Fish and Wildlife Conservation in the 21st Century

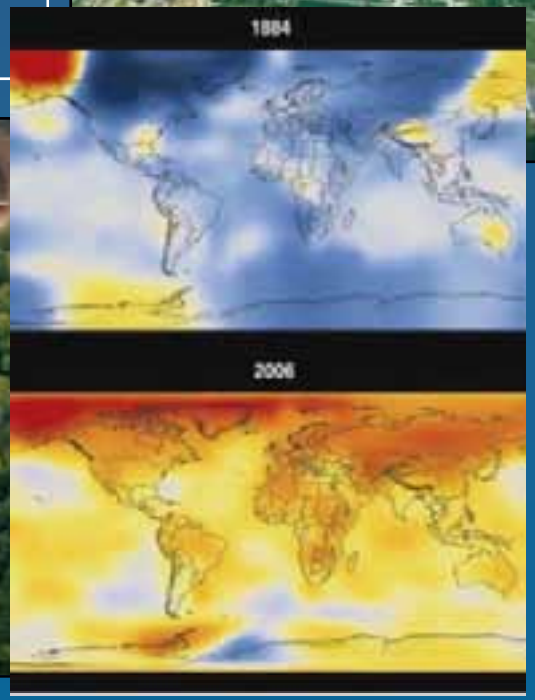
The Role of Landscape Conservation Cooperatives

FWS - Appalachian SHC Workshop

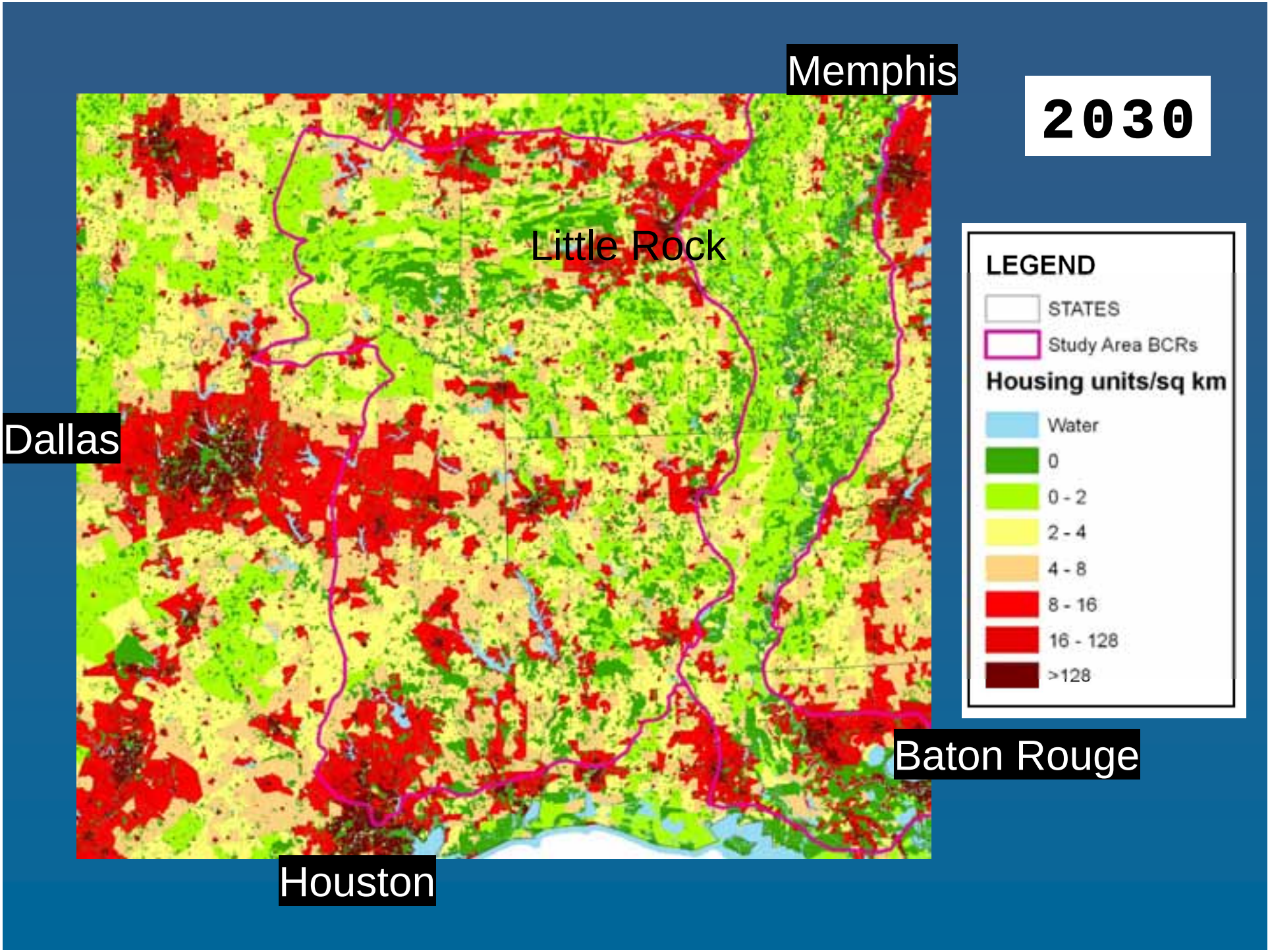
28 January 2010
Johnson City, Tennessee

"The conservation community faces unprecedented issues of scale, pace, and complexity in sustaining our Nation's fish and wildlife resources."

Year: 2042
– Global Population ~9 Billion People –
habitat fragmentation, contamination, pollution, invasive species, disease, threats to water quality and quantity…



"The conservation challenges of the 21st Century represent a force of change more far-reaching and consequential than any previously encountered."


Memphis
2030
Little Rock
LEGEND
STATES
Study Area BCRs
Housing units/sq km
Water
0
0 - 2
2 - 4
4 - 8
8 - 16
16 - 128
>128
Dallas
Baton Rouge
Houston

"The conservation community faces unprecedented issues of scale, pace, and complexity in sustaining our Nation's fish and wildlife resources."

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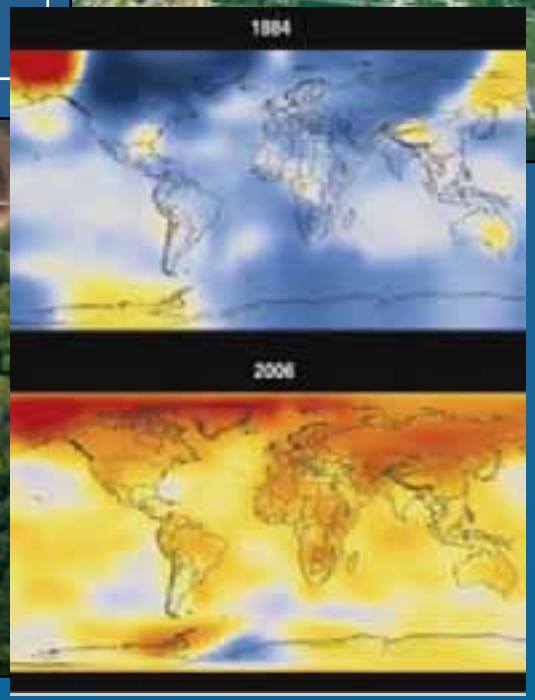

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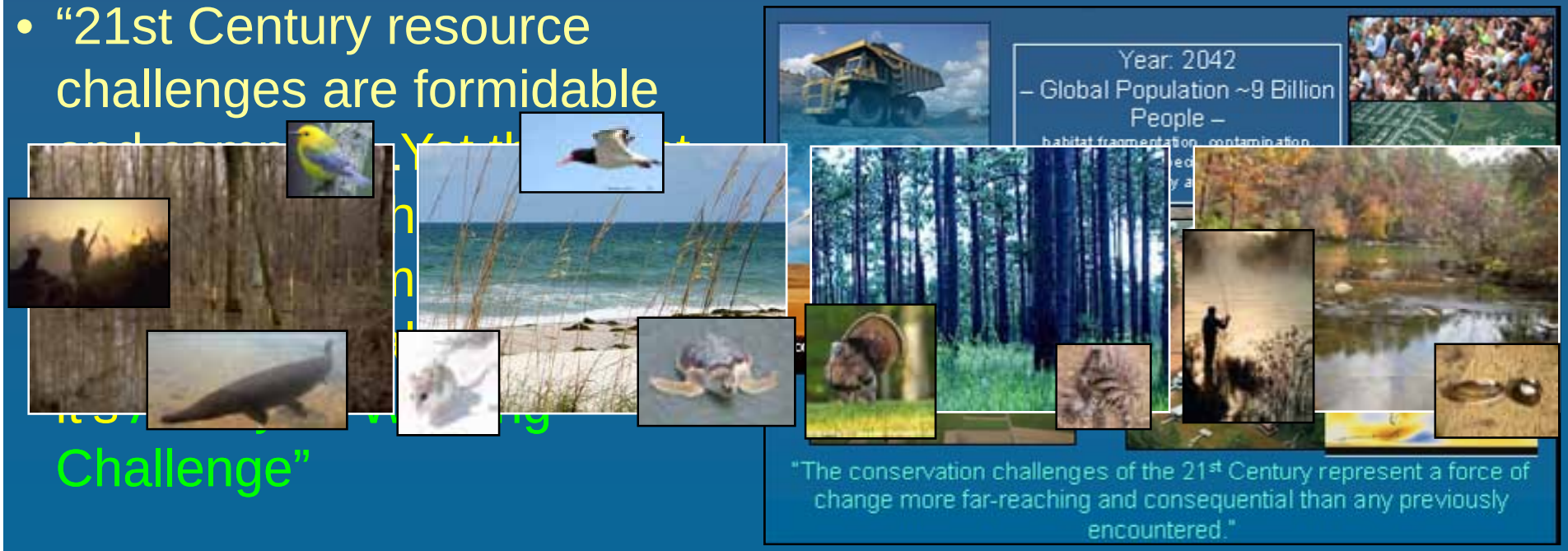
"The conservation community faces unprecedented issues of scale, pace, and complexity in sustaining our Nation's fish and wildlife resources."

The Public Trust Doctrine

The Nation's fish and wildlife resources are publicly owned and held in trust by the government for the continuing benefit of the public.

- "21st Century resource challenges are formidable



Challenge"

"The conservation challenges of the 21st Century represent a force of change more far-reaching and consequential than any previously encountered."

"The conservation challenges of the 21st Century represent a force of change more far-reaching and consequential than any previously encountered."

- Conservation In Transition
- A Way-of-Working Challenge
- Landscape Conservation Cooperatives

- "21st Century resource challenges are formidable and complex…Yet the most fundamental challenge facing the wildlife community is not a resource challenge at all; it's A Way-of-Working Challenge"

Trends Transforming Conservation

1) The emergence of Conservation Science as the 21st Century conservation paradigm

2) The changing conservation workforce

3) Escalating expectations regarding public sector performance

4) The increasing complexity of conservation issues

Three “ethics” or “philosophical movements” that have defined conservation in America*

- Romantic-Transcendental Conservation Ethic

  Exemplified by the work of early American naturalists, writers, and artists.

  Man/nature relationship seen in a spiritual renewal context.

- Resource Conservation Ethic

  Exemplified by public policies originating in the Roosevelt/Pinchot era.

  Man/nature relationship seen in a utilitarian, wise use context.

- Evolutionary-Ecological Land Ethic

  Defined by the theoretical thinking of Conservation Biology, Landscape Ecology, Ecosystem Management

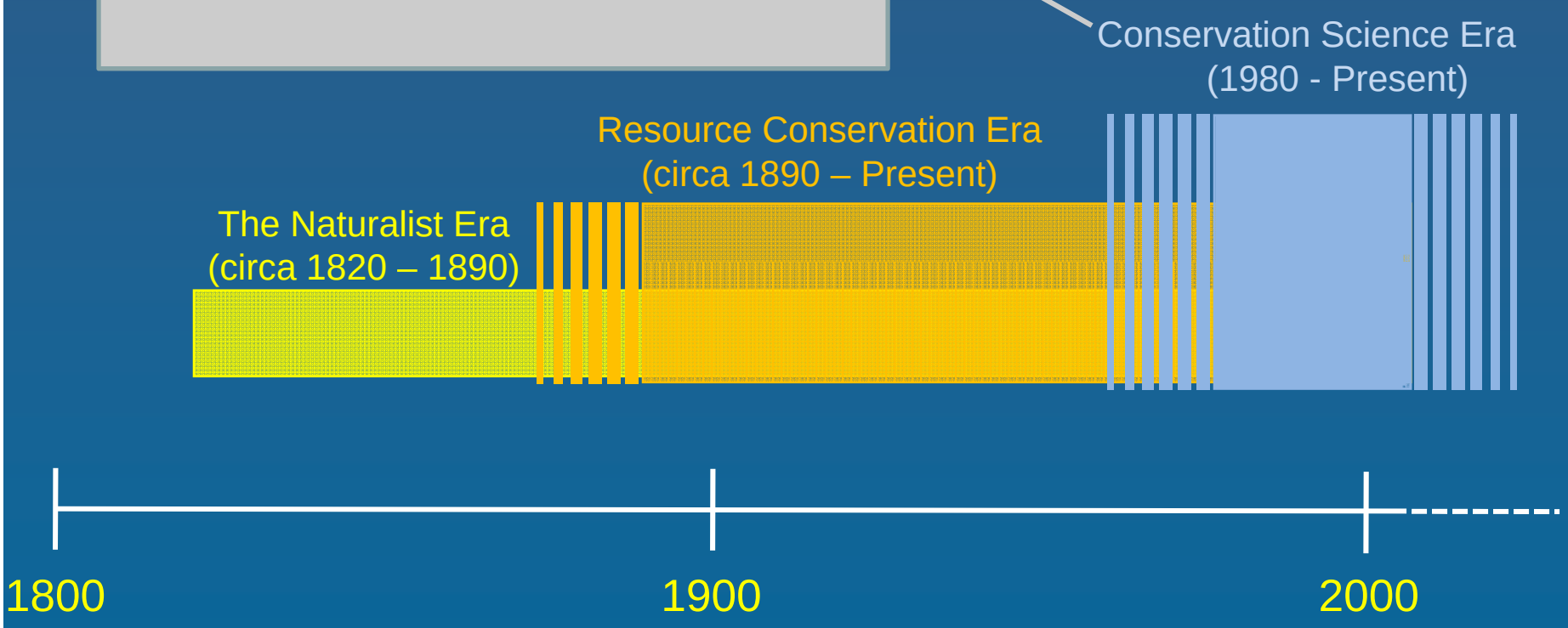
  Overtly seeks a change in the resource conservation ethic.

