

Identifying Healthy Watersheds to inform Management Planning in Alabama and the Mobile Bay Watershed

A partnership between Federal, State, Local and Private entities



ADEM Non-Point Source Conference
January 17, 2013, Renaissance Hotel in Montgomery

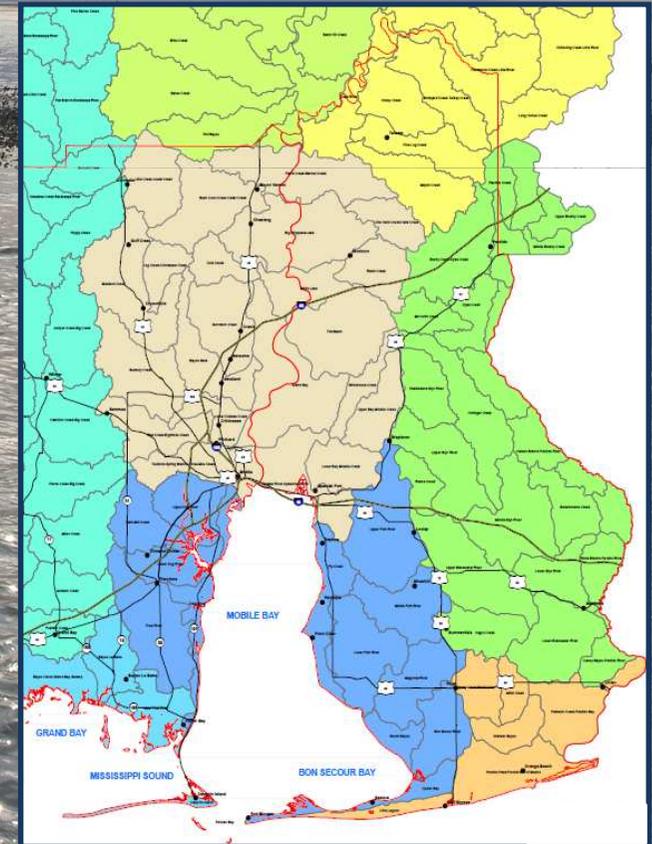
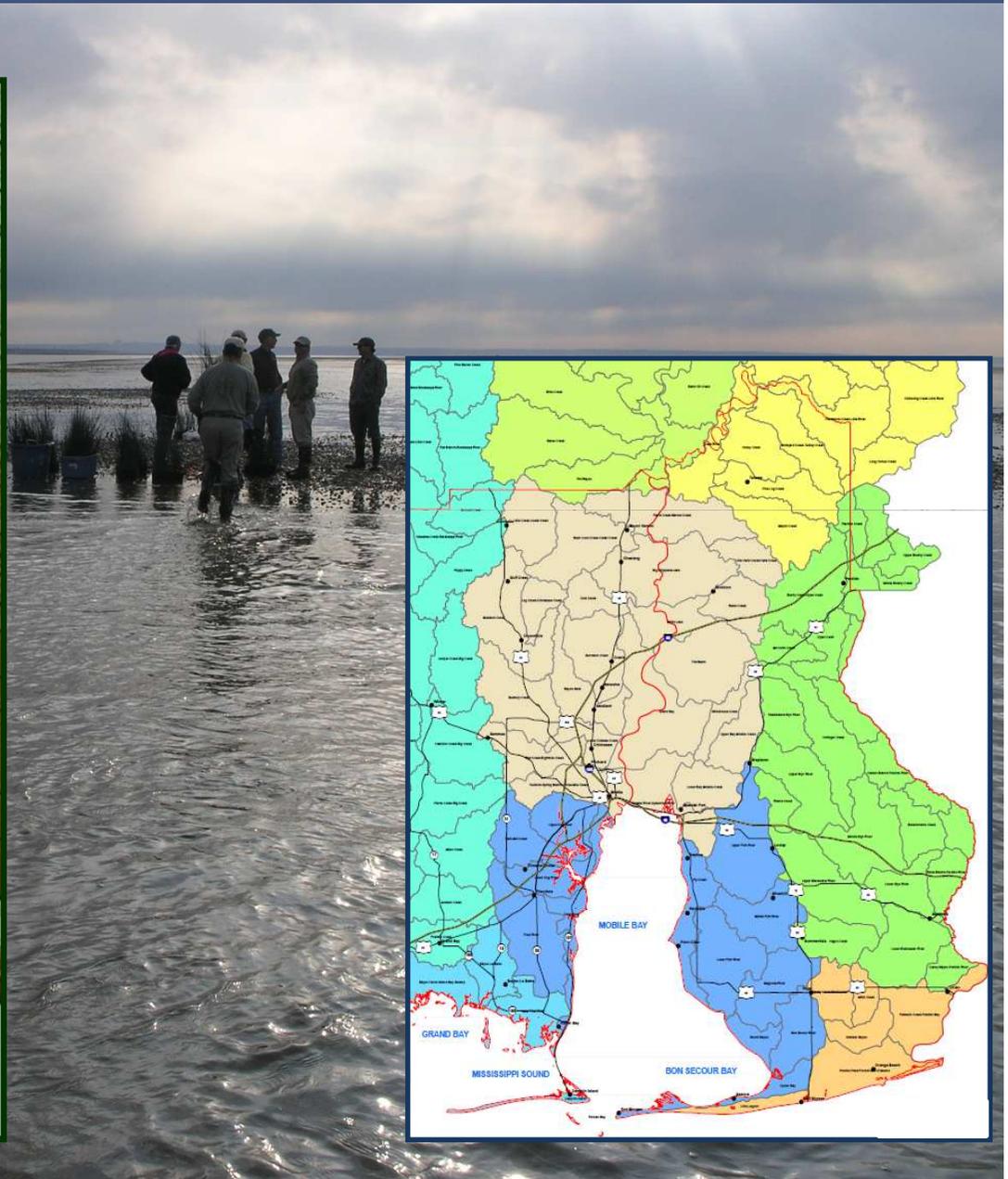
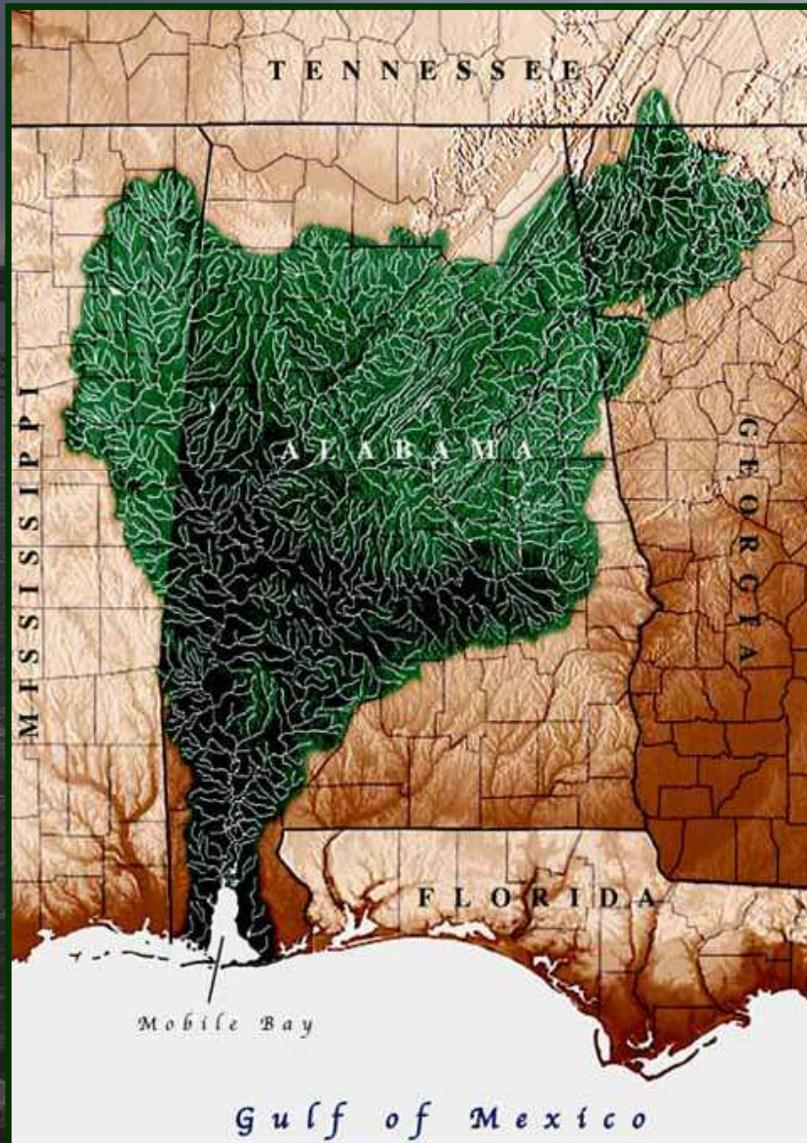


