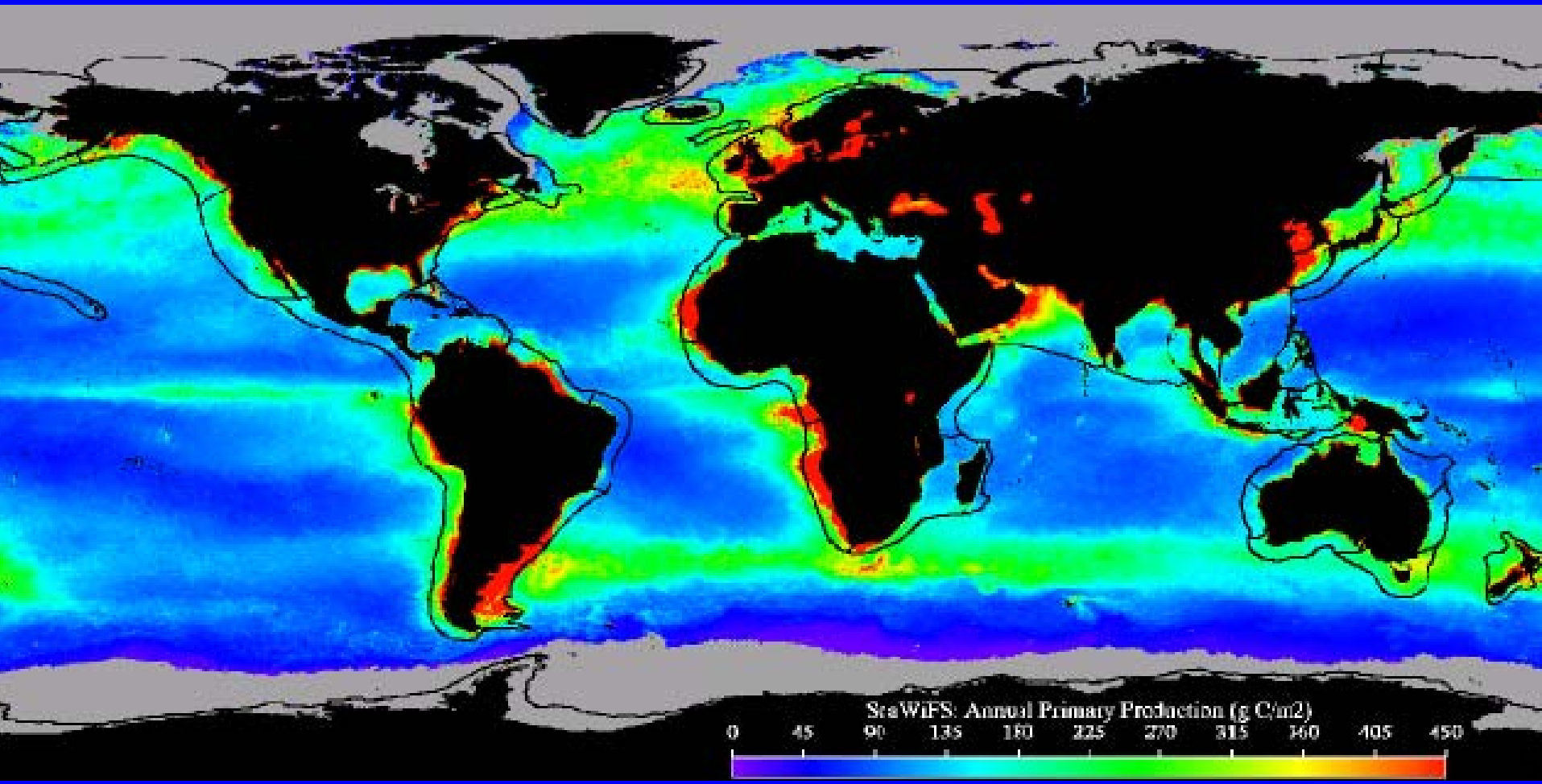
95% of the World's Annual Marine Fishery Catches are Produced in 64 LMEs

Affected by surface water; ground water; drainage basins, coasts, habitats, pollution



Strategic Objectives for GEF 4

Retain Strategic Objectives from GEF Operational Strategy:

- **SO 1: To foster international, multi-state cooperation on priority transboundary water concerns through more comprehensive, ecosystem-based approaches to management;**

- **SO 2: To play a catalytic role in addressing transboundary water concerns by assisting states to utilize the full range of technical assistance, economic, financial, regulatory, and institutional reforms that are needed, including active leveraging of co-financing**

Strategic Objective – 1

- Expected Impacts
  - Political commitments to multi-country cooperation supporting sustainable economic development opportunities, stability, and water-related security in transboundary water systems
- Indicators
  - Multi-country agreements
  - Co-financing Goal – 1.1

Strategic Objective – 2

- Expected Impacts
  - Participating states demonstrate the necessary capacity to
  - reduce over-exploitation of fish stocks,
  - reduce land-based coastal pollution,
  - balance competing water uses in basins,
  - Adjust to ice melt and
  - enter into *foundation programs*
- Indicators
  - Trend analysis by GEF-supported Transboundary Waters Assessment Program and additional states meet Johannesburg targets on sustainable fisheries, LMEs, IWRM, and ICM compared to 2006
  - Co-financing Goal – 3:1

GEF RESOURCES ARE FINITE, so the IW will focus on 4 global priority programming themes:

- *Ecosystem-based approach to address depletion of coastal and marine fish stocks* and associated biological diversity (Joint with Biodiv--LME/MPAs; habitat improv, high seas Spp recovery)
- Nutrient enrichment from land-based pollution of coastal/marine waters leading to *eutrophication and "dead zones*" in Large Marine Ecosystems (Joint with land degrad; POPs and biodiv)
- *Overuse and conflicting uses of water resources* in surface and groundwater basins (Joint with biodiv; land degra)
- Adapting to melting ice in high altitude basins and Polar systems (Joint with Climate Chg Adapt & POPs)

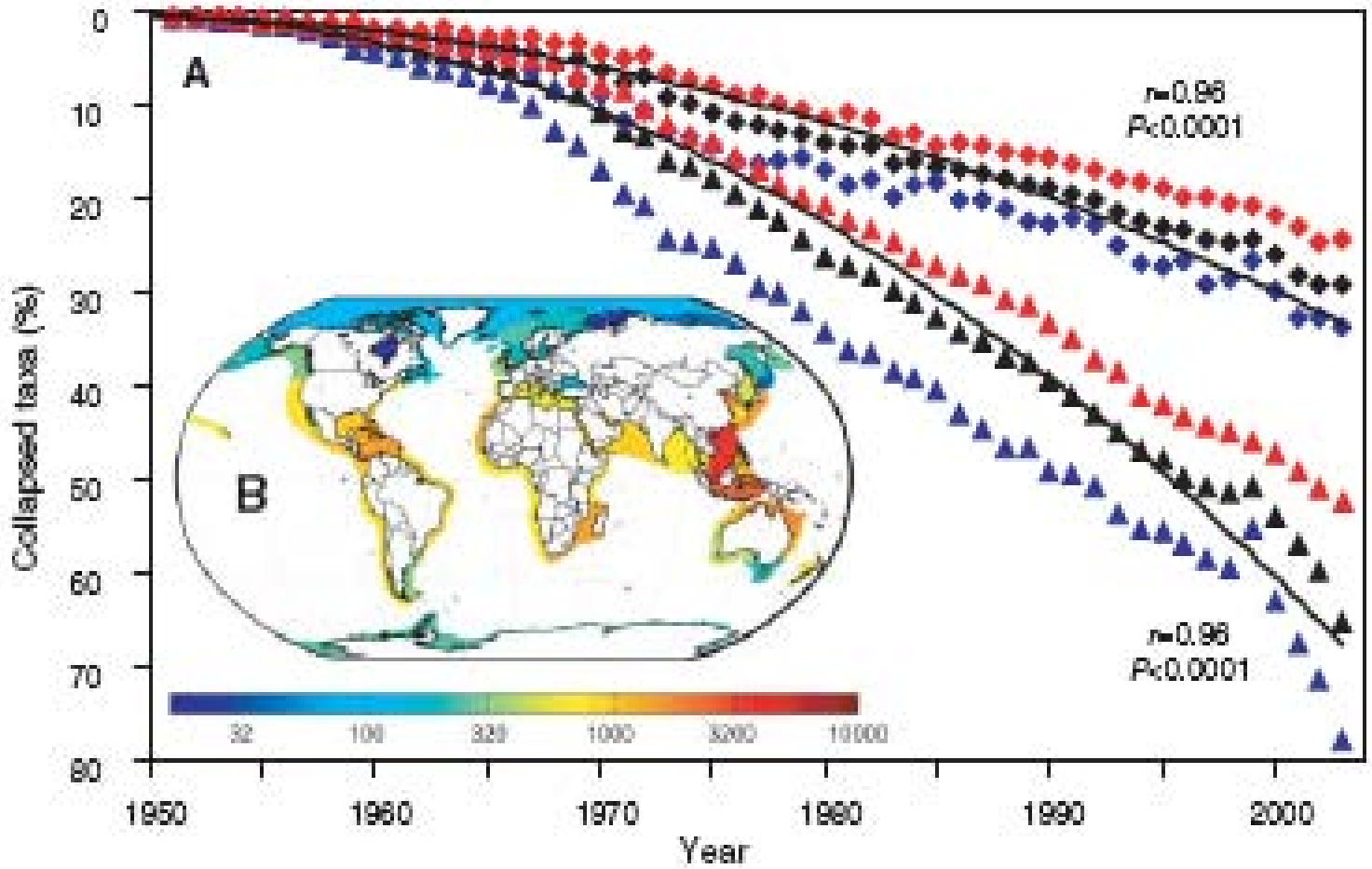
SP-1 Restoring and sustaining coastal and marine fish stocks and associated biological diversity

Expected Outcomes

- Political commitments made to ecosystem-based joint action on sustainable fisheries and Integrated Coastal Management (ICM)
- Institutional reforms introduced to catalyze implementation of policies reducing over-fishing and benefiting to communities
- Multi-agency partnerships catalyze replication of innovations
- MPAs effectively managed

Indicators

- National inter-ministry committees
- Ministerially agreed action programs and local ICM plans adopted
- Regional, national and local policy, legal, institutional reforms adopted; evaluations show implementation effectiveness
- Fish stocks and habitat assessments in LMEs and ocean biomes
- Per capita income
- Increased coverage of MPAs in national PA systems



Global loss of species from LMEs. (A) Trajectories of collapsed fish and invertebrate taxa over the past 50 years (diamonds, collapses by year; triangles, cumulative collapses). Data are shown for all (black), species-poor (<500 species, blue), and species-rich (>500 species, red) LMEs. Regression lines are best-fit power models corrected for temporal autocorrelation. (B) Map of all 64 LMEs, color-coded according to their total fish species richness.