* Meffe and Carroll, Principles of Conservation Biology, 1994

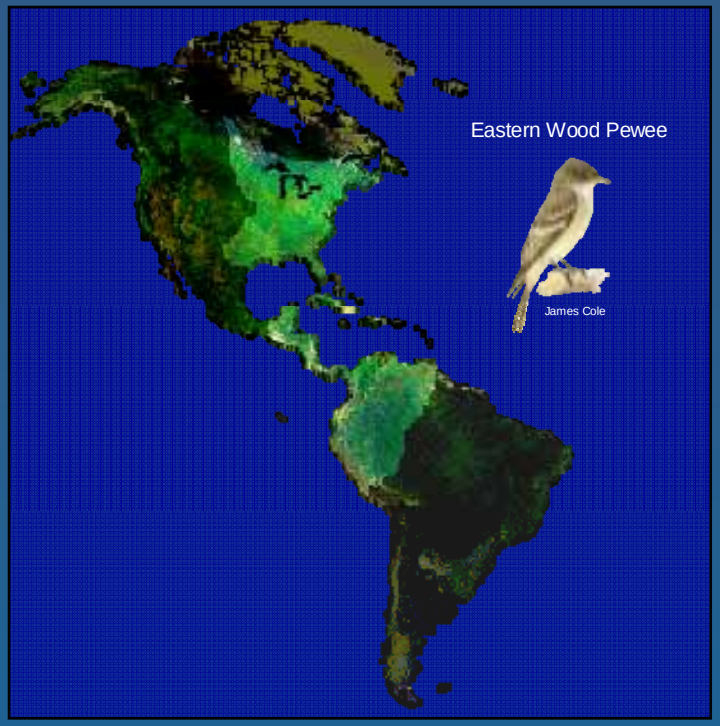
Moving Toward the Third Era of American Conservation

- Crisis oriented, value laden, science driven
- Overtly seeks a change in the conservation target

Disruptive Change



Adapted from Meffe and Carroll, Principles of Conservation Biology, 1994

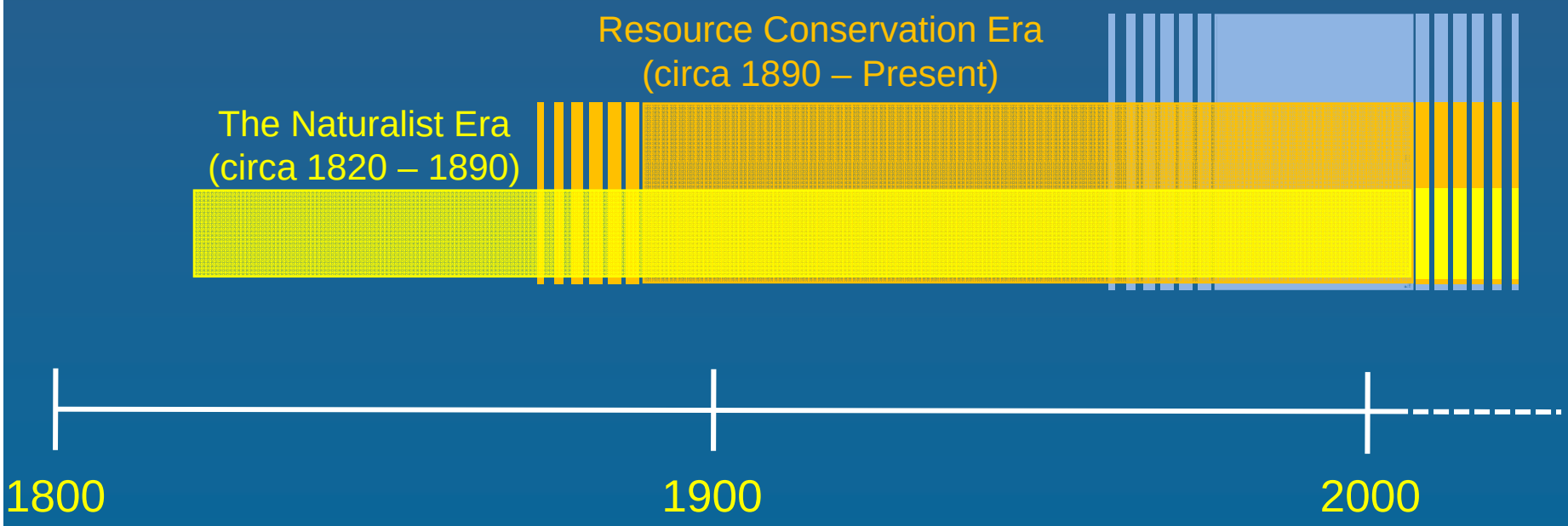


Land use change (e.g., conservation, development) occurs at the site scale; yet population sustainability is system dependent, operating on outcomes manifested at broader spatial and temporal scales.

Conservation Target: Ecologically Sustainable Landscapes: sustaining ecological systems, processes, and functions.

Moving Toward the Third Era of American Conservation

- Crisis oriented, value laden, science driven
- Overtly seeks a change in the conservation target
- Overtly seeks a departure from the resource conservation ethic



Adapted from Meffe and Carroll, Principles of Conservation Biology, 1994

The Resource Conservation Era (circa 1890 – Present)

- Conservation Ethic – Resource development as an economic imperative, stewardship as a public responsibility
- Natural resources were segmented and compartmentalized, i.e. forest, soil, water, wildlife, range, etc.
- Practitioners (both scientists and managers) trained in resource-specific disciplines, e.g. forestry, wildlife, range management, soil science.
- The Nation's private, state, federal conservation infrastructure developed following this compartmentalized approach.

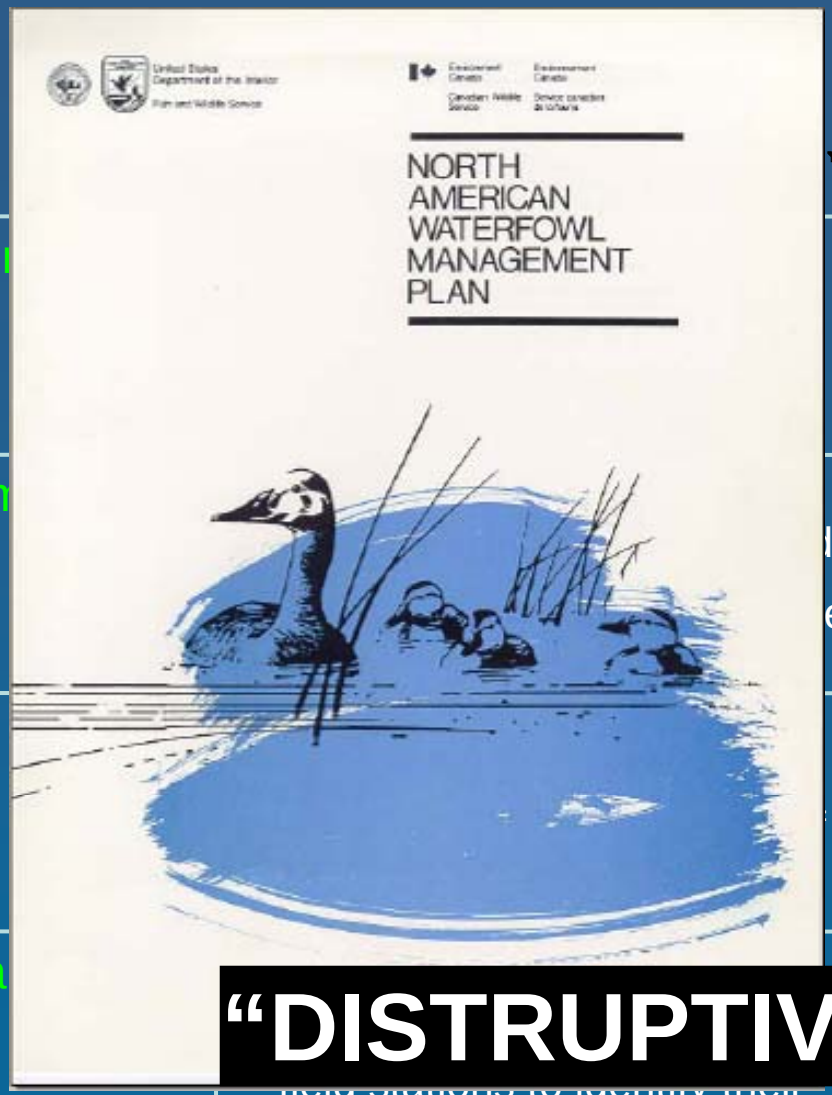
Resource Conservation and Conservation Science

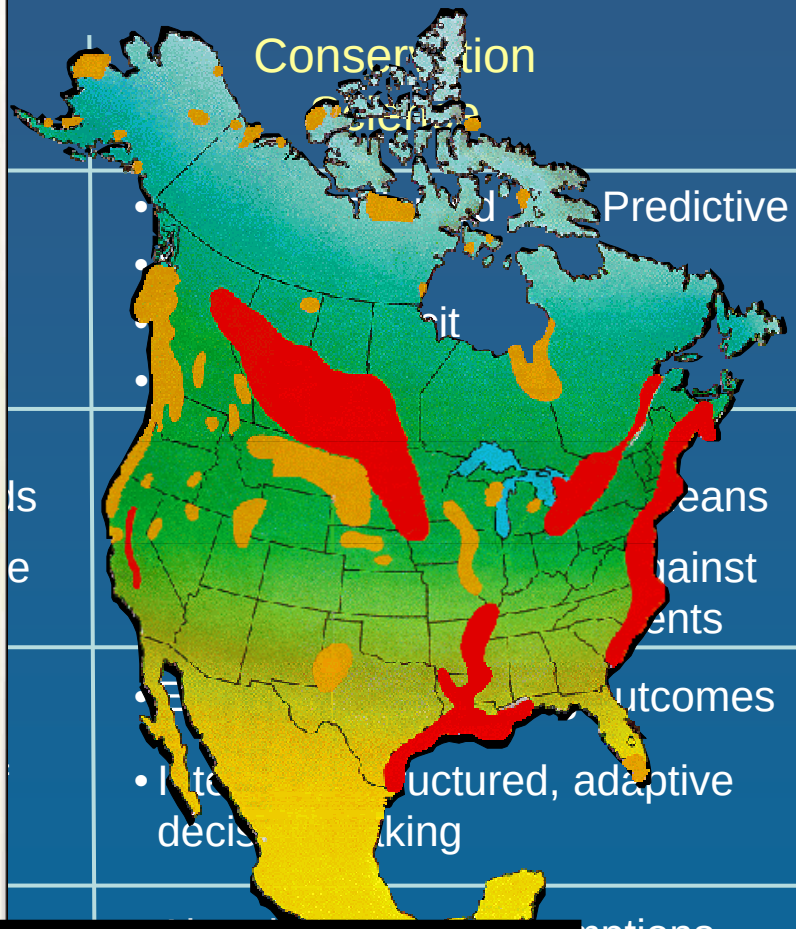
An Operational Comparison

	Resource Conservation	Conservation Science
Planning	• Activity oriented • Administratively focused • Programmatically explicit • Opportunity based	• Outcome oriented • Predictive • Model based • Spatially explicit • Multi-scaled
Implementation	• Protection, restoration, and management pursued as ends • Opportunities prioritized at the project scale	• Protection, restoration, and management pursued as means • Opportunities prioritized against landscape scale assessments
M&E	• An operational luxury • Appropriate as an element of research	• Essential to assessing outcomes • Integral to structured, adaptive decision making
Research	• Priorities are derived from periodic calls to programs and field stations to identify their needs	• Aimed at testing assumptions and uncertainties of biological planning and assessment

Resource Conservation and Conservation Science

An Operational Comparison





Conser tion
Science

Plannin

Implem

M&E

Resea

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- it
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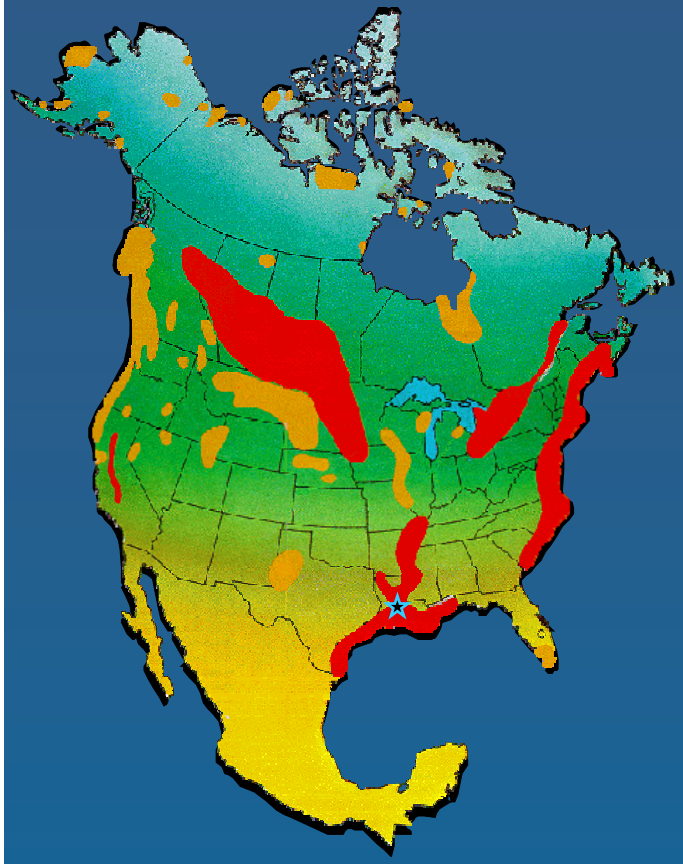
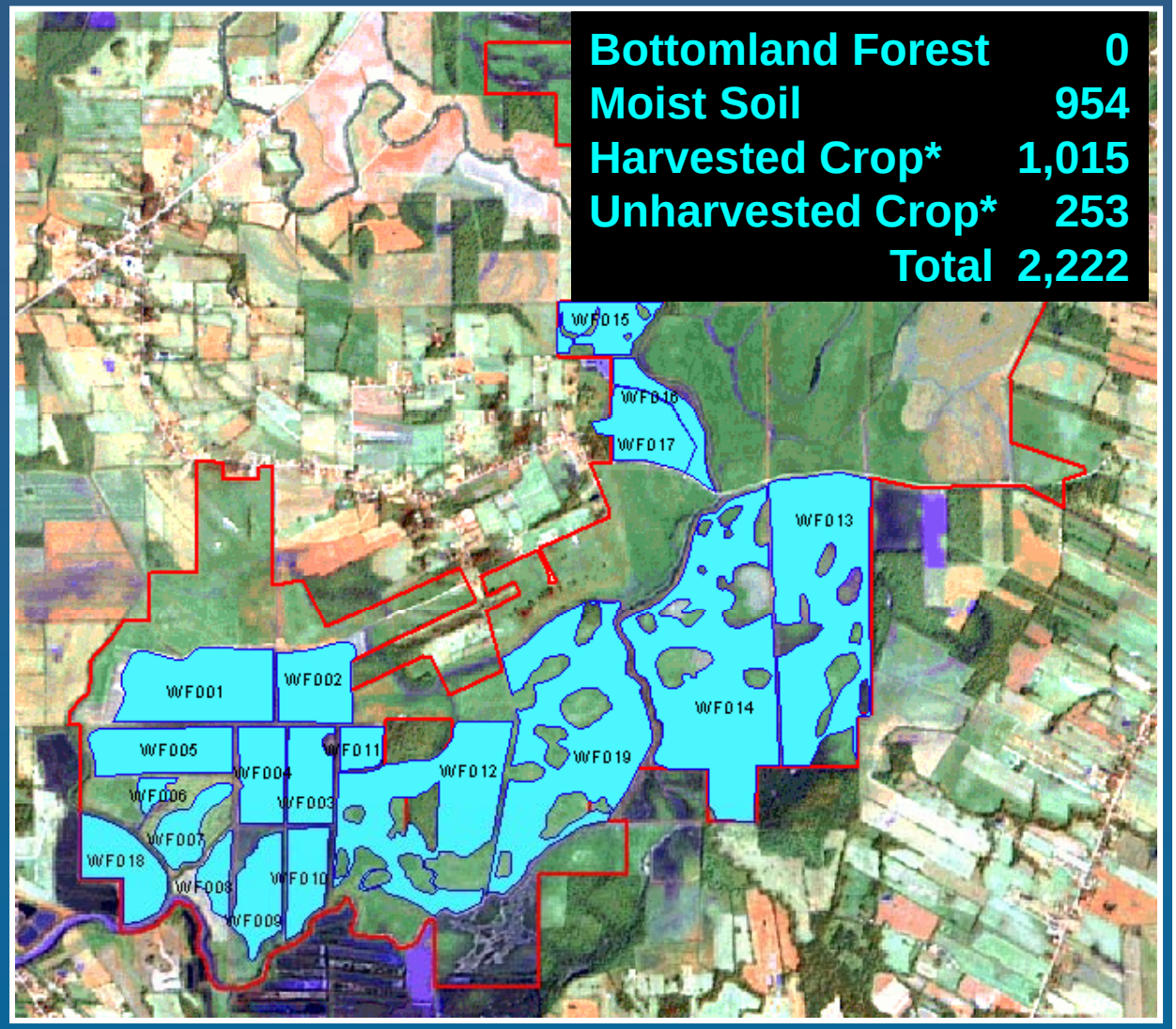
- eans
- ainst
- ents
- utcomes
- I te uctured, adaptive decis king
- nptions
- ological
- planning and assessment

field stations to identify their needs

"DISTRUPTIVE CHANGE"