The Mobile Bay National Estuary Program

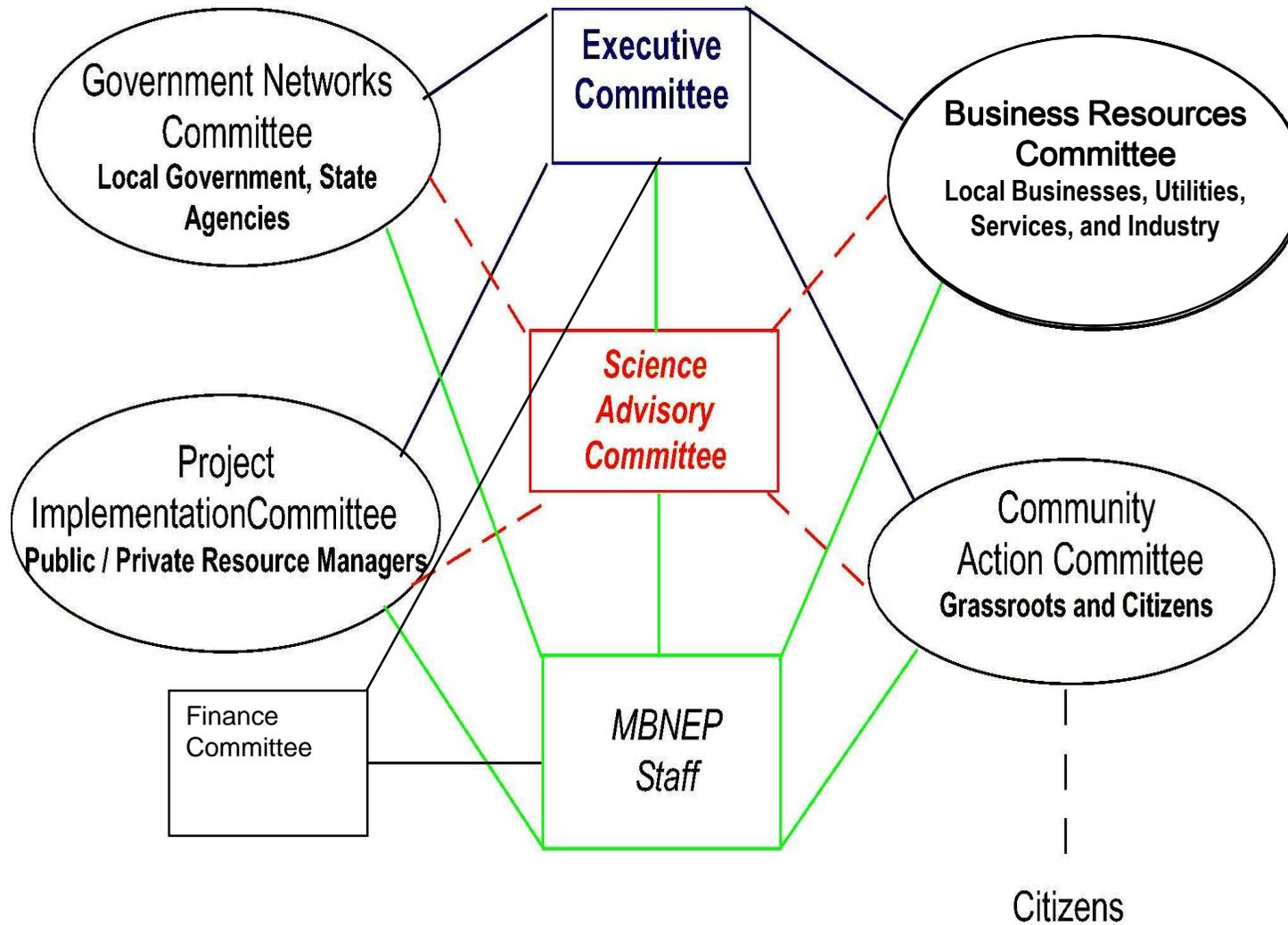
Our mission is to promote the wise stewardship of the water quality and living resources of Alabama's estuaries

- **Funded by U. S. EPA, State of Alabama, and local governments and private interests**
- **One of 28 “nationally significant estuaries” in the United States**
- **In existence for 17 years**
- **Comprehensive Conservation Management Plan (CCMP)**
 - **Water Quality**
 - **Living Resources**
 - **Habitat Management**
 - **Human Uses**
 - **Education/Public Involvement**

