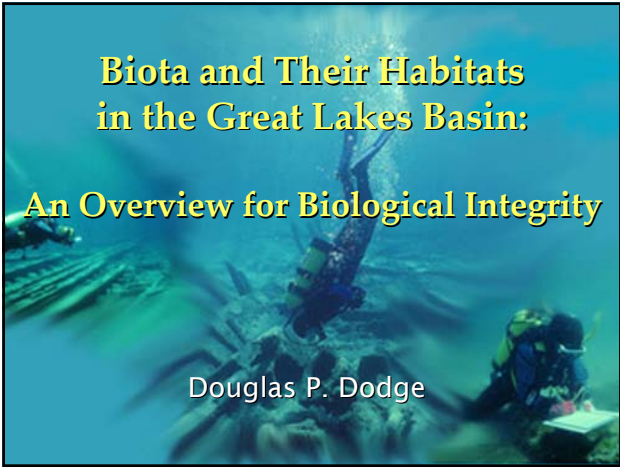


Biota and Their Habitats in the Great Lakes Basin:

An Overview for Biological Integrity

Douglas P. Dodge



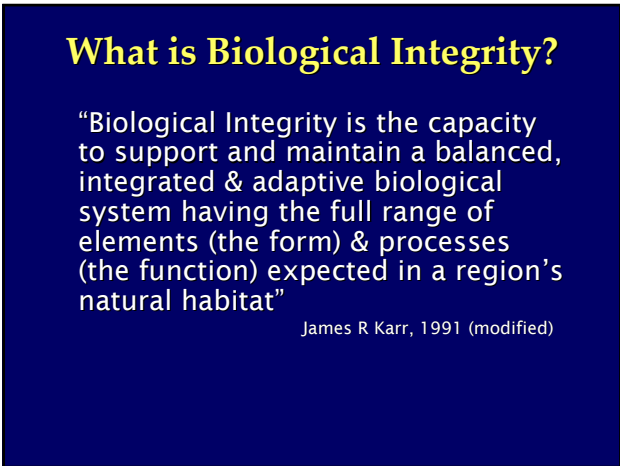
Overview

- What is Biological Integrity?
- Review indicator bundles for:
 - Biotic communities
 - Invasive species
 - Coastal zones
 - Aquatic habitats
- Review Biological Integrity from a Great Lakes perspective
- Consider persistent issues

What is Biological Integrity?

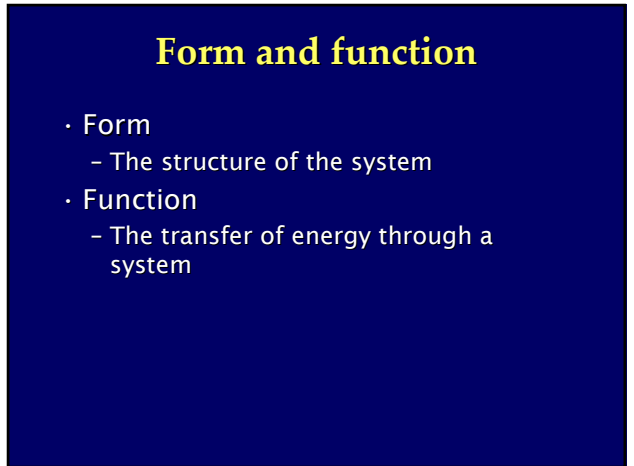
“Biological Integrity is the capacity to support and maintain a balanced, integrated & adaptive biological system having the full range of elements (the form) & processes (the function) expected in a region’s natural habitat”

James R Karr, 1991 (modified)



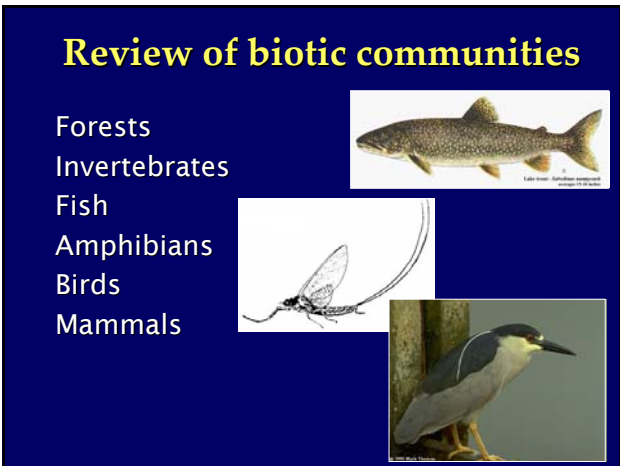
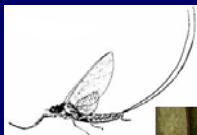
Form and function