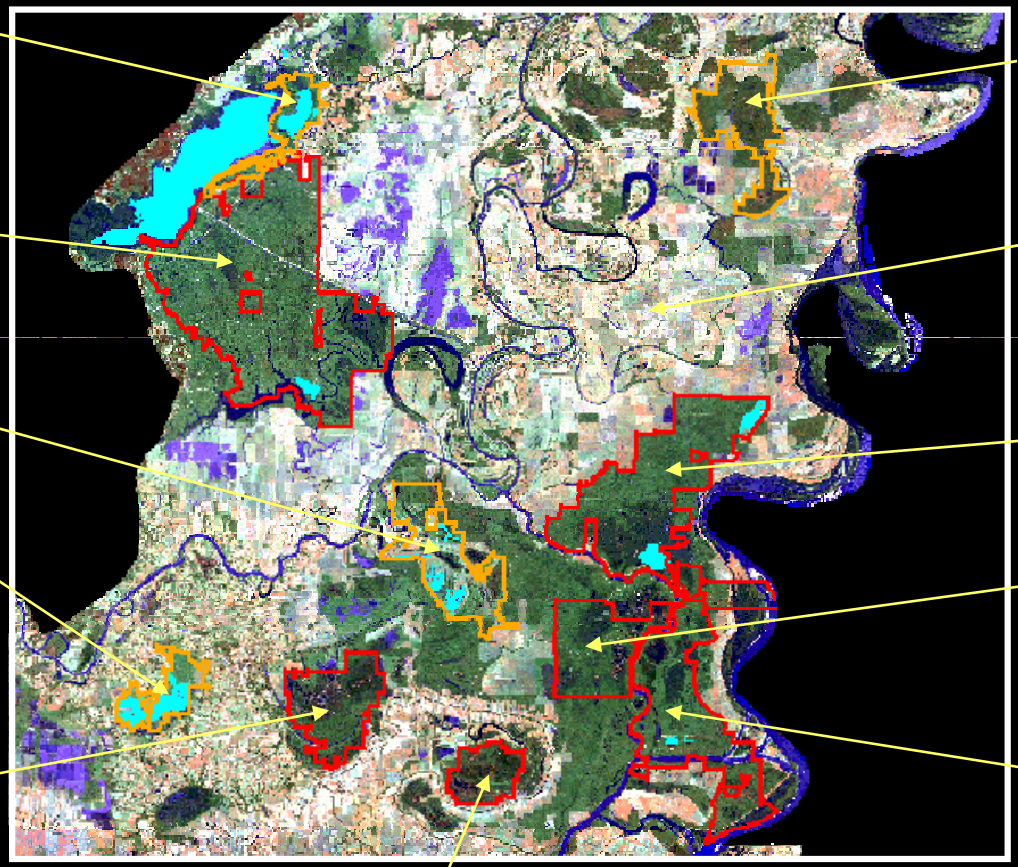
Grand Cote National Wildlife Refuge

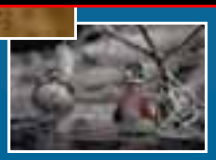




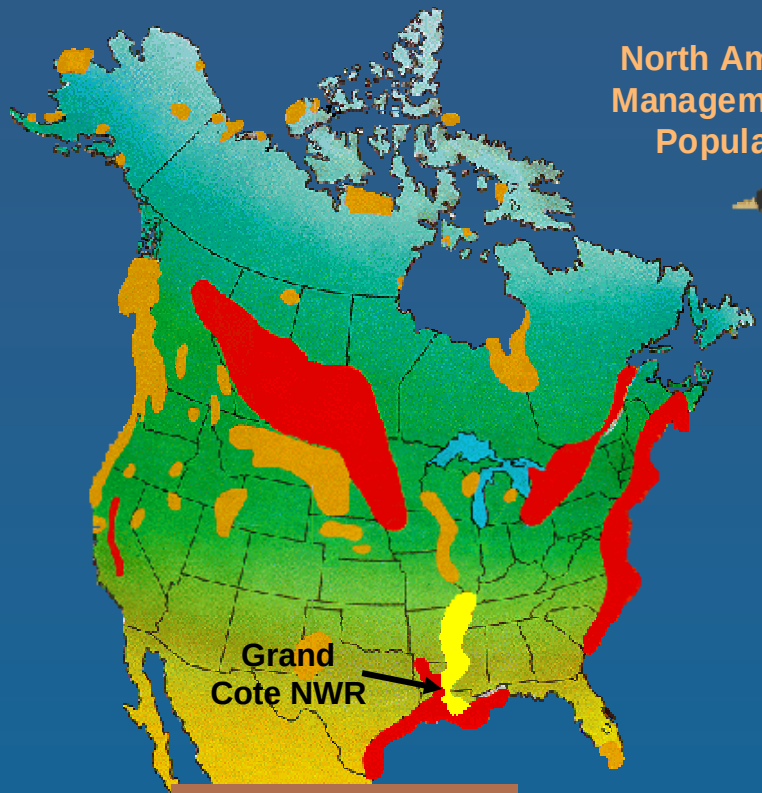
Bottomland Forest	0
Moist Soil	954
Harvested Crop*	1,015
Unharvested Crop*	253
Total	2,222

Grand Cote National Wildlife Refuge





Conservation Programs Connected Through Ecological Pathways



North American Waterfowl Management Plan Breeding Population Objectives

Return "Our Share" of Mid-Continent Wintering Population to Breeding Grounds

Sum of Foraging Habitats Meets Needs of Wintering Duck Populations

Public Managed Lands

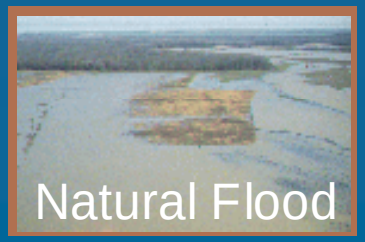
Private Managed Lands

Naturally Flooded Lands

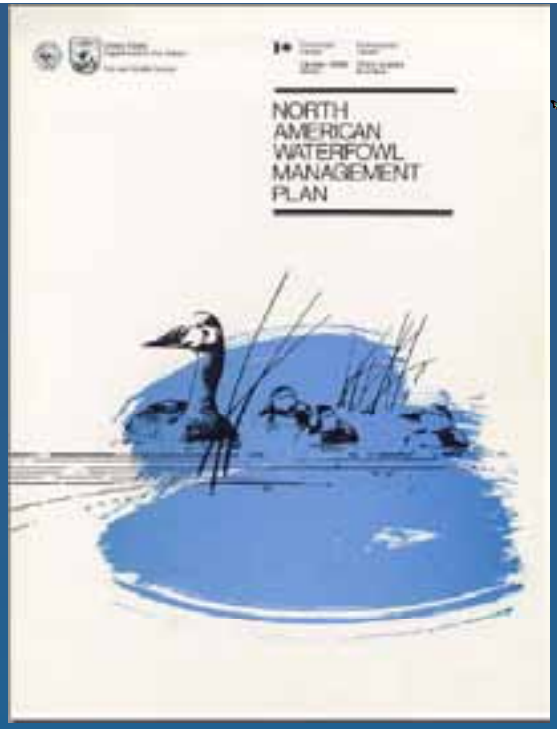
100,000 acres

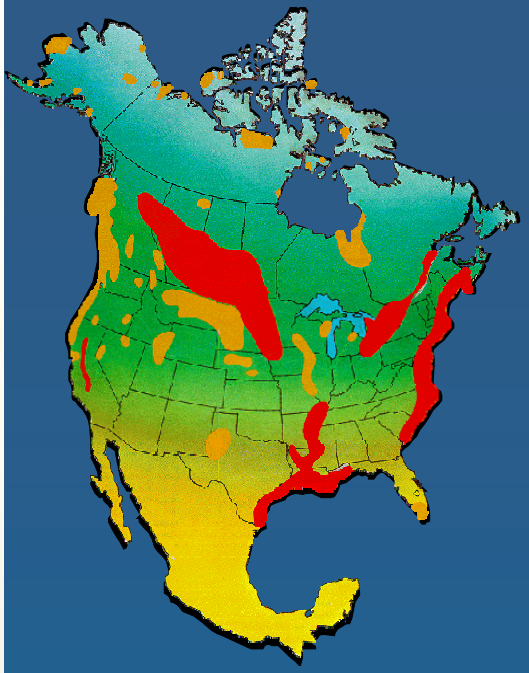
121,000 acres

400,000 acres



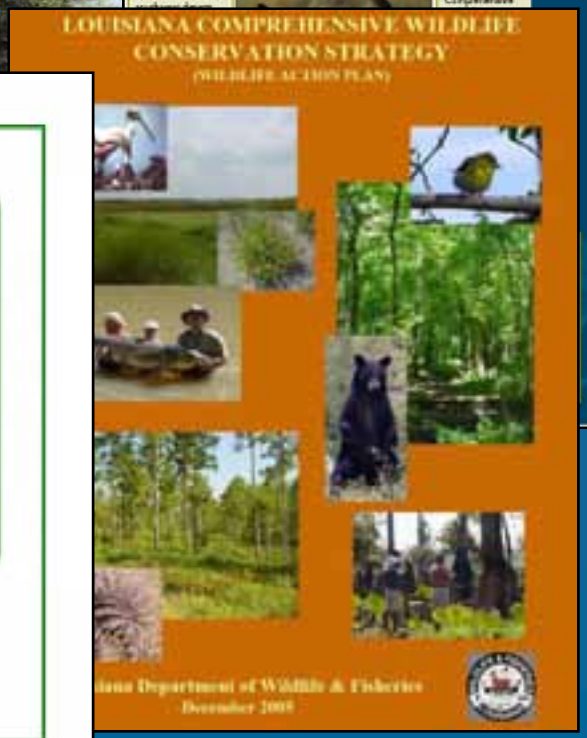
247,000 acres

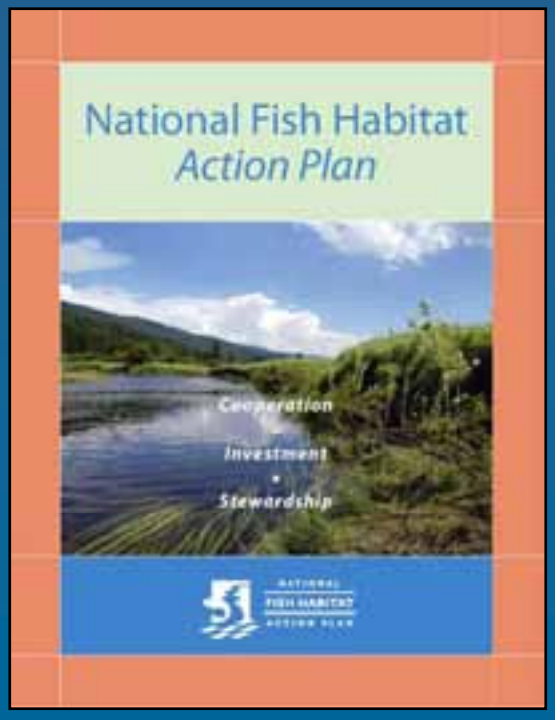

NORTH AMERICAN WATERFOWL MANAGEMENT PLAN

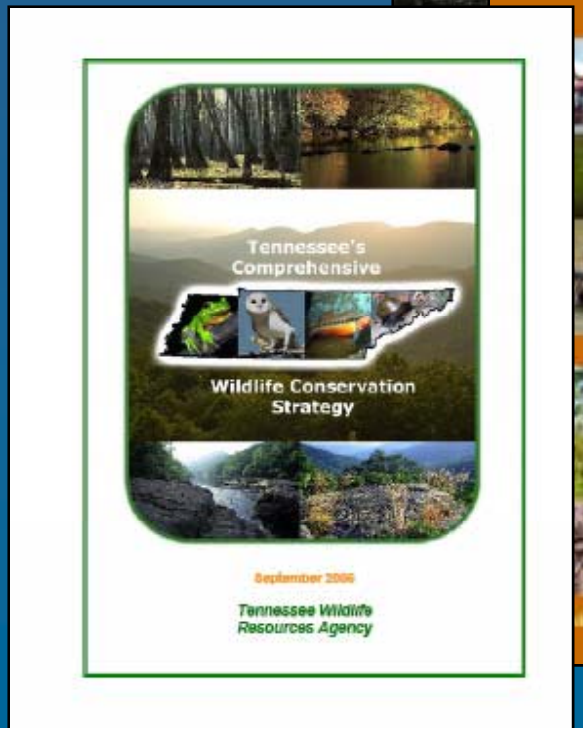


Arkansas Wildlife Action Plan

Missouri Comprehensive Wildlife Strategy
What is a wildlife action plan?
Congress asked each state to develop a wildlife action plan, known technically as a comprehensive wildlife conservation strategy. These proactive plans examine the health of wildlife and prescribe actions to conserve wildlife and vital habitat before they become more rare and more costly to protect.
Missouri snapshot
Missouri's planning approach
"Development of the Comprehensive Wildlife Strategy demonstrates our commitment to all wildlife. The Strategy highlights a renewed Department focus to conserve a broad array of wildlife and plants in recognition that all living things are part of a complex system."


