Role of APNEP's Flows Workgroup

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Albemarle-Pamlico National Estuary Partnership

Flows Workgroup Kickoff Meeting
ECU Science & Technology Building
7 April 2015

Implement CCMP

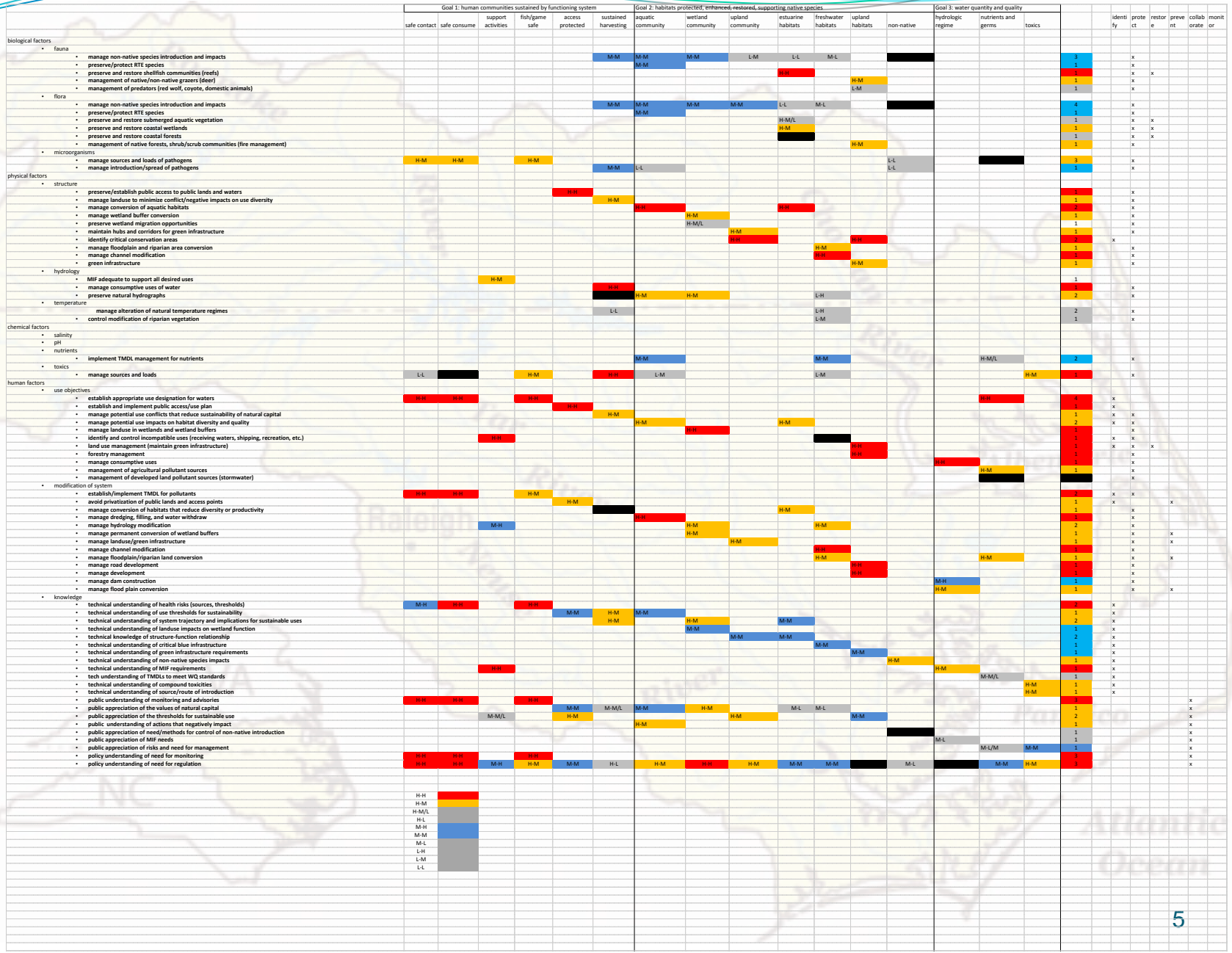
- Fourth CCMP question
- Ten-year horizon
- 58 CCMP actions
- Super-Aggregated into five components
- Aggregated into 15 CCMP objectives

