



APNEP

Air Resources Monitoring & Assessment

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Albemarle-Pamlico National Estuary Partnership

Air Resources Monitoring & Assessment Workshop

US Environmental Protection Agency, RTP, NC

27 March 2017



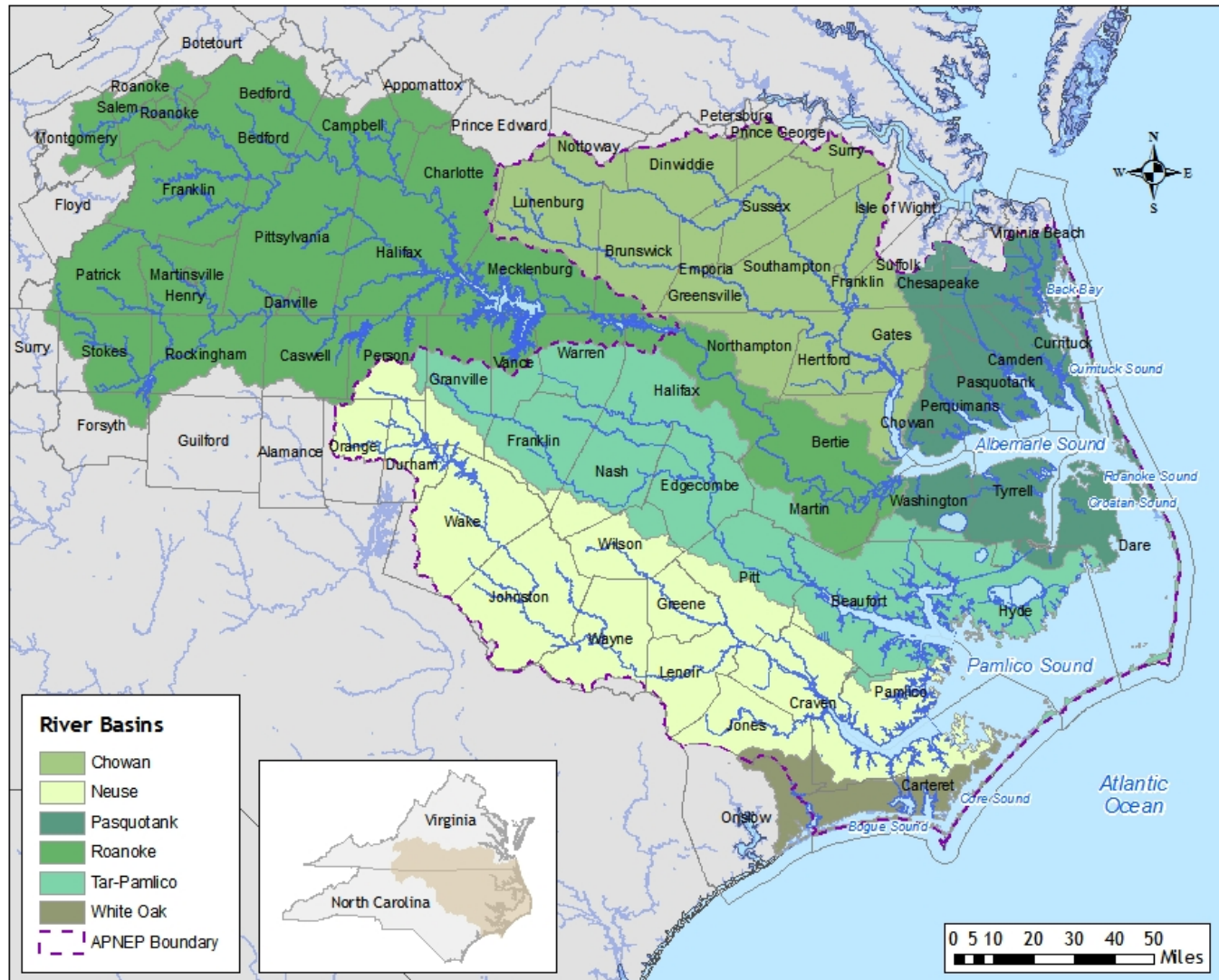
APNEP Mission

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

Albemarle - Pamlico



APNEP Implementation Area and Management Institutions