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Impacts of Biodiversity Loss on Ocean Ecosystem Services

Boris Worm,1* Edward B. Barbier,2 Nicola Beaumont,3 J. Emmett Duffy,4 Carl Folke,5,6 Benjamin S. Halpern,7 Jeremy B. C. Jackson,8,9 Heike K. Lotze,1 Fiorenza Micheli,10 Stephen R. Palumbi,10 Enric Sala,8 Kimberley A. Selkoe,7 John J. Stachowicz,11 Reg Watson12

SP-2 Reducing nutrient over-enrichment and oxygen depletion from land-based pollution of coastal waters in LMEs consistent with the GPA

Expected Outcomes

- Political commitments made to nutrient and other pollution reduction and ICM
- Institutional and policy reforms introduced to demonstrate capacities of states to catalyze coastal pollution reduction measures including ICM
- Multi-agency partnerships catalyze replication of reforms and innovative investments for nutrient reduction

Indicators

- National inter-ministry committees
- Ministerially agreed LME and basin action programs and local ICM plans adopted
- National and local policy, legal, institutional reforms adopted; evaluations show implementation effectiveness
- Levels of nutrient releases at demo sites
- Joint action adopted by regional institutions on nutrient reduction

POLLUTION AND ECOSYSTEM HEALTH INDICATORS

Indicators:

- *Water Clarity*
- *Dissolved Oxygen*
- *Coastal Wetland Loss*
- *Eutrophic Condition*
- *Sediment Contamination*
- *Benthic Index*
- *Fish Tissue Contaminants*
- *Multiple Marine Ecological Disturbances*

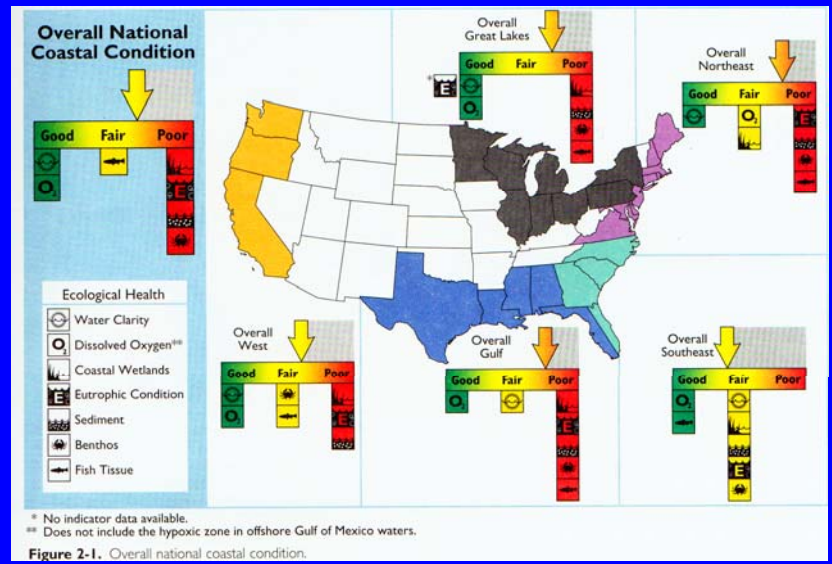
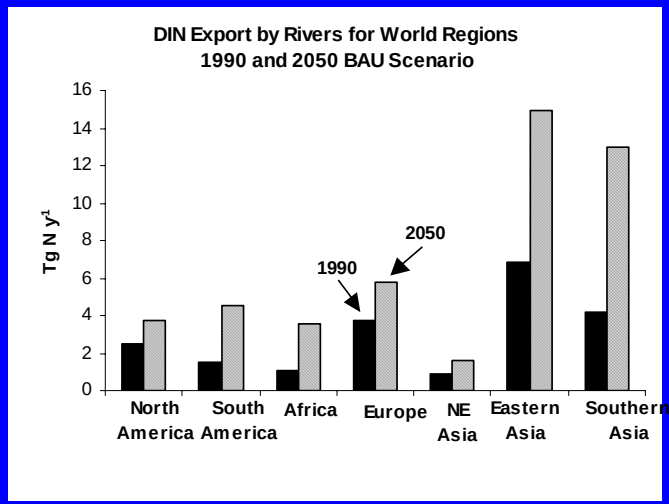
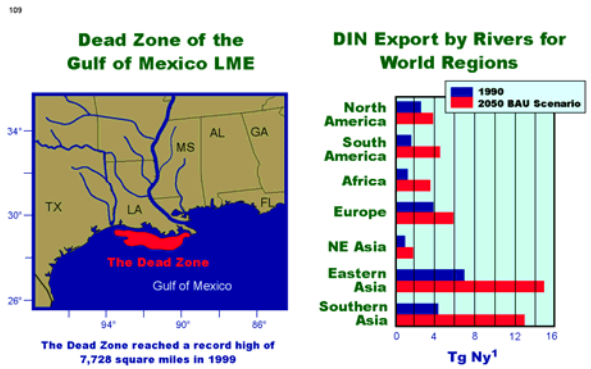


Figure 2-1. Overall national coastal condition.