LOUISIANA COMPREHENSIVE WILDLIFE CONSERVATION STRATEGY
(WILDLIFE ACTION PLAN)


National Fish Habitat Action Plan
Cooperation
Investment
Stewardship


Tennessee's Comprehensive
Wildlife Conservation Strategy
September 2006
Tennessee Wildlife Resources Agency

Four Trends Transforming Conservation

1) The emergence of Conservation Science as the 21st Century conservation paradigm

2) The changing conservation workforce

3) Escalating expectations regarding public sector performance

4) The increasing complexity of conservation issues

Four Trends Transforming Conservation

1) The emergence of Conservation Science as the 21st Century conservation paradigm

2) The changing conservation workforce
   - ✓ Educated and trained in systems thinking
   - ✓ Socially conditioned to networking
   - ✓ "Knowledge workers" uncomfortable in hierarchical, vertically integrated organizational structures.

Four Trends Transforming Conservation

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A Problem Statement re: Government Performance

"The current conduct of American government is a poor match for the problems it must solve…"

"American governments increasingly face problems that pay little attention to the boundaries created to manage them…"

"If government is to serve the needs of its citizens in the 21st century, it must reconfigure itself – to shift the boundaries of who does what and, even more important, how its work gets done."

A paraphrase…

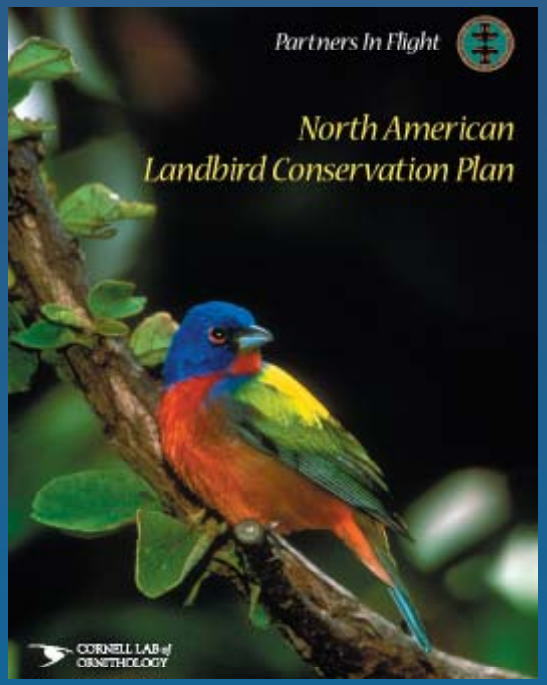
The conservation business models of most wildlife agencies and organizations are a poor match for the problems confronting 21st Century wildlife conservation.

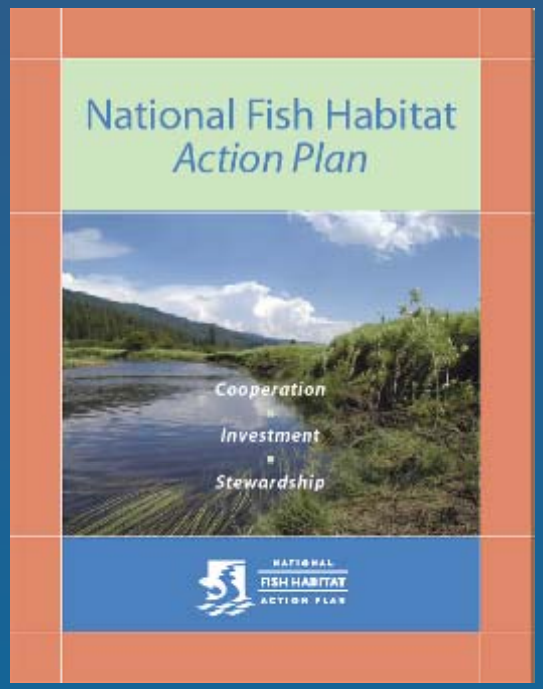
Increasingly, those problems transcend the boundaries of individual programs, agencies, and organizations and challenge traditional ways of thinking and doing.

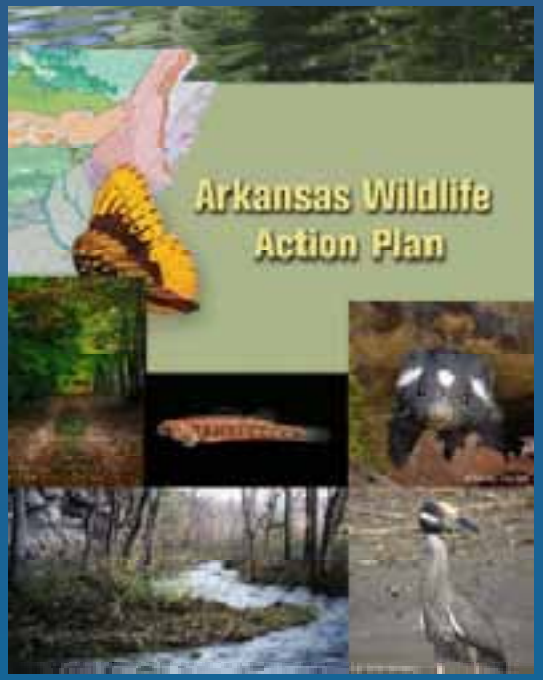
If 21st Century challenges are to be met, transformational change will be needed in how wildlife agencies and organizations work, individually and collectively.

A Discipline-Specific Emphasis On Performance and Accountability

Socio-Ecological Accountability







- Outcome based goals and objectives that exceed the singular grasp of any one organization.
- Measurable change at landscape scales.
- Collaborative strategies, interagency collaboration

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Year: 2042
– Global Population ~9 Billion People –
habitat fragmentation, contamination, pollution, invasive species, disease, threats to water quality and quantity…

21st Century conservation issues…

- Inter-disciplinary in nature
- Multi-scaled in scope
- Span the jurisdictions of multiple agencies and organizations
- Intertwined with issues of socio-economic sustainability

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Implications?

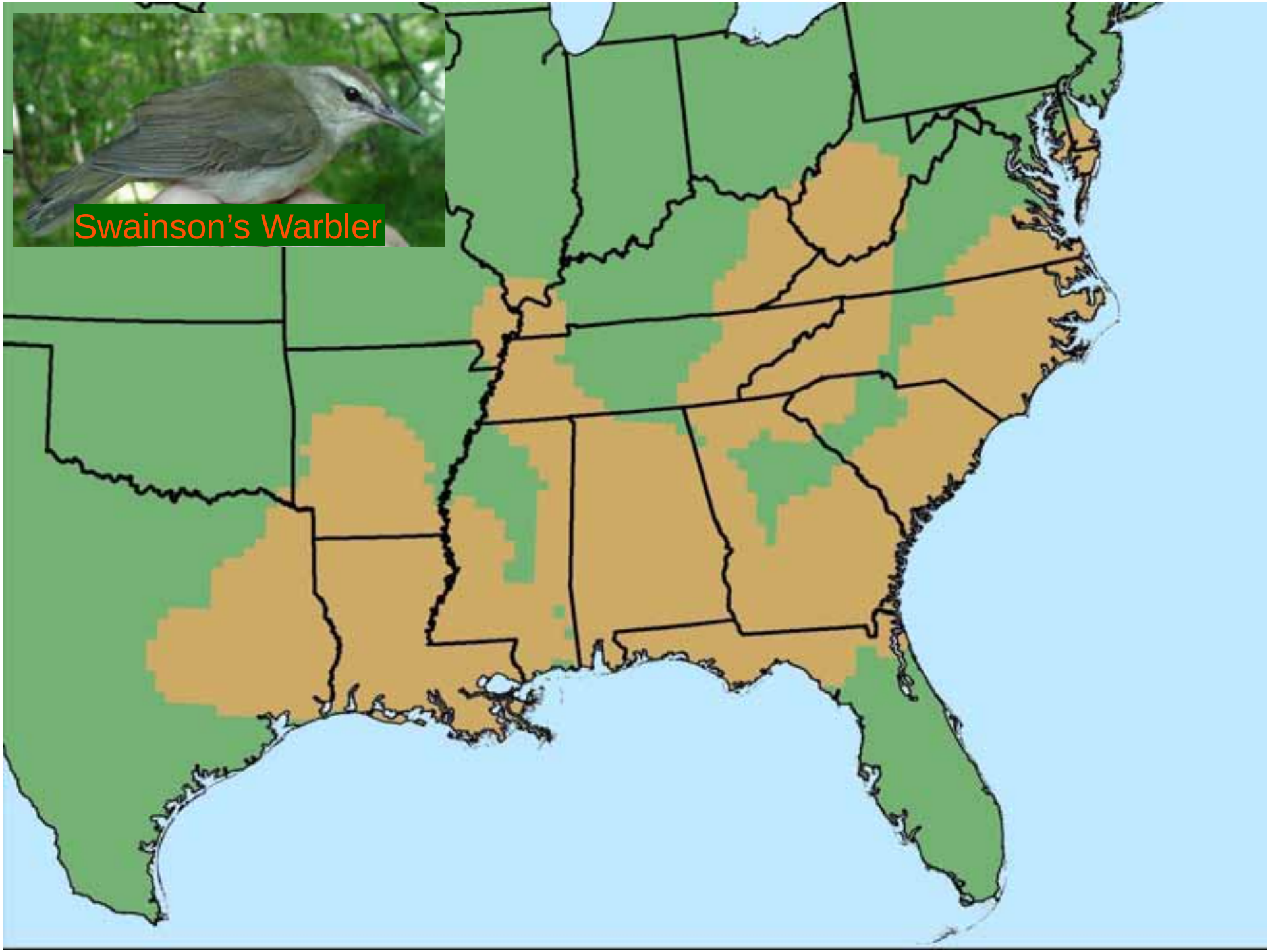
Conservation in Transition

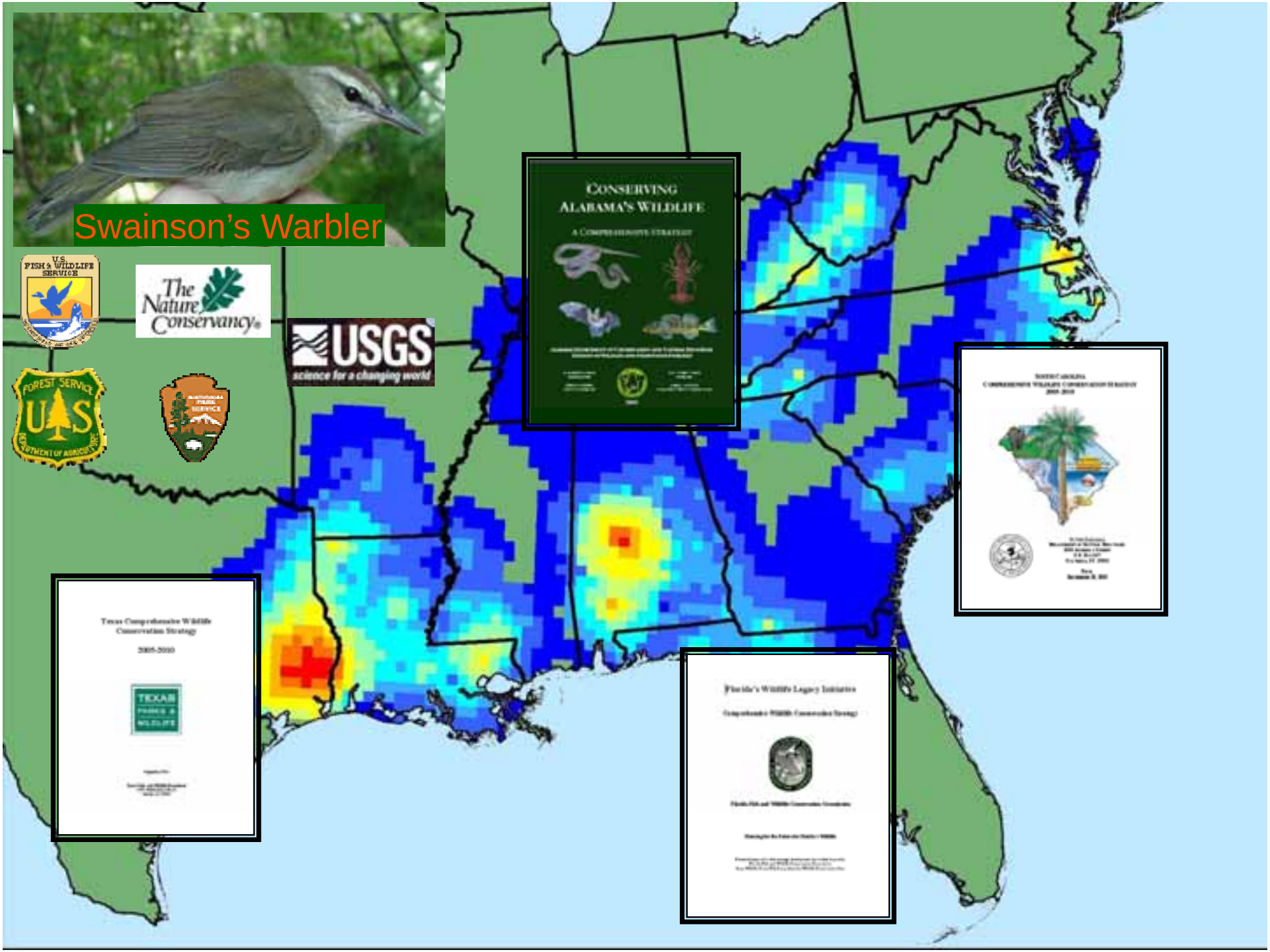
Implications to Wildlife Agencies and Organizations