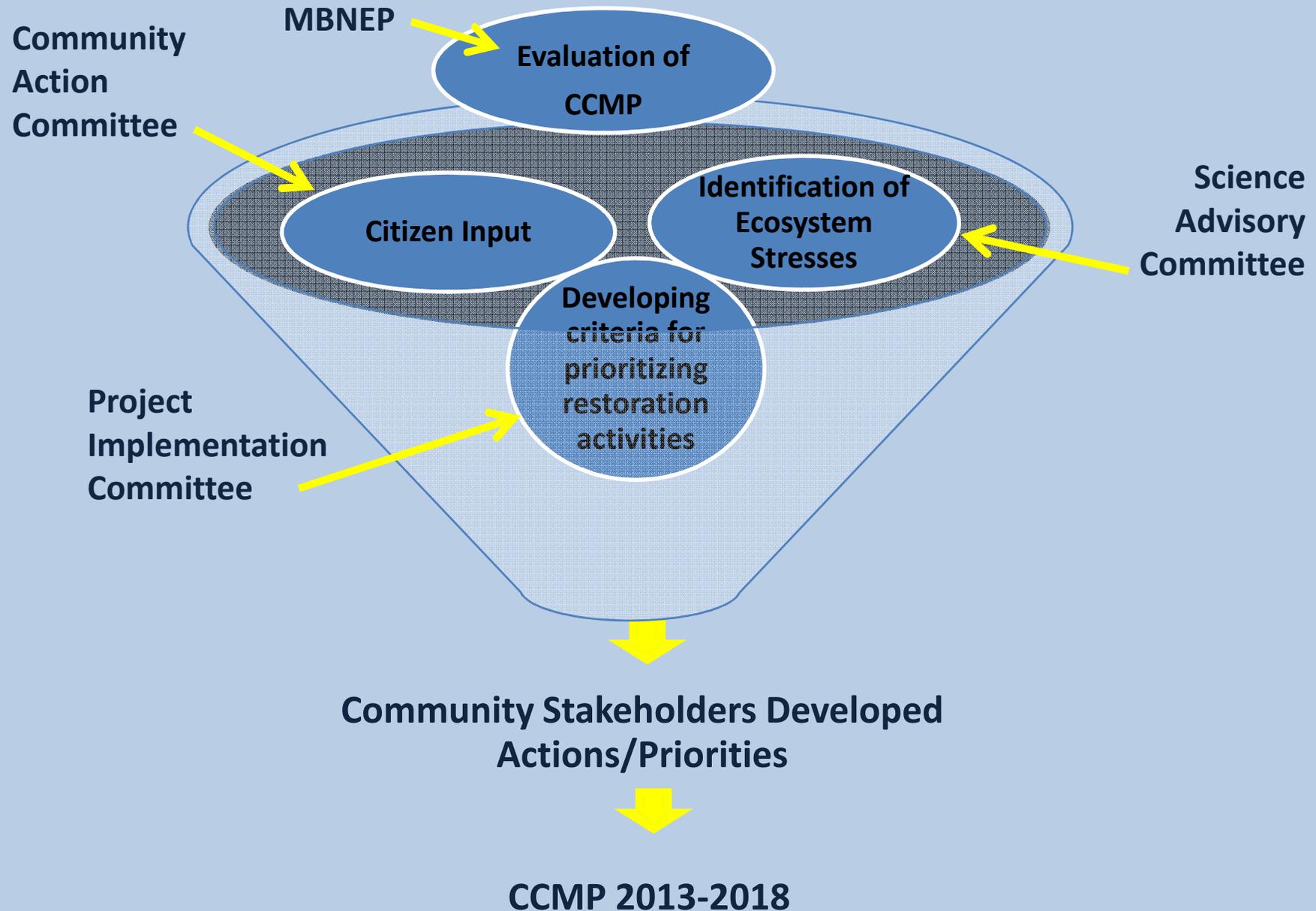
The Watershed and Estuary



The MBNEP Management Conference

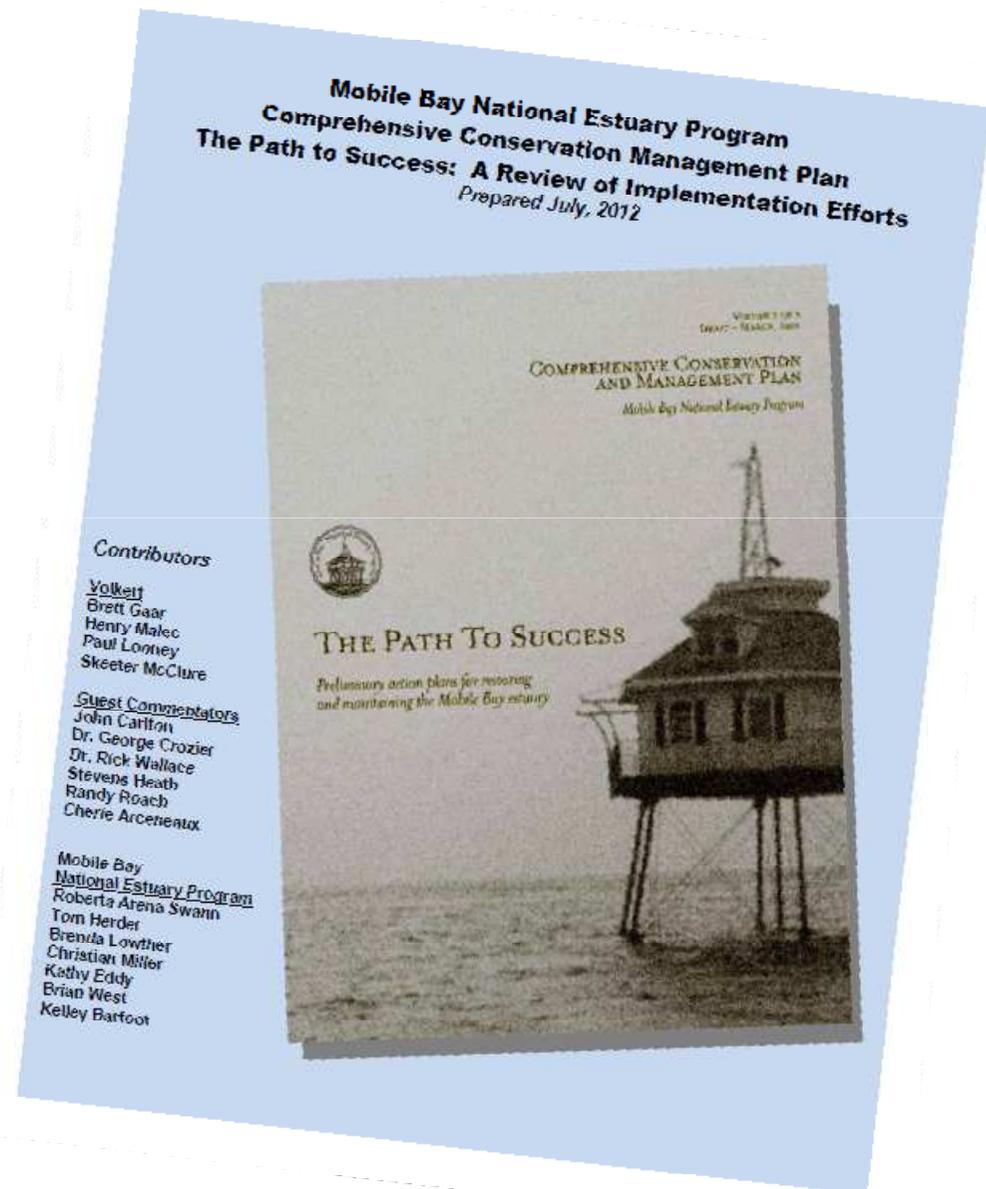


Re-visiting the Conservation Management Plan



Evaluation of CCMP

- Expand Research
- Monitor key species
- Identify/Restore/Protect areas of most and least stress
- Improve State and local governance of land and water
- Expand Citizen Participation
- Improve Education and Outreach



What people
value most
about living in
coastal
Alabama...



Access to Water and Open Spaces



**Coastlines
(Beaches and Other Shorelines)**



Fish



Heritage and Culture



**Environmental Health and
Resilience**



Water Quality

Assessing Stressors on Ecosystem Services Provided by a Suite of Priority Habitats

Habitat	Eco-Service	Chemical Contamination	Dredging/Filling	Fire Suppression	Fragmentation	Invasive Species	Land Use Change	Nutrient Enrichment	Pathogens	Sedimentation	Sea Level Rise	Climate Variability	Freshwater Discharge	Resource Extraction	Total
Freshwater Wetlands	Biodiversity	1.9	2.3	0.9	2.3	2.4	2.6	1.6	1.1	2.2	1.6	1.8	2	1.6	24.3
Freshwater Wetlands	Carbon Sequestration	1	2	0.7	1.7	1.5	2.3	1.4	0.7	2.1	1.5	1.5	1.5	0.9	18.8
Freshwater Wetlands	Fisheries habitat	1.8	2.5	0.5	2.1	2.1	2.4	1.9	1	2.2	1.7	1.8	2.2	1.4	23.6
Freshwater Wetlands	Flood control	0.6	2.4	0.5	1.9	1.1	2.4	0.8	0.5	2.2	1.8	1.4	1.9	1.1	18.6
Freshwater Wetlands	Groundwater replenishment	1.3	2.1	0.4	1.8	0.9	2.2	1.3	1	1.7	1.7	1.4	2.1	1.2	19.1
Freshwater Wetlands	Nesting habitat for birds and turtles	1.7	2.5	1.2	2.5	2.1	2.7	1.5	1.3	1.9	2	1.7	2.1	1.5	24.7
Freshwater Wetlands	Oyster production	0.8	1	0.2	0.8	0.8	1.1	1	0.8	1	0.6	0.7	1	0.6	10.4
Freshwater Wetlands	Primary production	1.3	2.1	0.8	1.9	1.9	2.6	1.9	0.7	2.1	1.7	1.5	1.9	1.2	21.6
Freshwater Wetlands	Sediment and nutrient retention and export	0.9	2.3	0.6	1.9	1.2	2.6	2.1	0.6	2.6	1.5	1.5	2	1.6	21.4
Freshwater Wetlands	Storm buffer/hazard protection	0.7	2.4	0.5	2.2	1.1	2.7	0.8	0.4	2.2	1.8	1.7	1.6	1.2	19.3
Freshwater Wetlands	Water quality enhancement	2	2.5	0.6	2	1.2	2.4	2.4	1.6	2.1	1.4	1.3	2	1.7	23.2
Freshwater Wetlands	Wildlife habitat	1.7	2.5	1.1	2.3	2.3	2.5	1.8	0.9	1.9	1.8	1.6	1.9	1.6	23.9
Freshwater Wetlands Total		15.7	26.6	8	23.4	18.6	28.5	18.5	10.6	24.2	19.1	17.9	22.2	15.6	248.9

Highest Ranking Habitats, Ecosystem Services and Stresses

Habitat	Ecosystem Services Most Stressed	Top Stress Impacts	Values
Freshwater Wetlands	Nesting for birds and turtles Biodiversity Wildlife, Fisheries	Land Use Change Fragmentation Dredging and Filling	Access Fish Heritage Resilience Water Quality
Intertidal Marshes and Flats	Biodiversity Fisheries Wildlife Water Quality	Sediment Sea Level Rise Fragmentation	Access Beaches Fish Heritage Resilience Water Quality
Streams and Rivers (Riparian Buffers)	Fish Biodiversity Water Quality Sediment	Freshwater discharge Land Use Change Sediments	Access Fish Heritage Resilience Water Quality

Where do we focus our efforts?

