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Coastal Wetlands Indicators

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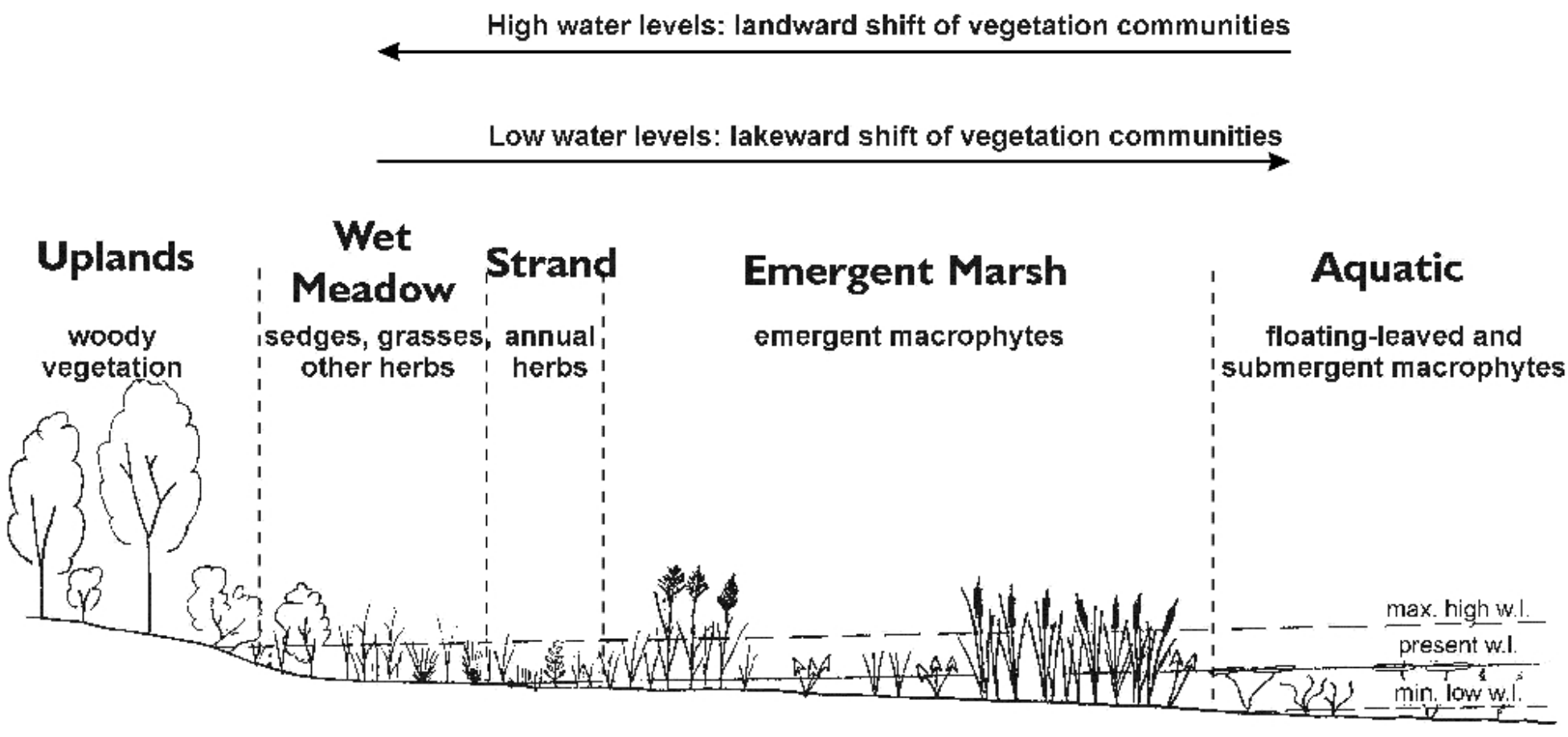
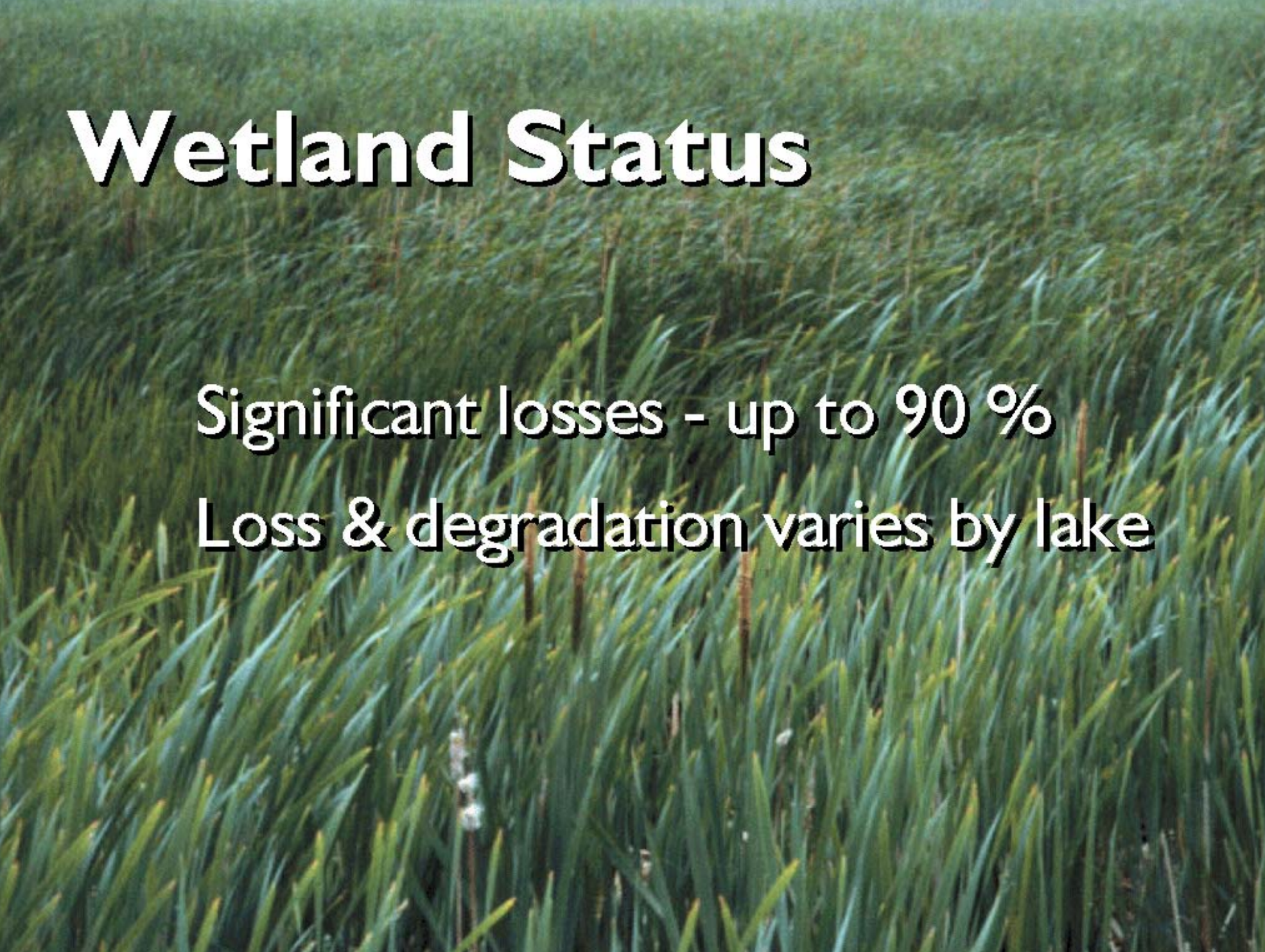