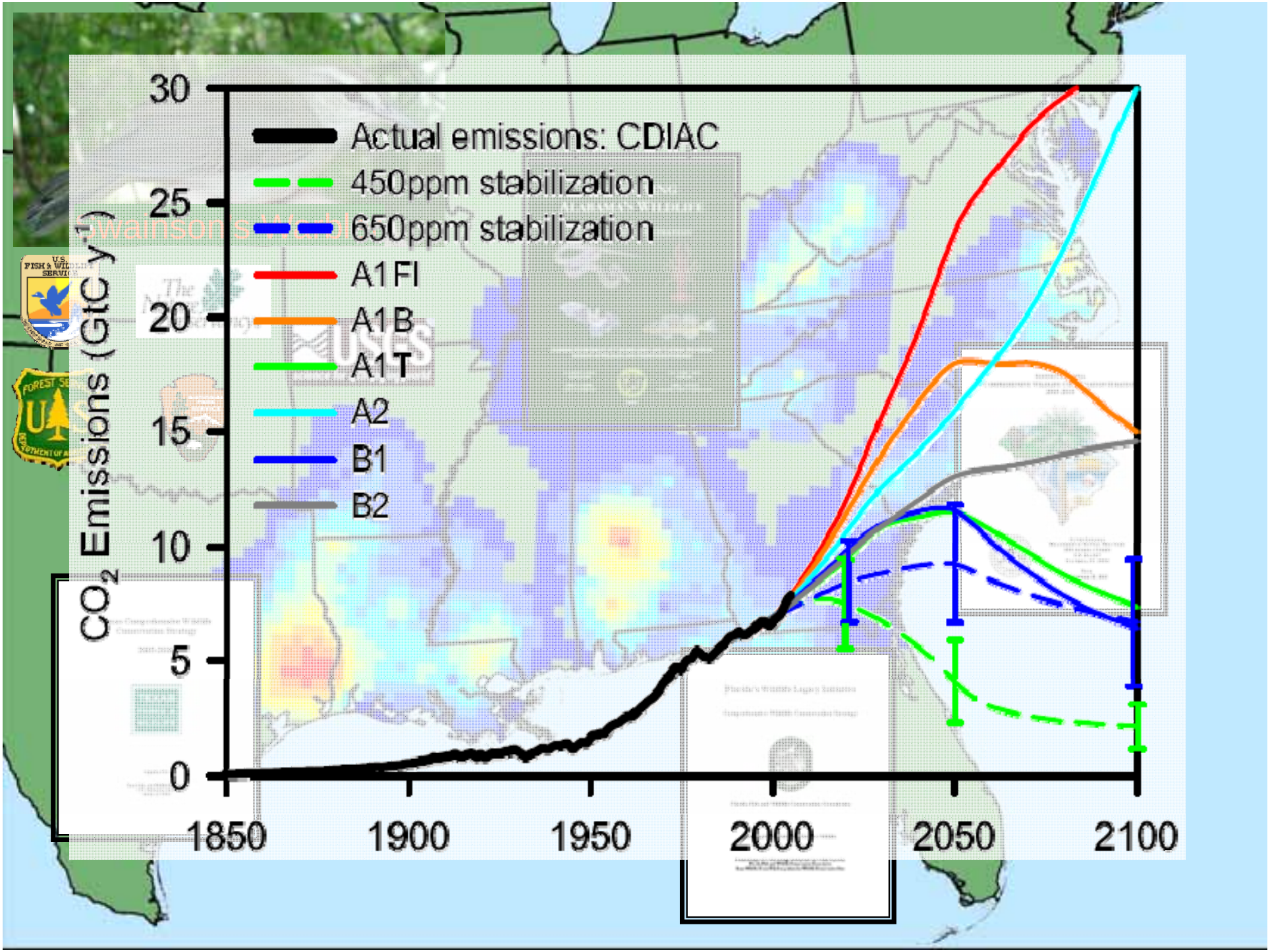
The 21st Century wildlife agency will need…

- A capacity for conservation that extends beyond the operational footprint of its programs – the capacity to characterize, assess, and predict population and habitat sustainability at landscape scales.
  - Problems transcend the boundaries of individual programs.
  - Goals and objectives defined at landscape scales exceed the operational reach of individual programs.
  - Solutions extend beyond the operational footprint of individual programs, agencies, and organizations.

Swainson's Warbler


Swainson's Warbler


Swainson's Warbler
U.S. FISH & WILDLIFE SERVICE
The Nature Conservancy
USGS
science for a changing world
FOREST SERVICE
U.S.
DEPARTMENT OF AGRICULTURE
NATIONAL PARK SERVICE
CONSERVING ALABAMA'S WILDLIFE
A COMPREHENSIVE STRATEGY
Texas Comprehensive Wildlife Conservation Strategy
2005-2010
TEXAS PARKS & WILDLIFE
Florida's Wildlife Legacy Initiative


Actual emissions: CDIAC
450ppm stabilization
650ppm stabilization
A1FI
A1B
A1T
A2
B1
B2
CO_2 Emissions (GtC y^{-1})
30
25
20
15
10
5
0
1850
1900
1950
2000
2050
2100

Conservation in Transition

Implications to Wildlife Agencies and Organizations

The 21st Century wildlife agency will need…

- A capacity for conservation that extends beyond the operational footprint of its programs – the capacity to characterize, assess, and predict population and habitat sustainability at landscape scales.
- New organizational core competencies[1] in landscape assessment.
  - Assessing and predicting sustainability at the landscape scale
  - Spatially depicting goals and objectives that reflect measurable biological outcomes
  - Assessing and characterizing the environmental sensitivity of landscapes to species and populations

[1] Prahalad, C.K. and Gary Hamel. The Core Competence of the Corporation. Harvard Business Review. May-June 1990

Conservation in Transition

Implications to Wildlife Agencies and Organizations

The 21st Century wildlife agency will need…

- A capacity for conservation that extends beyond the operational footprint of its programs – the capacity to characterize, assess, and predict population and habitat sustainability at landscape scales.
- New organizational core competencies in landscape assessment
- An approach to partnering that enables a region's private, state, federal conservation infrastructure to operate as a networked, leveraged system.

A Way-of-Working Challenge

Conservation in Transition

Implications to Wildlife Agencies and Organizations

The 21st Century wildlife agency will need…

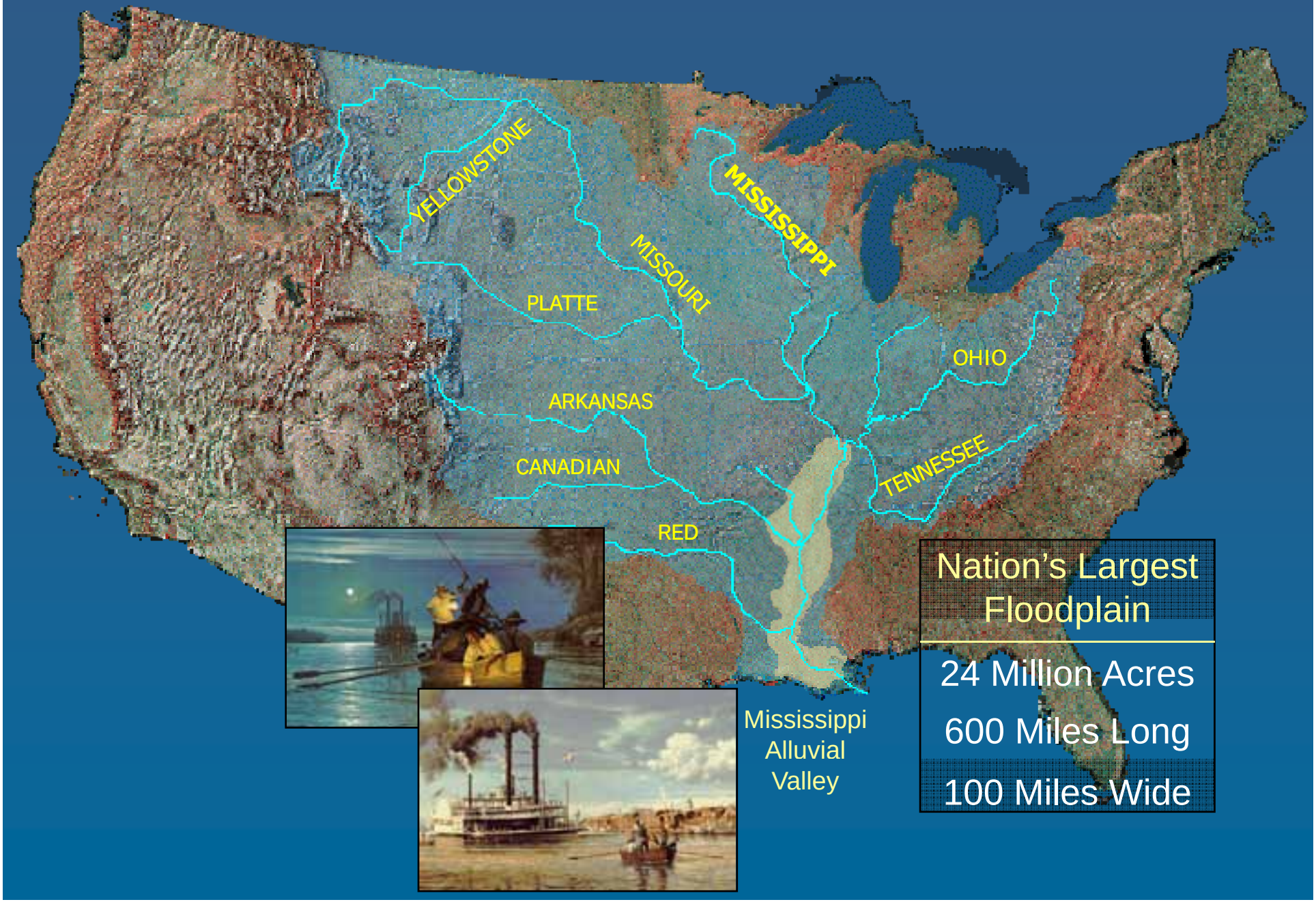
- A capacity for conservation that extends beyond the operational footprint of its programs – the capacity to characterize, assess, and predict population and habitat sustainability at landscape scales.
- New organizational core competencies in landscape assessment
- An approach to partnering that enables a region's private, state, federal conservation infrastructure to operate as a networked, leveraged system.
- To assume a role in the Public Square that extends beyond the operational footprint of its programs.
  - Make available transparent, science-based assessments of population and habitat sustainability
  - Engage the citizenry in the search for socially viable solutions

A Way-of-Working Challenge

- Designing An Ecologically Sustainable Landscape

- Toward An Ecological View of Organizational Relationships

Mississippi Alluvial Valley – Designing the Landscape



Nation's Largest Floodplain

24 Million Acres

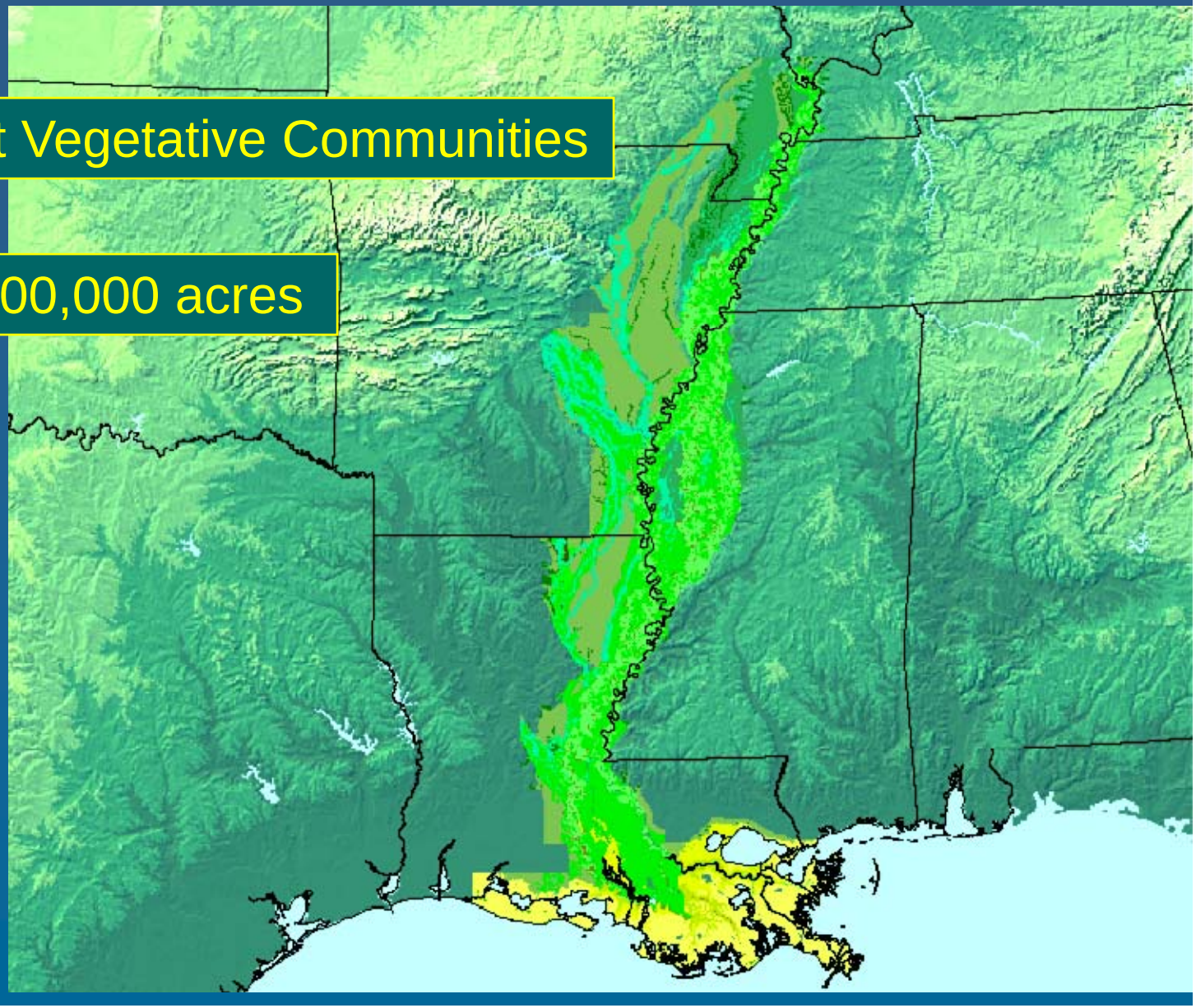
600 Miles Long

100 Miles Wide

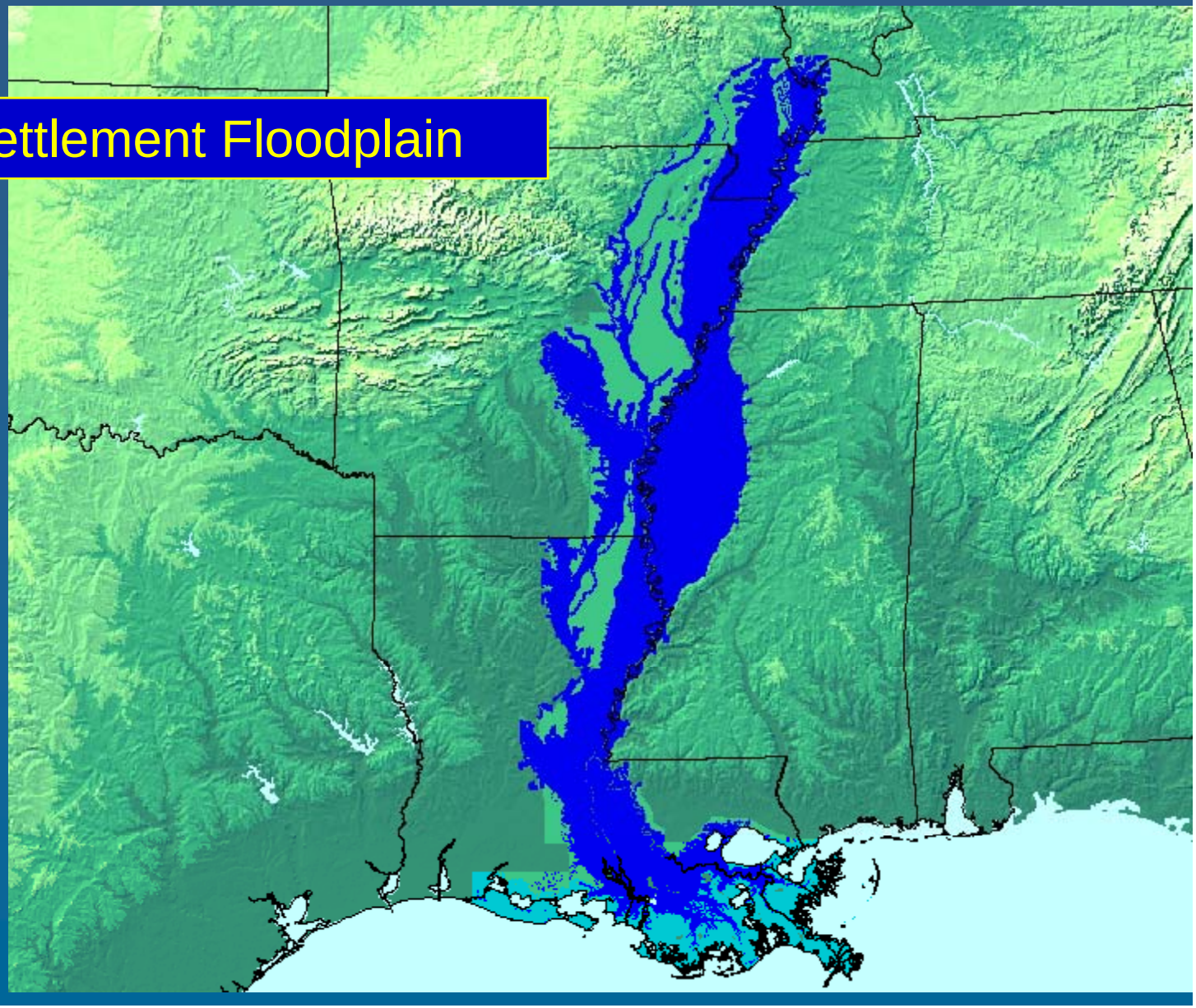
“The Nation’s Floodplain” – A Dynamic Ecological System