Figure 3: Prioritized Freshwater Wetlands

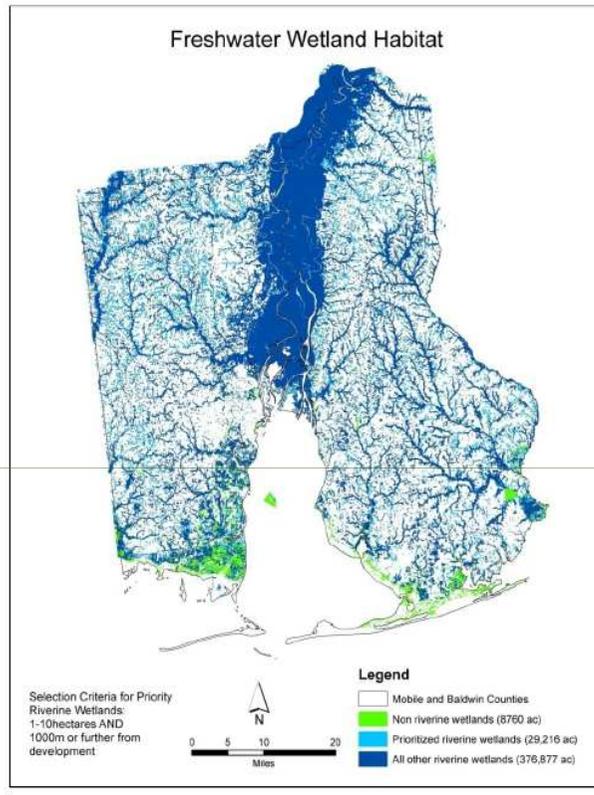


Figure 7: Prioritized Intertidal Marshes and Flats

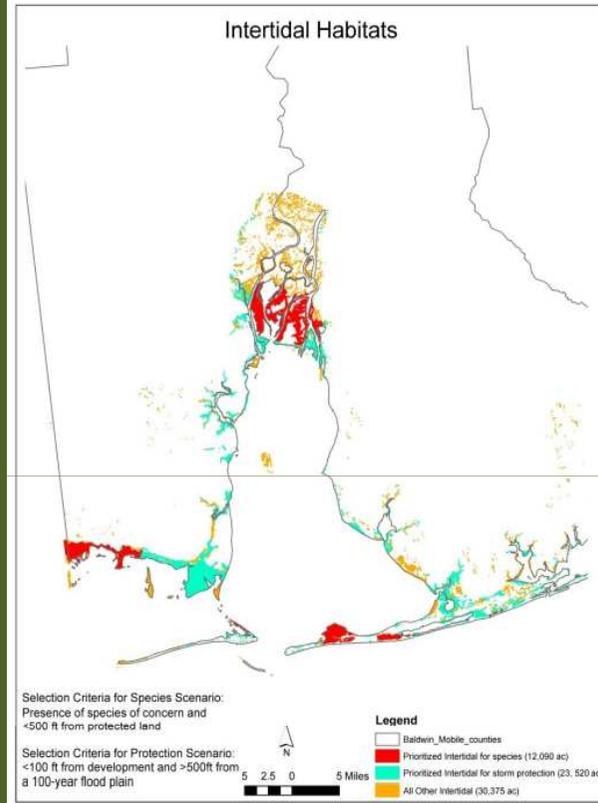
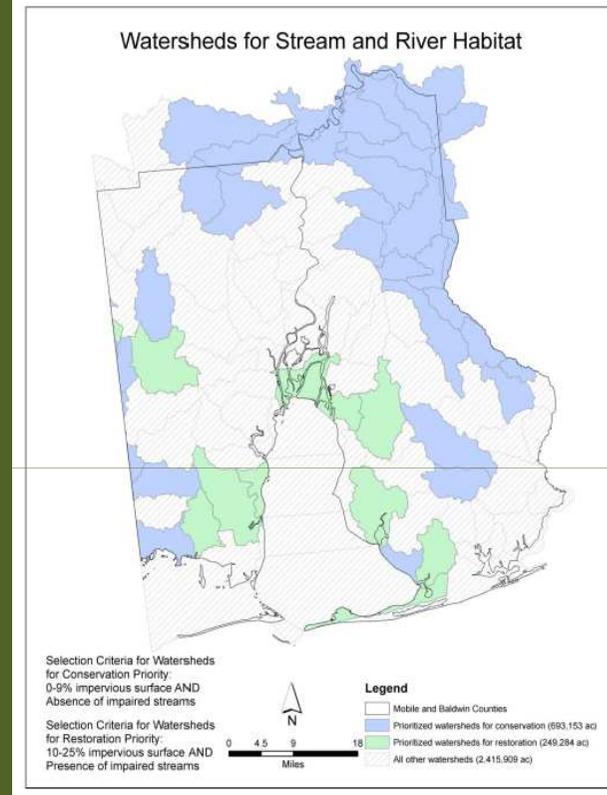


