Status Report: Environmental Indicators

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APNEP STAC
UNC-IMS

3 May 2006

ENVIRONMENTAL DEFENSE
finding the ways that work

APNEP

- Comprehensive Conservation and Management Plan (1994)
- Monitoring Programs
- Environmental Indicators

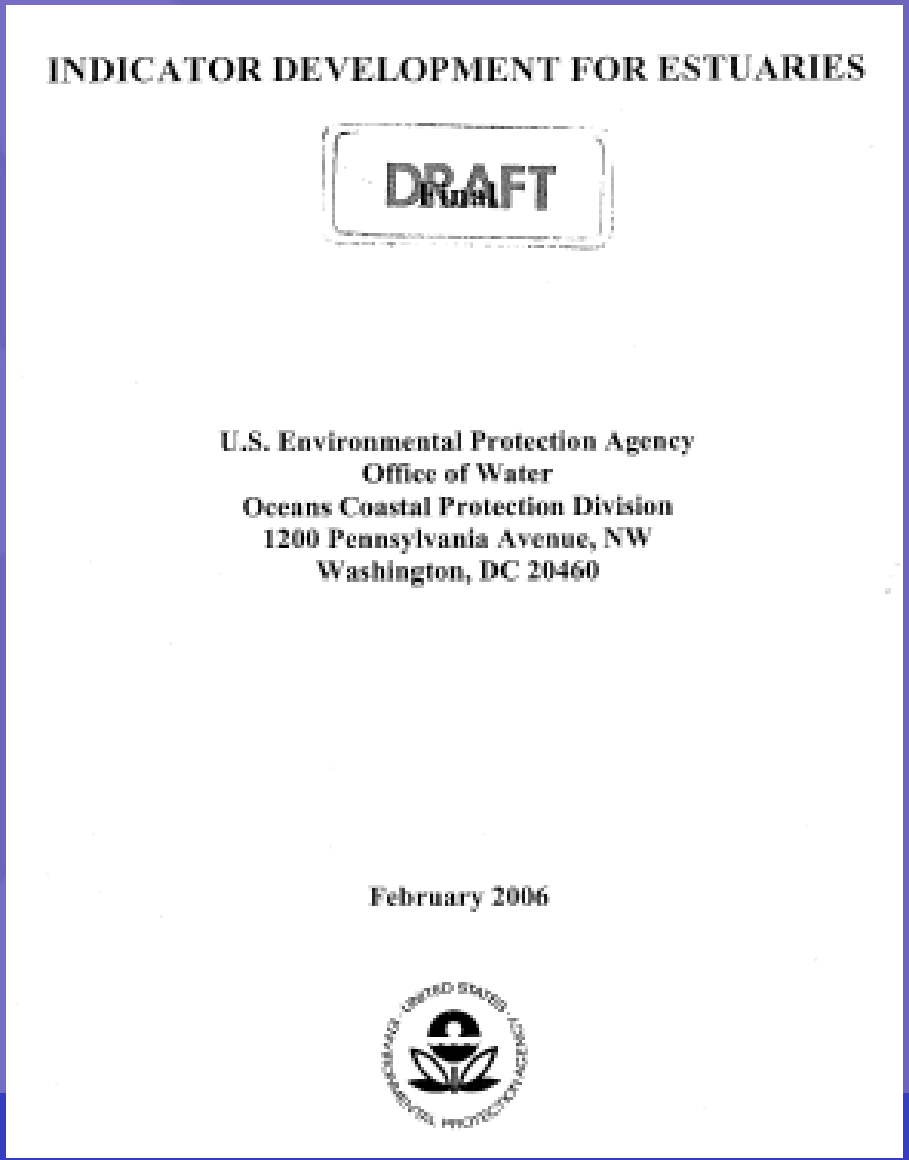
APNEP Indicators

- Process to Date (STAC/Ad Hoc Committee)
- Purpose/Need
- Definition
- Criteria and Audience
- Draft Conceptual Model
- Smithfield Workshop

Good Advice

- Atlantic Slope Consortium
- Atlantic Coast Environmental Indicators Consortium
- National Coastal Assessment

EPA Draft Guidance



INDICATOR DEVELOPMENT FOR ESTUARIES

DRAFT Final

U.S. Environmental Protection Agency
Office of Water
Oceans Coastal Protection Division
1200 Pennsylvania Avenue, NW
Washington, DC 20460

February 2006

Five Steps to Indicators (EPA)

- Planning the Program
- Conceptual Model Design
- Indicator Selection and Specification
- Monitoring Plan Development/Modification
- Indicator Implementation

EPA Draft Guidance: Lessons

"The most important aspect of an effective Steering Committee is to develop one that strikes the right balance of managers, policy makers, researchers, and the publci so that all are represented."

