

Charting the Course: An Overview of APNEP's Ecosystem- Based Approach to Regional Planning and Environmental Management

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APNEP State of the Sounds Symposium 2011





EBM Opportunity!

ANEP Fall 2008 Conference
New York City



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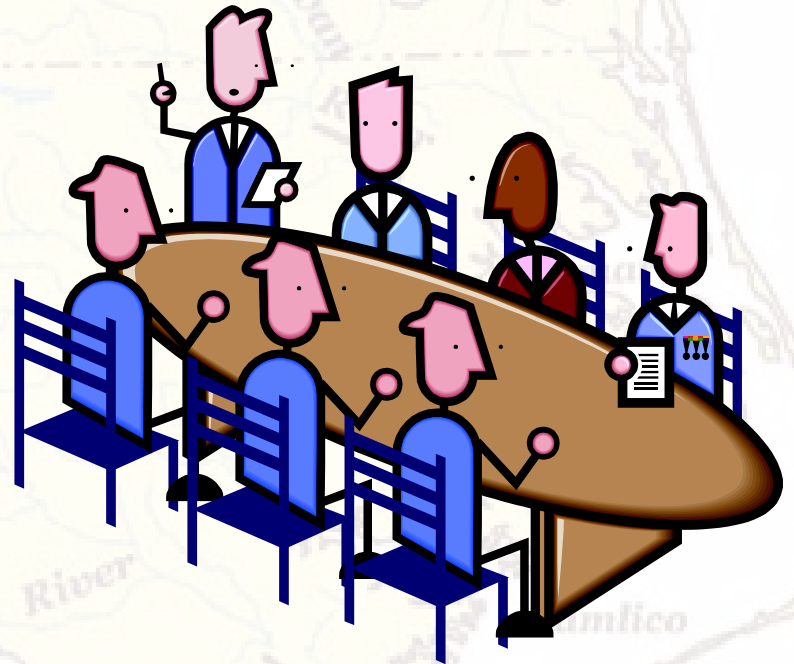
APNEP's Transition to Ecosystem-Based Management

- A **holistic vision and plan** that includes a comprehensive description of the Albemarle-Pamlico system and articulation of multiple management objectives.
- A community that has **effective engagement** of policy makers, managers, scientists, & stakeholders.
- A process that includes effective **adaptive management** to address a changing system.
- A **framework** that includes appropriate authority, implementation area, management institutions, financial resources, and effective communications.