Figure 11: Prioritized Watersheds

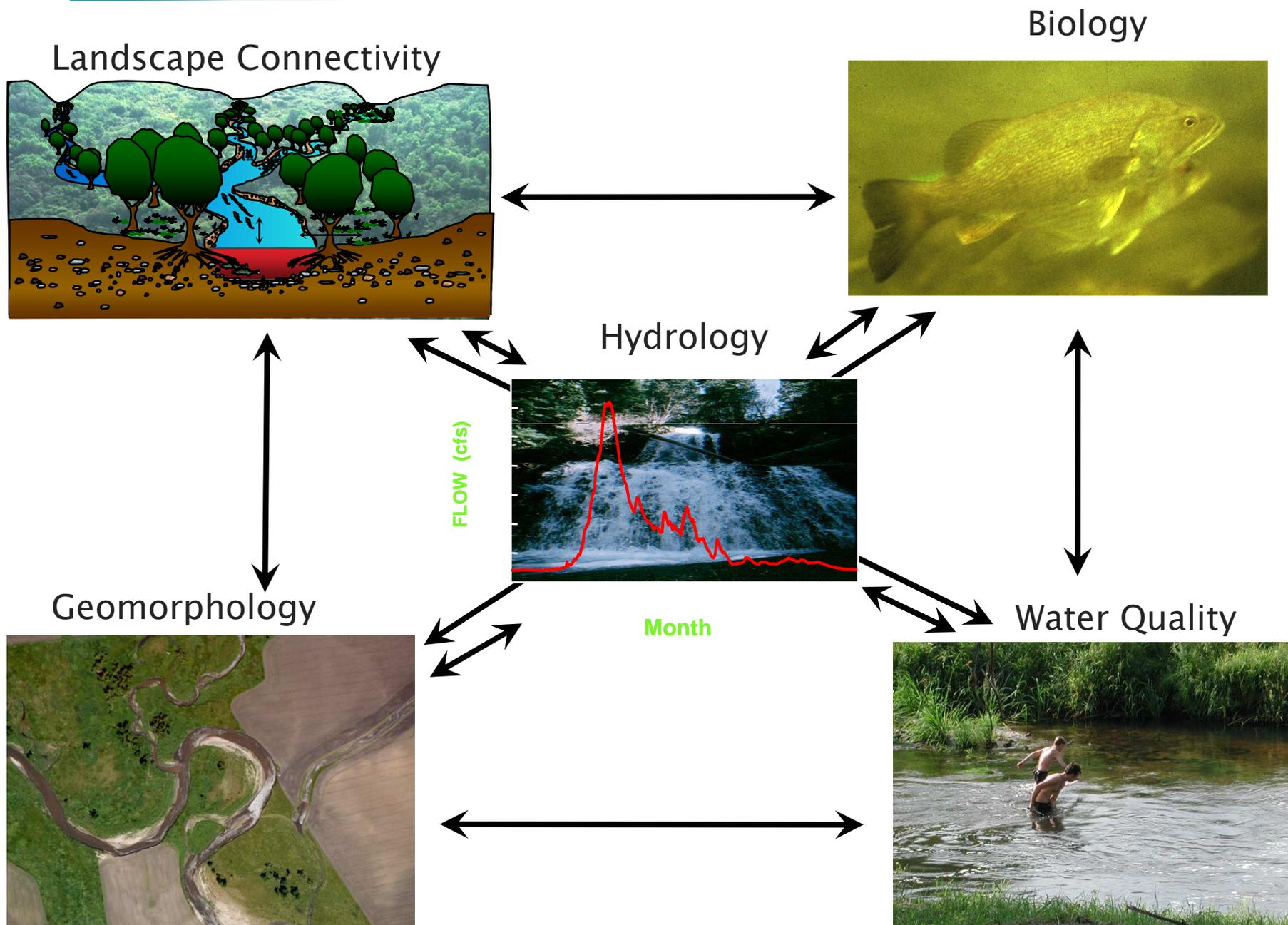


- *Size*
- *Proximity to developed areas*

- *Proximity to protected lands, developed areas, flood zones*
- *Presence of Species of Concern*

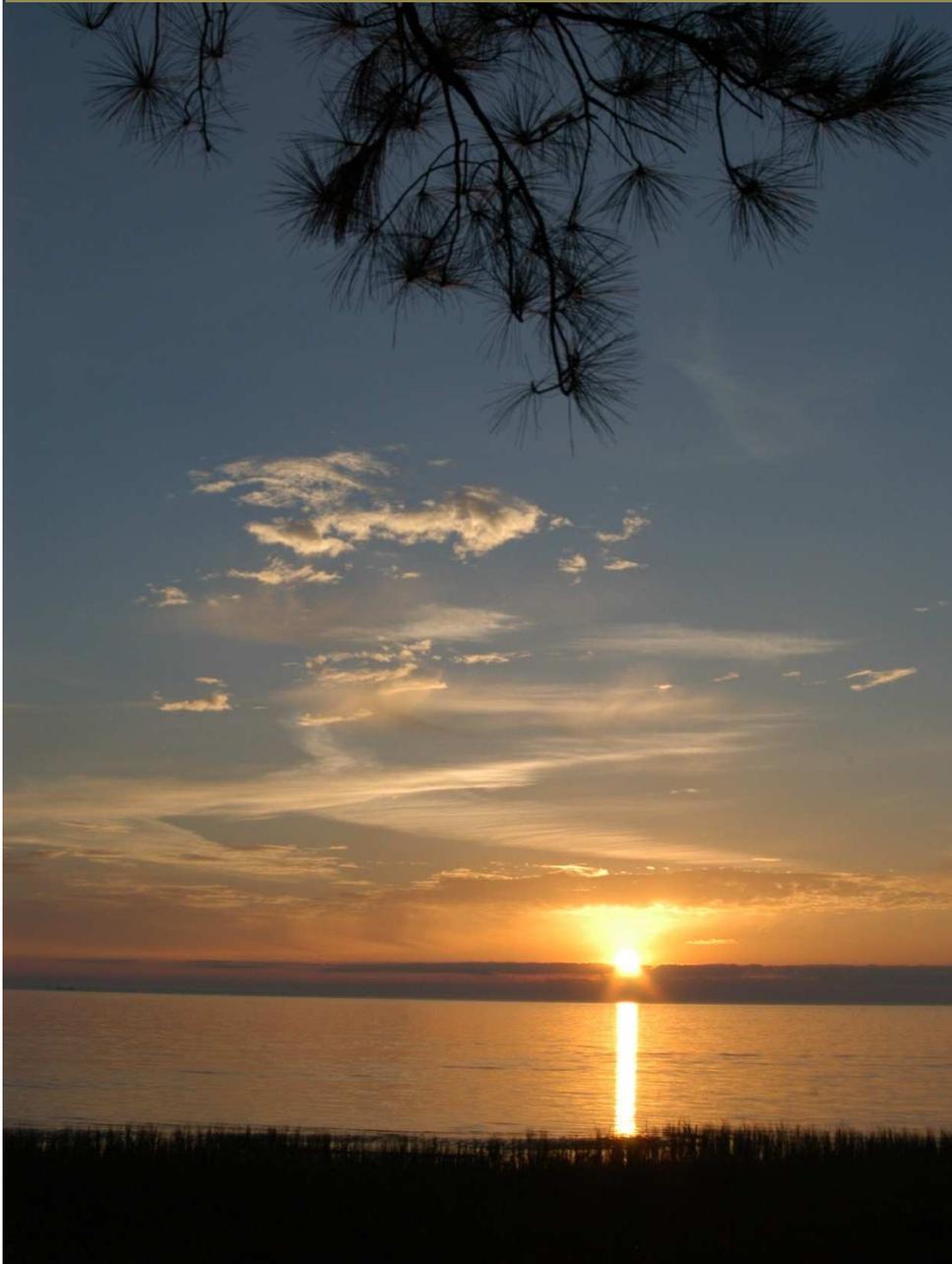
- *% of Impervious Area*
- *Presence of Impaired waters*

Identifying Attributes of Environmental Health in a Watershed

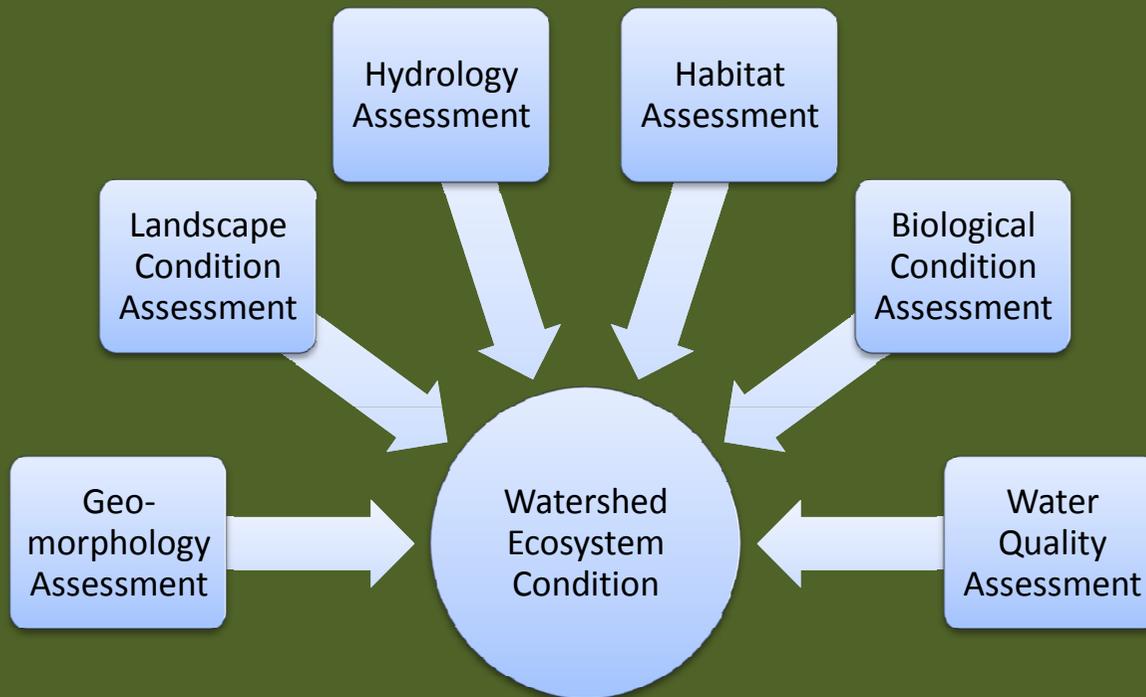


Characteristics of a Healthy Watershed

- **Habitat of sufficient size and connectivity** for native aquatic and riparian species
- **Green infrastructure network** of native vegetation in the landscape that maintains natural hydrology and nutrient and organic matter inputs to aquatic ecosystems
- Biotic refugia or **critical habitat** (e.g., deep pools, seeps & springs for survival during droughts)
- **Natural hydrology** (flow regime, lake water levels) that supports aquatic species and habitat
- **Natural transport of sediment** and stream geomorphology that provide natural habitat
- Functioning **natural disturbance regimes** (floods, fires)
- **Water quality** that supports biotic communities & habitat
- Healthy, self-sustaining aquatic **biological communities**



EPA's Healthy Watersheds Initiative



- ★ State priorities
- ★ Appropriate assessment scale
- ★ Data availability
- ★ Intended uses

Strategic framework that outlines a systems-based approach to integrated watershed assessment, protection and conservation

Focuses on maintaining healthy waters and meeting Clean Water Act (CWA) goals of “fishable” and “swimmable.”