APNEP EBM Transition Team

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

EBM Step 1:
Articulate Program Goals

EBM Step 2:
Develop system level model for goal attainment

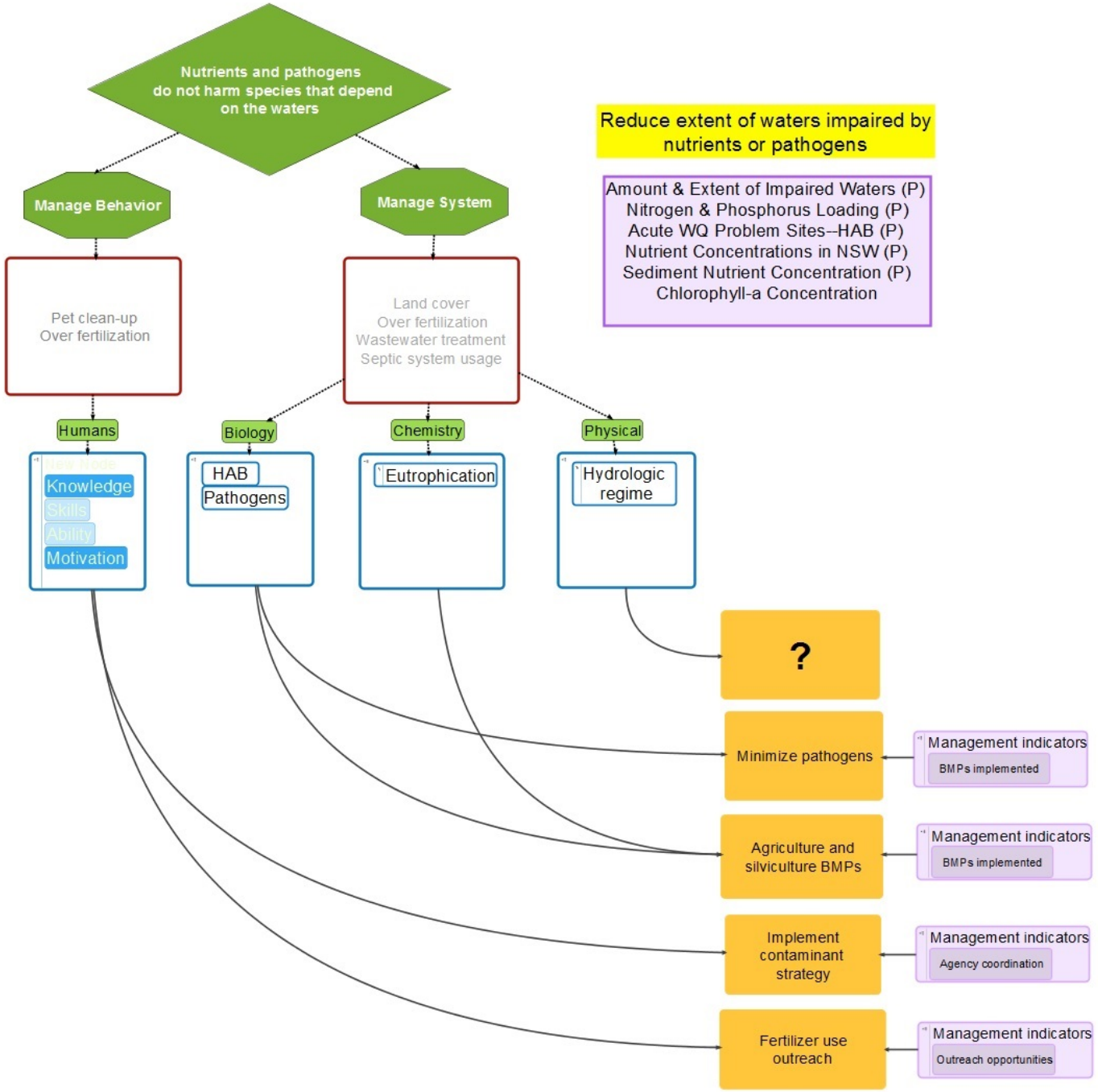

Goal 1: human communities sustained by functioning system
Goal 2: habitats protected, enhanced, restored, supporting native species
Goal 3: water quantity and quality
safe contact
safe consume
support activities
fish/game safe
access protected
sustained harvesting
aquatic community
wetland community
upland community
estuarine habitats
freshwater habitats
upland habitats
non-native
hydrologic regime
nutrients and germs
toxics
identify
protect
restore
prevent
collaborate
monitor
biological factors
fauna
manage non-native species introduction and impacts
preserve/protect RTE species
preserve and restore shellfish communities (reefs)
management of native/non-native grazers (deer)
management of predators (red wolf, coyote, domestic animals)
flora
manage non-native species introduction and impacts
preserve/protect RTE species
preserve and restore submerged aquatic vegetation
preserve and restore coastal wetlands
preserve and restore coastal forests
management of native forests, shrub/scrub communities (fire management)
microorganisms
manage sources and loads of pathogens
manage introduction/spread of pathogens
physical factors
structure
preserve/establish public access to public lands and waters
manage landuse to minimize conflict/negative impacts on use diversity
manage conversion of aquatic habitats
manage wetland buffer conversion
preserve wetland migration opportunities
maintain hubs and corridors for green infrastructure
identify critical conservation areas
manage floodplain and riparian area conversion
manage channel modification
green infrastructure
hydrology
MIF adequate to support all desired uses
manage consumptive uses of water
preserve natural hydrographs
temperature
manage alteration of natural temperature regimes
control modification of riparian vegetation
chemical factors
salinity
pH
nutrients
implement TMDL management for nutrients
toxics
manage sources and loads
human factors
use objectives
establish appropriate use designation for waters
