



Coastal Wetlands Indicators

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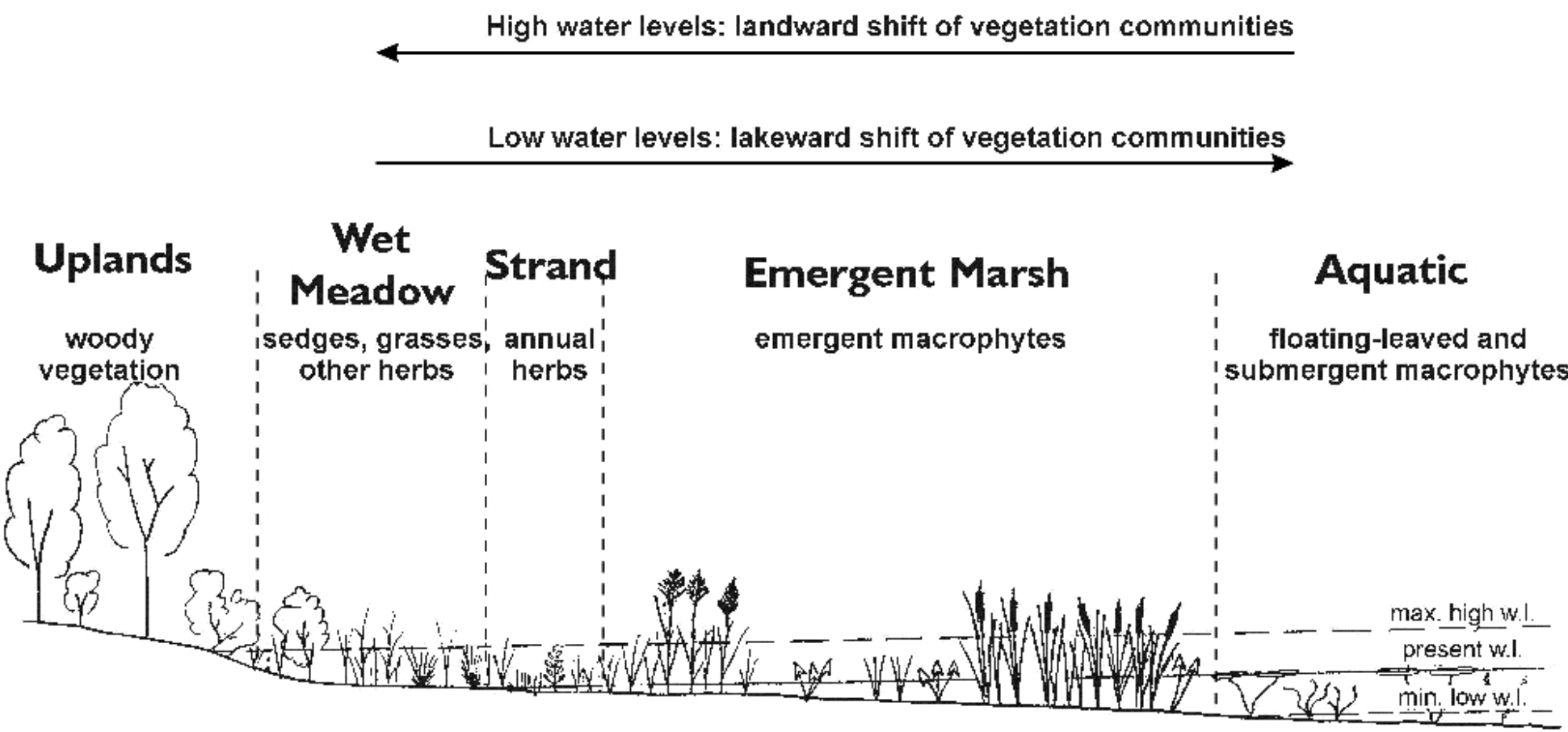


Figure 1: Generalized diagram of Great Lakes coastal marsh communities, showing the influence of fluctuating water levels.

Why Wetlands?





Threats

A photograph of a polluted waterway. In the center, a rusted metal barrel floats in the water. The banks are covered in dense green vegetation and dark, muddy soil. The water is murky and reflects the surrounding environment.