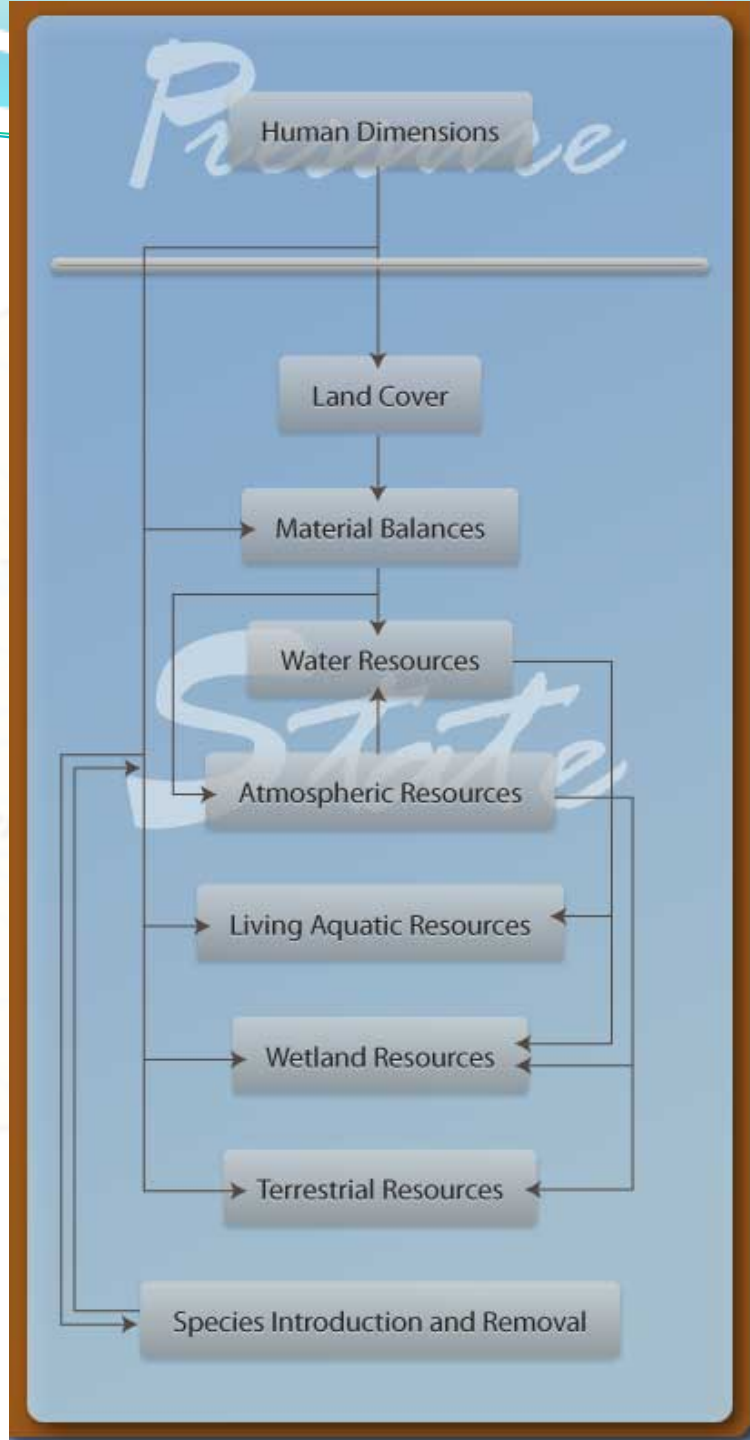
APNEP Indicator Definition

“A **numerical value** derived from actual measurements of a pressure, state or ambient condition, exposure, ecological condition, or measure of human health or wellbeing over a specified **geographic domain**, whose trends over time represent or draw attention to underlying **trends** in the condition of the environment in the A-P region.”