establish and implement public access/use plan
manage potential use conflicts that reduce sustainability of natural capital
manage potential use impacts on habitat diversity and quality
manage landuse in wetlands and wetland buffers
identify and control incompatible uses (receiving waters, shipping, recreation, etc.)
land use management (maintain green infrastructure)
forestry management
manage consumptive uses
management of agricultural pollutant sources
management of developed land pollutant sources (stormwater)
modification of system
establish/implement TMDL for pollutants
avoid privatization of public lands and access points
manage conversion of habitats that reduce diversity or productivity
manage dredging, filling, and water withdraw
manage hydrology modification
manage permanent conversion of wetland buffers
manage landuse/green infrastructure
manage channel modification
manage floodplain/riparian land conversion
manage road development
manage development
manage dam construction
manage flood plain conversion
knowledge
technical understanding of health risks (sources, thresholds)
technical understanding of use thresholds for sustainability
technical understanding of system trajectory and implications for sustainable uses
technical understanding of landuse impacts on wetland function
technical knowledge of structure-function relationship
technical understanding of critical blue infrastructure
technical understanding of green infrastructure requirements
technical understanding of non-native species impacts
technical understanding of MIF requirements
tech understanding of TMDLs to meet WQ standards
technical understanding of compound toxicities
technical understanding of source/route of introduction
public understanding of monitoring and advisories
public appreciation of the values of natural capital
public appreciation of the thresholds for sustainable use
public understanding of actions that negatively impact
public appreciation of need/methods for control of non-native introduction
public appreciation of MIF needs
public appreciation of risks and need for management
policy understanding of need for monitoring
policy understanding of need for regulation
H-H
H-M
H-M/L
H-L
M-H
M-M
M-L
L-H
L-M
L-L