Controlled water levels
Land use change
Invasive species
Toxic chemicals

Wetland Status

Significant losses - up to 90 %

Loss & degradation varies by lake



Why Indicators?

- Building on SOLEC '96 which described:
 - ▶ types and geomorphological settings
 - ▶ ecological functions and human-use values
 - ▶ human-induced and natural stressors
 - ▶ lake-by-lake status
 - ▶ initial suggestions for indicators

Why Indicators?

A photograph of a lake with lily pads and reeds, with a dense forest in the background. The text 'Why Indicators?' is overlaid in the top left, and 'Insufficient data to describe change' is overlaid in the bottom right.

Insufficient data to
describe change

SOLEC '96 Indicators



Land Use

Area & Number

Shoreline Change

Water Levels

Toxic Chemical Levels (abiotic & biotic)

Status of Plant Communities & Species

Exotics

A large flock of birds, likely terns, is seen in flight over a vast expanse of blue ocean. The sky is a soft, hazy blue, suggesting a sunset or sunrise. The birds are scattered across the frame, with some in sharp focus and others blurred, creating a sense of movement and activity. The overall mood is one of natural energy and transition.

Opportunity for Change

Allows new approaches

Sets priorities for information gathering

Provides coordination

What are we trying to measure?



SOLEC '98

- A healthy coastal wetland is
 - ▶ State:
 - Diverse, with self-sustaining assemblages of organisms
 - ▶ Stress:
 - Resilient to natural disturbances
 - human-induced pressures at an “acceptable level”



Challenges

Representation

Challenges

A Great Egret is shown in profile, standing in a shallow, marshy area. The bird has a long, straight neck and a long, pointed beak. Its feathers are a mix of grey and white. The water is calm, and the surrounding vegetation consists of tall, thin reeds and grasses. The background is a soft, out-of-focus green, suggesting a natural, wetland environment.

Natural Factors

Challenges

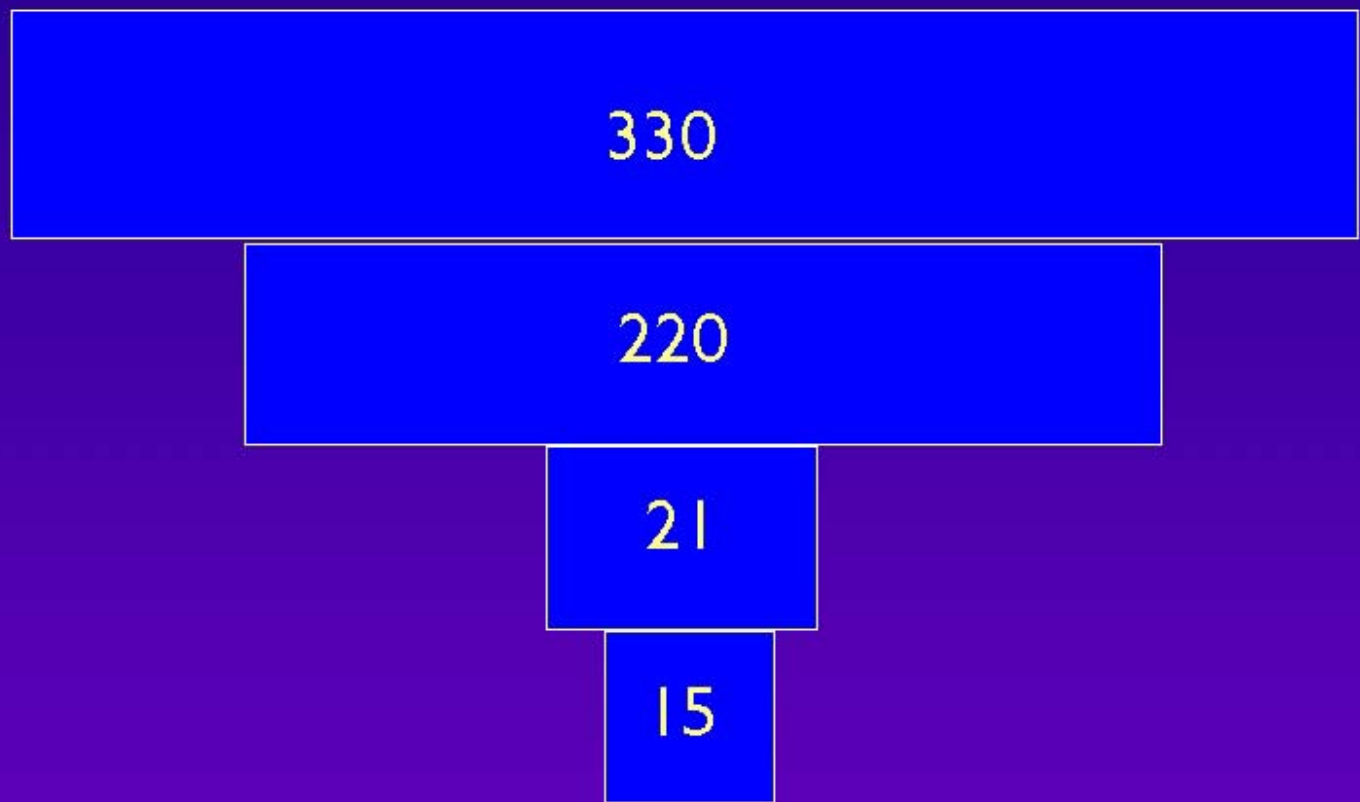
A photograph of a large body of water, likely a lake or bayou, with numerous lily pads floating on the surface. In the foreground, there are tall, green reeds. The background shows a line of trees under a clear blue sky. The overall scene suggests a natural, but potentially stressed, ecosystem.