Figure 1: Generalized diagram of Great Lakes coastal marsh communities, showing the influence of fluctuating water levels.

Why Wetlands?


Threats
Controlled water levels
Land use change
Invasive species
Toxic chemicals


Wetland Status
Significant losses - up to 90 %
Loss & degradation varies by lake

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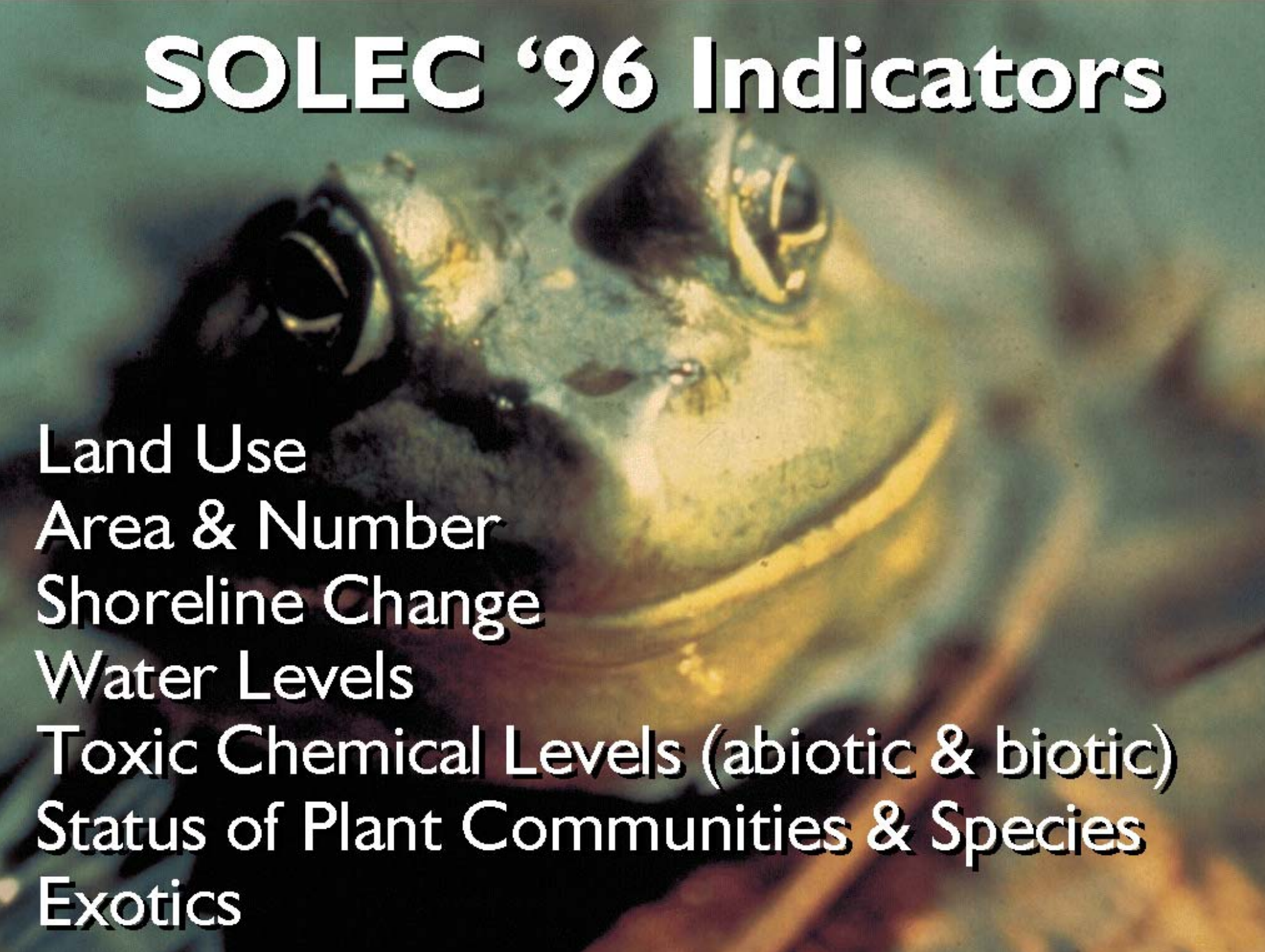
Why Indicators?

- 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?
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

Opportunity for Change

Allows new approaches
Sets priorities for information gathering
Provides coordination

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What are we trying to measure?

