APNEP's Comprehensive Conservation & Management Plan: Collaborative Actions for Protecting & Restoring the Albemarle-Pamlico Ecosystem

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EBM Track
Craven Boardroom
1:30 – 2:00pm

Albemarle-Pamlico Ecosystem Symposium
Embarking on a New Voyage

APNEP's Mission

To identify, restore, and protect the significant resources of the Albemarle-Pamlico estuarine system.

National Estuary Partnership

- Designated as an estuary of national significance by Congress in 1987.
- Part of the National Estuary Program, under Section 320 of the Clean Water Act.
- Funded through an EPA grant to the NC Department of Environment and Natural Resources.
- Each program establishes a Comprehensive Conservation and Management Plan (CCMP).
- The plan addresses water quality, habitat, and living resource challenges in each program's designated watershed.

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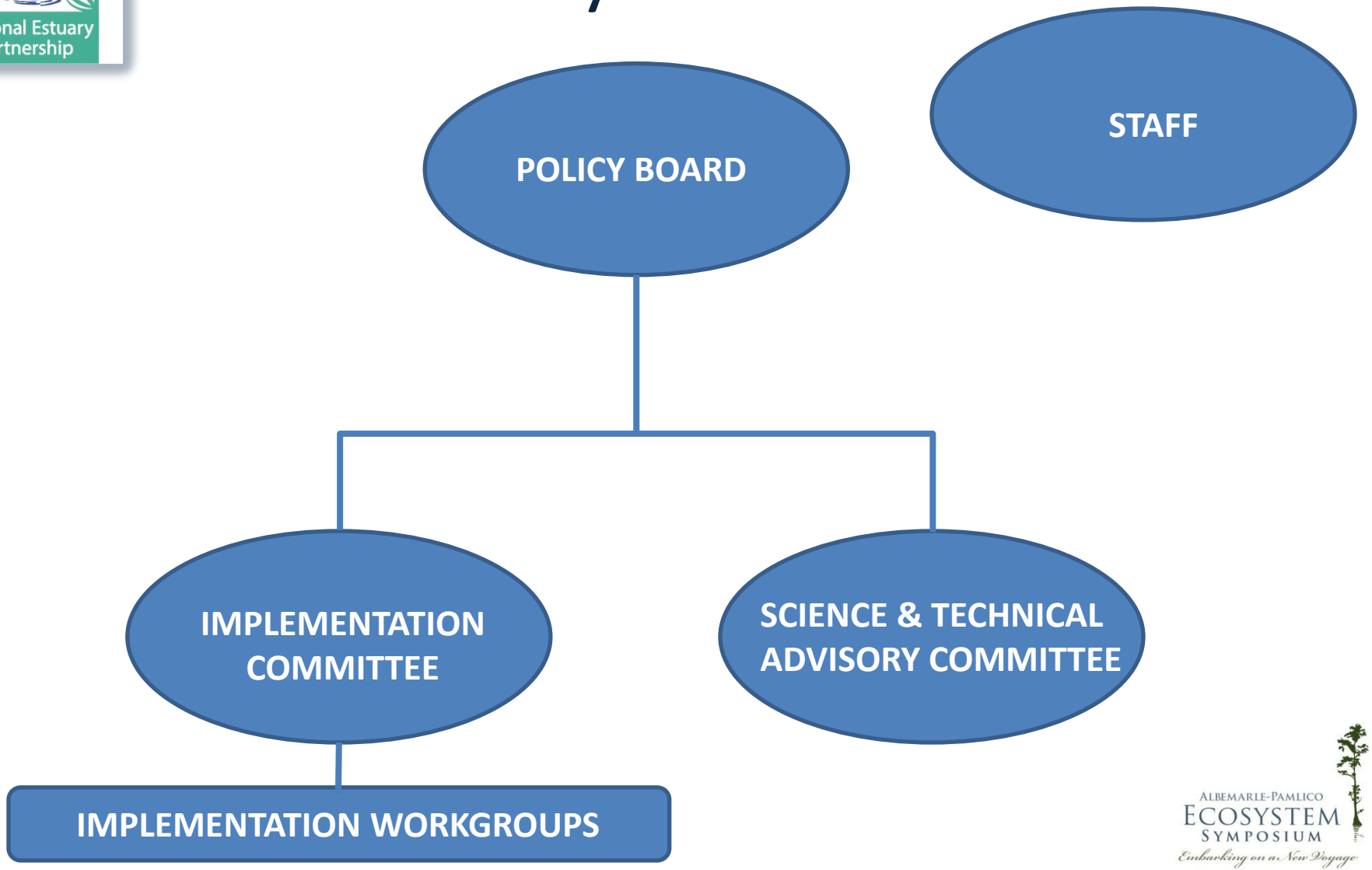
Advisory Structure