Stressed Ecosystem



Selection Process

- Eleven documents reviewed



The Indicators

State - Wildlife

Invertebrate community health

Diversity and abundance of:

Amphibians

Reptiles

Birds



Contaminants in snapping turtle eggs

Reproductive output of mink

The Indicators

An aerial photograph of a wetland area. A winding waterway, possibly a stream or small river, flows through a large, flat, brownish-green area that appears to be a wetland or marsh. The surrounding landscape consists of green fields and some trees. The overall scene is a mix of natural and agricultural land.

State - Extent & Structure:
Area
Restored Area
Chlorophyll a
Invasive plants



The Indicators

- Pressure -
Abiotic/Physical
 - ▶ Water level fluctuations
 - ▶ Water quality:
 - sediment
 - chlorides
 - nitrates
 - phosphorus





What Will We Know?

- general health
- changes over time
- knowledge gaps
- degree human activities are affecting wetlands
- tools for informed decision-making



Sample Indicator (Pressure)

- Water Quality: Sediment
Flowing Into Coastal
Wetlands



Sediment Flowing Into Coastal Wetlands

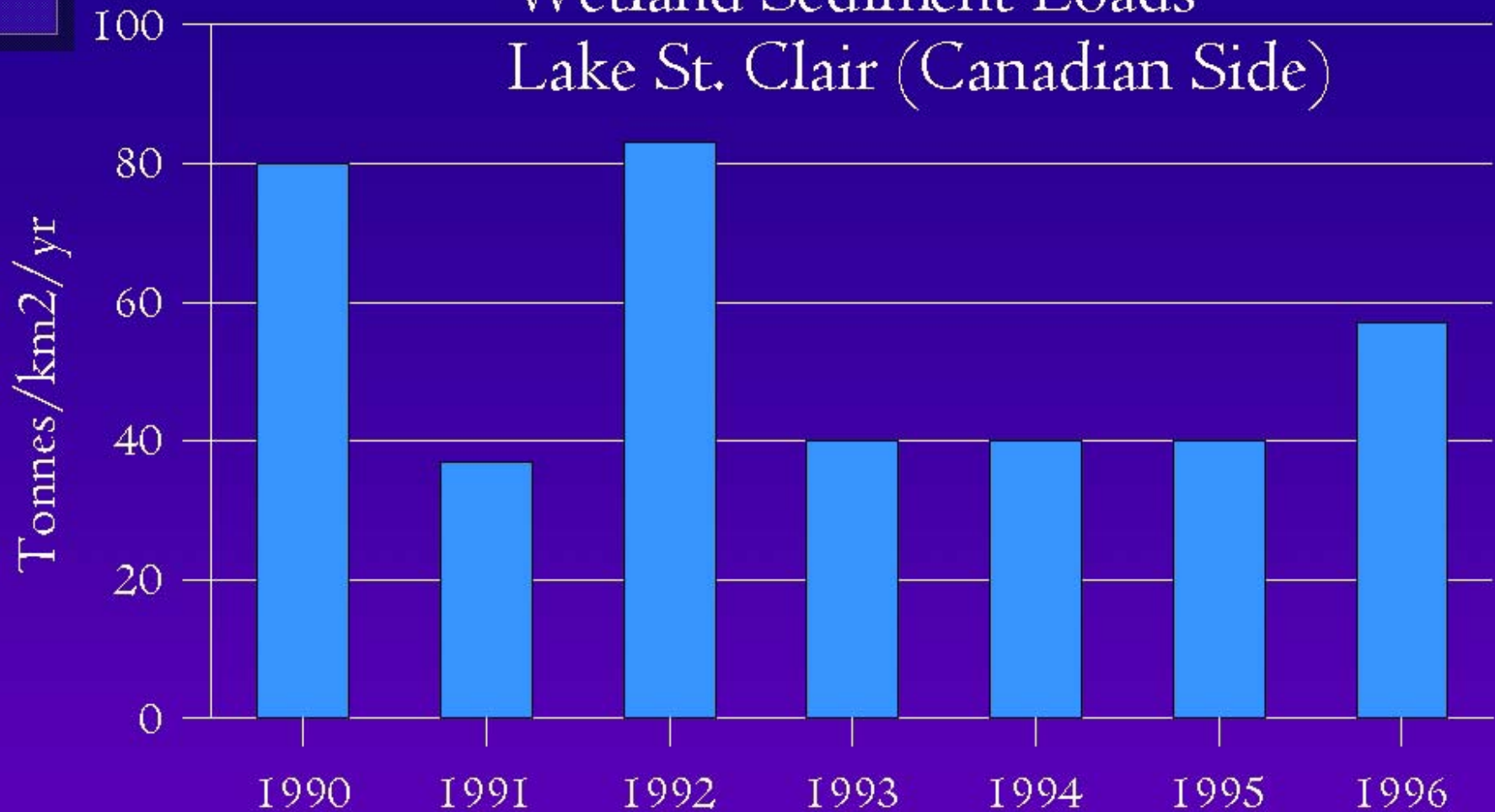
- **Measure:** suspended sediment per watershed area for all existing monitoring sites just upstream
- **Purpose:** to indicate severity of sediment loads to wetlands
- **Limitations:** largely a flow measure calibrated with sediment samples rather than direct measures

Sediment Flowing Into Coastal Wetlands



SOLEC '98

Wetland Sediment Loads
Lake St. Clair (Canadian Side)





Sample Indicator (State)

- Wetland dependent bird diversity and abundance



Wetland Bird Diversity and Abundance

- **Measure:** species composition and relative abundance
- **Purpose:** to indicate availability and quality of habitat
- **Limitations:** an Index of Biotic Integrity is a more preferable approach