SP-3 Balancing overuse and conflicting uses of water resources in transboundary surface and groundwater basins

Expected Outcomes

- Political and legal commitments made to utilize IWRM policies towards sustainable water use in transboundary basins
- Institutions and reforms introduced to catalyze implementation of policies for basin-scale IWRM and increased water use efficiency
- Communities benefit from access to water-related benefits in tests of innovative demonstrations of balancing water uses
- In SIDS, water-related health risks reduced through protected water supplies

Indicators

- National inter-ministry committees
- Ministerially-agreed action programs and basin IWRM plans adopted
- National water resource and IWRM reforms;/policies adopted; evaluations show effectiveness
- Regional/basin agreements and institutions adopted; evaluations show effectiveness
- Level of water use efficiency in demonstrations

Per capita access to water resource benefits in demonstrations

- Levels of sewage treatment and water supply protection measures in SIDS

GEF EXAMPLE: Nile Transboundary Environment Project

$100 MIL total cost GEF IW Project with many Bilaterals in Partnership on transboundary management of the Nile River Basin… a long-term regional cooperative initiative (NBI) that seeks to eradicate poverty and promote sustainable water resource development

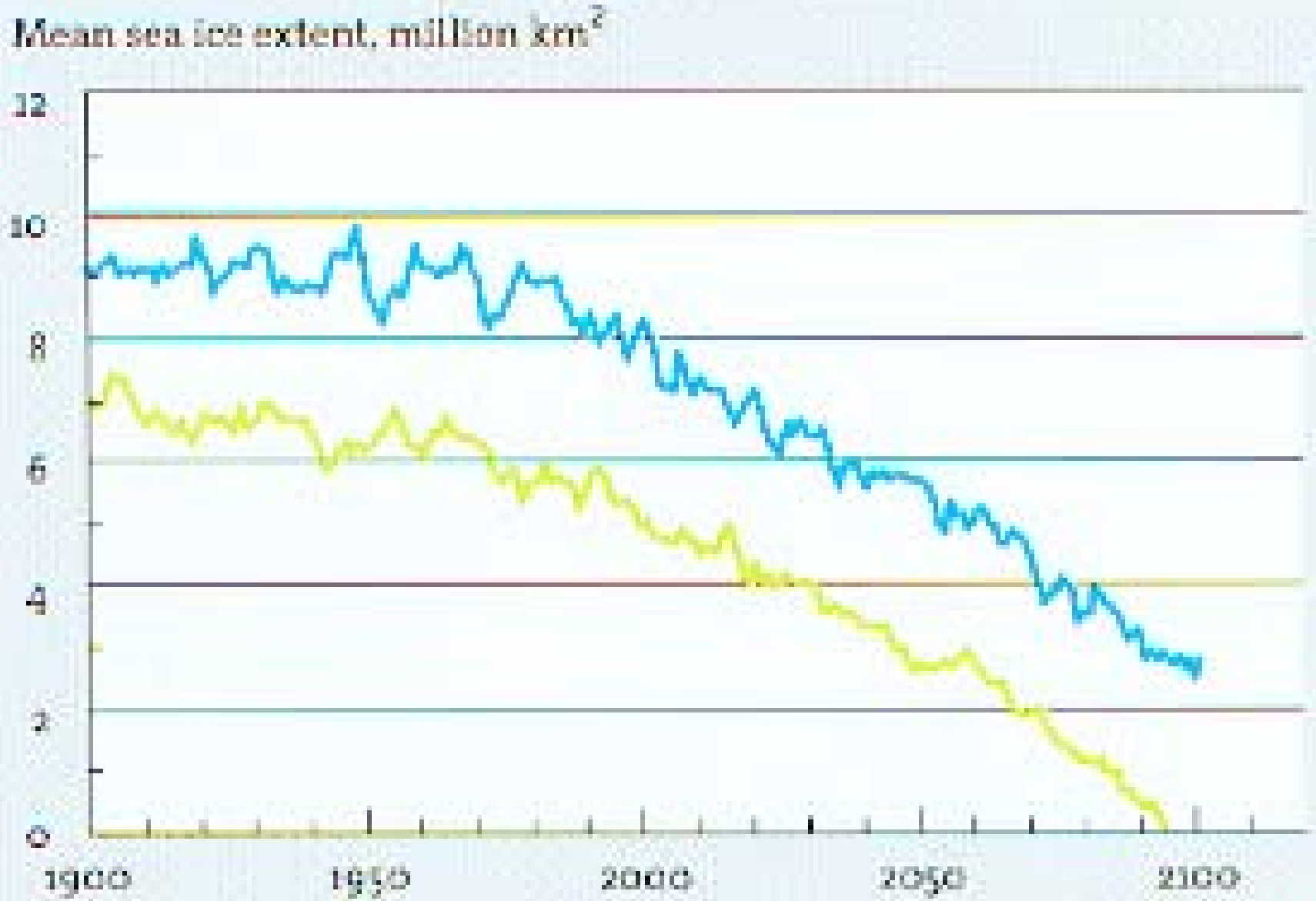
SP-4 Adapting to Melting Ice in High Altitude Basins and Polar Systems

Expected Outcomes

- Adaptive management measures identified, agreed, and tested in a limited number of basins with high altitude headwaters and polar LMEs
- Reduction of human and ecosystem health risks from PTS at demo sites
- Incorporation of pollution prevention strategies for PTS into private sector operations