APNEP Indicator Criteria

- **Utilization:** Address a key process or property, and answers (or makes an important contribution toward answering) an important question about conditions in the A-P region
- **Objectivity:** Developed and presented in an accurate, clear, complete, and unbiased manner
- **Integrity:** Underlying data should be characterized by sound collection methodologies and data management systems adequate to protect its integrity, and to comply with quality assurance procedures
- **Availability:** Data should be available and timely, or will likely be available in the future, to maintain the indicator's utility
- **Representation:** Trends should accurately represent the underlying trends in the target population
- **Clarity:** The indicator should be clearly defined and reproducible. The specific data used and the specific assumptions, analytical methods, and statistical procedures employed are clearly stated

Regional Ecosystem Model



APNEP Objectives-Metrics Hierarchy

- Modules
- Categories
- Dimensions
- Metrics

APNEP Monitoring & Assessment 2008-2010

- APNEP staff adopt indicators/metrics in 2007
- Plan in 2008 to develop an integrated monitoring strategy for those indicators
- In concert with APNEP revising its Comprehensive Conservation & Management Plan (CCMP)
- Six APNEP resource monitoring & assessment teams



APNEP Air Resources Monitoring & Assessment (Phase I)

- Develop a **monitoring strategy** for Air Resource metrics within the APNEP region
- Metric-specific monitoring **proposals**
- Indicators to be featured in the 2012 APNEP Regional Ecosystem Assessment

APNEP Monitoring Proposal

- Justification for indicator
- Goal of sampling/monitoring program
 - What the optimum sampling/monitoring program will achieve and why that is important
- Existing sampling/monitoring program
 - Objectives - What the existing program is designed to measure.
 - Example: *Conduct periodic aerial mapping to monitor dramatic change of SAV presence over 5-year increments in four of six APES regions*
 - Methods
 - Costs
 - Data quality control (data quality objective)
 - Data analysis, statistical methods and hypotheses



APNEP Monitoring Proposal

- **Enhanced sampling/monitoring program**
 - Objectives - what the enhanced sampling/monitoring program is designed to measure.
 - Example: *Estimate the areal distribution and abundance of SAV along the western shorelines of APES and be capable of detecting significant change in SAV distribution and abundance*
 - Methods
 - Costs
 - Data quality control (data quality objective)
 - Data analysis, statistical methods and hypotheses
- **Reference(s)**
- **Contact Person**