APNEP's Management Approach

- Watershed approach
- Applied science initiatives
- Collaborative, inclusive initiatives
- Partnerships

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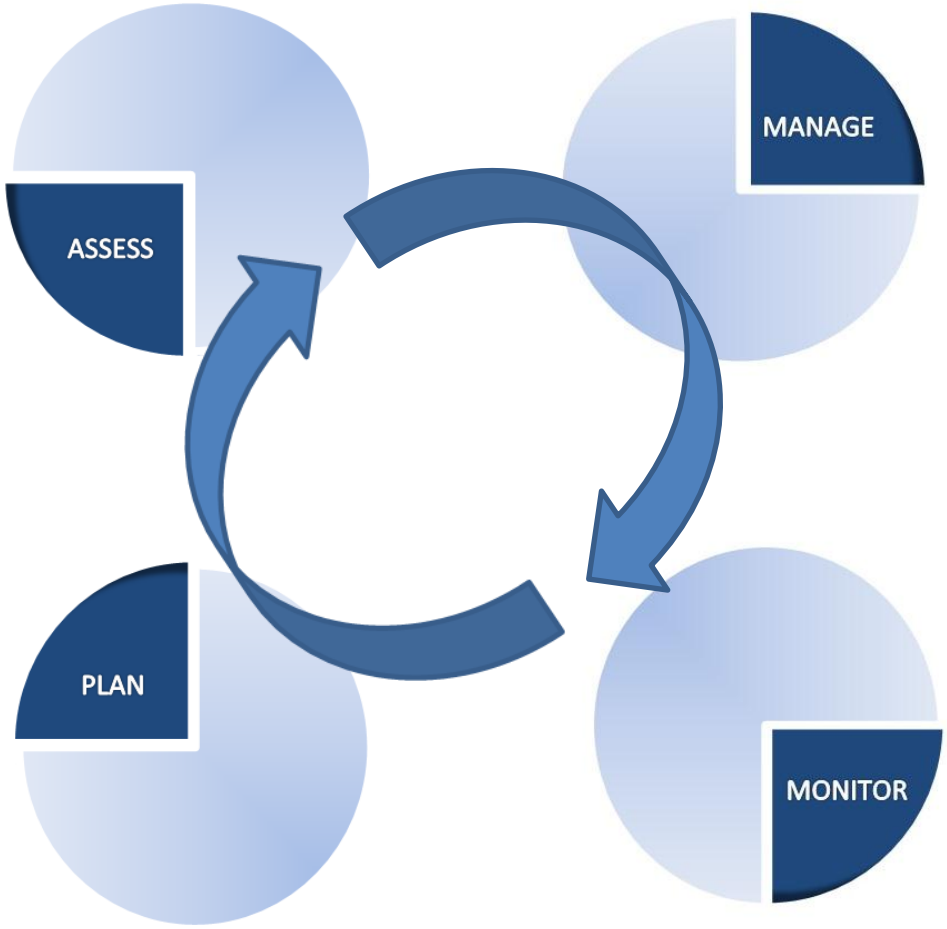
2012 Update to Management Approach