Integrates CWA programs and other aquatic resource programs across agencies and the private sector.

Provides technical assistance and funding to states and watershed organizations.

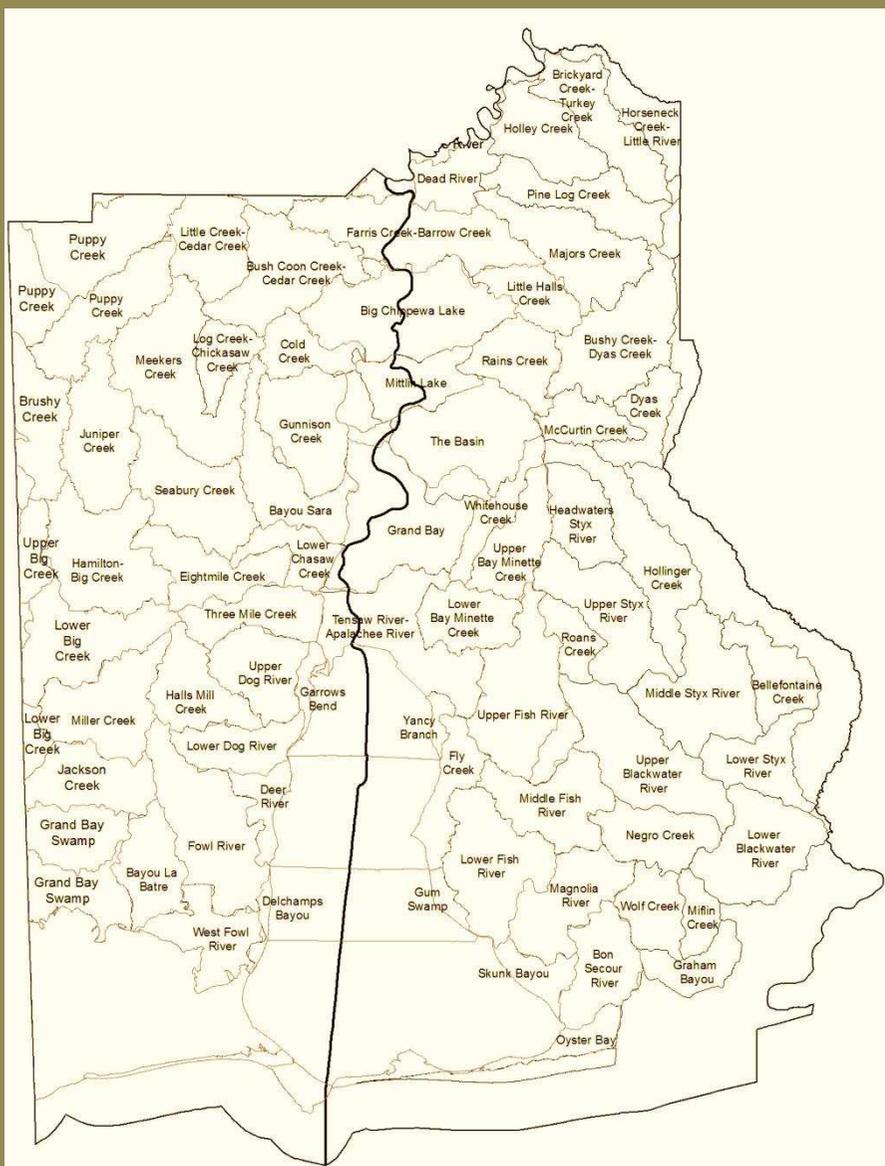
Overall Goals of the Project

- Identify both healthy and degraded watersheds
- Inform monitoring, protection and restoration efforts
- Improve coordination across agencies and organizations to improve environmental outcomes
- Identify important ecological hubs and corridors

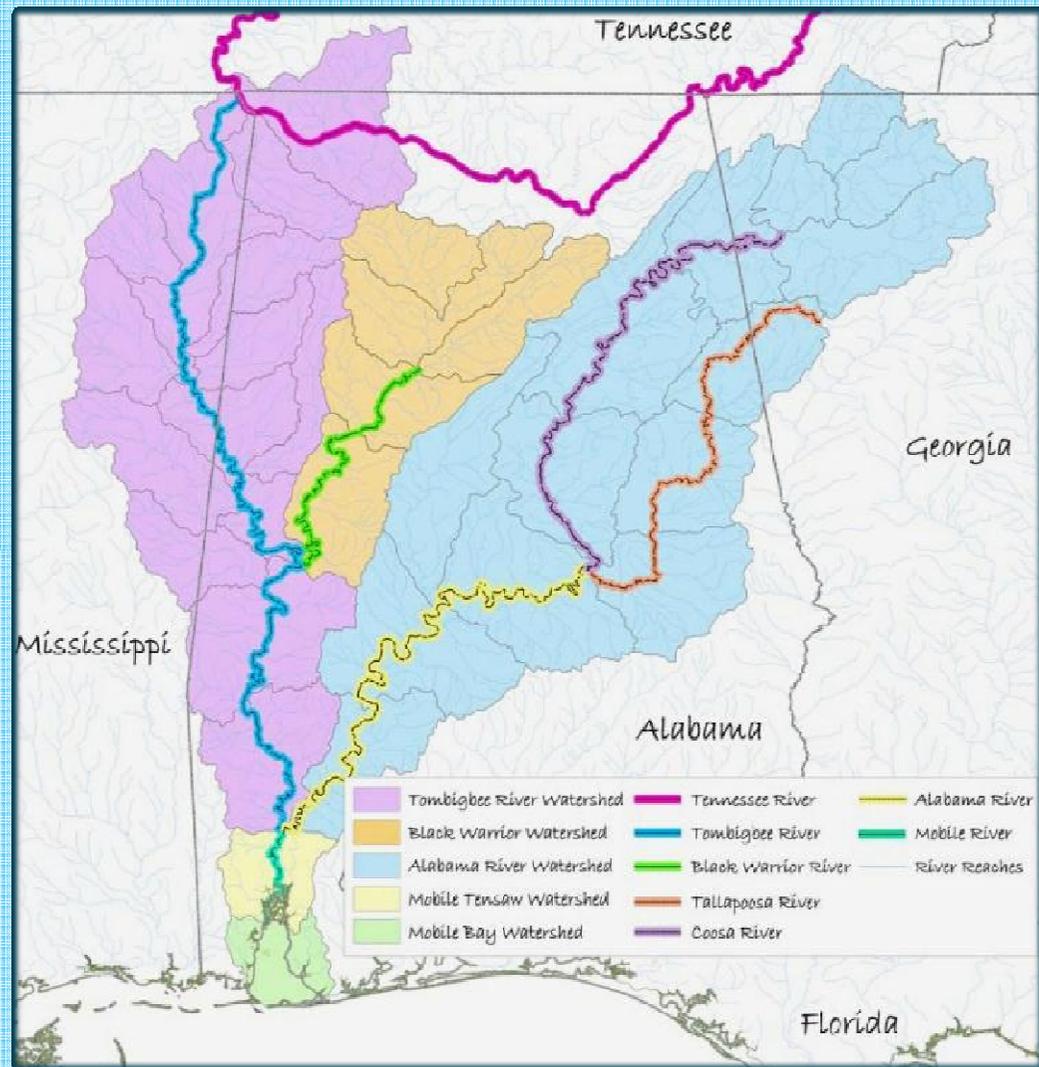
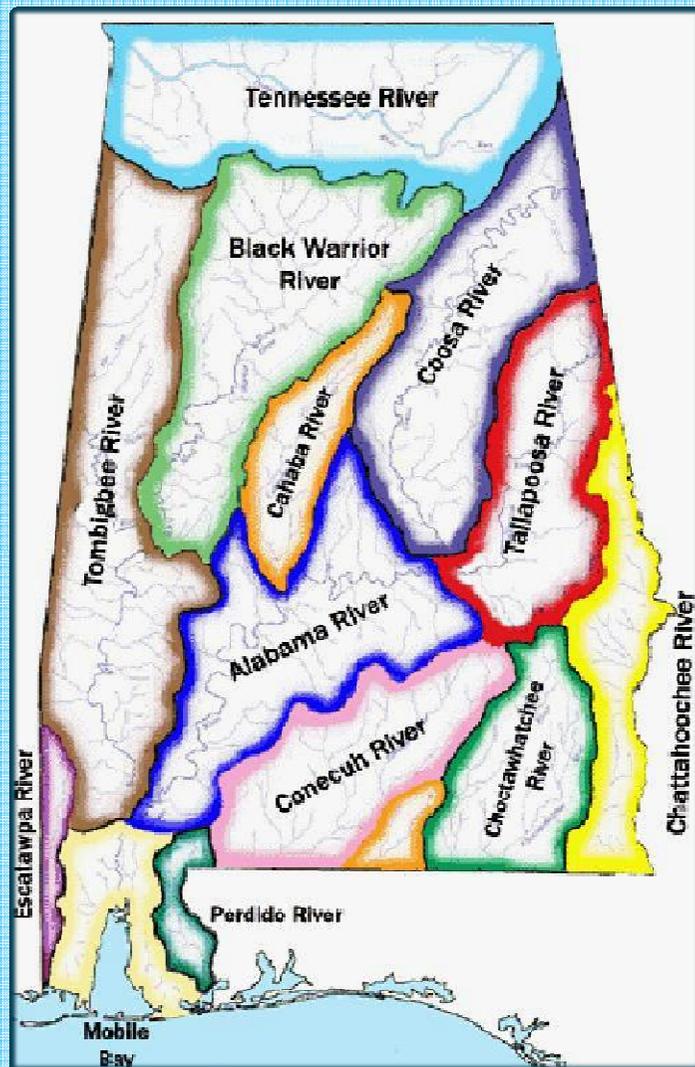
Additional MBNEP Goal