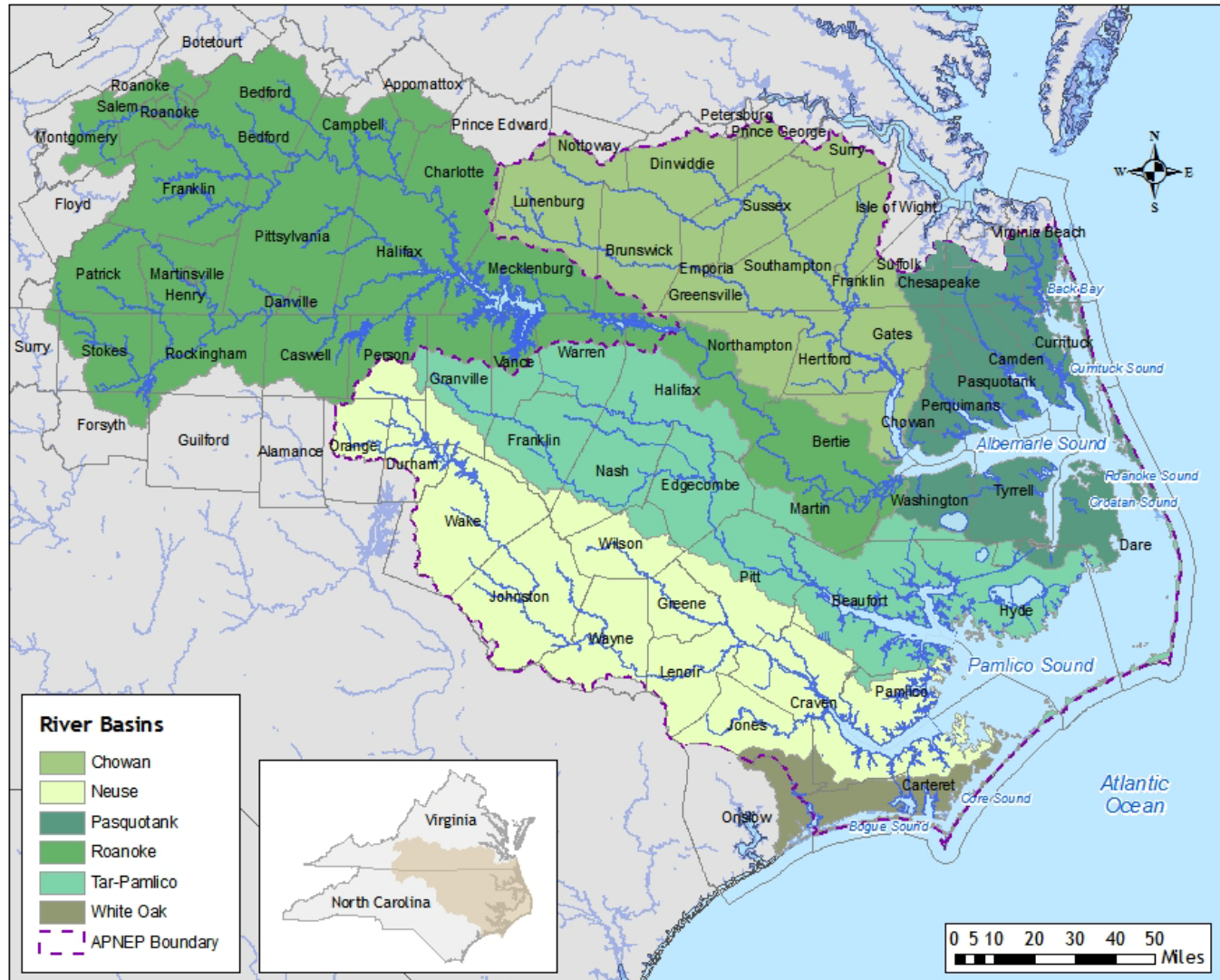


Gaining “Appropriate Authority” to Undertake EBM

- Presentation to Policy Board (May 2009)
- Theme of Science & Technical Advisory Committee meeting (July 2009)
- Formed EBM Proposal Team (August 2009)
- Proposal to Policy Board (December 2009)
- Progress Reports to Policy Board (September 2010, June 2011)



APNEP Implementation Area and Management Institutions



APNEP EBM Transition Team

Policy Board
Science & Technical Advisory Committee
Citizens Advisory Committee
State Planner
Federal Planner
EBM Tech Transfer
Staff



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APNEP's Seven Steps to EBM Enlightenment

- Articulate **program goals**
- Develop **system level model** for goal attainment
- Assess current management efforts –identify **gaps**
- Develop **management strategy**
- Develop **monitoring program**
- **Assess** performance
- **Manage adaptively**

Step 1: Articulate program goals

- Objective Hierarchy Structure
 - Goal-Objective-Management Action-Step (1994)
 - Goal-Subgoal-Objective-Management Action (2008-2010)
 - Goal-Outcome + Strategy-Objective-Action (2011)
- Objectives Hierarchy Content
 - Five Goals, 15 Objectives, 49 Actions (1994)
 - Three goals, 12 Outcomes + 5 Components, 15 Objectives, 58 Actions (2011)

APNEP's CCMP Goals

- A region where **human communities** are sustained by a functioning ecosystem
- A region where aquatic, wetland, and upland habitats support viable populations of **native species**
- A region where **water** quantity and quality maintain ecological integrity