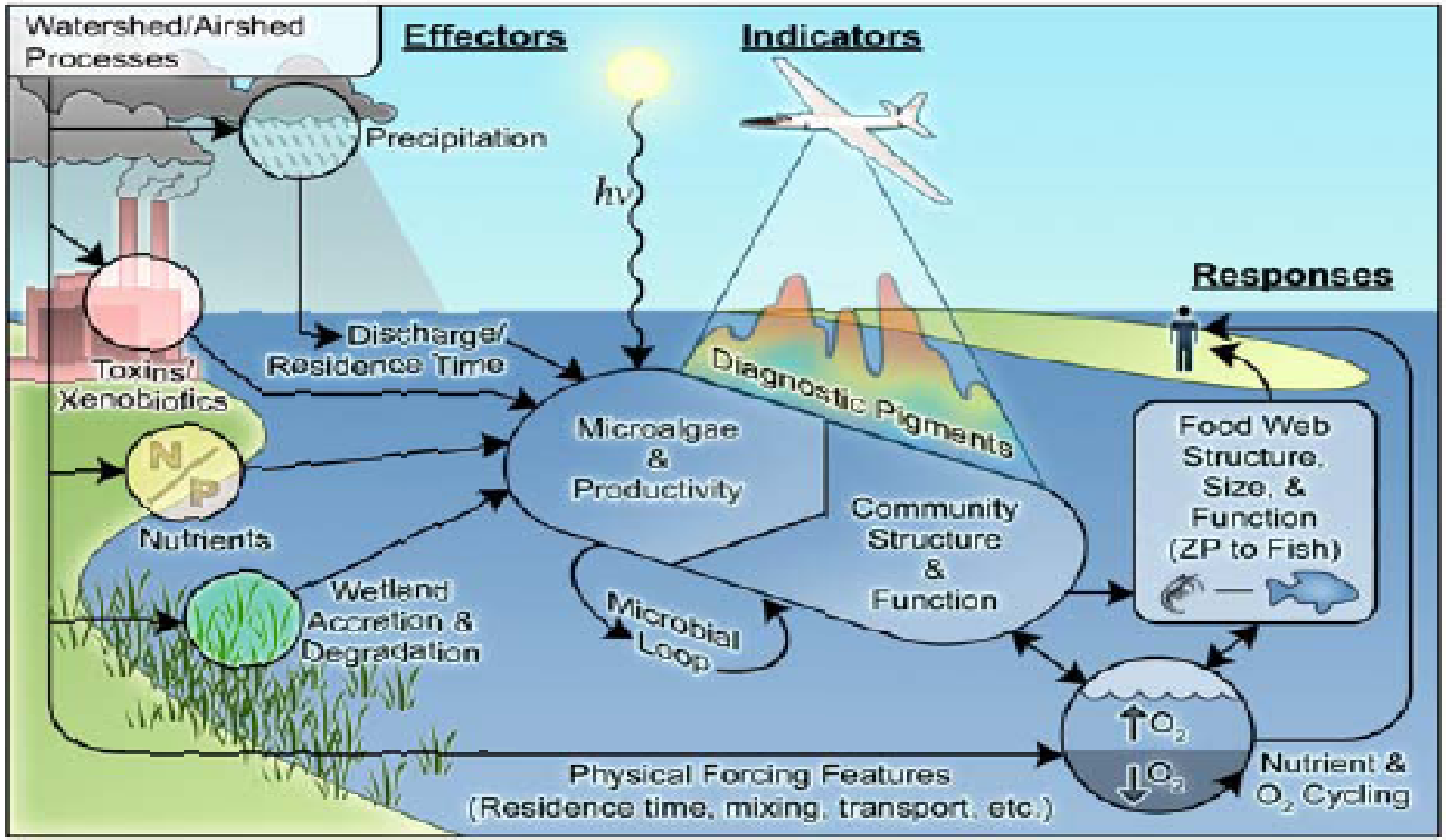


Figure 1.2: *Roles of diagnostic photopigments as indicators of ecosystem productivity and plant community composition in response to physical-chemical stressors in estuarine and coastal waters.*