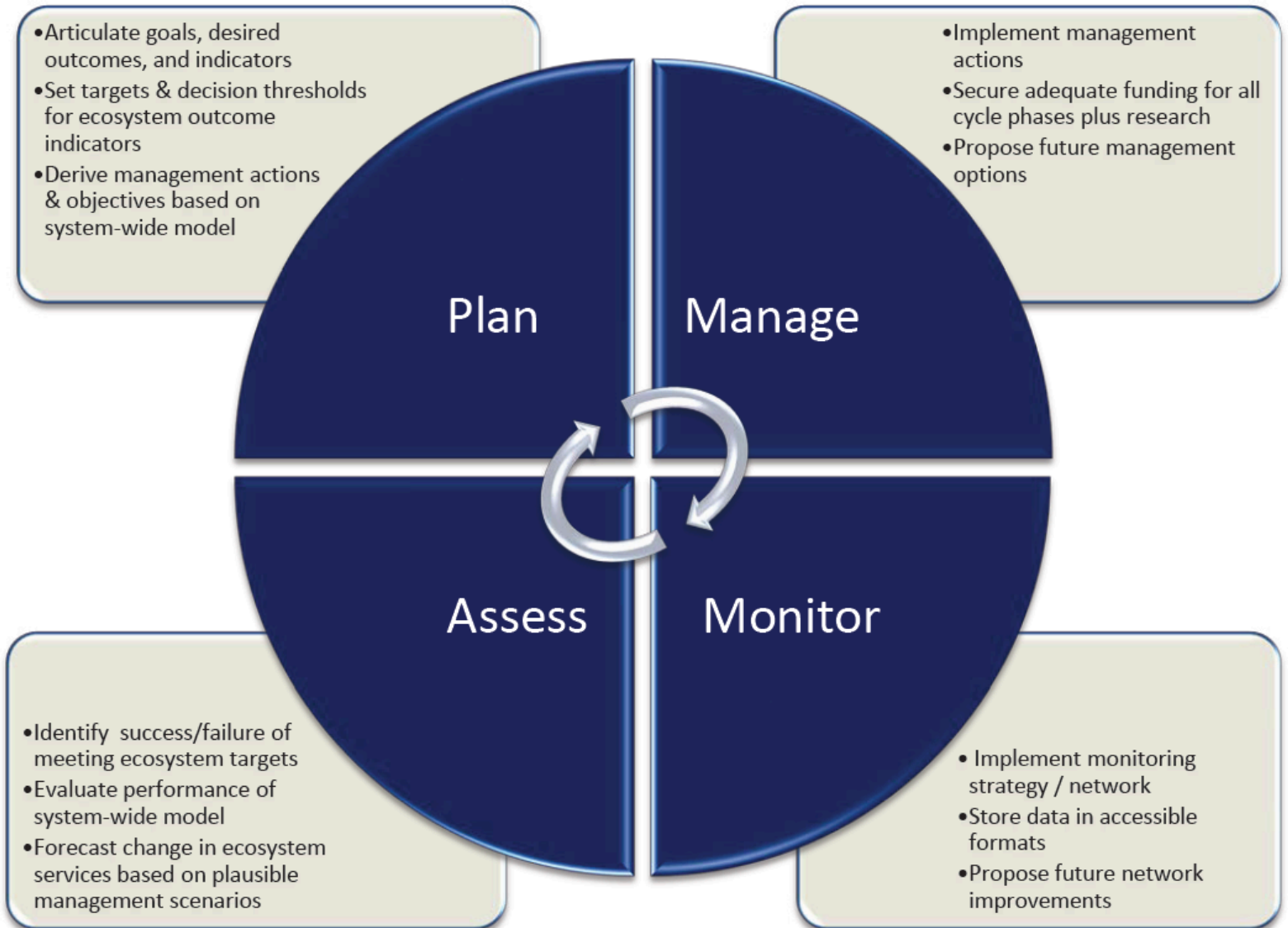


APNEP's Transition to Ecosystem-Based Management

- A **holistic vision and plan** that includes a comprehensive description of the A-P 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.



Figure 2: APNEP's adaptive management cycle.



CCMP's Four Questions

- What is a **healthy** Albemarle-Pamlico Estuarine System?
- What is the **status** of Albemarle-Pamlico Estuarine System?
- What are the **biggest threats** to Albemarle-Pamlico Estuarine System?
- What **actions** should be taken that will move us from where we are today to a healthier Albemarle-Pamlico Sounds by 2022?