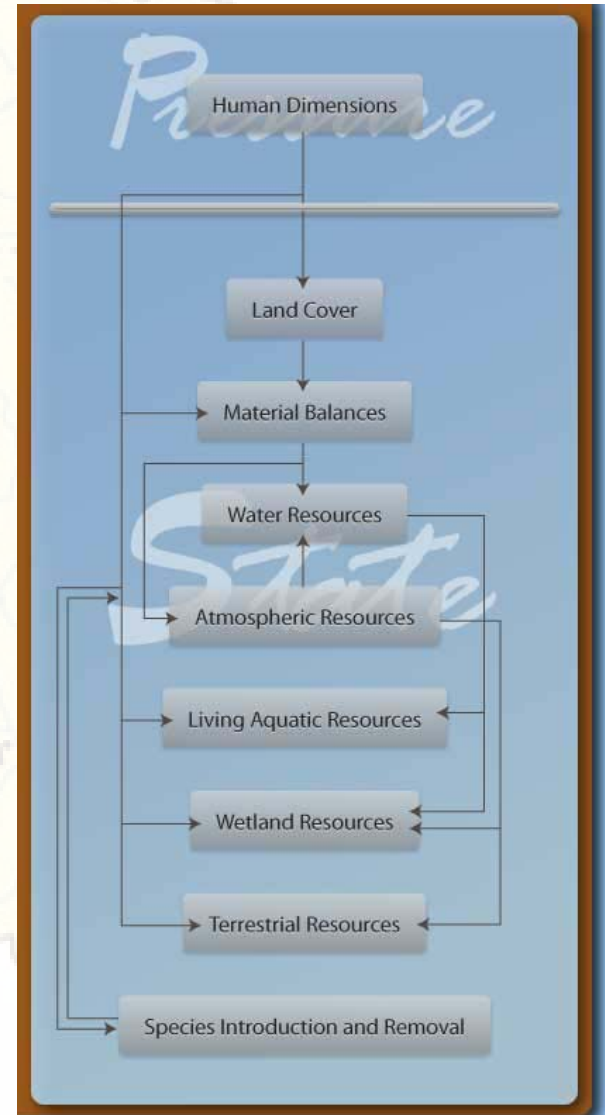
Goal	Environmental Outcome	Outcome Type	Provisional Indicator
1: Human Communities	1A: Waters are safe for personal contact.	Swimming	Beach Action Days/Closings by Water Body Type Sounds, Freshwater River, Lake, Brackish River)
	1B: Designated surface and ground water supplies are safe for human consumption.	Potable Surface Waters	WQ Standard Violations (Surface)
		Potable Groundwaters	Drinking Water Standard Violations (Water-supply Aquifers) Nutrient Concentrations in Land Use Categories (Shallow Aquifer)
	1C: Surface hydrologic regimes sustain regulated human uses.	Water Supply	Flows, Severity, Frequency, Duration of Droughts & Floods
	1D: Fish and game are safe for human consumption.	Edible Harvest	Fish Consumption Advisories Shellfish (& Swimming) Area Closures
	1E: Opportunities for recreation and access to public lands and waters are protected and enhanced.		Access, Water Trails Number of Visitations & People Who Use Coastal Areas Number of Tourists to Coastal Regions Water Access Number & Location