Source: ACEINC

Conceptual Model

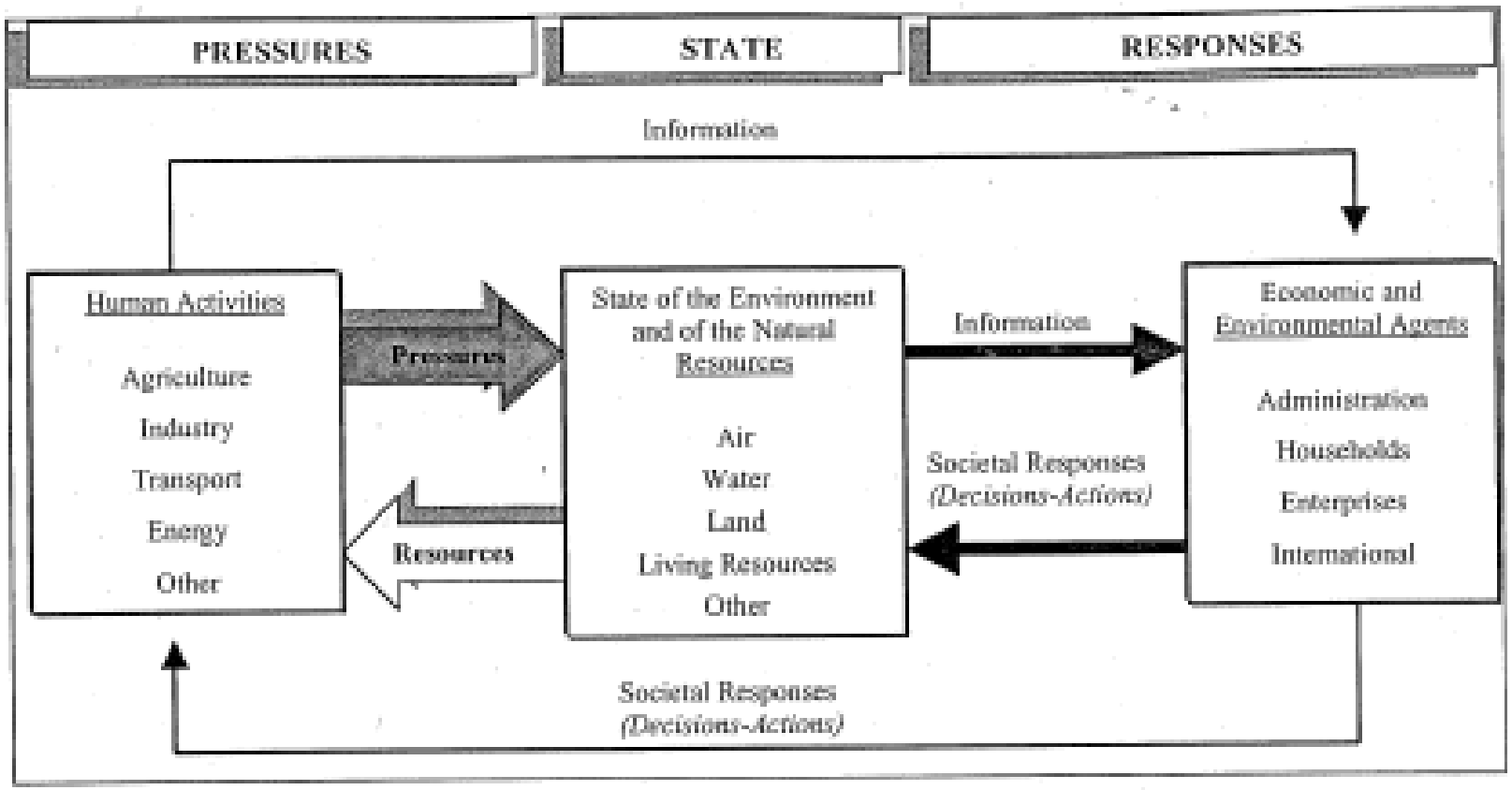


Figure 6. The PSR Conceptual Model (OECD 1993)