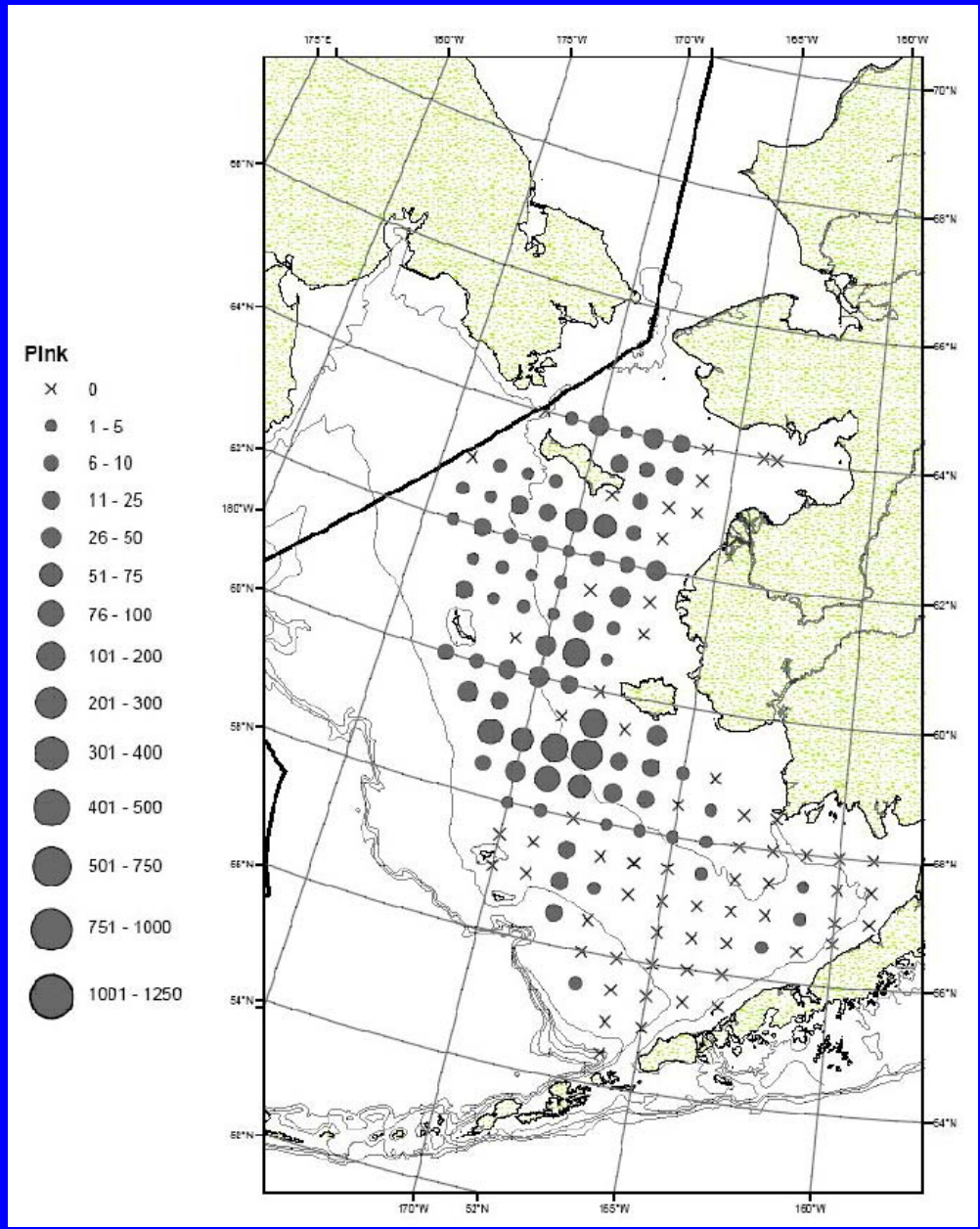
Indicators

- Ministerially-agreed action programs and basin IWRM & LME plans adopted
- Level of PTS releases at demonstration sites
- Industry codes of conduct, company policies


Mean sea ice extent, million km²
12
10
8
6
4
2
0
1900
1950
2000
2050
2100

10 M New Salmon in the E. Bering Sea 2004

Jack Helle, AFSC



IW Waters Strategic Programs, Replenishment 4

Summary & Crosscut with Other GEF Focal Areas

Strategic Program 1: Restoring and sustaining coastal and marine fish stocks and associated biological diversity (entire program joint with Biodiversity focal area)

- * $90-95 mil: (a) Africa Regional LME Component (joint with Biodi), (b) Latin America/Carib Regional LME Compponent (joint with Biodi), and (c) Global component (joint with Biodi, with special attention to East Asia/Pacific and reducing invasive species in ship ballast water).