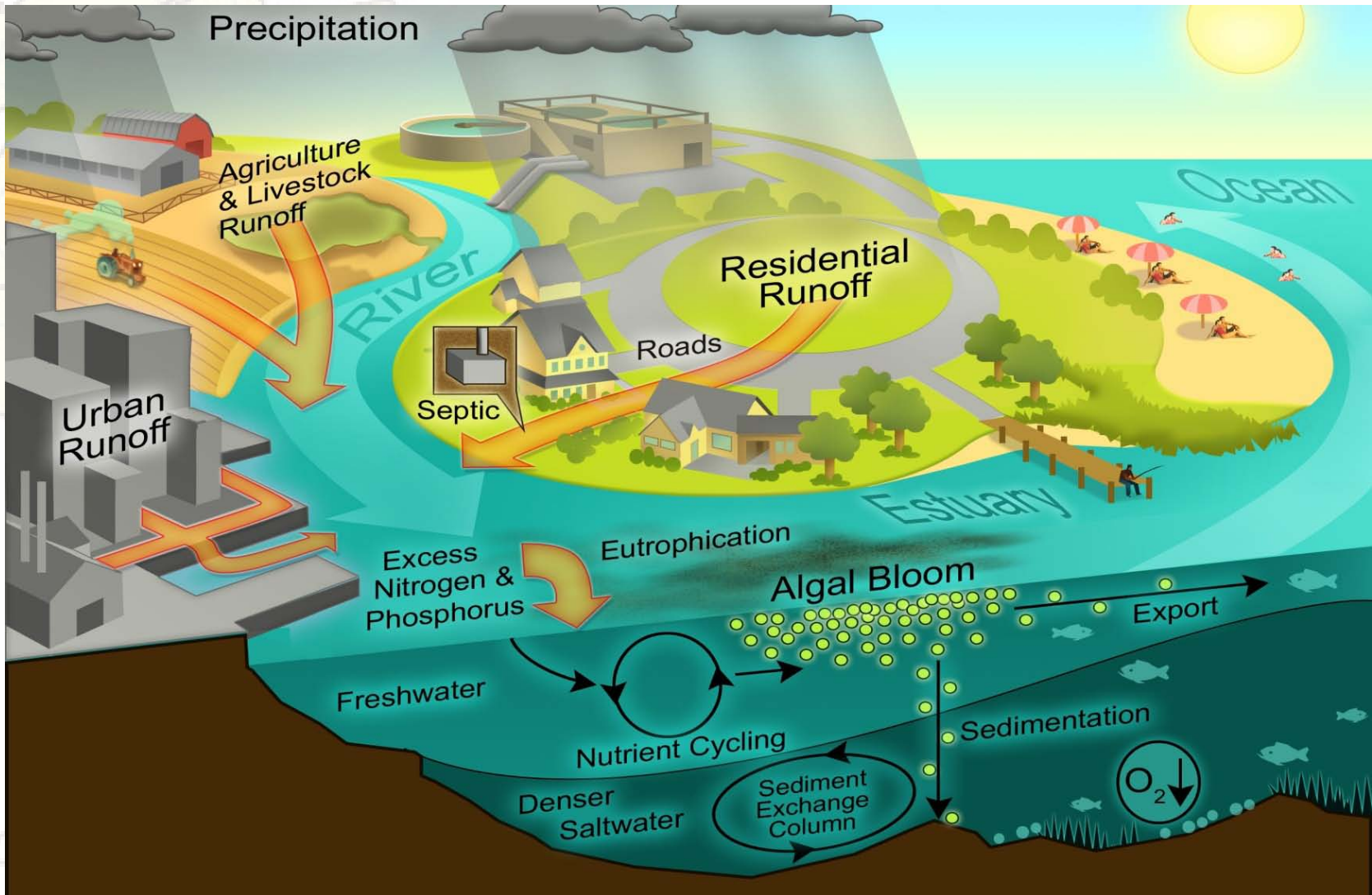
Step 2: Develop system level model for goal attainment

Ecological management actions (stressor mitigation) can impact multiple ecosystem endpoints

Multiple stressors (including other endpoints) impact directly and indirectly ecosystem endpoints



Conceptual Model of Nutrient Cycle



Modified from H. Paerl

Outcome: Nutrients and pathogens do not harm the species that depend on the waters

- ***Biological Factors***

- ***Fauna***

- ***Flora***

- ***Microorganisms***

- pathogen source control

- human (wastewater)

- animal (pasture, CAFO manure management)

- wildlife population (?)