APNEP's Ecosystem Health Goals

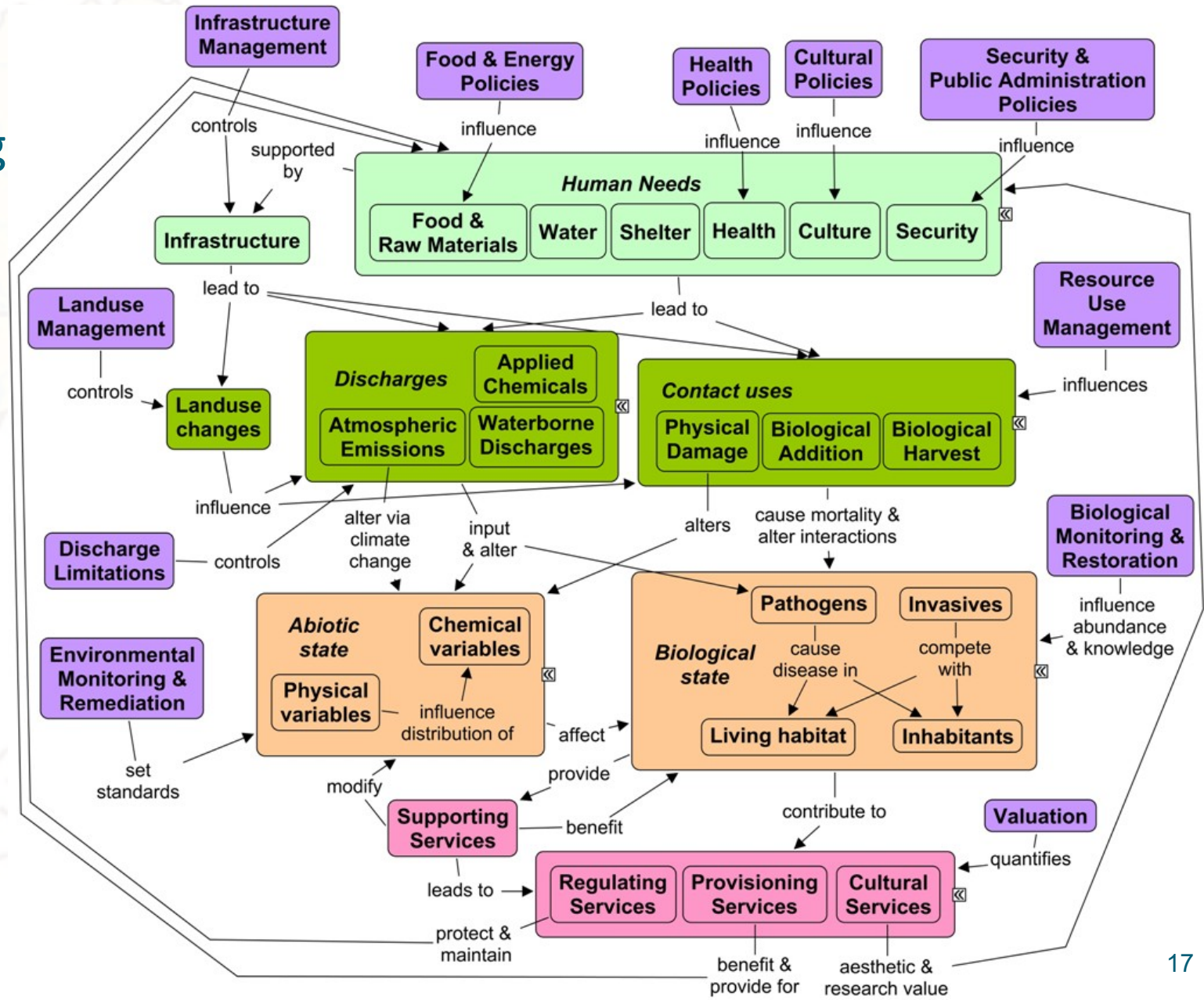
- A region where **human communities** are sustained by a functioning ecosystem
- A region where aquatic, wetland, and upland habitats support viable populations of **native species**
- A region where **water** quantity and quality maintain ecological integrity



Indicator Planning Decisions

- **What indicator(s) map to each environmental outcome?**
- **What are the fair, good, and excellent health target values for each ecosystem outcome indicator?**
- **What is the expected trajectory of an indicator value, based on how CCMP actions are implemented?**
- **What is the “trigger” value for a given interval since action steps are implemented, outside of which means the system is not behaving as forecast and change in business (e.g., research, revised action step, partner commitment) is required?**

DPSER Modeling



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

EPA-ORD-ESRP 2010



A-P Ambient Monitoring Program

- Precise goals and specific measures for monitoring policy effectiveness should be designed and tested at the time that a policy is implemented
- Status Quo: APNEP 2000 monitoring survey update

Monitoring Integration Continuum

- **Independence:** Knowledge of partners monitoring strategies
- **Cooperation:** Taking advantage of common geography, timing
- **Collaboration:** Opportunities to leverage partners' monitoring networks
- **Integration:** Working toward a common set of regional ecosystem objectives

APNEP Ecosystem Assessment System-Wide: Chemical & Physical

- *Total Inorganic Nitrogen Deposition*
 - Why Is Nitrogen Deposition Important?
 - What Does This Indicator Report?
 - What Do the Data Show?
 - Why Can't This Entire Indicator Be Reported at This Time?
 - Understanding the Data
 - Technical Notes