Strategic Program 2: Reducing nutrient over-enrichment and oxygen depletion from land-based pollution of coastal waters of Large marine Ecosystems consistent with the GPA

- *$90-95 mil: (a) East Asia Regional LME Component (joint with Land Degradation) (b) Mediterranean Sea LME Component (IW / POPs / Biodi) and (c) Global Component

Strategic Program 3: Balancing overuse and conflicting uses of water resources in surface and groundwater basins

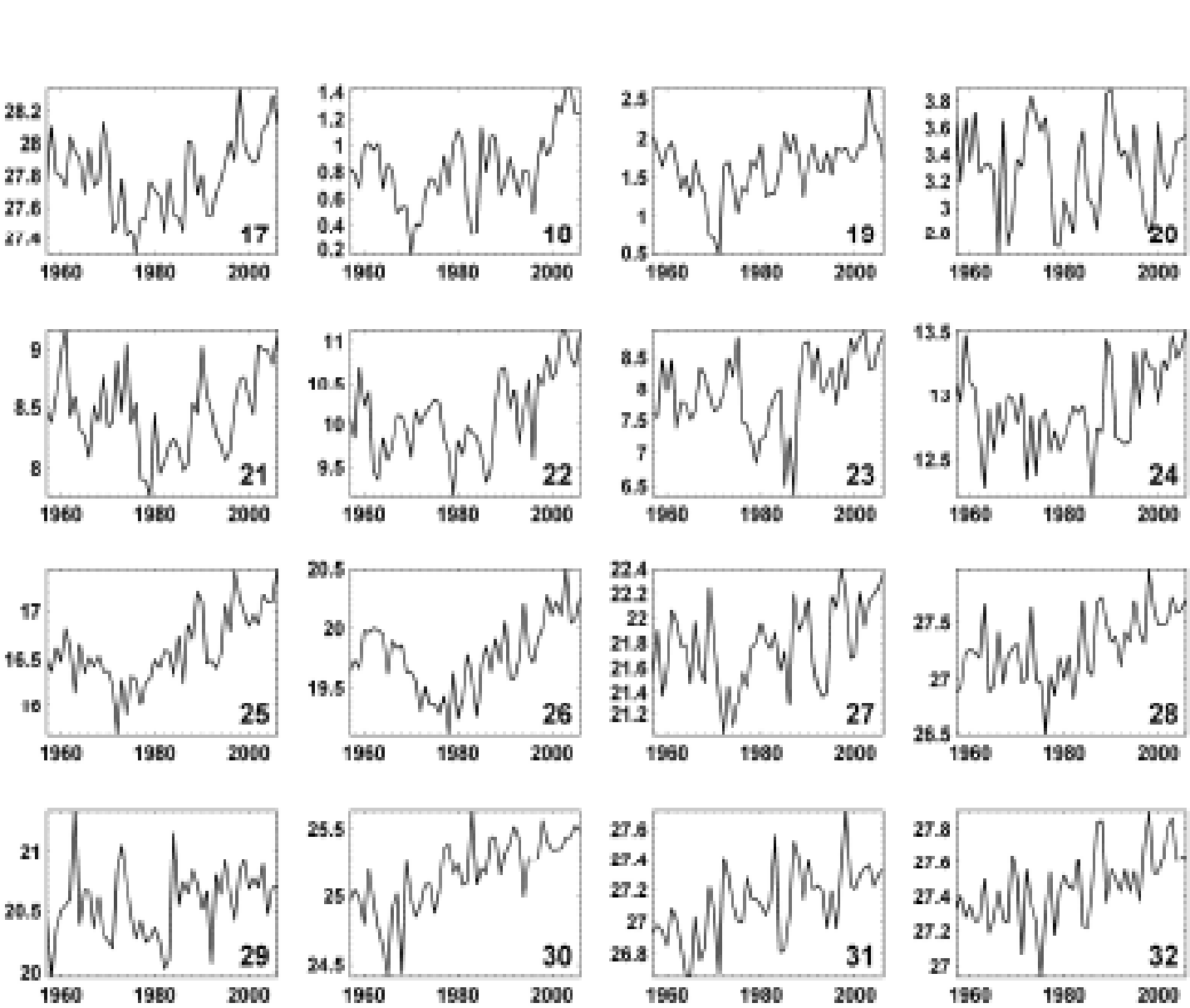
$110-115 mil: (a) South America Basin Component (joint with Climate Change Adaptation and in the Pantanal basis, joint with Biodi and Land Degradation), (b) Groundwater component including NENA Regional Component (joint with Land Degradation), and (c) Global Component

Strategic Program 4: Adapting to melting ice in high altitude basins and polar systems