- ***Physical Factors***

- ***Structure***

- ***Hydrology***

- ***Temperature***

Outcome: Nutrients and pathogens do not harm the species that depend on the waters

- ***Chemical Factors***

- ***Salinity***

- ***pH***

- ***Nutrients***

- Load controls for nitrogen and phosphorus (air deposition, runoff, groundwater, point source)

- ***Human Factors***

- ***Use objectives***

- Management of agricultural pollutant sources
- Management of developed land pollutant sources (stormwater)
- Water body use designation (WQ standard development)

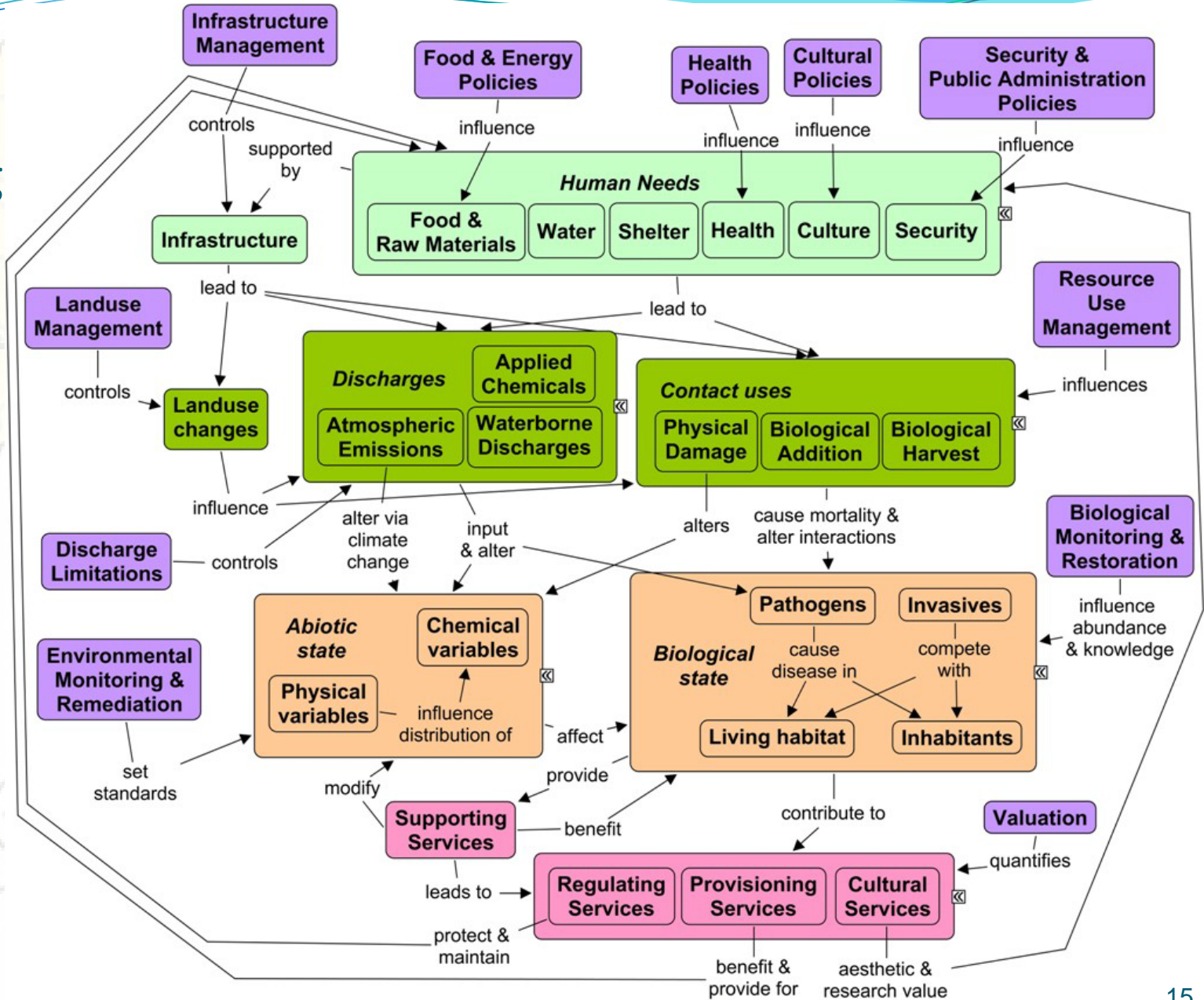
- ***Modification of system***

- Land-use management (particularly riparian lands)