Pre-Settlement Vegetative Communities

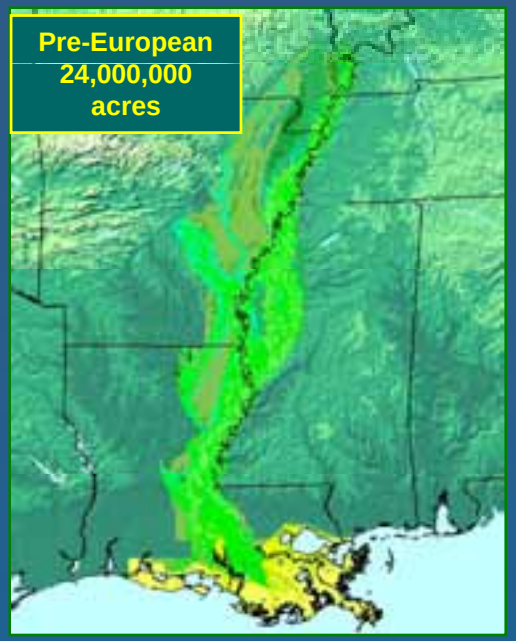
24,000,000 acres

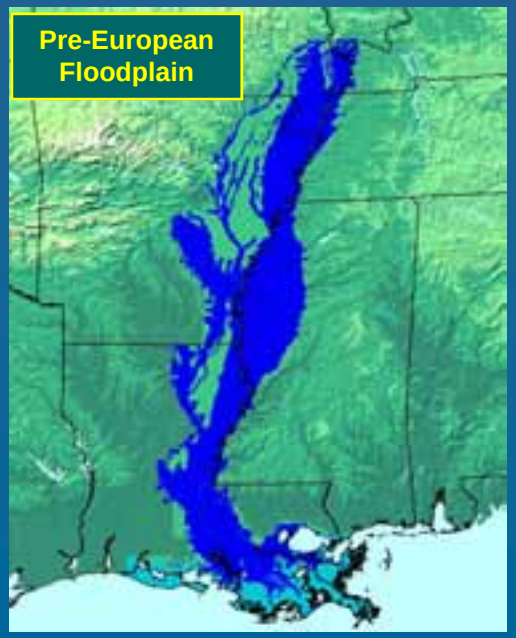


“The Nation’s Floodplain” – A Dynamic Ecological System

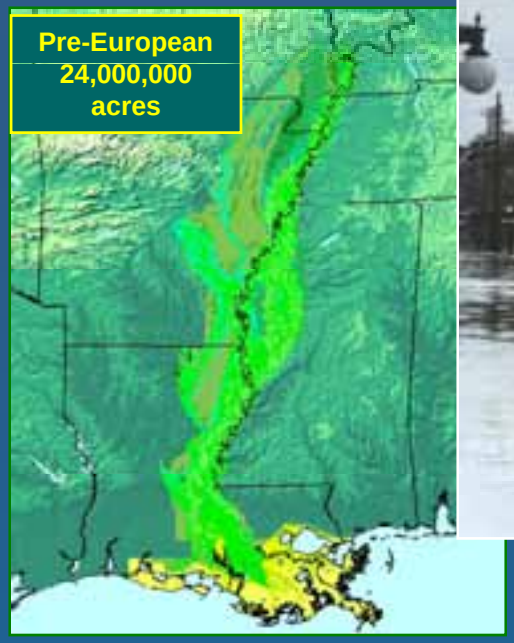


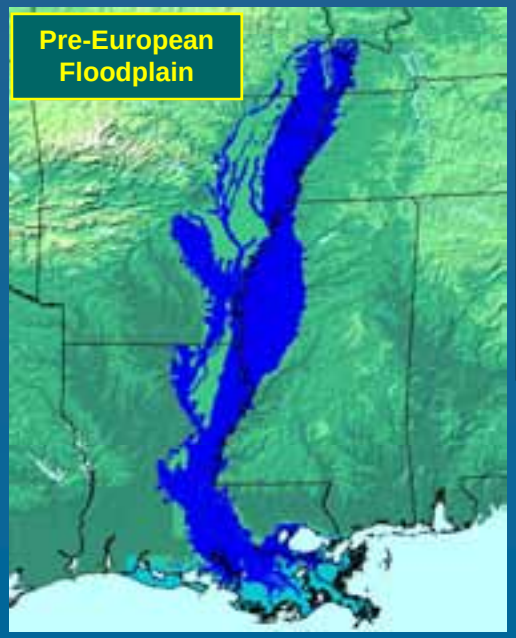
Mississippi Alluvial Valley – Designing the Landscape





Mississippi Alluvial Valley – Designing the Landscape





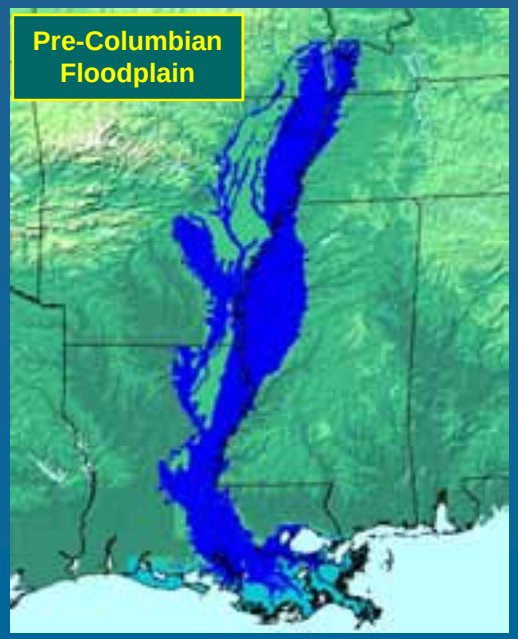
Mississippi Alluvial Valley – Designing the Landscape

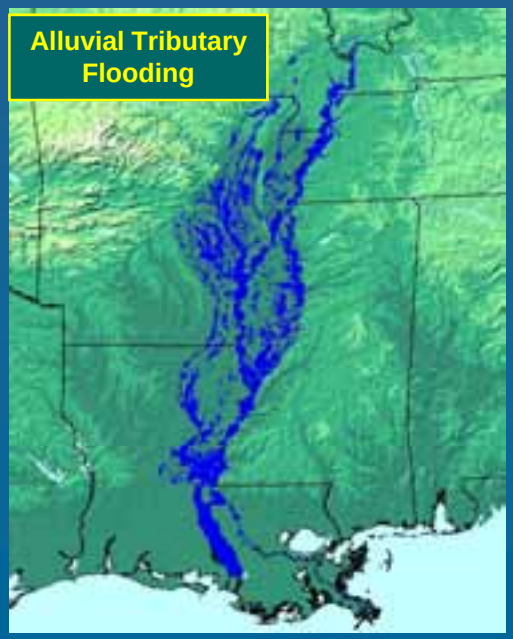
Levee Construction

Channel Realignment

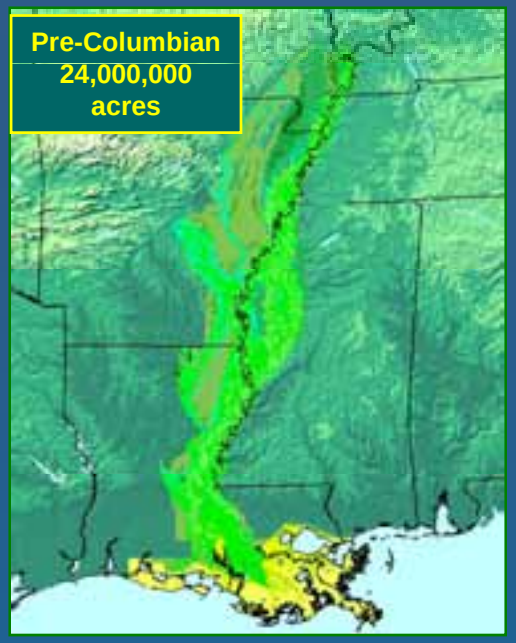
Channel Revetments

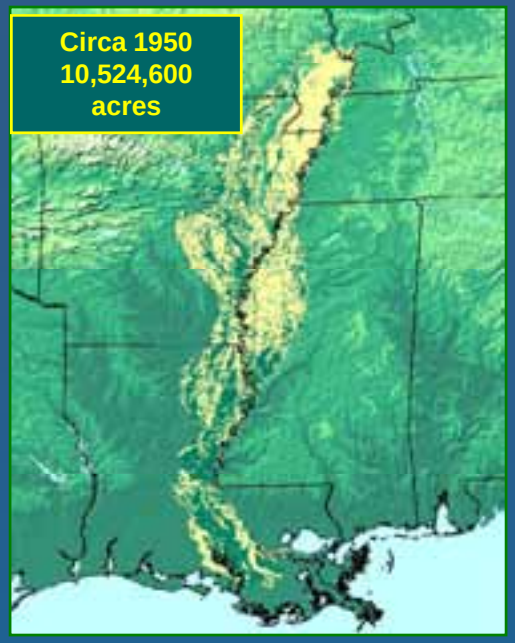
Bank Stabilization

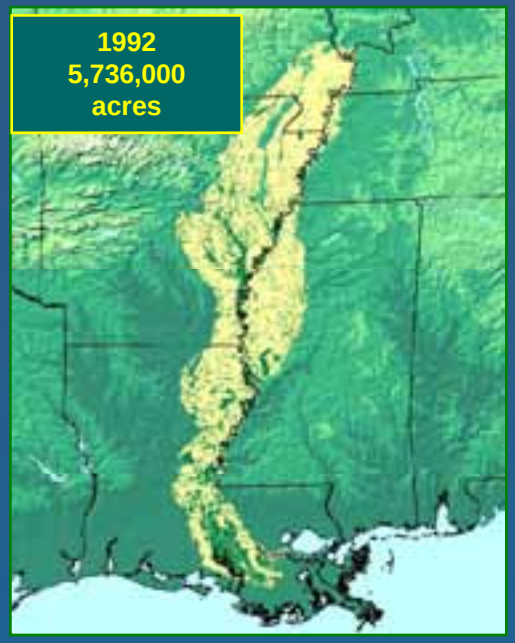


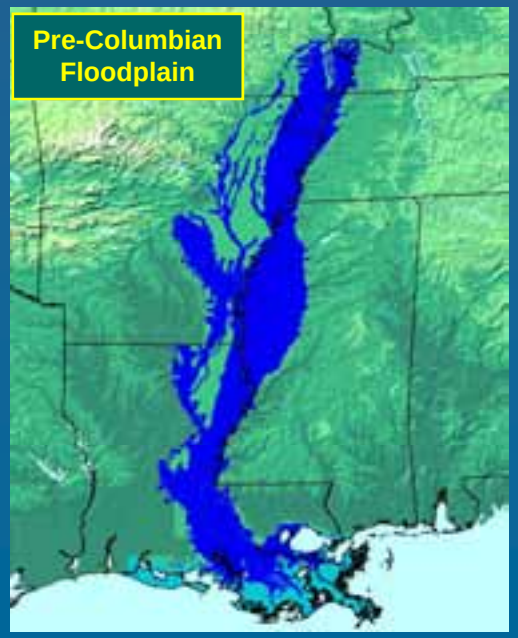


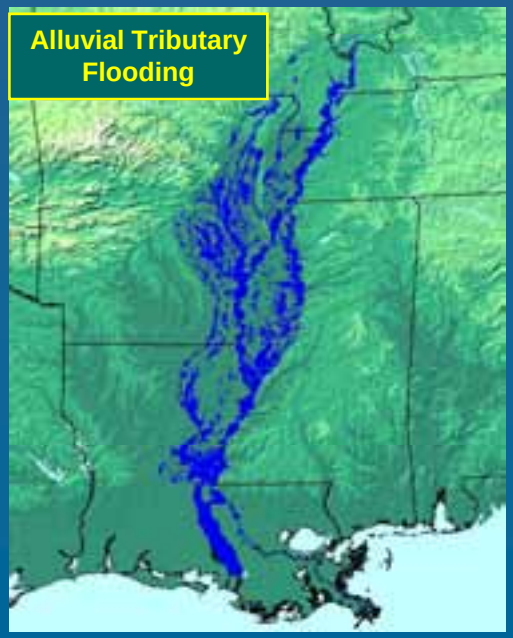
Mississippi Alluvial Valley – Designing the Landscape