- 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

Natural Factors


Challenges
Stressed Ecosystem

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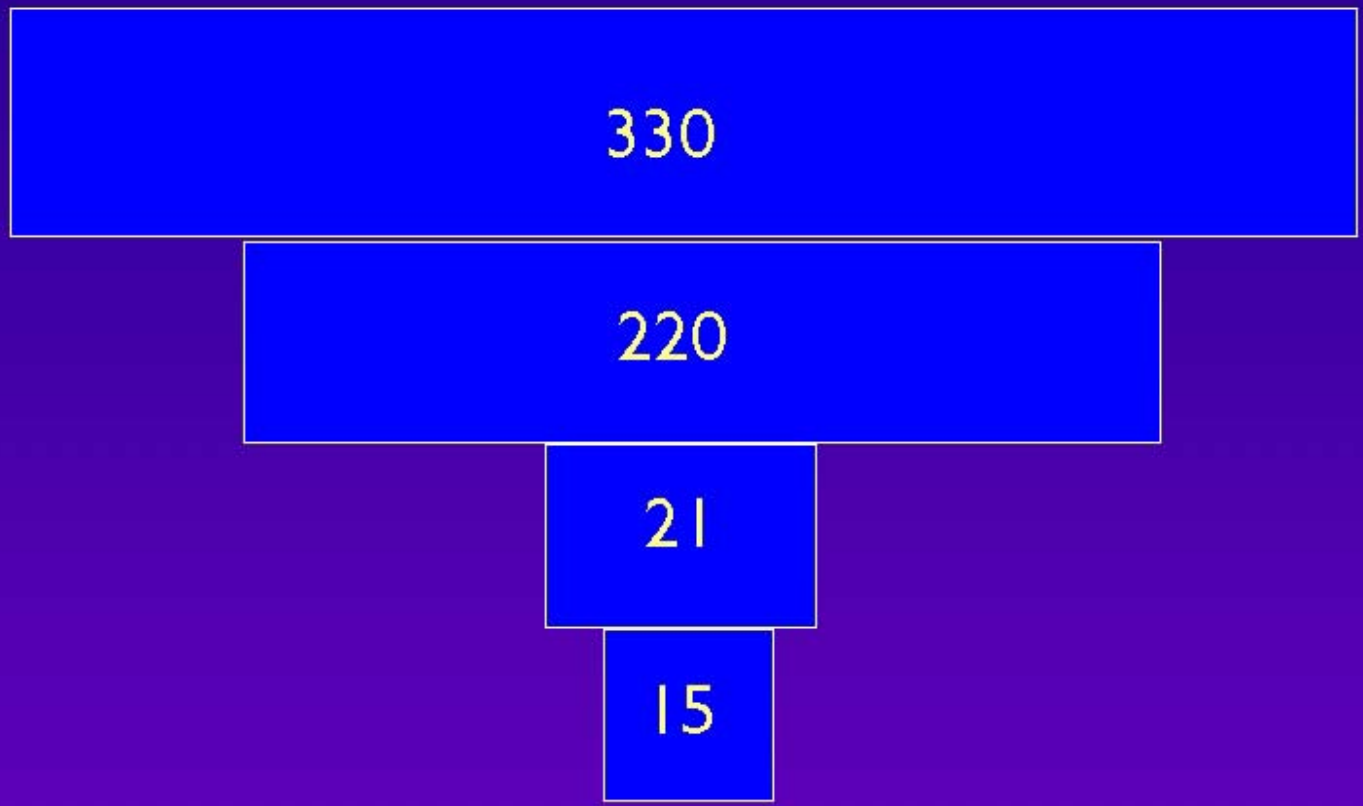
Selection Process

- 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

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

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The Indicators

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

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What Will We Know?

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

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Sample Indicator (Pressure)

- Water Quality: Sediment Flowing Into Coastal Wetlands

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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