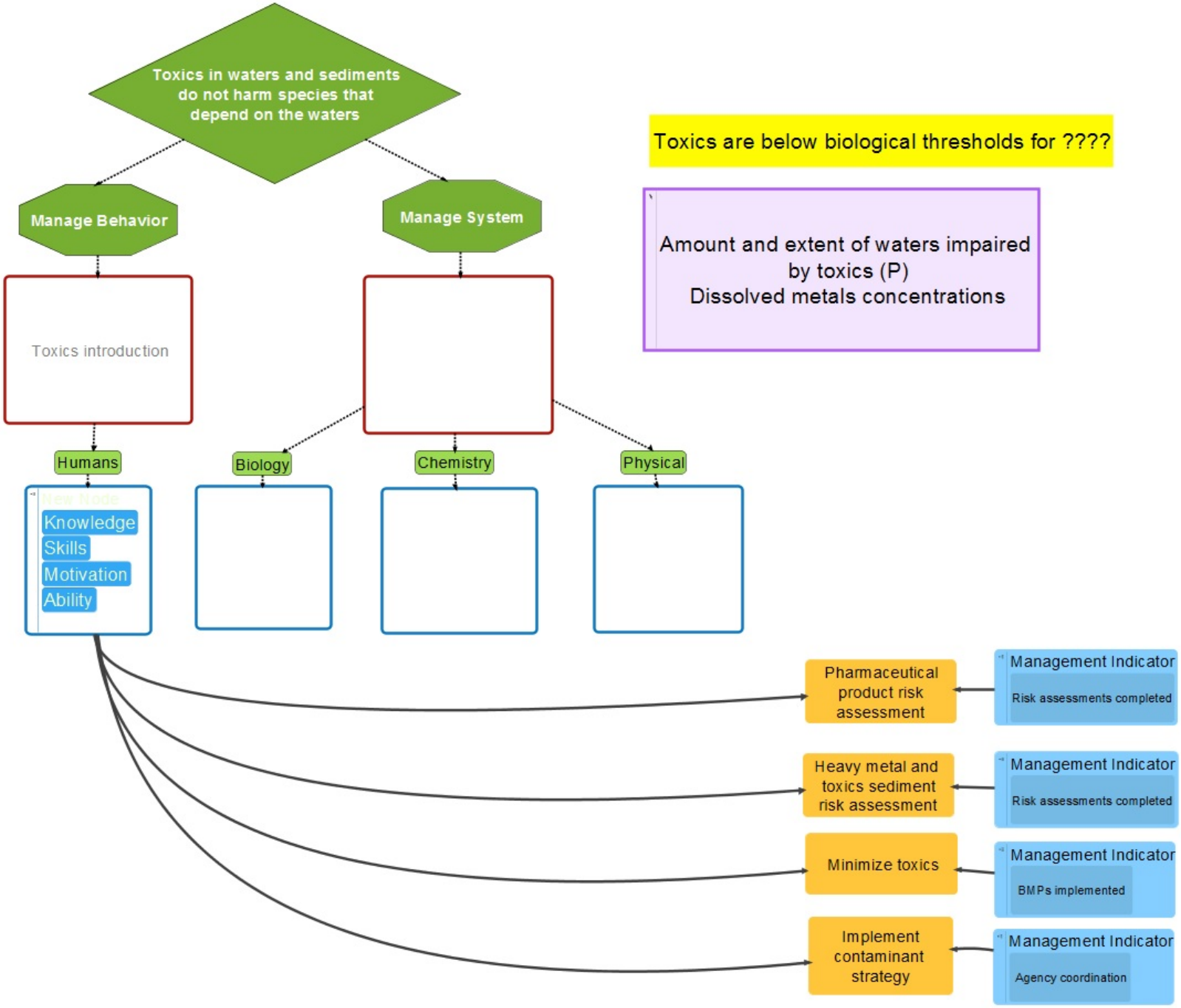
Outcome: Nutrients and pathogens do not harm the species that depend on the waters

- ***Biological Factors***
  - ***Fauna***
  - ***Flora***
  - ***Microorganisms***
    - **pathogen source control**
      - **human (septic)**
      - **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