*Inform CCMP prioritization
regarding watershed planning
and protection*

Scale of the Assessment



Scale of the Assessment



HUC 12s for State of Alabama, Mobile Bay Watershed

The Data



Landscape Condition

Patterns of natural land cover, natural disturbance regimes, lateral and longitudinal connectivity of the aquatic environment, and continuity of landscape processes.



Geomorphology

Stream channels with natural geomorphic dynamics.



Habitat

Aquatic, wetland, riparian, floodplain, lake, and shoreline habitat. Hydrologic connectivity.



Water Quality

Chemical and physical characteristics of water.



Hydrology

Hydrologic regime: Quantity and timing of flow or water level fluctuation. Highly dependent on the natural flow (disturbance) regime and hydrologic connectivity, including surface-ground water interactions.



Biological Integrity

Biological community diversity, composition, relative abundance, trophic structure, condition, and sensitive species.

The Data

Assessment Component	Dataset
Landscape Condition	ADEM HDG
Landscape Condition	SWCD Watershed Assessments
Landscape Condition	USGS
Habitat Condition	ADEM Habitat Assessments
Habitat Condition	GSA Habitat Assessments
Habitat Condition	ADCNR - Aquatic Biodiversity Center
Habitat Condition	USFWS
Habitat Condition	TVA
Habitat Condition	Dauphin Island Sea Lab
Hydrology	USGS
Hydrology	GSA
Hydrology	Alabama Power Company
Hydrology	US Army Corps of Engineers
Hydrology	TVA
Geomorphology	GSA
Geomorphology	USGS
Geomorphology	US Army Corps of Engineers
Geomorphology	ADCNR - Weeks Bay NERR
Geomorphology	TVA
Water Quality	ADEM water quality data
Water Quality	GSA
Water Quality	Alabama Water Watch
Water Quality	USGS
Water Quality	Mississippi Dept. of Environmental Quality
Water Quality	Georgia Environmental Protection Division
Water Quality	Dauphin Island Sea Lab
Water Quality	ADCNR - Weeks Bay NERR
Water Quality	TVA
Biology	ADEM Macroinvertebrate data
Biology	USGS
Biology	ADCNR - Aquatic Biodiversity Center
Biology	TVA
Biology	ADCNR - Weeks Bay NERR
Biology	GSA