$25-35 mil: Joint with Climate change Adaptation and POPs

GEF-LME Projects Approved

GEF-LME Projects in Preparation


Annual Mean SST (°C; Hadley); Plate 2: LME 17-32
17
18
19
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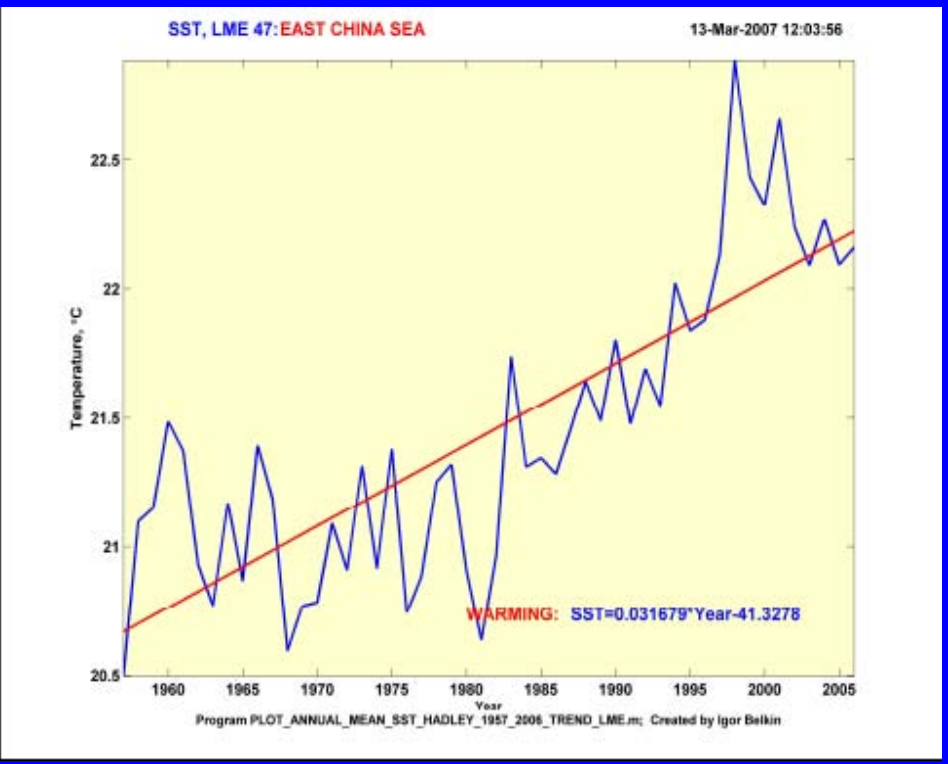
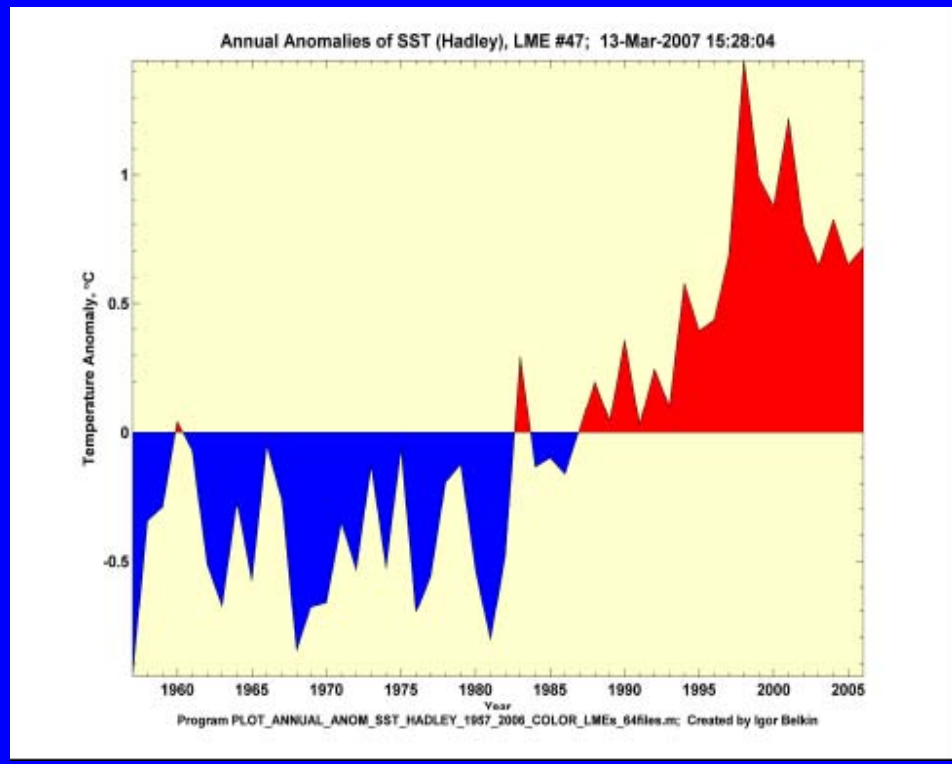
31
32
1960
1980
2000
Program PLOT_ANNUAL_MEAN_SST_HADLEY_1957_2006_4PLATES.mc; Created by Igor Belkin; 09-Mar-2007 12:41:27

EAST CHINA SEA

Mean Annual SST
and
Annual Anomales of SST





Other Transboundary Concerns of Less Global Urgency and Priority during GEF 4

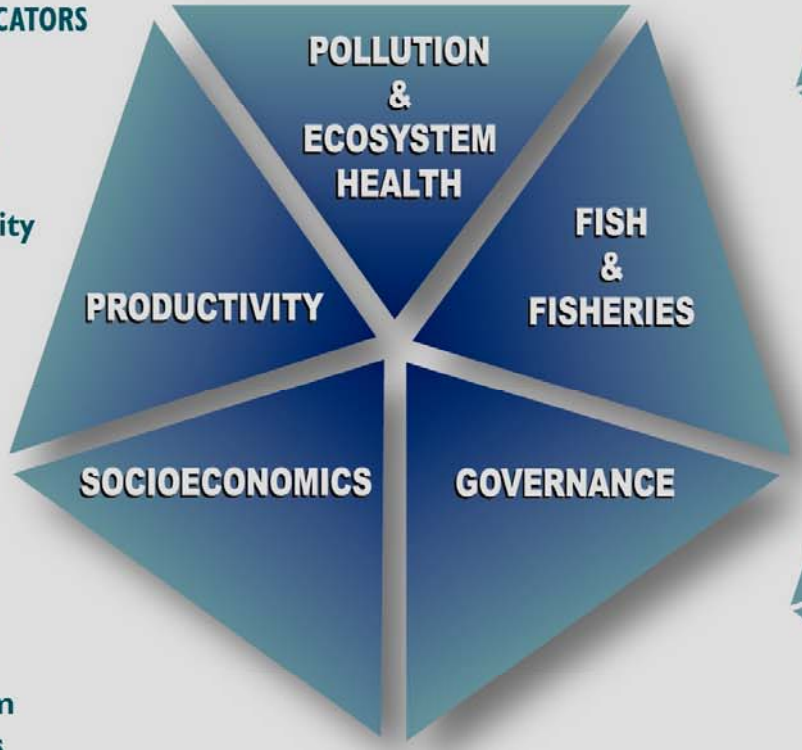
- General cooperation on transboundary waterbodies
- Oil-related ship pollution
- Inland fisheries
- General pollution concerns in transboundary water systems
- Wetland Protected Areas
- Monitoring of transboundary water systems without GEF investments