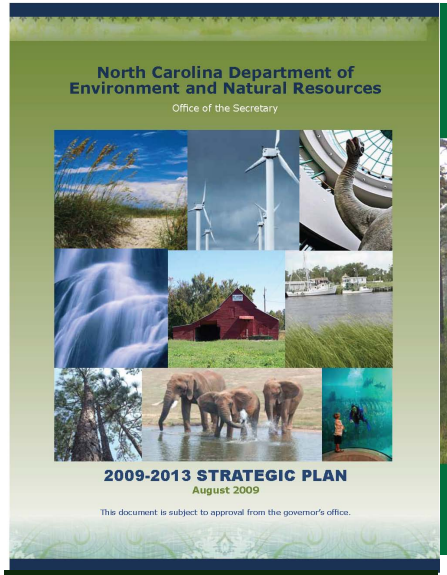
- ***Chemical Factors***
  - ***Salinity***
  - ***pH***
  - ***Nutrients***
    - **Load controls for nitrogen and phosphorus (air deposition, runoff, groundwater, point source)**
- ***Human Factors***
  - ***Use objectives***
    - **Management of agricultural pollutant sources**
    - **Management 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**

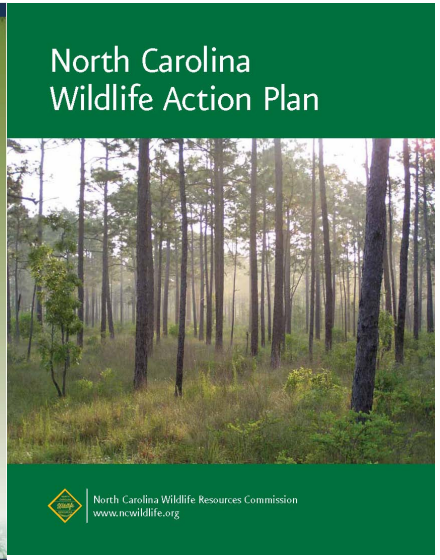

Nutrients and pathogens do not harm species that depend on the waters
Reduce extent of waters impaired by nutrients or pathogens
Amount & Extent of Impaired Waters (P)
Nitrogen & Phosphorus Loading (P)
Acute WQ Problem Sites--HAB (P)
Nutrient Concentrations in NSW (P)
Sediment Nutrient Concentration (P)
Chlorophyll-a Concentration
Manage Behavior
Manage System
Pet clean-up
Over fertilization
Land cover
Over fertilization
Wastewater treatment
Septic system usage
Humans
Biology
Chemistry
Physical
Knowledge
Skills
Ability
Motivation
HAB
Pathogens
Eutrophication
Hydrologic regime
?
Minimize pathogens
Management indicators
BMPs implemented
Agriculture and silviculture BMPs
Management indicators
BMPs implemented
Implement contaminant strategy
Management indicators
Agency coordination
Fertilizer use outreach
Management indicators
Outreach opportunities

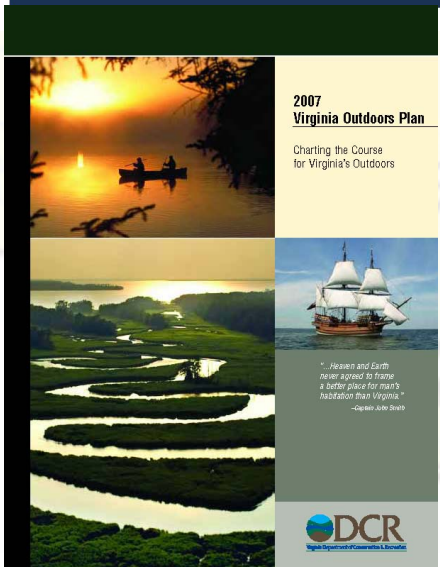

Toxics in waters and sediments do not harm species that depend on the waters
Manage Behavior
Manage System
Toxics introduction
Humans
Biology
Chemistry
Physical
New Node
Knowledge
Skills
Motivation
Ability
Toxics are below biological thresholds for ????
Amount and extent of waters impaired by toxics (P)
Dissolved metals concentrations
Pharmaceutical product risk assessment
Management Indicator
Risk assessments completed
Heavy metal and toxics sediment risk assessment
Management Indicator
Risk assessments completed
Minimize toxics
Management Indicator
BMPs implemented
Implement contaminant strategy
Management Indicator
Agency coordination