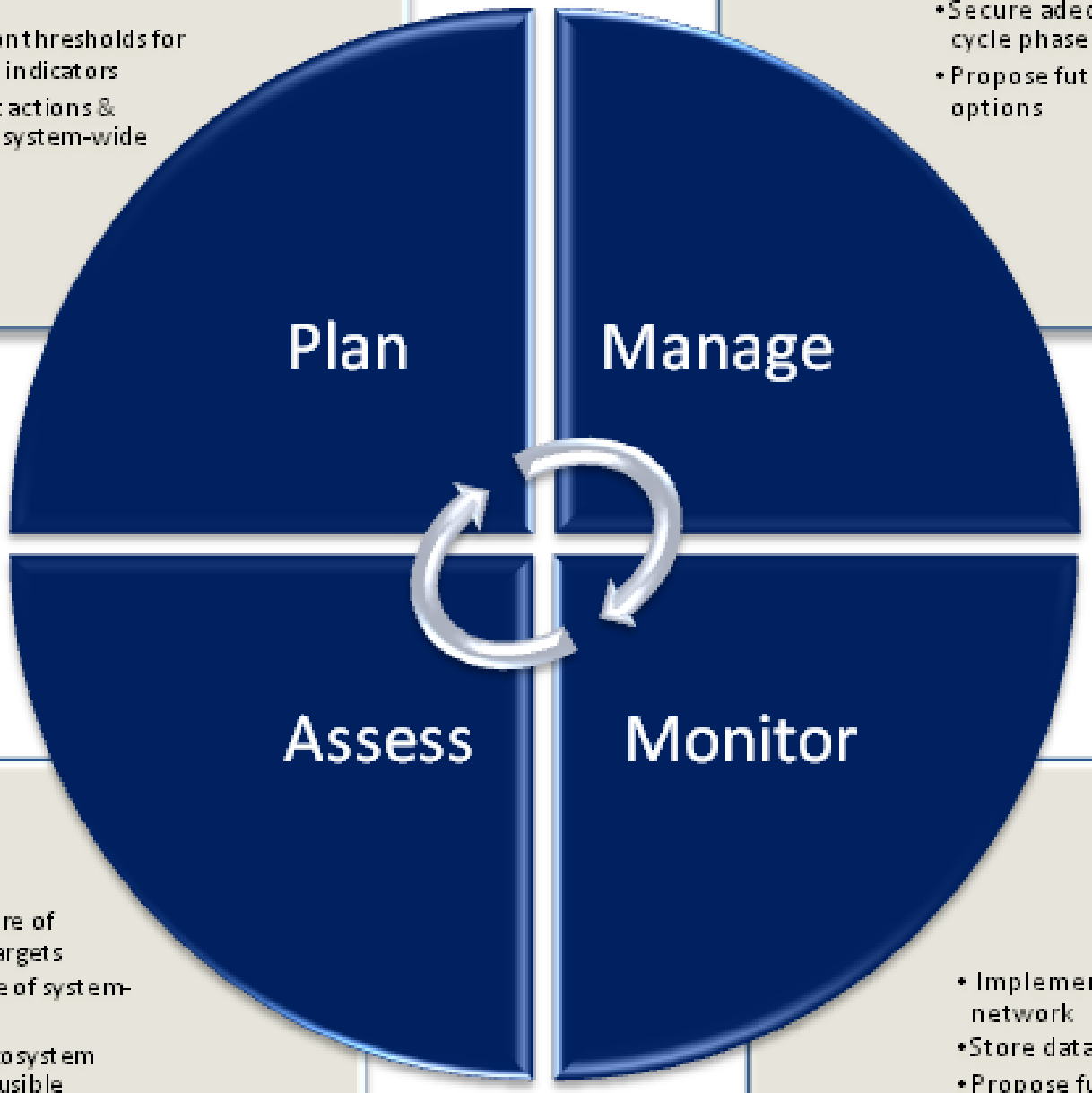
Incorporation of **Ecosystem-based Management**

- Systems-based approach.
- Human and environmental considerations.
- Adaptive management.
- Accountability.

Ecosystem-based Management

- Holistic vision & plan to include a comprehensive description of the system.
- Effective engagement of policy makers, managers, scientists, and stakeholders.
- Adaptive management framework to address a changing system.





- Articulate goals, desired outcomes, and indicators
- Set targets & decision thresholds for ecosystem outcome indicators
- Derive management actions & objectives based on system-wide model

- Implement management actions
- Secure adequate funding for all cycle phases plus research
- Propose future management options

- Identify success/failure of meeting ecosystem targets
- Evaluate performance of system-wide model
- Forecast change in ecosystem services based on plausible management scenarios

- Implement monitoring strategy / network
- Store data in accessible formats
- Propose future network improvements

Plan Organization

4 Fundamental Questions:

1. What is a healthy Albemarle-Pamlico estuarine system?

2. What is the status of the Albemarle-Pamlico estuarine system?

3. What are the greatest challenges facing the Albemarle-Pamlico system?

4. What actions should be taken to move toward a healthier system by 2022?

Question 1:

What is a Healthy Albemarle-Pamlico Estuarine System?