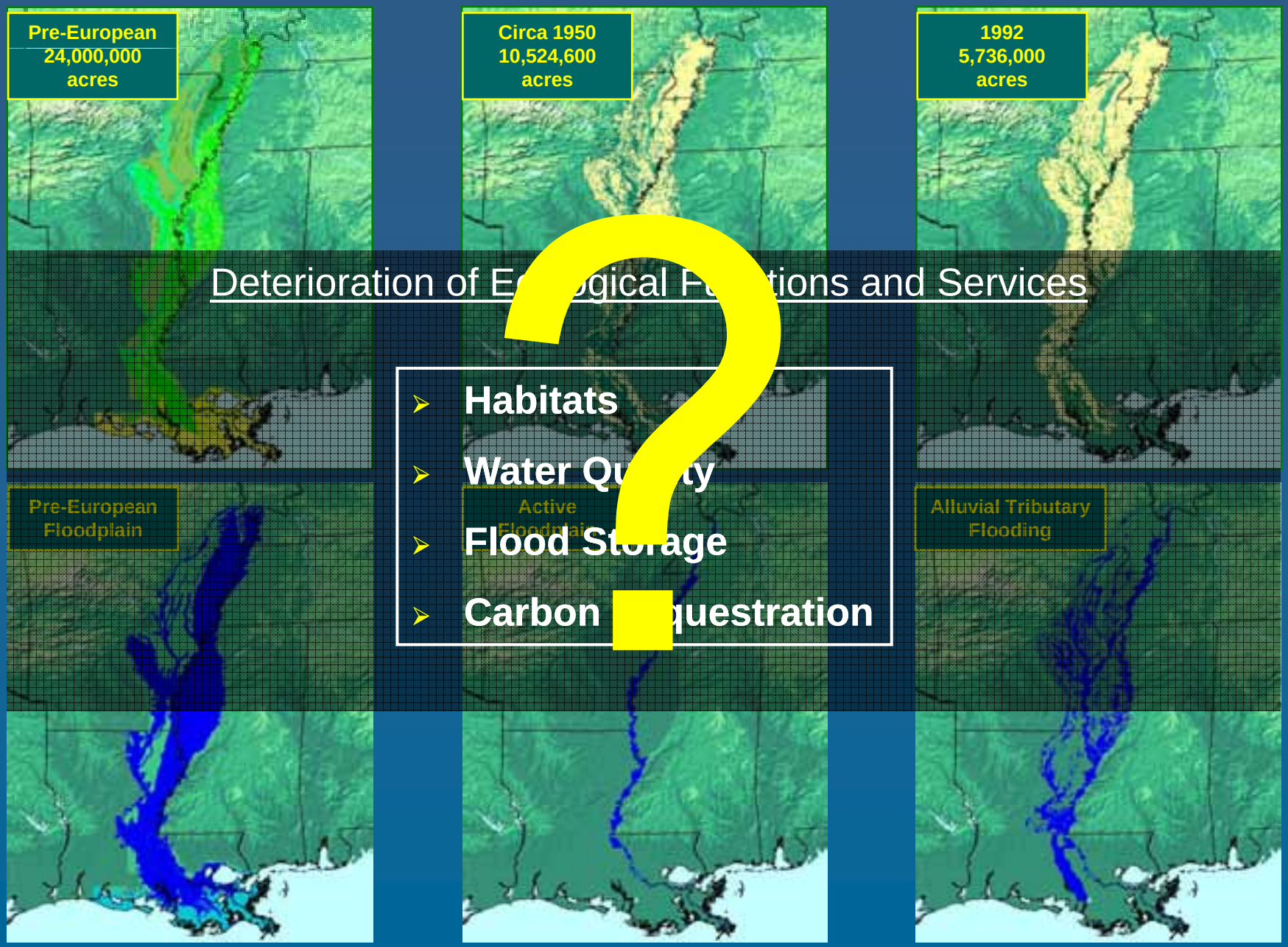








Mississippi Alluvial Valley – Designing the Landscape



Deterioration of Ecological Functions and Services

- Habitats
- Water Quality
- Flood Storage
- Carbon Sequestration

Mississippi Alluvial Valley – Designing the Landscape

Biological Planning and Conservation Design

North American Landbird Plan

North American Waterbird Plan

U.S. Shorebird Conservation Plan

North American Waterfowl Management Plan

Northern Bobwhite Quail Conservation Initiative

Landscapes capable of sustaining bird populations ecoregionally

On-the-ground conservation actions

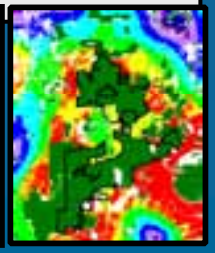
Swainson's Warbler
Prothonotary Warbler
Hooded Warbler
Wood Thrush
Acadian Flycatcher

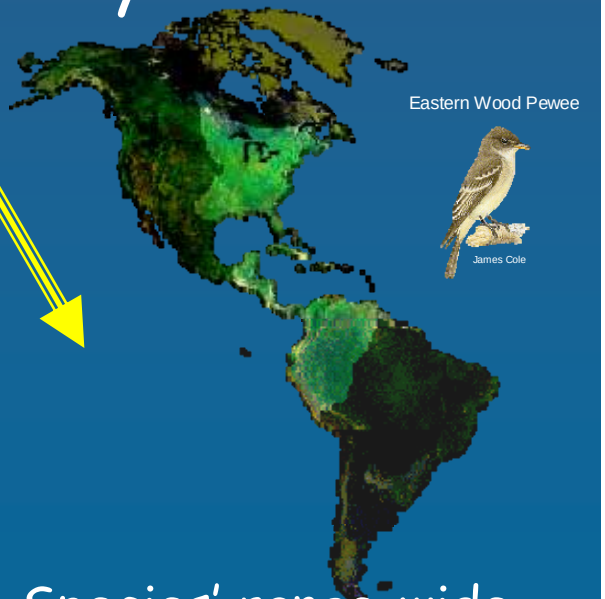
Patch Size Model: A = (N * D) + B

A = Area of forest required to support a source population
N = Desired number of breeding pairs
D = Density of breeding birds (pairs / area)
B = Area of a 1-km wide forested buffer around the core (N*D)

Source Population Objectives

State	10K	20K	100K
Arkansas	9	11	3
Illinois	0	1	0
Kentucky	2	1	0
Louisiana	19	15	7
Mississippi	14	6	2
Missouri	6	1	0
Tennessee	1	1	1
Totals	51	36	13





Eastern Wood Pewee

James Cole

Species' range-wide population objectives.

Mississippi Alluvial Valley – ~~Designing~~ the Landscape

Redesigning

2000

A Vision of An Ecologically Sustainable Landscape

2050

Swainson's Warbler
Prothonotary Warbler
Hooded Warbler
Wood Thrush
Acadian Flycatcher

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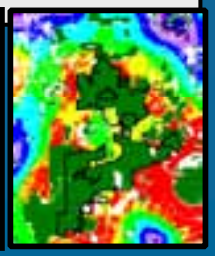
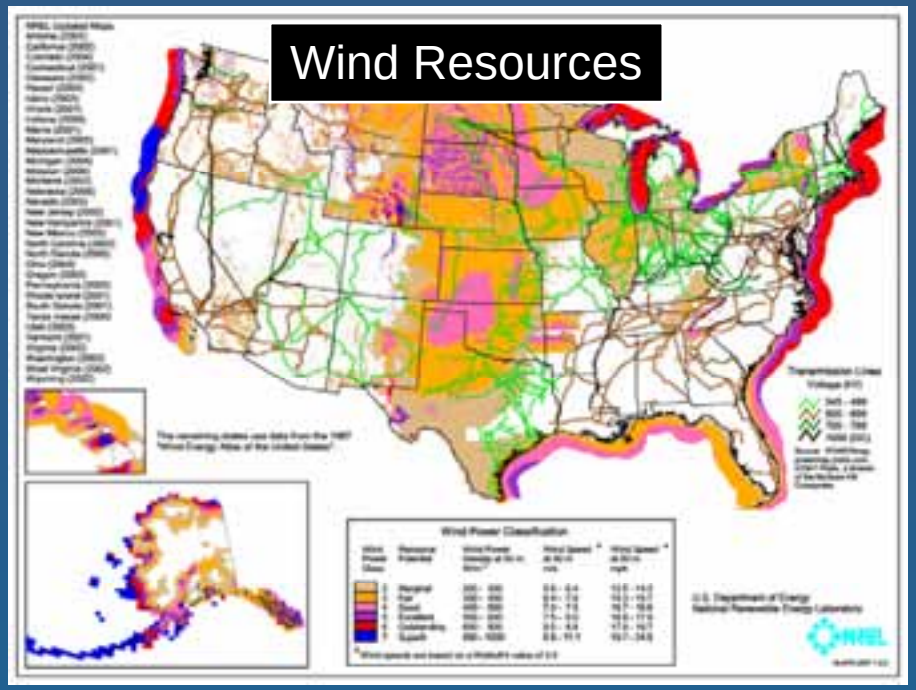
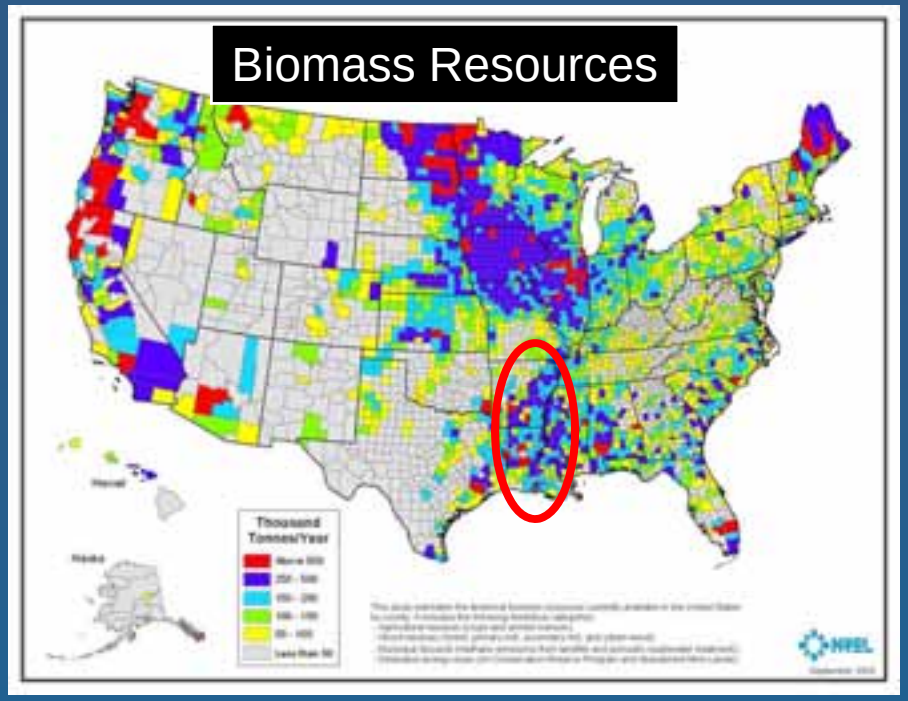
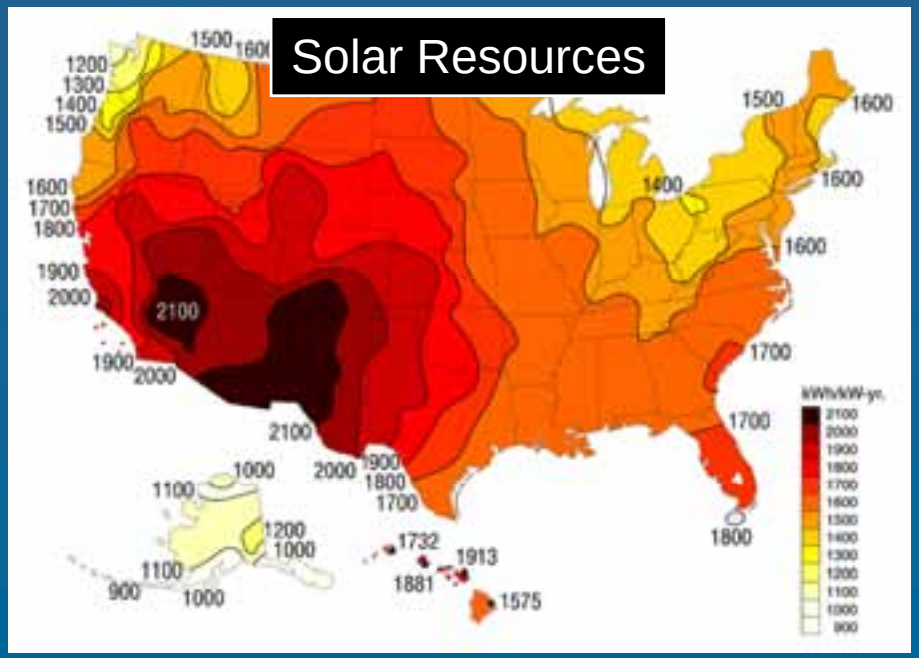
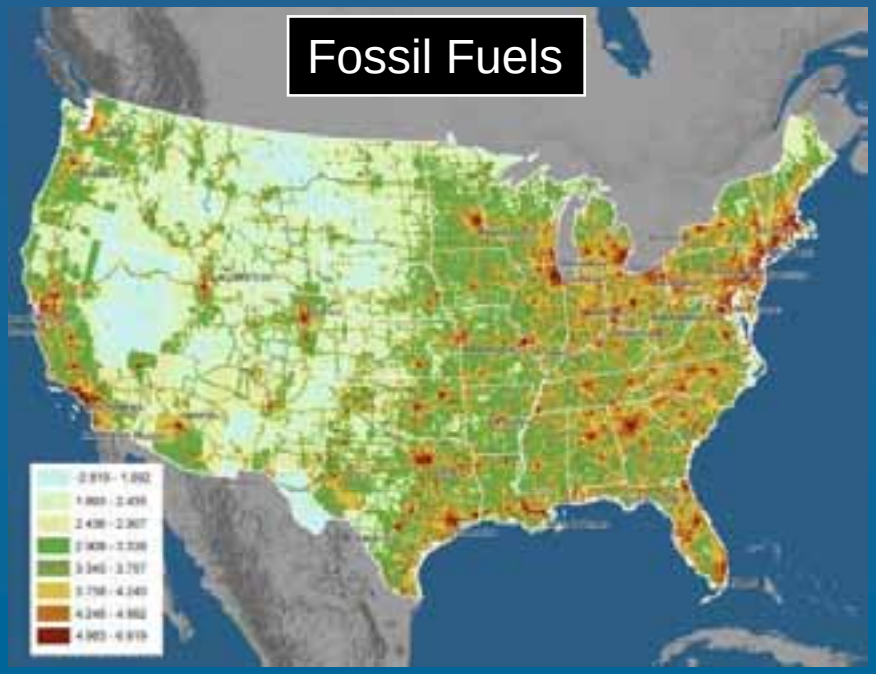



Wind Resources

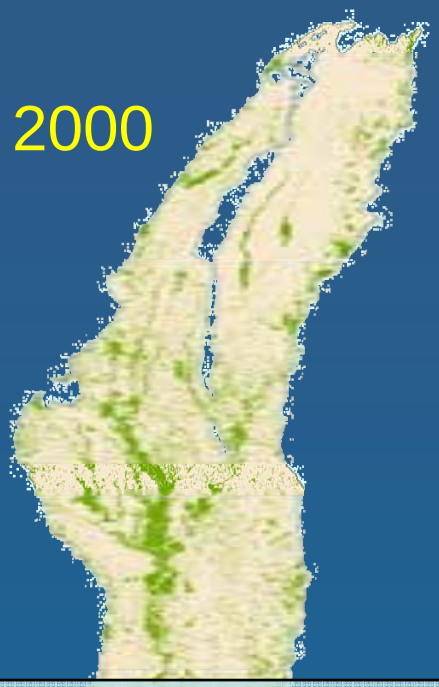

Biomass Resources
Thousand Tonnes/Year


Solar Resources
kWh/kW-yr.