Conceptual Model

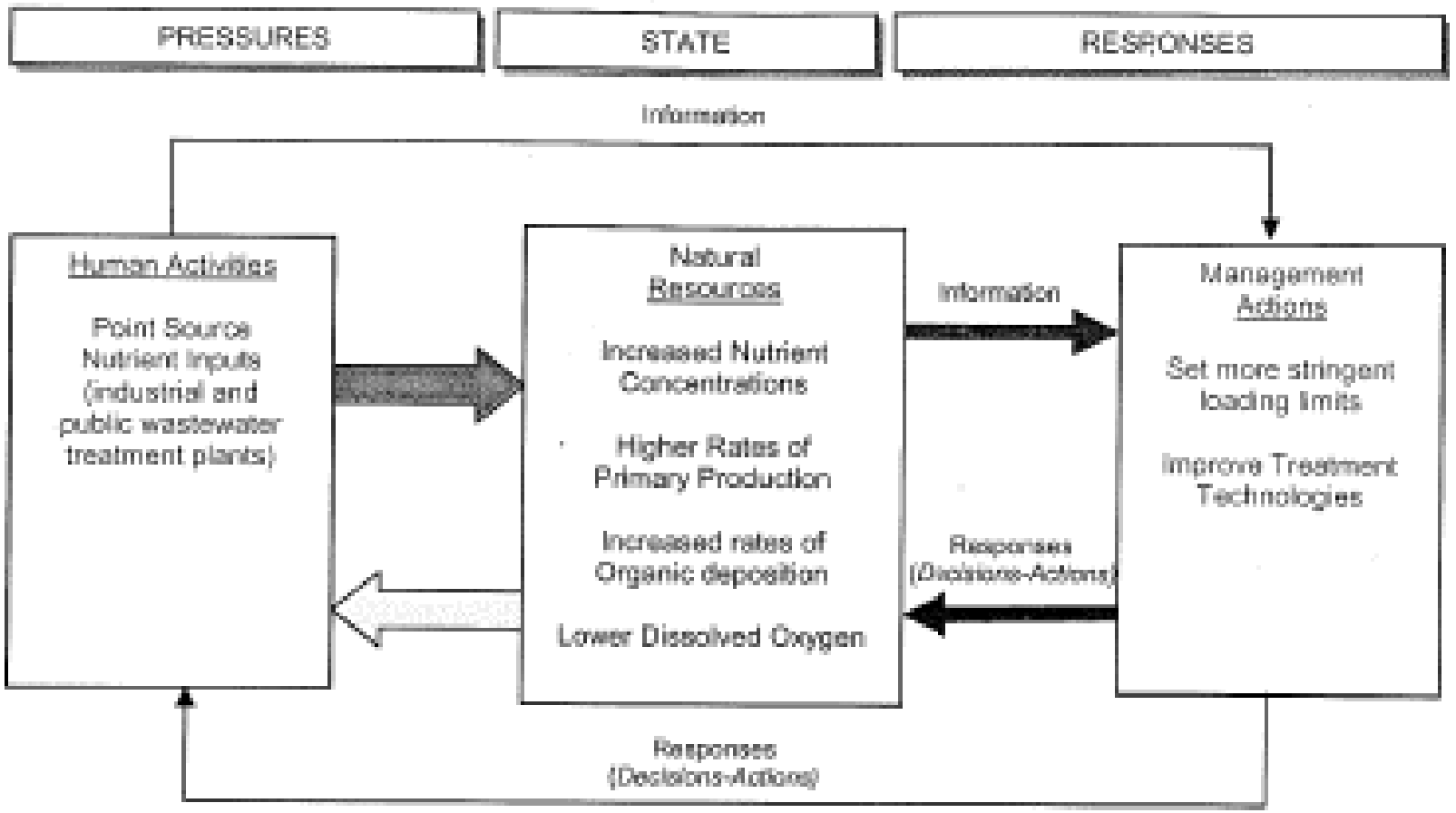
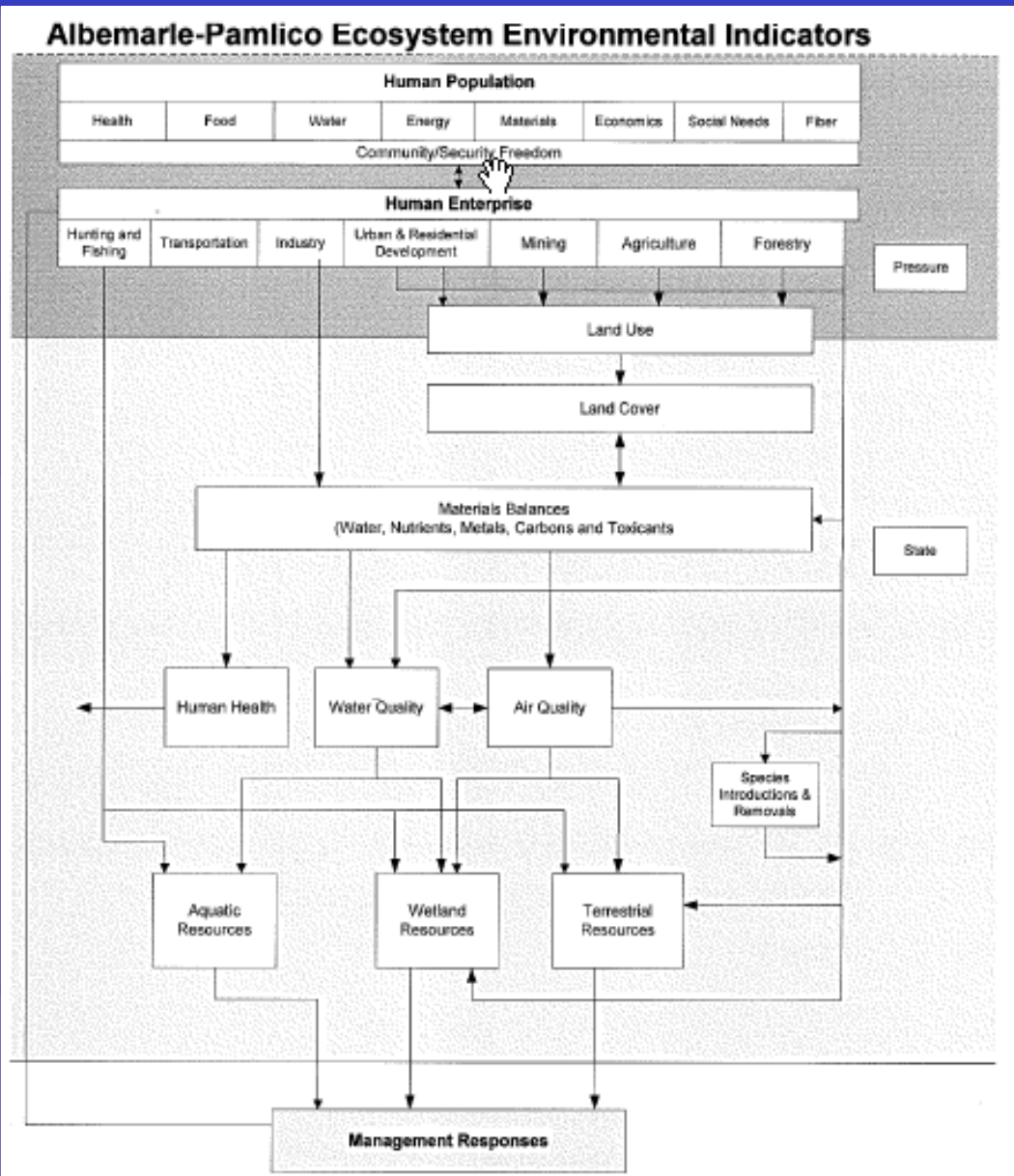