- 3 overarching goals established for the system.
- 12 measurable ecosystem outcomes.
- Ecosystem outcomes reflect desired status of the estuarine system.
- If goals are fully met, the system would be healthy.

Goal Description	A region where human communities are sustained by a functioning ecosystem.	
Outcome ID	Goal ID	Outcome Description
1a	Goal 1	Waters are safe for personal contact.
1b	Goal 1	Designated surface and groundwater supplies are safe for human comsumption.
1c	Goal 1	Surface hydrologic regimes sustain regulated human uses.
1d	Goal 1	Fish and game are safe for human consumption.
1e	Goal 1	Opportunities for recreation and access to public lands and waters are protected and enhanced.

Management Goal

Ecosystem Outcomes

Goal Description	A region where aquatic, wetland, and upland habitats support viable populations of native species.	
Outcome ID	Goal ID	Outcome Description
2a	Goal 2	The biodiversity, function, and populations of species in aquatic, wetland, and upland communties are protected, restored, or enhanced.
2b	Goal 2	The extent and quality of upland, freshwater, estuarine, and near-shore marine habitats fully support biodiversity and ecosystem function.
2c	Goal 2	Non-native invasive species do not significantly impair native species' viability or function, nore impair habitat quality, quantity, and the processes that form and maintain habitats.

Goal Description	A region where water quantity and quality maintain ecological integrity.	
Outcome ID	Goal ID	Outcome Description
3a	Goal 3	Appropriate hydrologic regimes support ecological integrity.
3b	Goal 3	Nutrients and pathogens do not harm species that depend on the waters.
3c	Goal 3	Toxics in waters and sediments do not harm species that depend on the waters.
3d	Goal 3	Sediments do not harm species that depend on the waters.

Goal	Ecosystem Outcome	CCMP Supporting Actions	Candidate Indicator
1: Human Communities A region where human communities are sustained by a functioning ecosystem	1a: Waters are safe for personal contact.	A1.1, 1.2, 2.3, 3.3; B1.2; C1.1,1.2, 1.4; D1.1, 1.2, 2.3,3.1,3.3; E1.1, 1.2, 2.1, 2.2	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.	A1.1, 1.2, 2.3, 3.3; B1.2; C1.1,1.2, 1.4; D1.1, 1.2, 2.3,3.1,3.3; E1.1, 1.2 , 2.1, 2.2	WQ standard violations (surface waters)
			Drinking water standard violations (aquifers)
	1c: Surface hydrologic regimes sustain regulated human uses.	A 1.1, 1.2, 1.2, 2.3, 3.4; D 1.2, 2.2, 3.2; E1.1, 1.2, 2.1 2.2	Severity and frequency of droughts
	1d: Fish and game are safe for human consumption.	A1.1, 1.2, 2.3, 3.3; B1.2; C1.1,1.2; D 1.1, 1.2, 2.3,3.1,3.3; E1.1, 1.2, 2.1, 2.2	Fish consumption advisories
			Shellfish area closures
	1e: Opportunities for recreation and access to public lands and waters are protected and enhanced.	A 1.1, 1.2, 2.3; D 1.1, 1.2, 1.5, 2.2, 3.3; E1.1, 1.2, 2.1 2.2	Total distance of land and paddle trails
			Water access points: number & location
2: Native Species A region where aquatic, wetland, and upland habitats support viable populations of native species	2a: The biodiversity, function, and populations of species in aquatic, wetland, and upland communities are protected, restored, or enhanced.	A1.1, 1.2, 2.2, 3.1, 3.4: B 1.3, 2.1, 2.3, 2.4, 2.5, 3.3; C 1.3, 1.4, 2.2, 3.2, 3.3, 4.1, 4.2, 4.3, 4.4; D1.1, 1.2, 1.4, 2.1, 2.2, 3.1, 3.3; E 1.1, 1.2, 2.1, 2.2	Oyster bed extent
			River herring abundance
			King rail, Swainson's warbler population /occurrences
			Box Turtle population /occurrences
			Longleaf Pine extent, location
			Firefly population
	2b: The extent and quality of upland, freshwater, estuarine and near-shore marine habitats fully support biodiversity and ecosystem function.	A 1.1, 1.2, 2.3, 3.1, 3.2, 3.4; B 1.1, 1.2, 1.3, 1.4, 1.5, 2.2, 2.3, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3; C 1.3, 1.4, 1.5, 2.1, 2.2, 3.1, 3.2, 3.3, 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3; D 1.2, 1.4, 2.2, 3.1, 3.3; E1.1, 1.2, 2.1, 2.2	SAV extent and composition
			Quality & extent of anadromous fish spawning/nursery areas
	2c: Non-native invasive species do not significantly impair native species' viability or function, nor impair habitat quality, quantity, and the processes that form and maintain habitats.	A 1.2, 2.1, 2.3; B 2.6; C 3.1; D 1.2, 1.3, 2.2, 3.3; E 1.1, 1.2, 2.1, 2.2	Hydrilla population status/occurrences
			Phragmites australis extent (common reed)
			Kudzu population status/occurrences
3: Water Quantity & Quality A region where water quantity and quality maintain ecological integrity	3a: Appropriate hydrologic regimes support ecological integrity.	A 1.2, 2.1, 2.3; B 2.6; C 3.1; D 1.2, 1.3, 2.2, 3.3; E 1.1, 1.2, 2.1, 2.2	Dissolved oxygen concentration
			Major river flows
	3b: Nutrients and pathogens do not harm species that depend on the waters.	A 1.1, 1.2, 2.3; B 1.2, 1.3, 1.4, 1.5; C 1.2, 2.1, 2.3, 2.4; D 1.1,1.2, 1.4, 2.1,2.2, 3.3, E1.1, 1.2, 2.1, 2.2	Amount and extent of impaired waters
			Chlorophyll-a concentration
	3c: Toxics in waters and sediments do not harm species that depend on the waters.	A 1.1, 1.2, 2.3, 2.4; B 1.1; C 1.2; D 1.2, 3.1, 3.3; E 1.1, 1.2, 2.1, 2.2	Amount and extent of impaired waters
			Dissolved metals concentrations
	3d: Sediments do not harm species that depend on the waters.	A 1.1, 1.2, 2.3; B 1.3, 1.4, 1.5, 2.3, 2.6, 3.1, 3.2; C 1.3, 1.5, 2.1, 2.3, 3.1, 3.2; D 1.2, 3.1, 3.3; E 1.1, 1.2, 2.1, 2.2	Amount and extent of impaired waters
			Average secchi disk depth