Fossil Fuels

Mississippi Alluvial Valley – ~~Designing~~ the Landscape
Redesigning

2000



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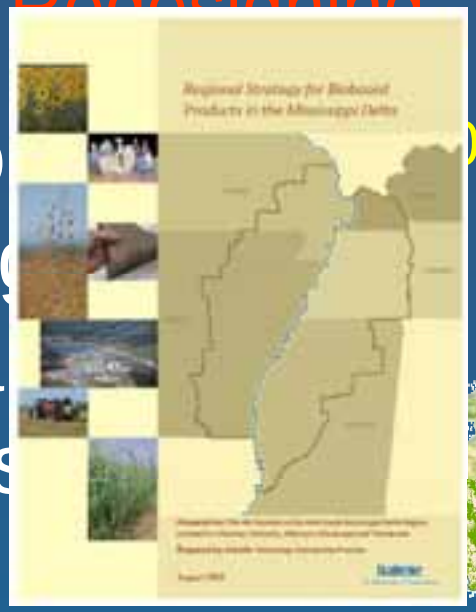

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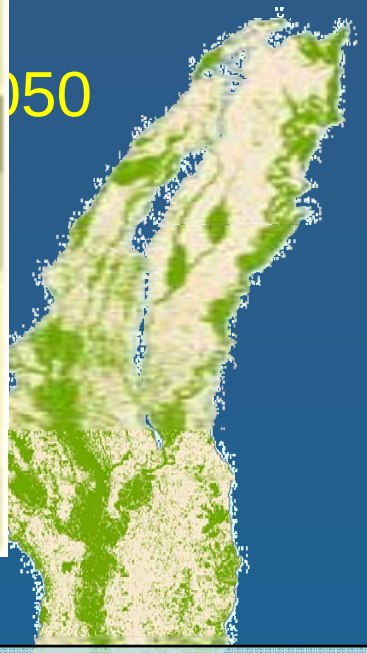


Swainson's Warbler
Prothonotary Warbler

- **Collectively the five states can secure a key leadership role in the emerging multi-billion global bioeconomy by leveraging their assets and attracting technology partners from outside the region.**
- **Sustainably grown and harvested biomass in the 98 county region can adequately supply an $8 billion biofuels and biobased products industry without affecting the food and feed supply chain.**
- **The bioeconomy will open up markets for new crops… Increase biodiversity and wildlife**

A Way-of-Working Challenge

- Designing An Ecologically Sustainable Landscape

- Toward An Ecological View of Organizational Relationships

Sustaining ecological systems, processes, and functions.

Building Conservation Partner Ecosystems

An Ecological View of Organizational Relationships

- Work as a System – a region's private, state, federal conservation infrastructure will need to interact as a system if measurable outcomes are to be achieved at landscape scales.
- Recognize our functional interdependence – Partners are mutually dependent in accomplishing outcomes at landscape scales.
- Strive for functional connectivity – leveraged capacity for biological assessment, conservation design, conservation delivery, monitoring, and research built on the principle of horizontal integration.
- Niche recognition and support – the performance and accountability of our partners will often relate to their ability to access, use, and leverage our assets and vice versa.
- System sustainability – organizations strive to leverage assets in a way that sustains the health of their conservation partner ecosystem.

"The conservation challenges of the 21st Century represent a force of change more far-reaching and consequential than any previously encountered."

- Conservation In Transition
- A Way-of-Working Challenge
- Landscape Conservation Cooperatives

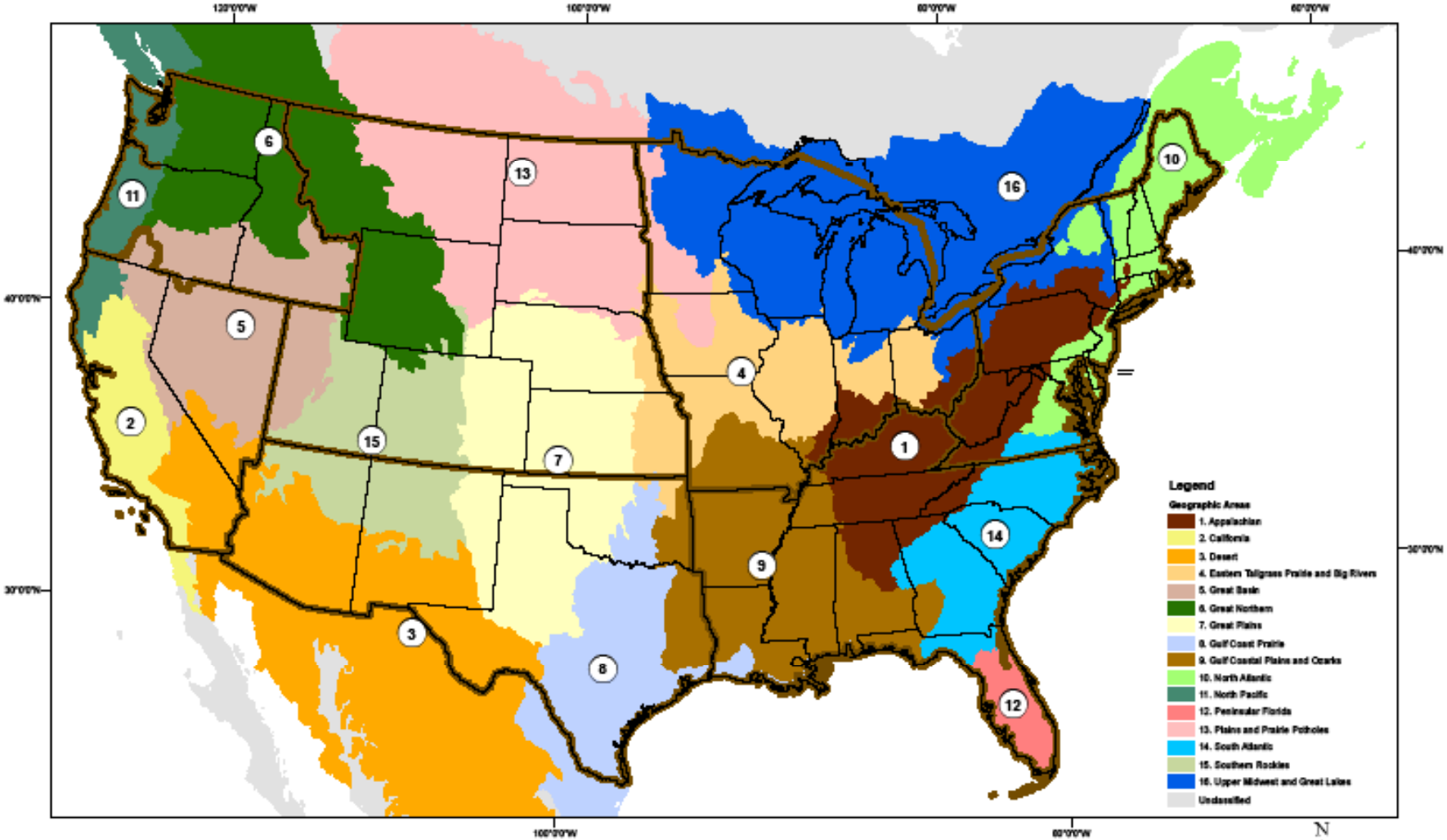
- "21st Century resource challenges are formidable and complex…Yet the most fundamental challenge facing the wildlife community is not a resource challenge at all; it's A Way-of-Working Challenge"

A 21st Century Management-Science Partnership: Landscape Conservation Cooperatives.

- 21st Century Challenges demand new capacities to comprehend problems across large scales, but still design and target site-scale efforts.
- These capacities are inherently scientific and technical, but they should be directed by and toward resource managers, and they should be shared across management organizations.
- LCCs are shared management-science partnerships involving federal agencies, states, tribes, NGOs, universities, and NGOs. They house capacity for biologically-based assessment and planning to inform strategic responses to broad-scale forces, like changing climate.
- The Service hopes to help catalyze a national and international network of LCCs that collectively develops shared science capacity, information, and decision support.

U.S. Department of the Interior

Geographic Areas



0 175 350 700 1,050 1,400 Miles

0 400 800 1,600 2,400 3,200 Kilometers

N W E S

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NAD83

Produced by FWS, IRTM, Denver, CO
Map Date: 01222010

A 21st Century Management-Science Partnership: Landscape Conservation Cooperatives.

Form | Function

Steering Committee

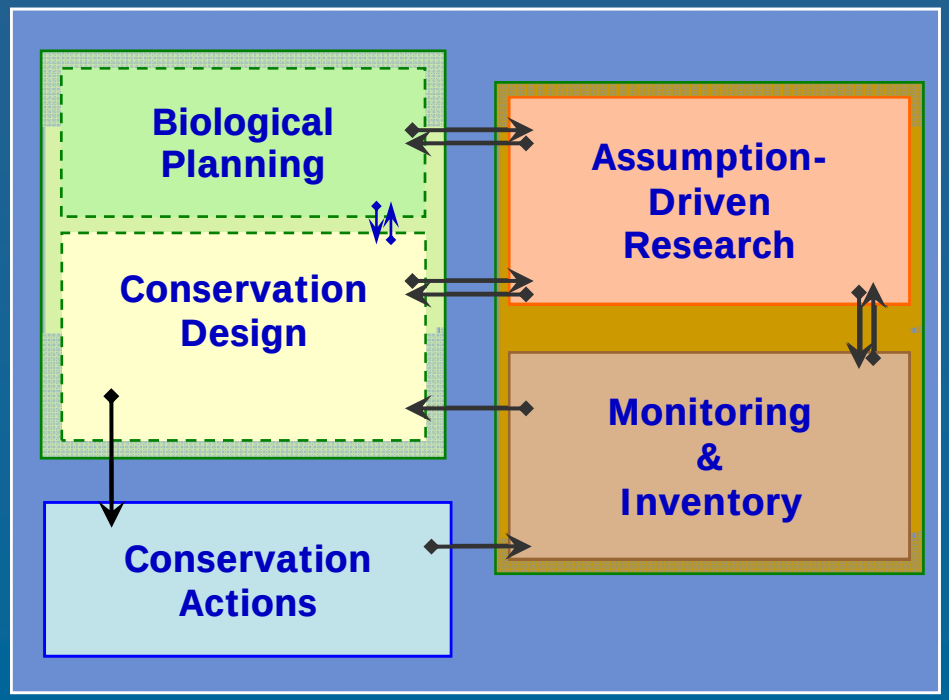
Dedicated Staff

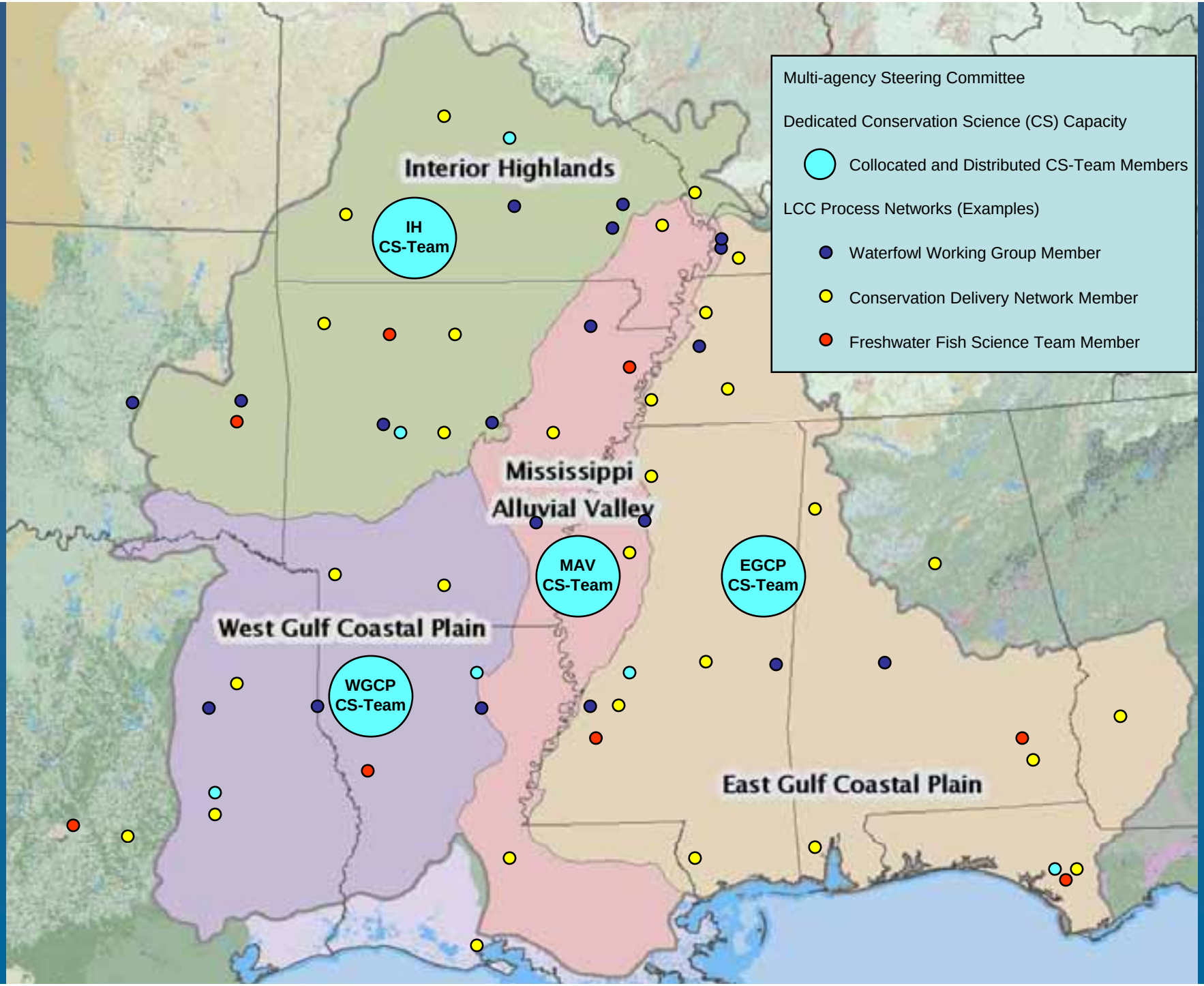
LCC Coordinator

Science Coordinator

"Process Networks"

Science and Coordination Support




Multi-agency Steering Committee
Dedicated Conservation Science (CS) Capacity
Collocated and Distributed CS-Team Members
LCC Process Networks (Examples)
Waterfowl Working Group Member
Conservation Delivery Network Member
Freshwater Fish Science Team Member
Interior Highlands
IH CS-Team
Mississippi Alluvial Valley
MAV CS-Team
EGCP CS-Team
West Gulf Coastal Plain
WGCP CS-Team
East Gulf Coastal Plain