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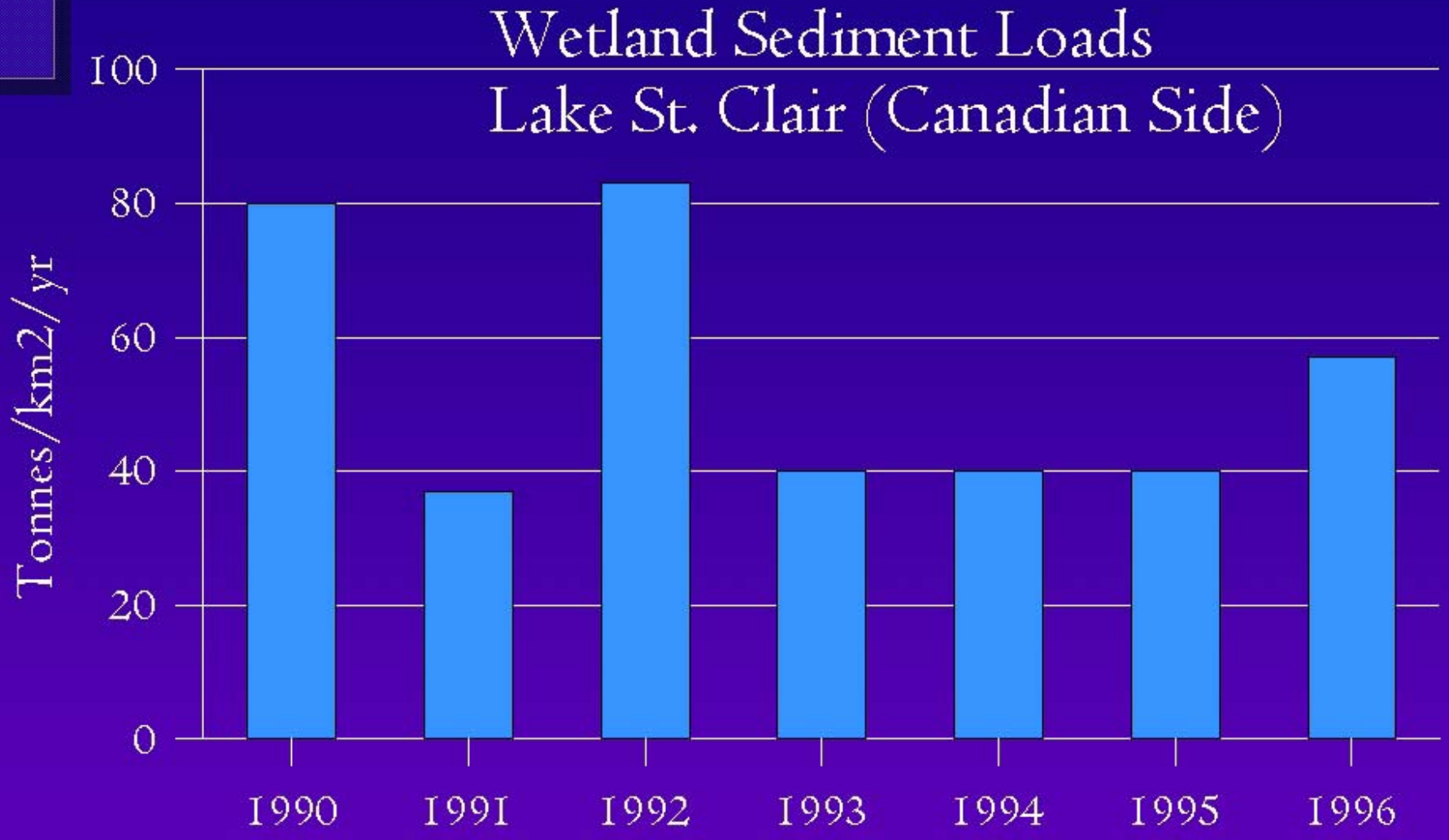
Sediment Flowing Into Coastal Wetlands



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Sample Indicator (State)

- Wetland dependent bird diversity and abundance

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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