Question 2:

What is the status of the Albemarle-Pamlico System?

- This question is currently addressed by APNEP's 2012 Ecosystem Assessment.
- And in line with the adaptive management framework & ecosystem-based principles, this assessment will be revised periodically.
- Gaps and deficiencies in information will be identified through this process.
- The assessment analyzes 24 environmental indicators to give a status and trends overview for the system.

Question 3:

What Are the Greatest Challenges Facing the System?

- This question was addressed by APNEP's ecosystem-based management process.
- Significant challenges include:
  - Alteration and loss of habitat,
  - Land use changes,
  - Ongoing pollution inputs,
  - Increasing population,
  - Climate pressures.

Question 4:

What Actions Should Be Taken to Move Toward a Healthier Watershed by 2022?

- Management activities defined.
- Each management action is linked directly to one or more environmental outcomes.
- Indicators will be developed to track the implementation of management actions.
- Partner organizations & agencies are identified to highlight complimentary strengths & promote accountability.

5 Components

IDENTIFY

PROTECT

RESTORE

ENGAGE

MONITOR

Example

Objective A1: Develop & Refine Conservation Atlas

Action A1.1: Facilitate the mapping of significant ecological, bathymetric, geologic, demographic, & cultural features.

In a dynamic natural and social environment, regional mapping efforts develop and maintain the timely information necessary to support environmental decision making.

Key Partners: NC-OLWS, NC-DMF, SALCC, USFWS, NOAA, NC-DCM, NC-WRC, NC-NHP, VA-NHP

Outputs: Maps and GIS data

Results: Improved resource management decisions.

To Recap:

- 4 framing questions
- 3 overarching goals
- 12 ecosystem outcomes
- 16 objectives
- 58 actions
- The plan follows ecosystem-based management principles.
- It establishes an adaptive management framework to respond effectively to changes.
- It establishes quantifiable accountability measures.
- The plan organization and principles will ultimately lead to more effective implementation.

Questions?

CCMP can be downloaded at: http://portal.ncdenr.org/web/apnep/ccmp

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