SOLEC '98

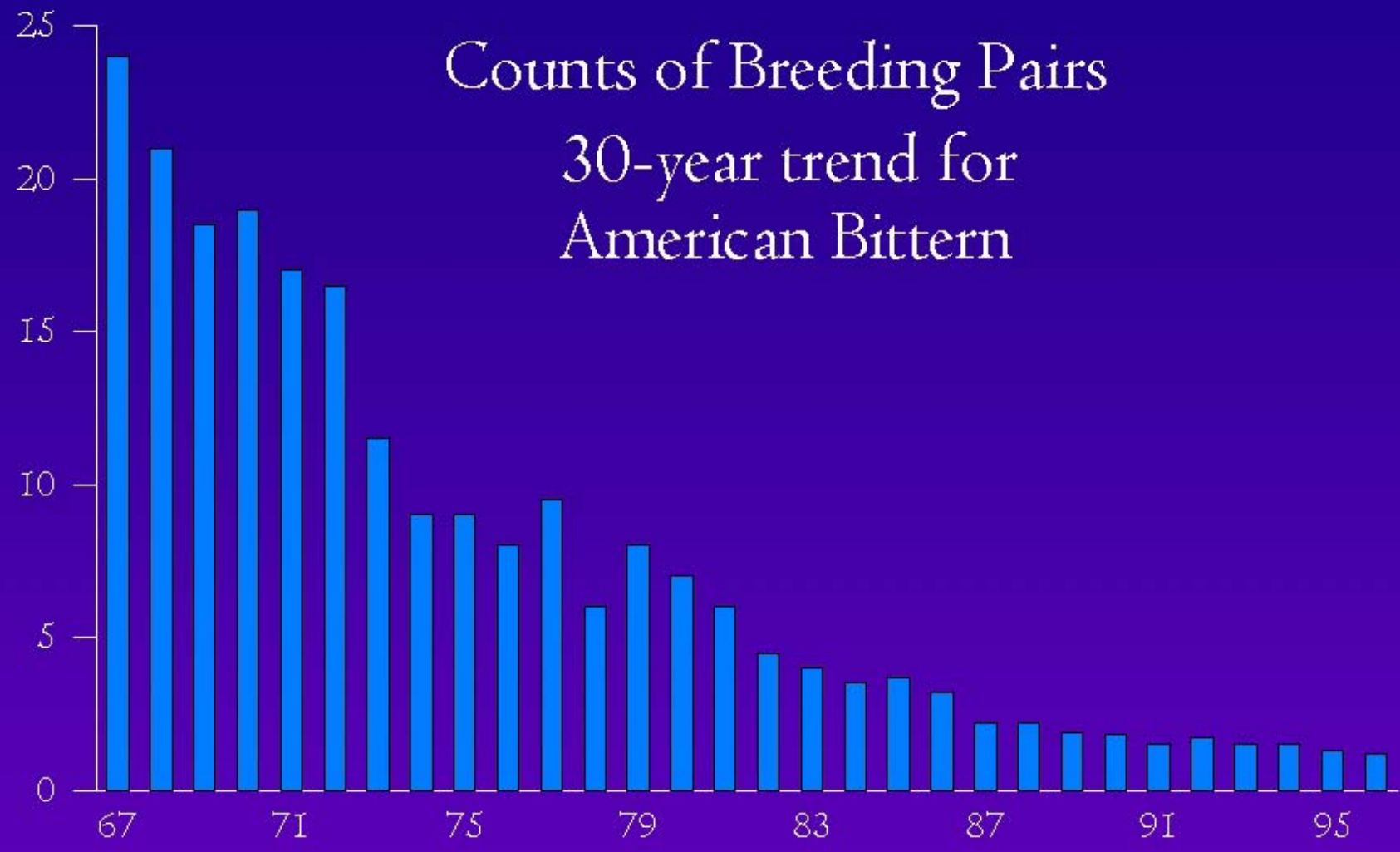


American Bittern





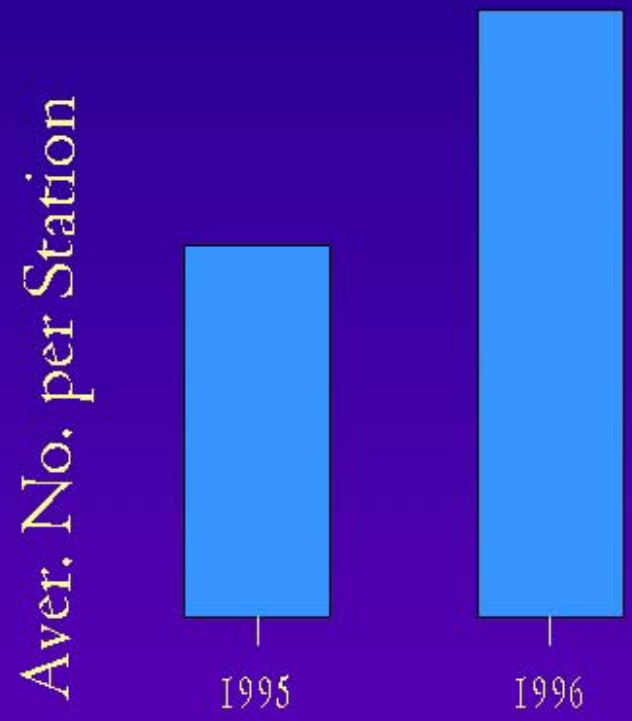
Breeding Trend





American Bittern (Marsh Monitoring Program)

- Present on 19 of 267 routes



Next Steps

- Agreement on suite of indicators
- Design and partnerships for monitoring programs
- Selection of representative sites based on Biodiversity Investment Area reaches
- Coordination of reporting