- ***Knowledge***

- Technical understanding of Contaminant Management Strategies to meet WQ standards
- Public appreciation of risks and need for management
- Policy appreciation of regulatory needs

DPSER Modeling



Lt. green = Drivers
 Dk. Green = Pressure
 Orange = State
 Red = Ecosystem Services
 Purple = Response

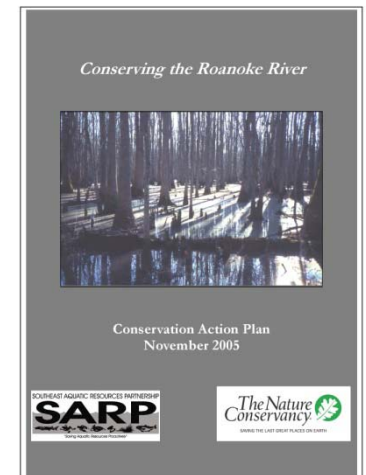
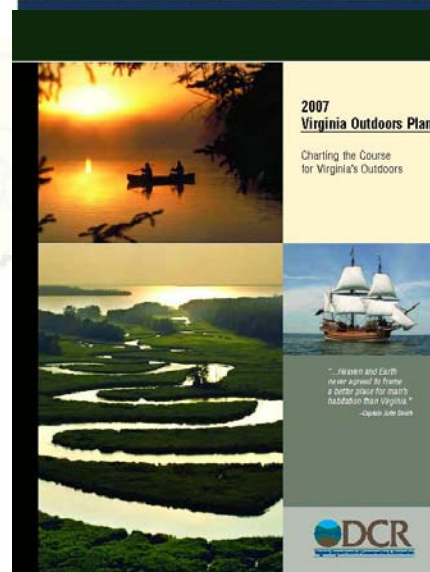
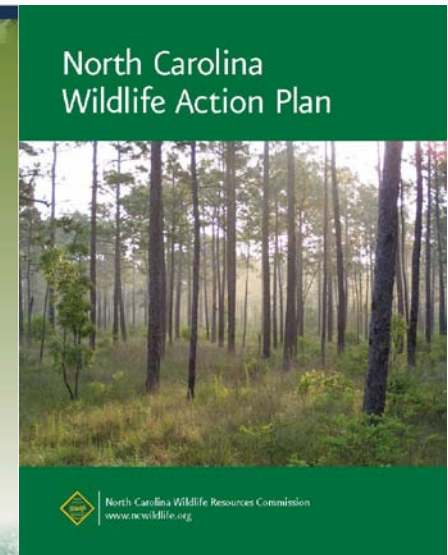
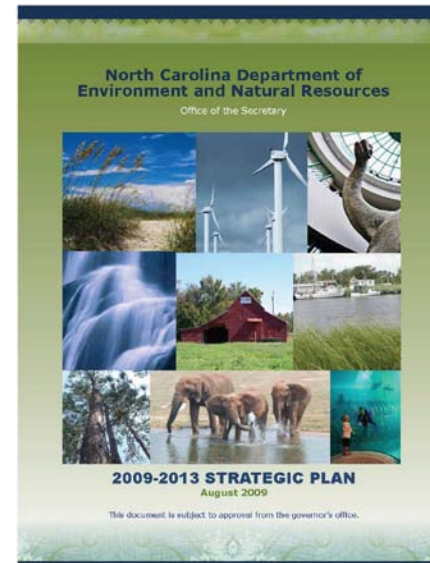
EPA-ORD-ESRP 2010