Figure 7. Example of a PSR Conceptual Model for Nutrient Inputs and Aspects of Eutrophication.


Albemarle-Pamlico Ecosystem Environmental Indicators
Human Population
Health
Food
Water
Energy
Materials
Economics
Social Needs
Fiber
Community/Security Freedom
Human Enterprise
Hunting and Fishing
Transportation
Industry
Urban & Residential Development
Mining
Agriculture
Forestry
Pressure
Land Use
Land Cover
Materials Balances
(Water, Nutrients, Metals, Carbons and Toxicants
State
Human Health
Water Quality
Air Quality
Species Introductions & Removals
Aquatic Resources
Wetland Resources
Terrestrial Resources
Management Responses

Wiring Diagrams?

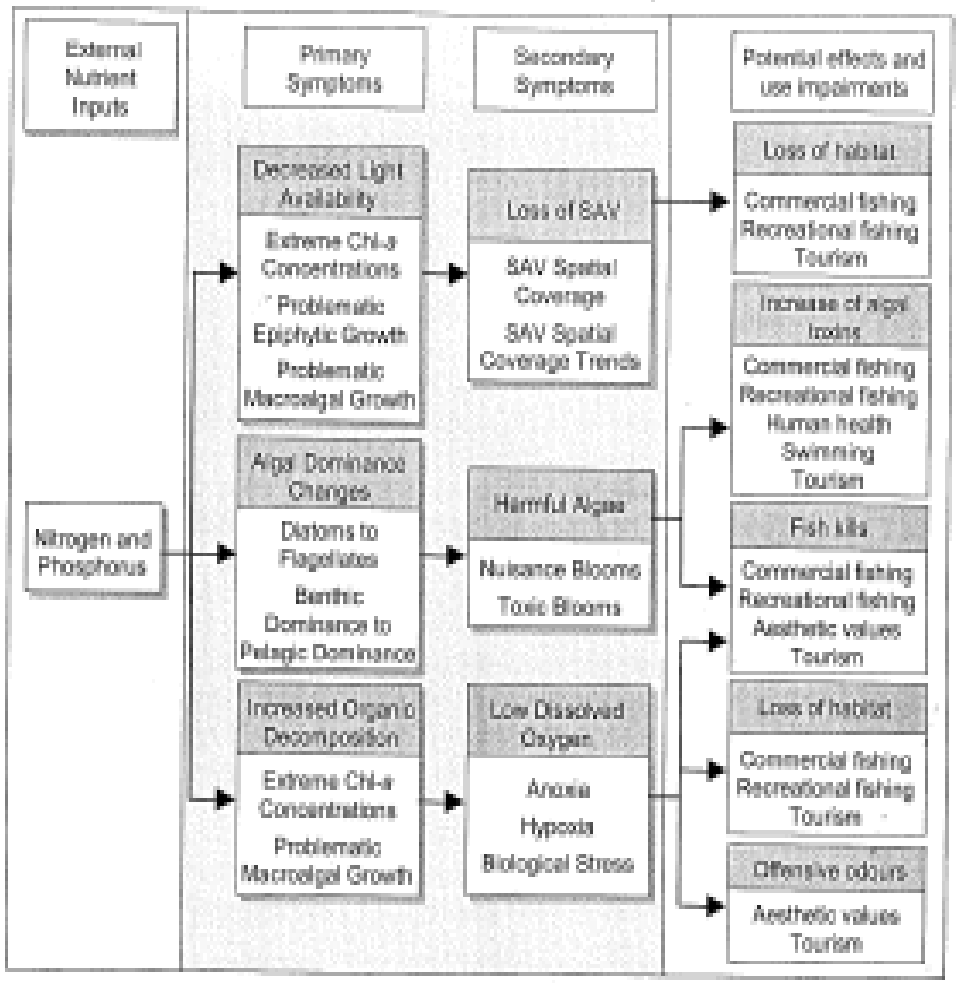


Figure 9. Example of Multiple Levels of Indicators Associated with Eutrophication and the Inputs of Nutrients (Bricker, Ferreira, and Simas, 2003)

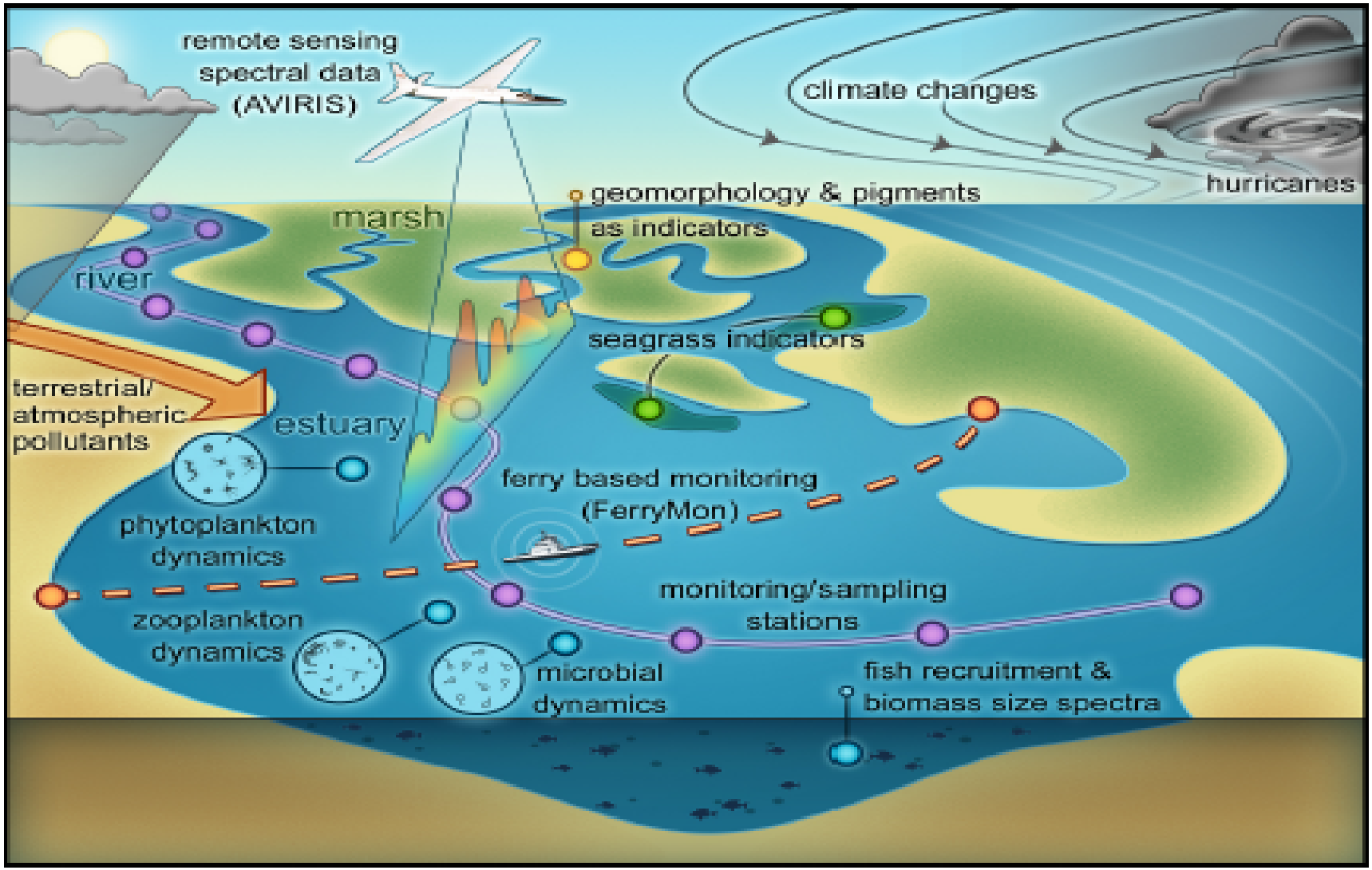


Figure B: Conceptual diagram showing the integrated set of ACE INC indicators being developed and deployed at the ecosystem scale. Also shown are the key hydrologic, nutrient and other pollutant stressors whose impacts are being evaluated by component projects.