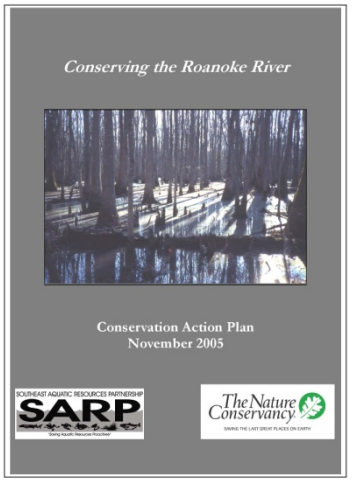
EBM Step 3: Assess current management efforts –identify gaps

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









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APNEP CCMP Workgroups

- highlighting indicates individual workgroup responsibilities for program actions and outcomes

Outcomes	Actions					Workgroups
1a	A1.1	B1.1	C1.1	D1.1	E1.1	Freshwater Habitats and Fish Passage
1b	A1.2	B1.2	C1.2	D1.2	E1.2	Policy & Economics
1c	A2.1	B1.3	C1.3	D1.3	E1.3	Decision Support Tools
1d	A2.2	B1.4	C1.4	D1.4	E2.1	Education & Engagement
1e	A2.3	B1.5	C1.5	D1.5	E2.2	Water Quality Imnprovements
2a	A2.4	B2.1	C2.1	D2.1		Shorelines
2b	A2.5	B2.2	C2.2	D2.2		Contaminant Management
2c	A3.1	B2.3	C2.3	D2.3		Invasives
3a	A3.2	B2.4	C3.1	D3.1		Restoration Strategies
3b	A3.3	B2.5	C3.2	D3.2		Monitoring Networks
3c		B2.6	C3.3	D3.3		Oysters
3d		B3.1	C4.1			SAV
		B3.2	C4.2			Flows
		B3.3	C4.3			Public Access
			C4.4			
			C5.1			
			C5.2			
			C5.3			

Flows

Outcomes	Actions					Workgroups
1a	A1.1	B1.1	C1.1	D1.1	E1.1	Freshwater Habitats and Fish Passage
1b	A1.2	B1.2	C1.2	D1.2	E1.2	Policy & Economics
1c	A2.1	B1.3	C1.3	D1.3	E1.3	Decision Support Tools
1d	A2.2	B1.4	C1.4	D1.4	E2.1	Education & Engagement
1e	A2.3	B1.5	C1.5	D1.5	E2.2	Water Quality Imnprovements
2a	A2.4	B2.1	C2.1	D2.1		Shorelines
2b	A2.5	B2.2	C2.2	D2.2		Contaminant Management
2c	A3.1	B2.3	C2.3	D2.3		Invasives
3a	A3.2	B2.4	C3.1	D3.1		Restoration Strategies
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		B3.3	C4.3			Public Access
			C4.4			
			C5.1			
			C5.2			
			C5.3			

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Flow Workgroup Actions

- Action A3.3: Develop and refine ecological flow requirements for each major river. Many of the fish, aquatic plants, and other species that live within the estuarine system depend on flowing water to survive. Identifying these ecological flows will help ensure that these species and ecosystems are protected.
- Action D3.2: Facilitate the development and implementation of basinwide water management plans to ensure no less than minimum in-stream flows are maintained. APNEP will work to provide scientific information and engage regional stakeholders to develop and implement water management plans that fully account for both human and ecological demands.

APNEP CCMP Outcomes

- highlighting indicates actions and workgroups responsible for each outcome
- actions are color-coded to indicate the responsible workgroups

Outcomes	Actions					Workgroups
1a	A1.1	B1.1	C1.1	D1.1	E1.1	Freshwater Habitats and Fish Passage
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			C4.4			
			C5.1			
			C5.2			
			C5.3			