Step 3: Assess current management efforts

–identify gaps

- Directed by conceptual models
- Survey of partners' strategic/action plans
 - Specificity and publication date
 - Action extraction
 - Align with APNEP outcomes/strategies
- Interview senior management





Step 4: Develop management strategy

- Stakeholder Questions
- Management Objectives
- Actions with Partner Responsibilities
- APNEP Management Conference Review
- Public and Partner Input
- CCMP Publication

Step 5: Develop monitoring program

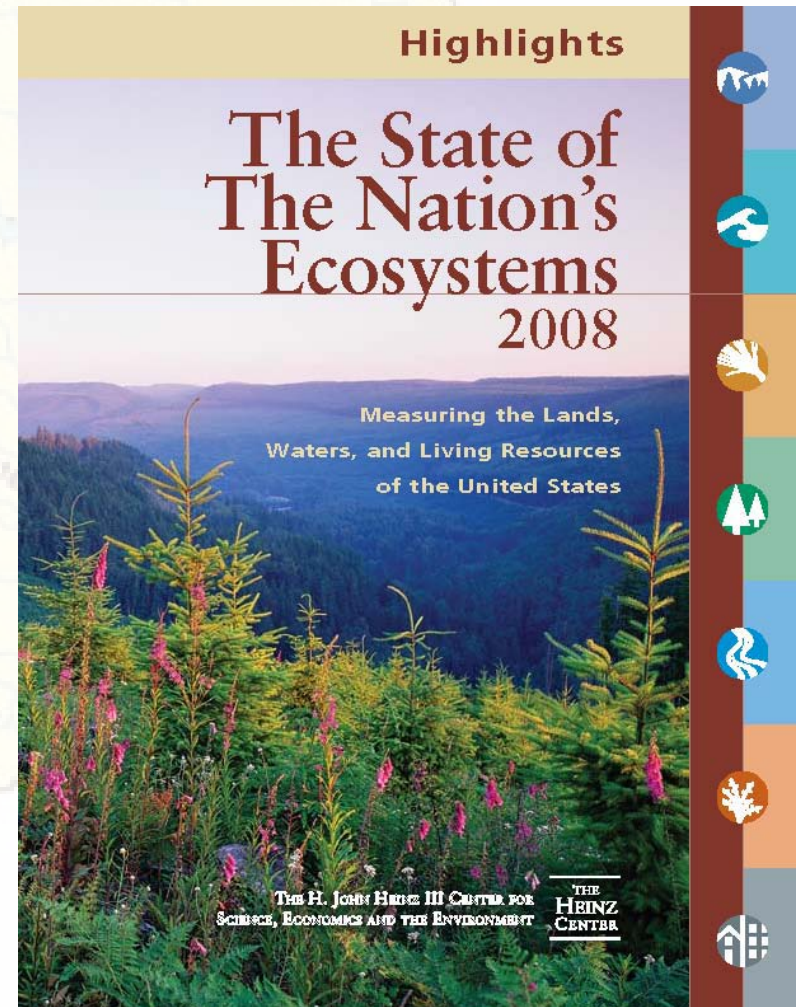
- Linking candidate indicators to CCMP outcomes
- Indicator-specific monitoring strategies
 - Justification for indicator
 - Goal of sampling/monitoring program
 - Existing sampling/monitoring program
 - Enhanced sampling/monitoring program
 - Reference(s)

Integrated monitoring strategy



Step 6: Assess performance

- “Interim” regional ecosystem assessment (2012)
 - Select provisional indicators
 - Status & trends from 1995 to present
 - Heinz Center format
- Phase 2 assessment (2013?)
 - Diagnosis
- Phase 3 assessment (2014?)
 - Forecasting



Step 7: Manage adaptively

- Most difficult step?
- Senior management engagement
- Trigger levels in plan