Millennium Ecosystem Assessment

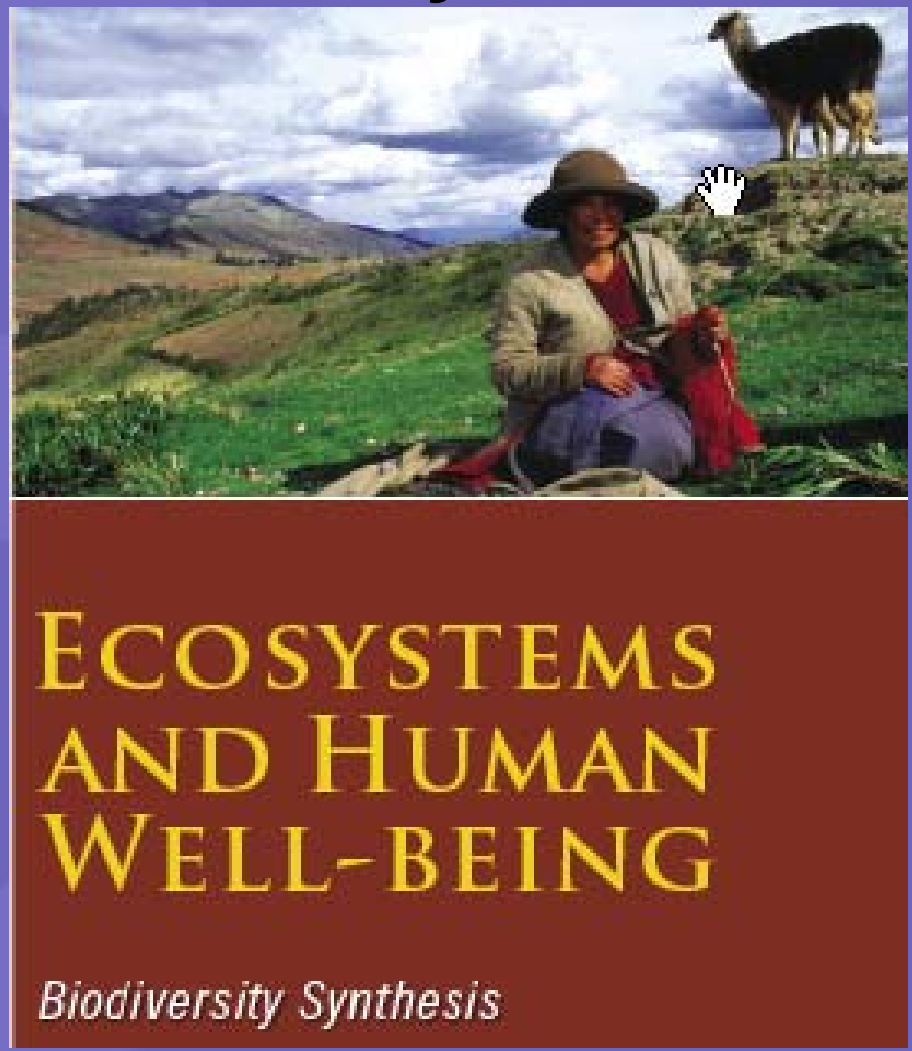


Figure 8. MA Sub-global Assessments

Eighteen sub-global assessments were approved as components of the MA. These were not designed to provide a scientific sample of any feature of ecosystems or human well-being. Instead, the choice of assessment locations was determined by a combination of interest in undertaking the assessment, interest in using the findings, and availability of resources to undertake the assessment. These assessments thus were primarily designed to meet needs of decision-makers in the locations where they were made, but they also informed the global MA findings with information and perspectives from the sub-global scale and vice versa. The MA also drew on information from 15 other sub-global assessments affiliated with the MA that met a subset of these criteria or were at earlier stages in development.