Healthy Watersheds Project Team

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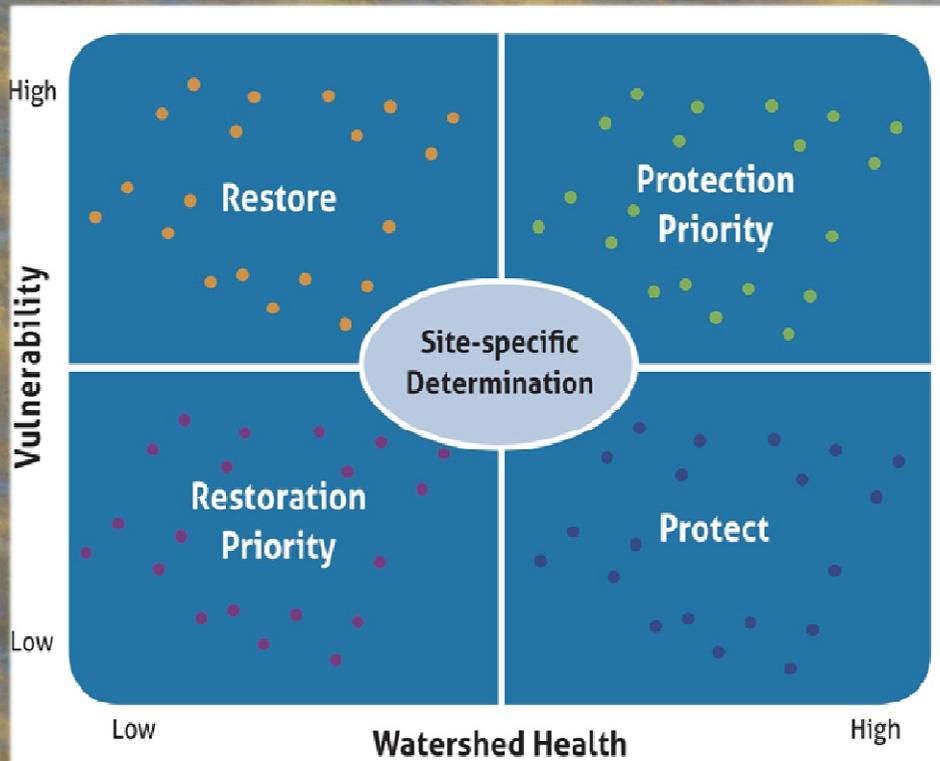
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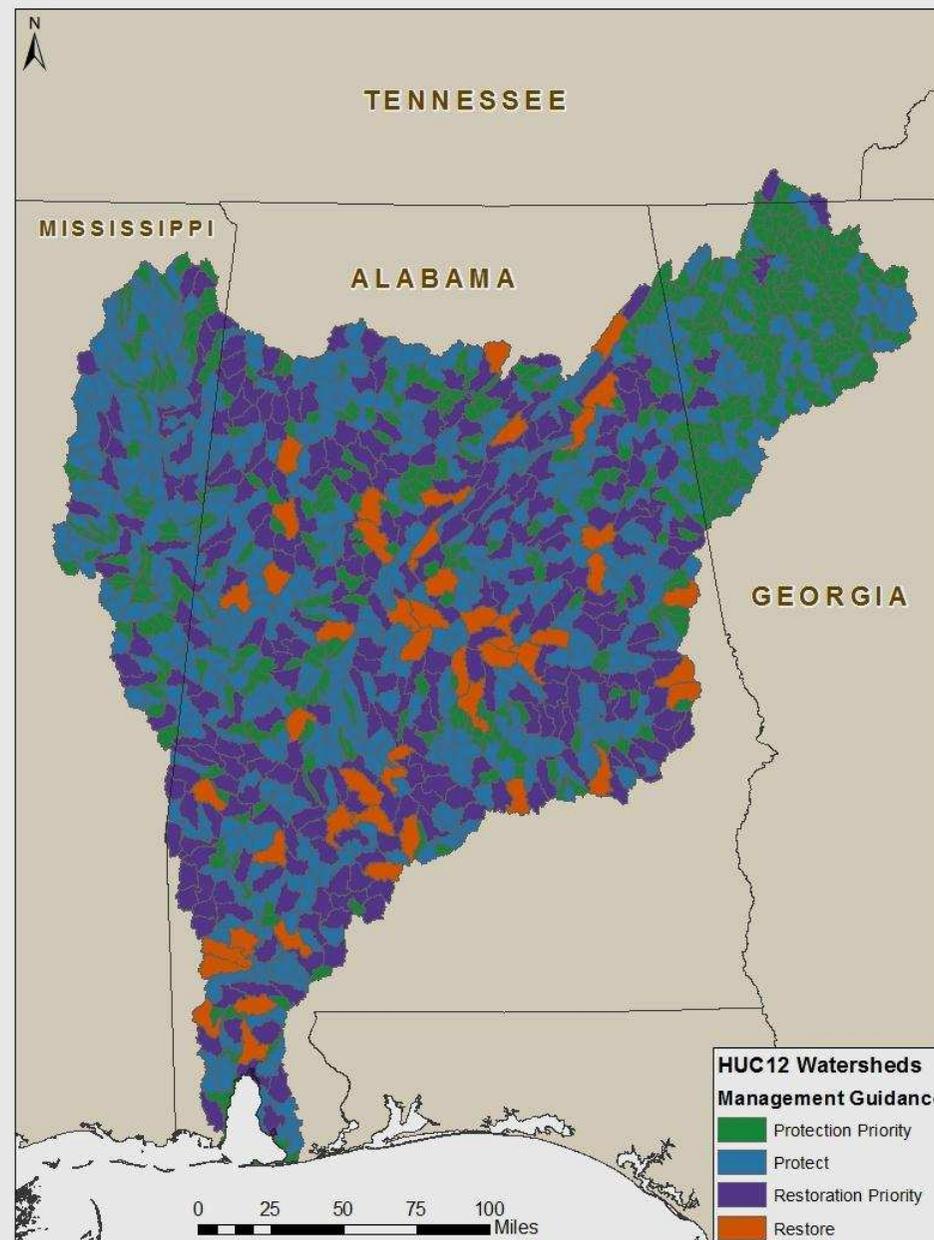
Project Coordinator: MBNEP

Status of the Assessment



- Held organizational meetings in the summer
- Identified team leads and members
- Data acquisition 95% complete
- Draft Assessment methodology with proposed indicators under development
- Team meeting to finalize indicators early February, 2013
- Draft results planned for March, 2013
- Final results and report planned for end of April, 2013

Example Output for Mobile Bay Drainage Basin



Uses of the Assessment Products

- **Inform CCMP Prioritization** and Biological Condition Gradient Framework (results from nearshore assessment component)
- **Help target resources** as part of the Coastal Zone Management Plan (results from nearshore assessment component)
- **Inform flow alteration assessment** of the State's Water Resource Management Plan (results from statewide assessment component)
- **Inform NRCS Statewide Water Quality Initiative** (results from basin-wide assessment component)

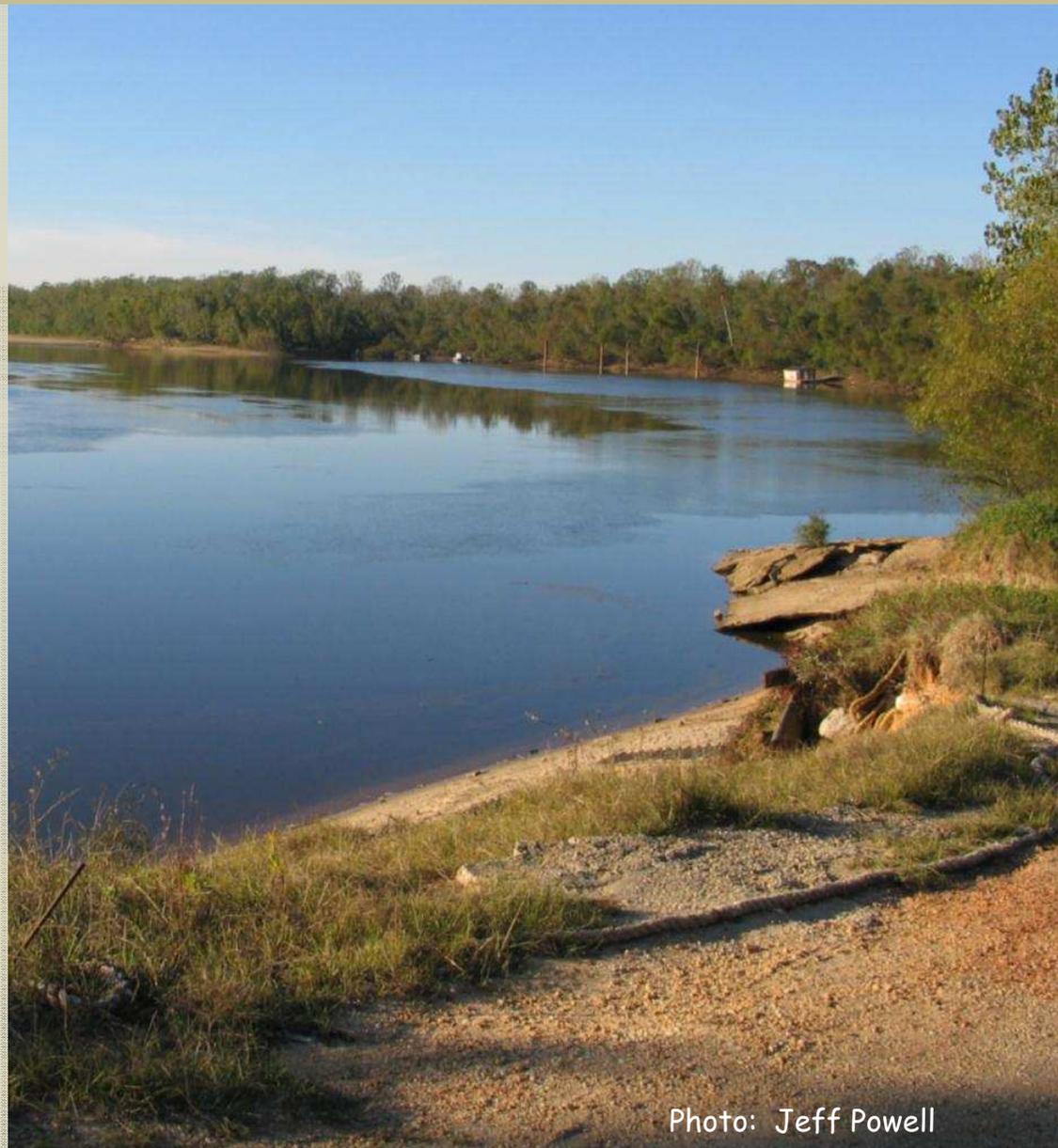


Photo: Jeff Powell



The Comprehensive Conservation Management Plan
Baldwin and Mobile Counties, Alabama
2013-2018



DRAFT



Photo by Internet

**The nation behaves
well if it treats its
natural resources as
assets which it must
turn over to the next
generation increased
and not impaired in
value**

Theodore Roosevelt

Thank you.