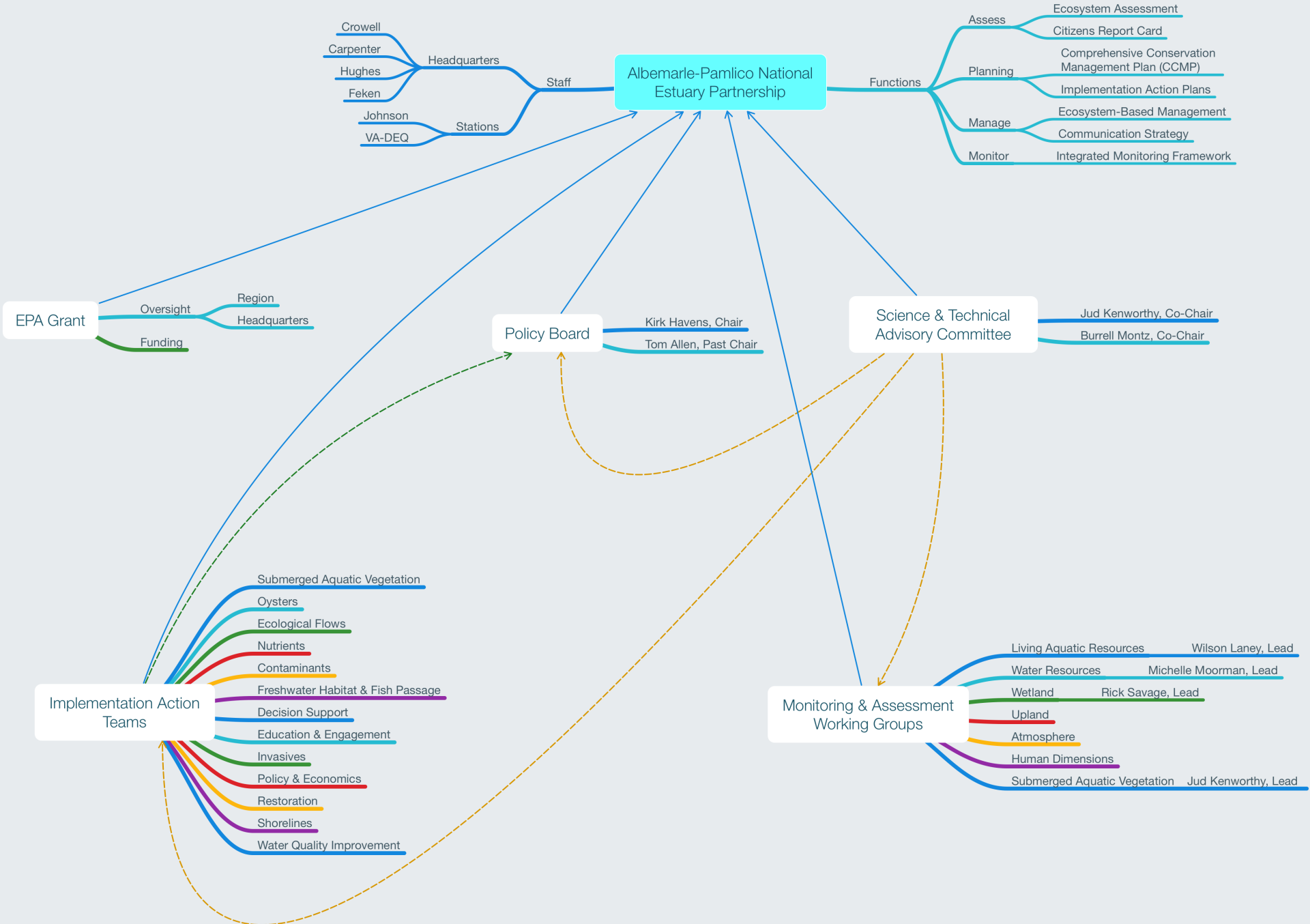
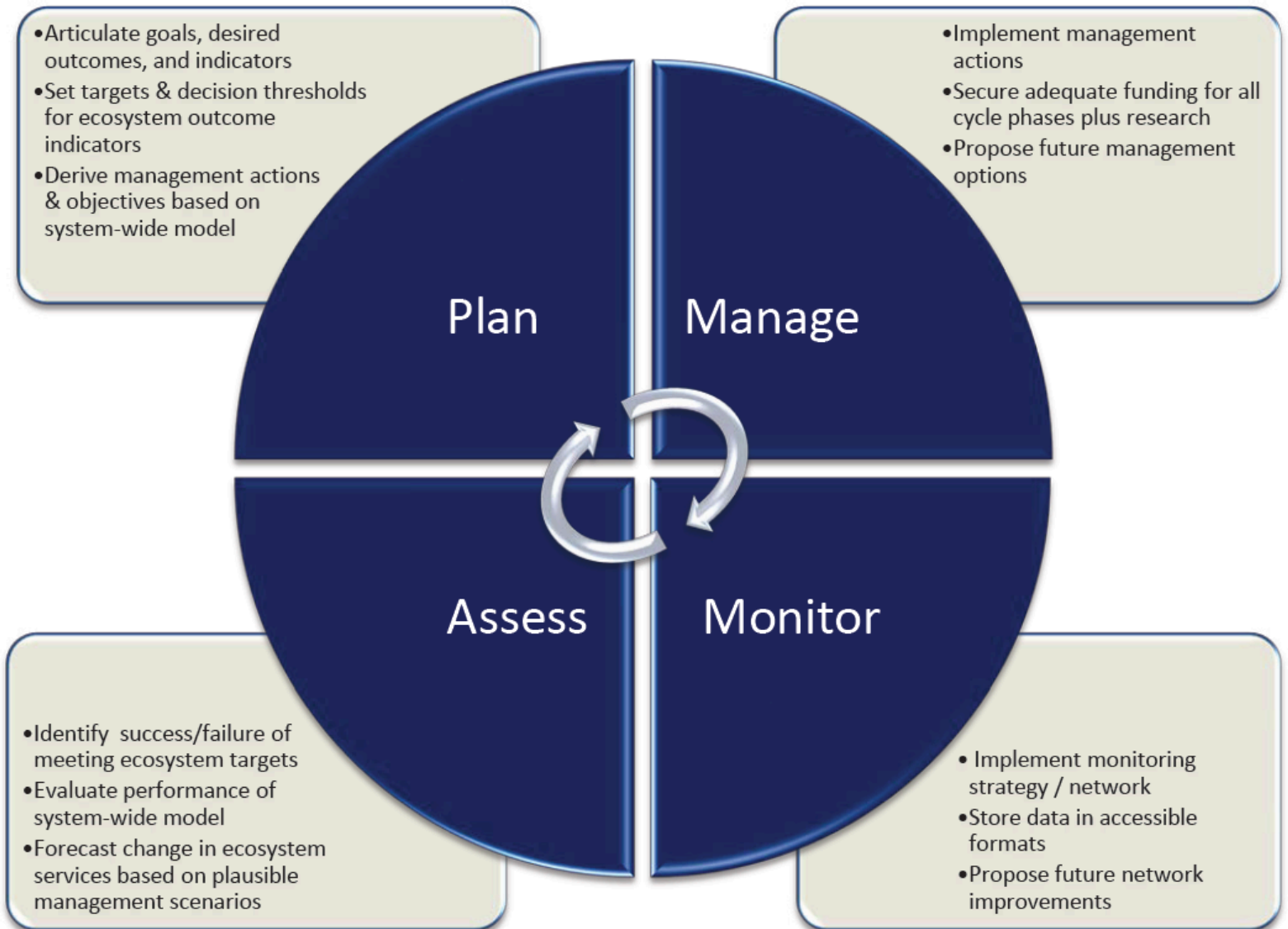


Figure 2: APNEP's adaptive management cycle.



APNEP Deliverables 2017-2018

- Regional Ecosystem Assessment 1.1
- Comprehensive Conservation & Management Plan (CCMP) 2.1
 - Indicator Specification & Targets 1.1
 - Ecosystem-Based Management (EBM) Plan 1.1
- Action Team Implementation Plans 1.0
- Integrated Monitoring Strategy 1.0
 - Indicator Specification 1.1
- Regional Ecosystem Model 1.0