LMEs ARE GLOBAL CENTERS OF EFFORTS TO:

- **REDUCE** coastal pollution
- **RESTORE** damaged habitats
  (Coral reefs, mangroves, sea grasses)
- **RECOVER** depleted fishery stocks
- **SUSTAIN** ecosystem health

5 MODULES WITH INDICATORS

Modular Assessments for Sustainable Development



PRODUCTIVITY MODULE INDICATORS
- Photosynthetic activity
- Zooplankton biodiversity
- Oceanographic variability
- Zooplankton biomass
- Ichthyoplankton biodiversity

POLLUTION & ECOSYSTEM HEALTH MODULE INDICATORS
- Eutrophication
- Biotoxins
- Pathology
- Emerging disease
- Health indices
- Multiple marine ecological disturbances

SOCIOECONOMIC MODULE INDICATORS
- Integrated assessments
- Human forcing
- Sustainability of long-term socioeconomic benefits

FISH & FISHERIES MODULE INDICATORS
- Biodiversity
- Finfish
- Shellfish
- Demersal species
- Pelagic species

GOVERNANCE MODULE INDICATORS
- Stakeholder participation
- Adaptive management

ECOSYSTEM MANAGEMENT: A PARADIGM SHIFT

FROM	TO
Individual species	**Ecosystems**
Small spatial scale	**Multiple scales**
Short-term perspective	**Long-term perspective**
Humans: independent of ecosystems	**Humans: integral part of ecosystems**
Management divorced from research	**Adaptive management**
Managing commodities	**Sustaining production potential for goods and services**

NOTE: Some of the substantive changes between traditional resource management and ecosystem management.

SELECTED ECOSYSTEM-RELATED WSSD TARGETS AND PROGRAM OF ACTION (POI), Johannesburg, August 2002

- Land-based Sources of Pollution
  POI – Substantially reduce by 2006
- Ecosystem-based Approach
  POI – Introduce by 2010
- Marine Protected Areas
  POI - Designated Network by 2012
- Restoration and Sustainability of Fisheries
  POI – On an urgent basis and where possible to MSY by 2015

LME / GEF PROJECTS IN SUPPORT OF UNEP REGIONAL SEAS PROGRAMME

- Integrate land-based sources of pollution Project activities with LME modular assessment strategy
- From $650 million to $1.8 billion
- + $200 million (Sub-Sahara World Bank Fisheries Grants and Loans)
- TOTAL: $2 billion

PLANNING ACTIONS

1. Transboundary Diagnostic Analysis (TDA) – provides consensus priorities from analysis and ranking of water-related resources issues, their environmental and socioeconomic impacts, immediate and root causes and possible remedies

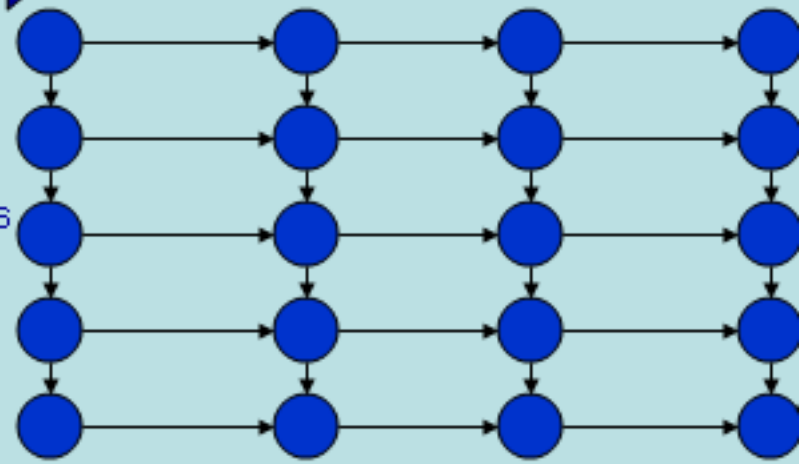
2. Strategic Action Program (SAP) – provides national and regional commitments to policy, legal and institutional reforms, and investments to remedy root causes of priority transboundary issues identified in TDA

IMPLEMENTATION ACTIONS

3. Ecosystem-based assessment and management strategy for TDA and SAP

- 3.1 Productivity indicators and assessments
- 3.2 Fish and fisheries indicators and assessments
- 3.3 Pollution and ecosystem health indicators and assessments
- 3.4 Socioeconomic indicators and assessments
- 3.5 Govemance indicators and assessments

Integrated Ecosystem-Based, Assessment and Adaptive Management



Year 1	Year 2	Year 3	Year 4	Years 5-10
	Assessments & Management Actions	Assessments & Management Actions	Assessments & Management Actions	Toward Self-financing Assessments and adaptive management