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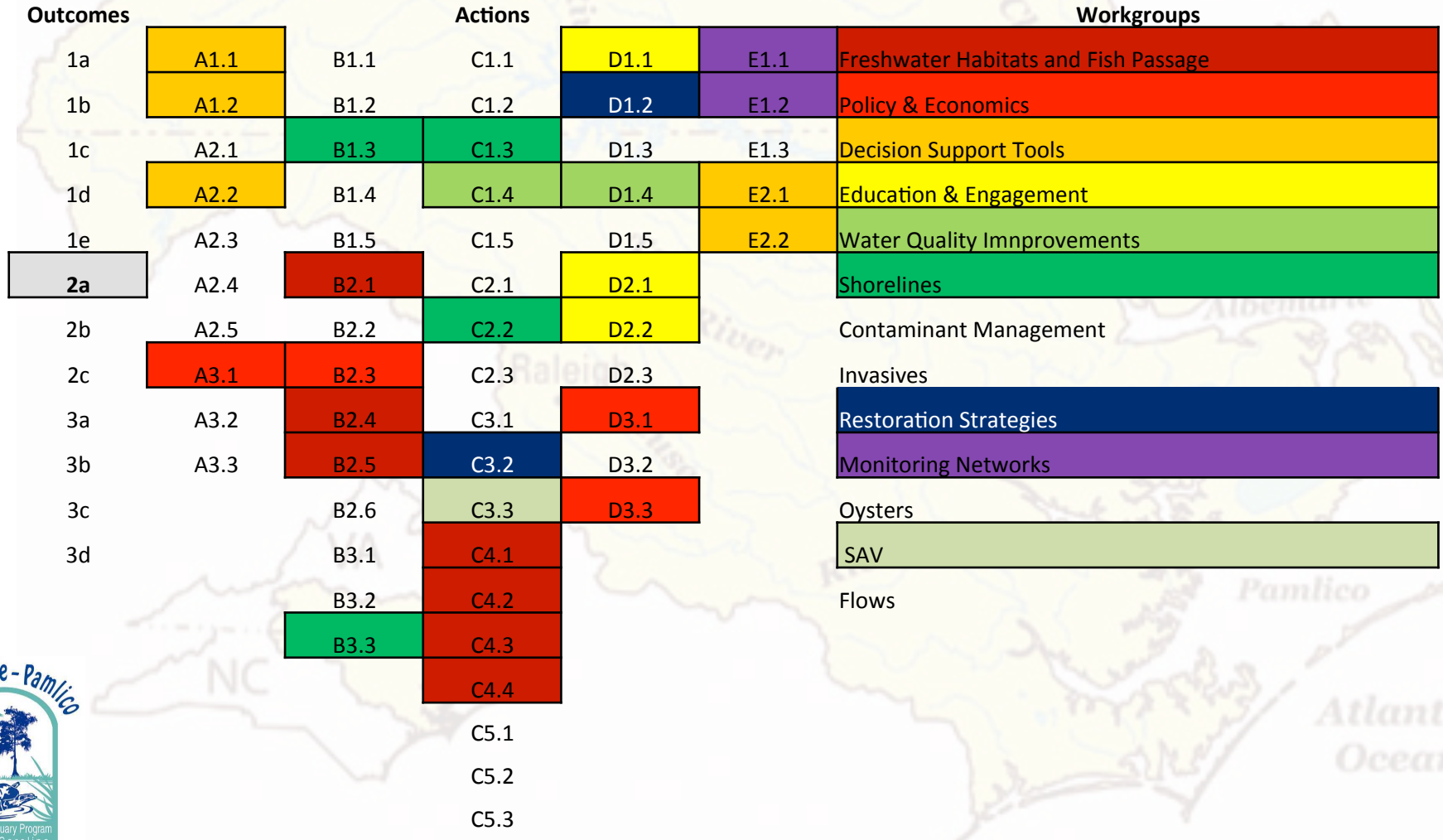
2a. The biodiversity, function, and population of species in aquatic, wetland, and upland communities are protected, restored, or enhanced



2b. The extent and quality of upland, freshwater, estuarine and near-shore marine habitats fully support biodiversity and ecosystem function

Outcomes	Actions					Workgroups
1a	A1.1	B1.1	C1.1	D1.1	E1.1	Freshwater Habitats and Fish Passage
1b	A1.2	B1.2	C1.2	D1.2	E1.2	Policy & Economics
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			C4.4			
			C5.1			
			C5.2			
			C5.3			

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Figure 2: APNEP's adaptive management cycle.