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American Bittern

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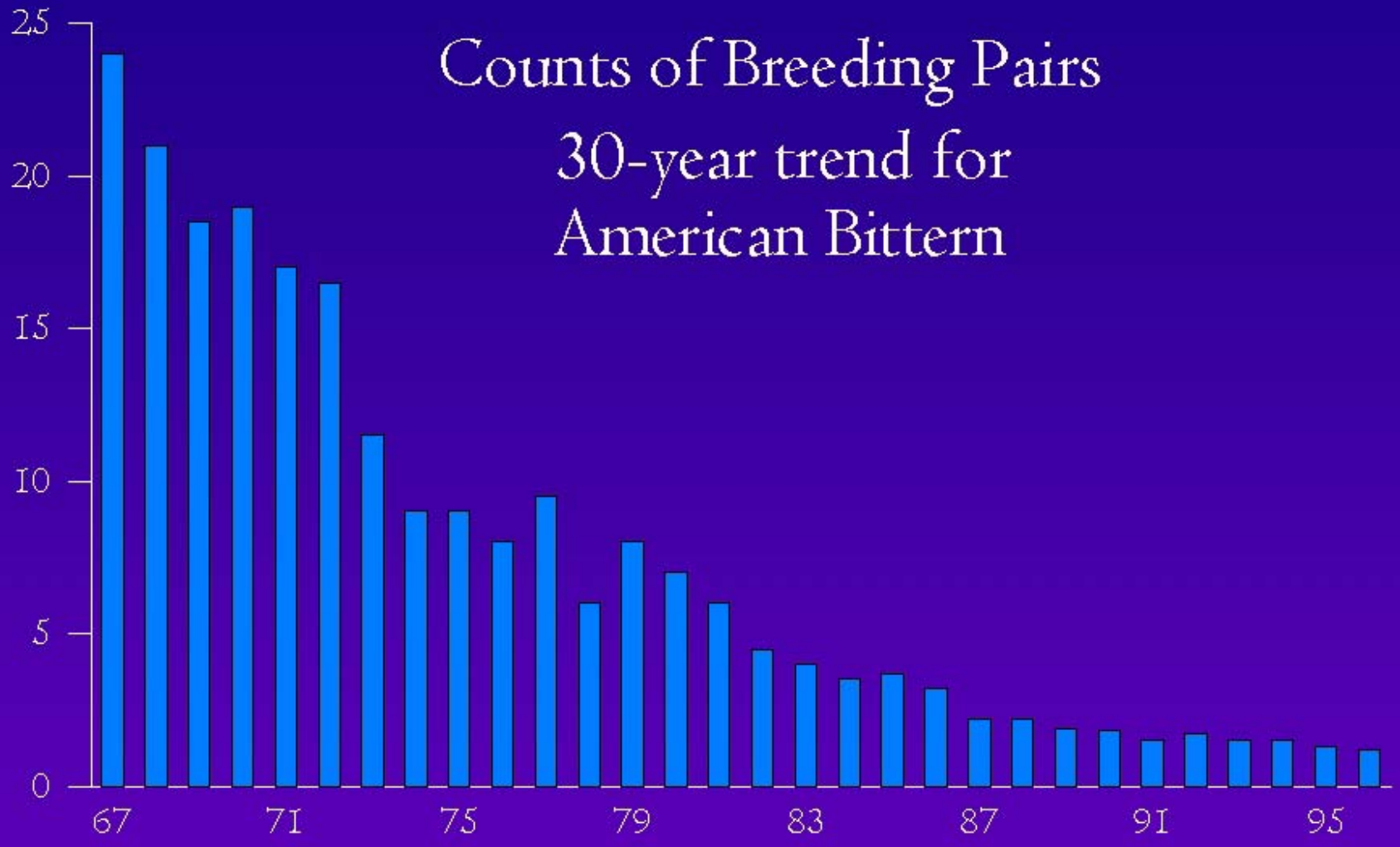
Breeding Trend



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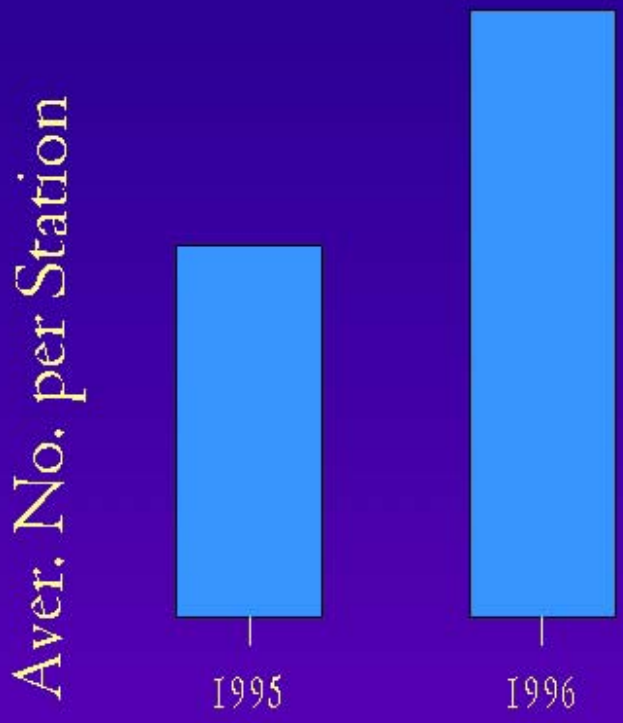
American Bittern (Marsh Monitoring Program)

- 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