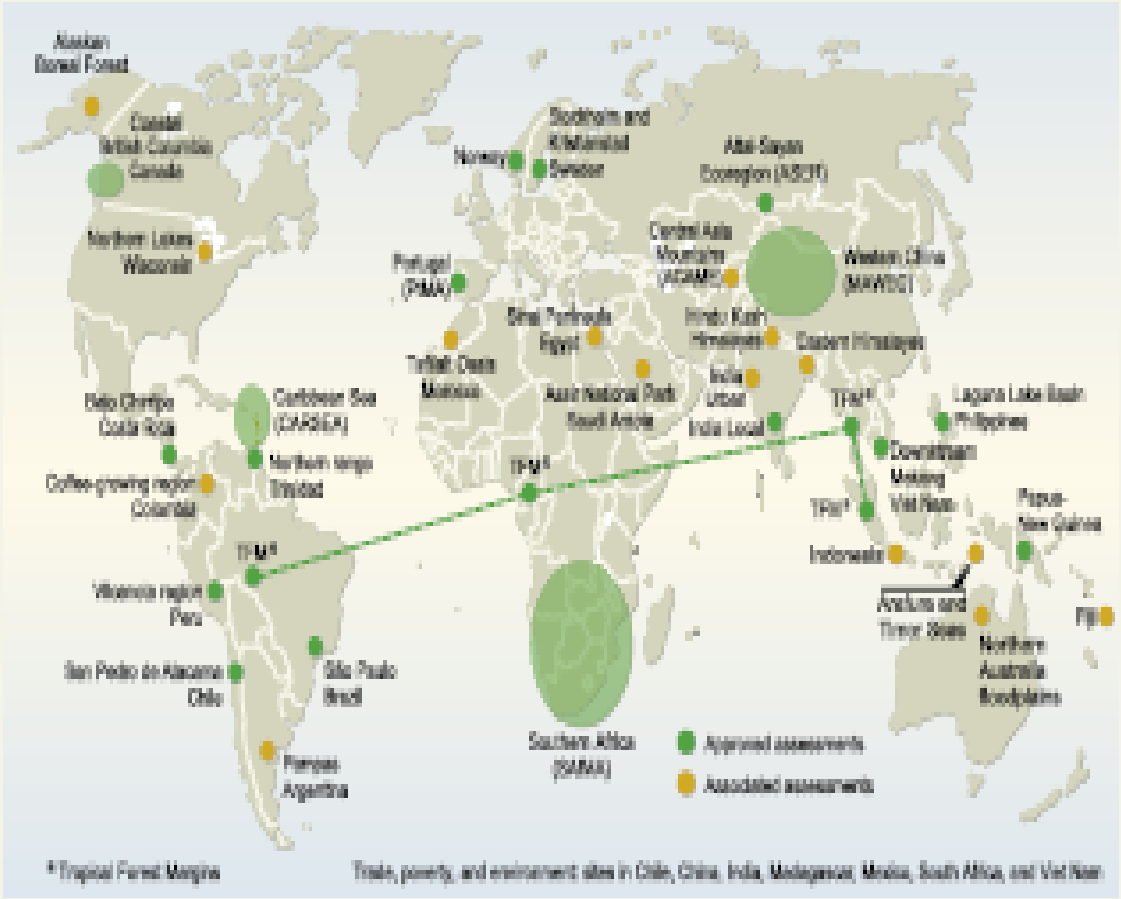
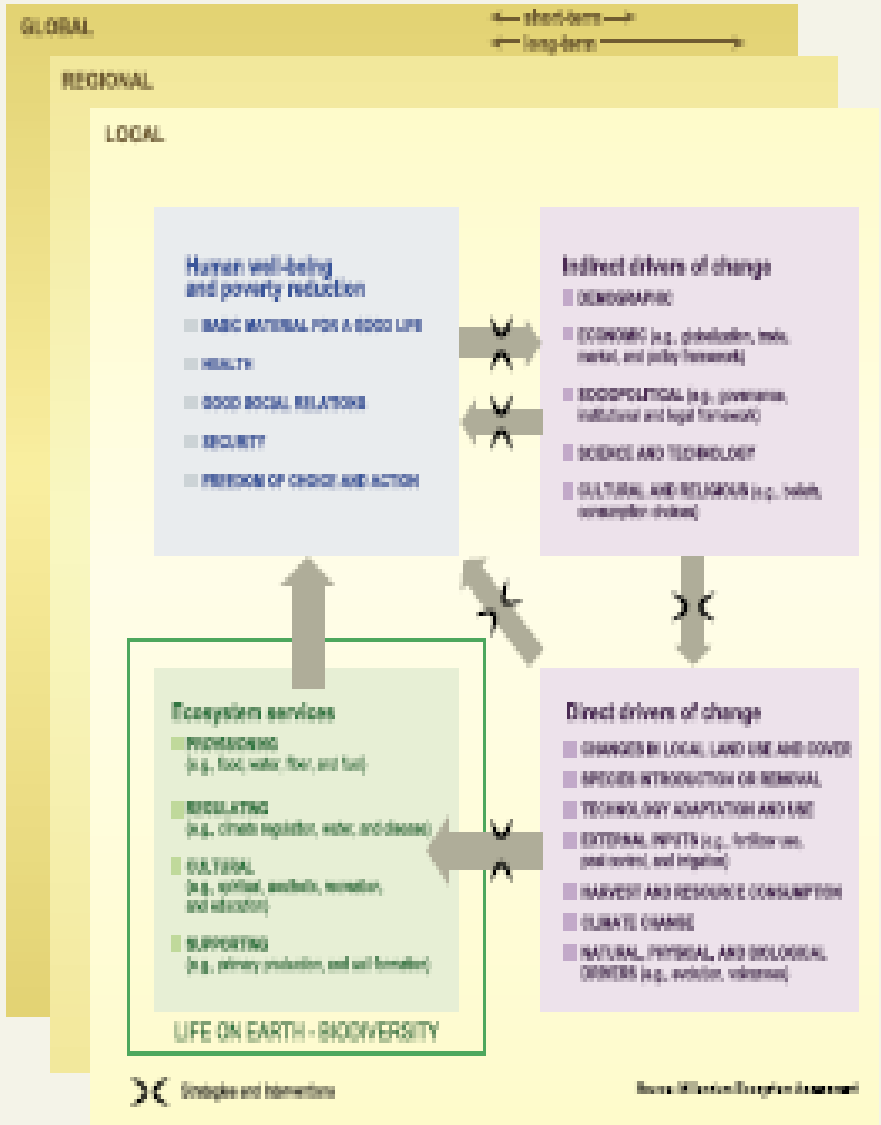