- Form
 - The structure of the system
- Function
 - The transfer of energy through a system



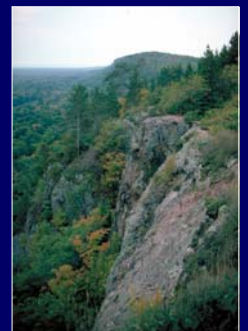
Review of biotic communities

- Forests
- Invertebrates
- Fish
- Amphibians
- Birds
- Mammals



Forest cover

- Water quality and quantity
- Restoration of terrestrial, aquatic, and groundwater resources
- Land/water interfaces



Status: Mixed

Trend: Improving



Native invertebrates are losing ground

- Benthos
 - *Hexagenia*
 - *Diporeia*
- Wetland species



Native invertebrates are losing ground

- Benthos
 - *Hexagenia*
 - *Diporeia*
- Wetland species



Fish communities



Salmon
and
Trout

Fish communities

Walleye



Yellow perch



Fish communities

American eels



Lake sturgeon



Prey fish



Assessment of open water biota



Status: Mixed

Trend: Unknown

Amphibians and birds



John Mitchell



John Mitchell

Status: Mixed Trend: Deteriorating

Non-native species

Sea lamprey control:



Status: Fair-Good Trend: Improving

The rest of the mess:
Poor and Deteriorating

Assessment of coastal zones:

- Nearshore Aquatic
- Coastal Wetlands
- Nearshore Terrestrial

Status: Mixed Trend: Deteriorating

Aquatic habitats: Open lake



Phosphorus Status: Mixed

Aquatic habitats: Open lake



Toxic chemicals in offshore waters
Status: Mixed Trend: Improving

Aquatic habitats: Open lake



Toxic chemicals in sediments
Status: Mixed Trend: Improving

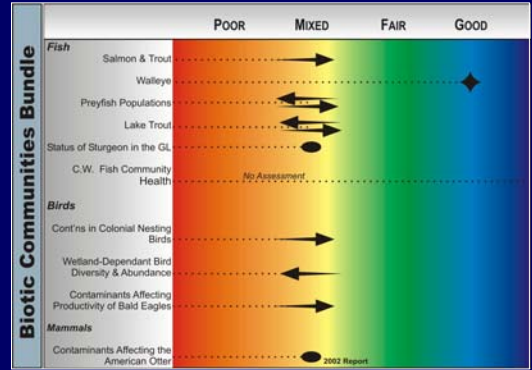
Aquatic habitats: Groundwater



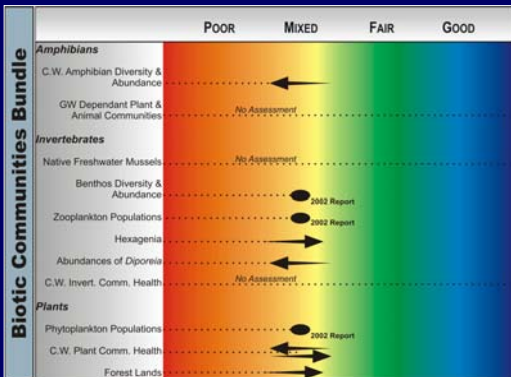
Status: Mixed

Trend: Deteriorating

Summary of assessments



Summary of assessments



Assessment of Biological Integrity

The Biological Integrity of the Great Lakes is Severely Compromised

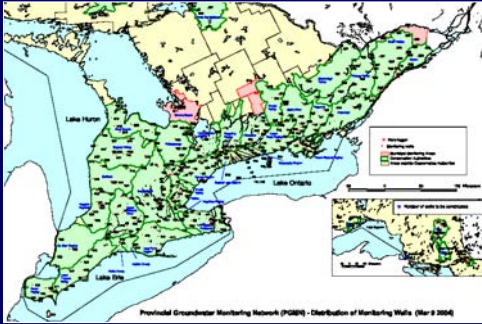
Persistent and entrenched issues: Non-native species



Persistent and entrenched issues: Habitat quality and quantity



Persistent and entrenched issues: Water quality and quantity



Persistent and entrenched issues: Native biota

- Sustainable natural reproduction
- Loss of condition in fish

Acknowledgments

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 - Great Lakes Fishery Commission and its committees
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 - Environment Canada
 - Toronto and Region Conservation Authority