Figure A. Millennium Ecosystem Assessment Conceptual Framework of Interactions between Biodiversity, Ecosystem Services, Human Well-being, and Drivers of Change

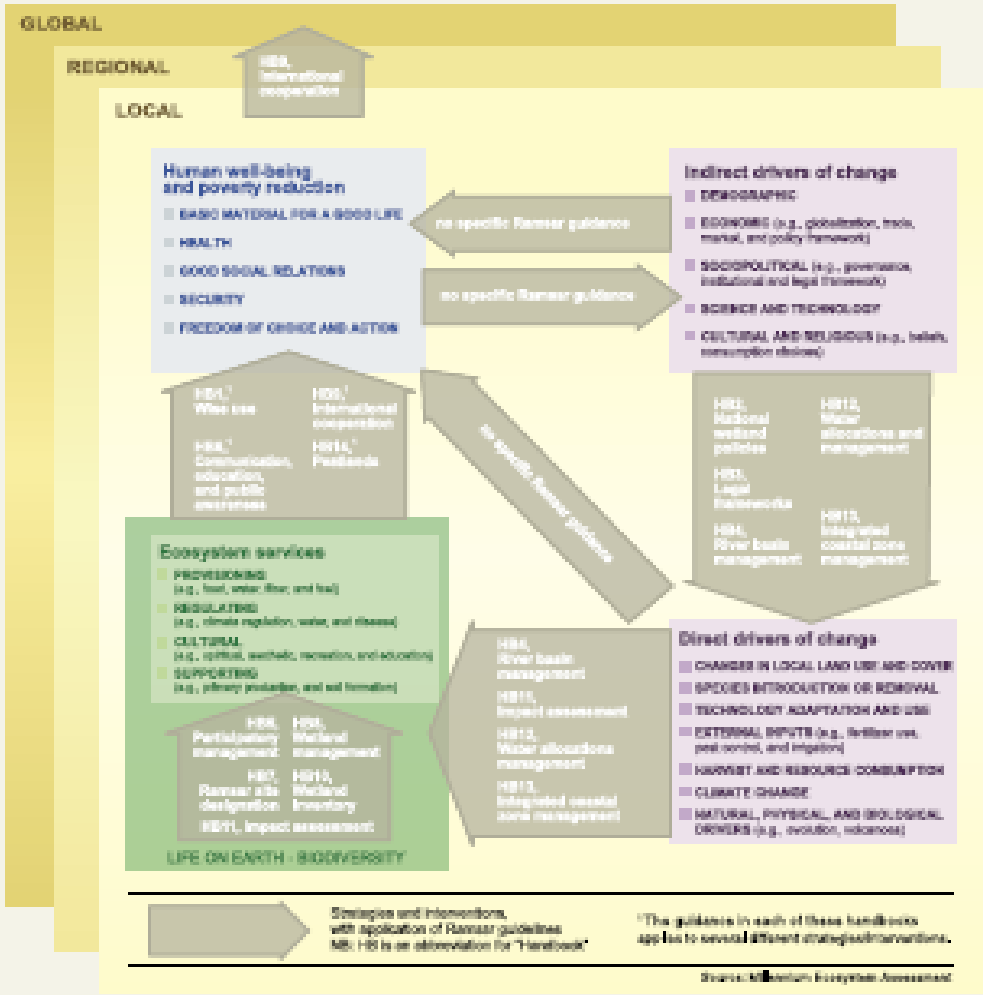
Changes in drivers that indirectly affect biodiversity, such as population, technology, and lifestyle (upper right corner), can lead to changes in drivers directly affecting biodiversity, such as the catch of fish or the application of fertilizers to increase food production (lower right corner). These result in changes to biodiversity and to ecosystem services (lower left corner), thereby affecting human well-being. These interactions can take place at more than one scale and can cross scales. For example, international demand for timber may lead to a regional loss of forest cover, which increases flood magnitude along a local stretch of a river. Similarly, the interactions can take place across different time scales. Actions can be taken either to respond to negative changes or to enhance positive changes at almost all points in this framework. Local scales refer to communities or ecosystems and regional scales refer to nations or biomes, all of which are nested within global scale processes.



Box 7.1. The MA's Conceptual Framework and the Ramsar Wise Use Concept (C20.6)

The MA conceptual framework for ecosystems and human well-being provides a valuable framework for delivery of the Ramsar Convention's concept of the "wise use of all wetlands." In the MA construct, "wise use" equates to the maintenance and delivery of ecosystem services to human well-being and poverty reduction through maintenance of the ecological character of wetlands.

The Figure illustrates where interventions using each of the Ramsar Wise Use Handbooks can be applied in the MA conceptual framework. Many of the current Ramsar guidelines concern interventions that apply directly to ecosystems and their processes. Others—such as those concerning river basin management, water allocations and management for maintaining wetland ecosystem functions, and impact assessment—form interventions addressing aspects of the direct drivers of change to ecosystems. Only two sets of Ramsar guidelines—on national wetland policies and on reviewing legislative and institutional frameworks—deal wholly with indirect drivers of change. Some guidelines—such as those on international cooperation, on global action for peatlands, on communications, education, and public awareness, and on the Convention's original "wise use" guidelines—include strategies and interventions that apply to several parts of the MA conceptual framework. The Figure also demonstrates that there are only a small number of levels in the framework for which Ramsar Wise Use Handbooks do not provide at least some guidance.



Process From Here?

- Review and revise process (Steering Committee: STAC + PB + CAC?)
- Complete conceptual model (STAC)
- Complete “wiring diagram” (STAC)
- Indicator selection and specification
  - Elaborate candidates from workshop
  - Integrate into conceptual model . . .