

Towards an Ecology-Economy “Win-Win” for Offshore Wind Power in the Great Lakes

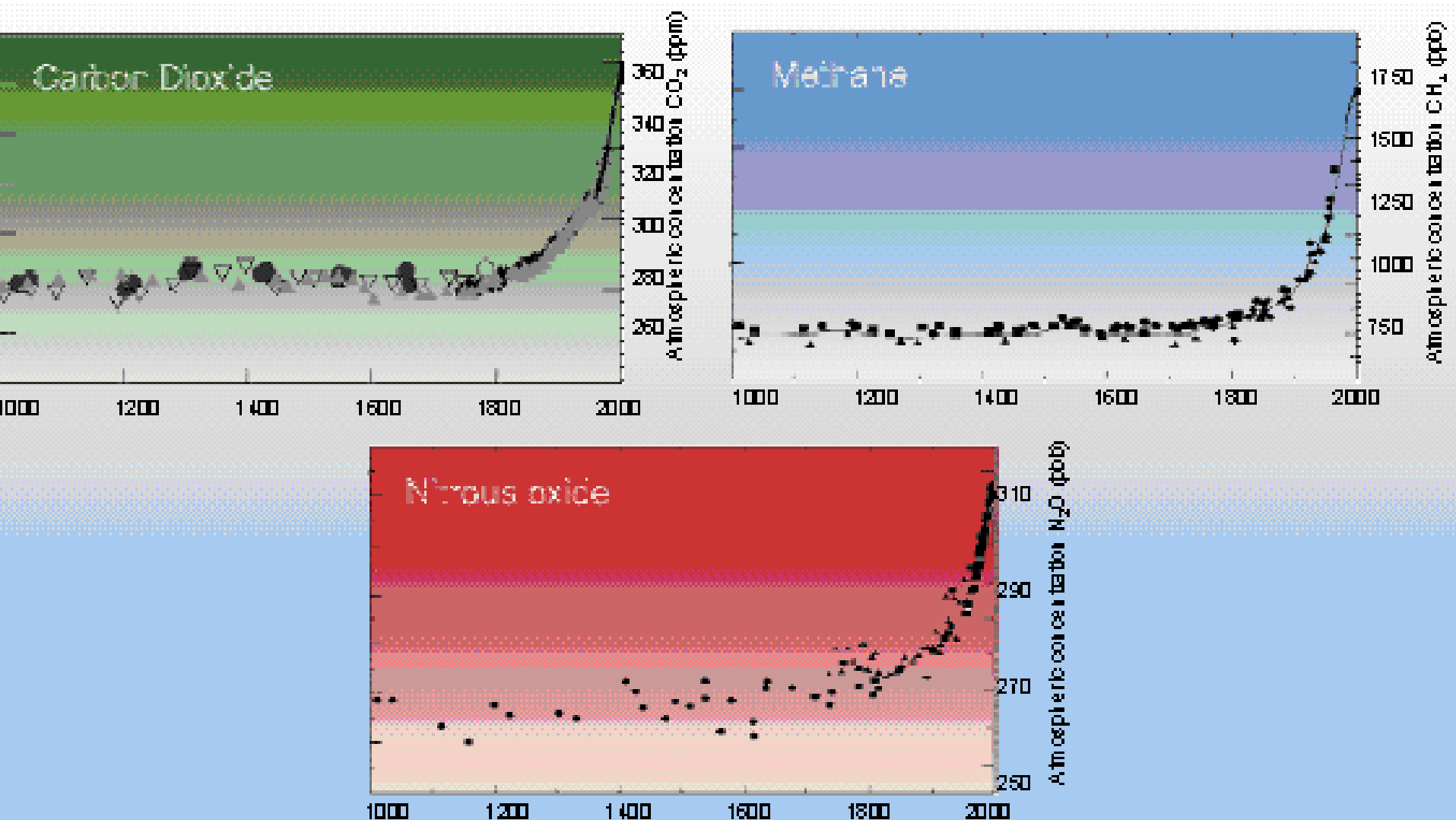
by John E. Gannon
International Joint Commission
Great Lakes Regional Office
Windsor, Ontario Canada
for
6th Biennial Conference
Lake Erie Millennium Network
Windsor, Ontario
April 2010

Disclaimer

The views expressed here are in my own personal capacity and do not necessarily reflect those of the International Joint Commission.

Changes in Atmospheric Concentration

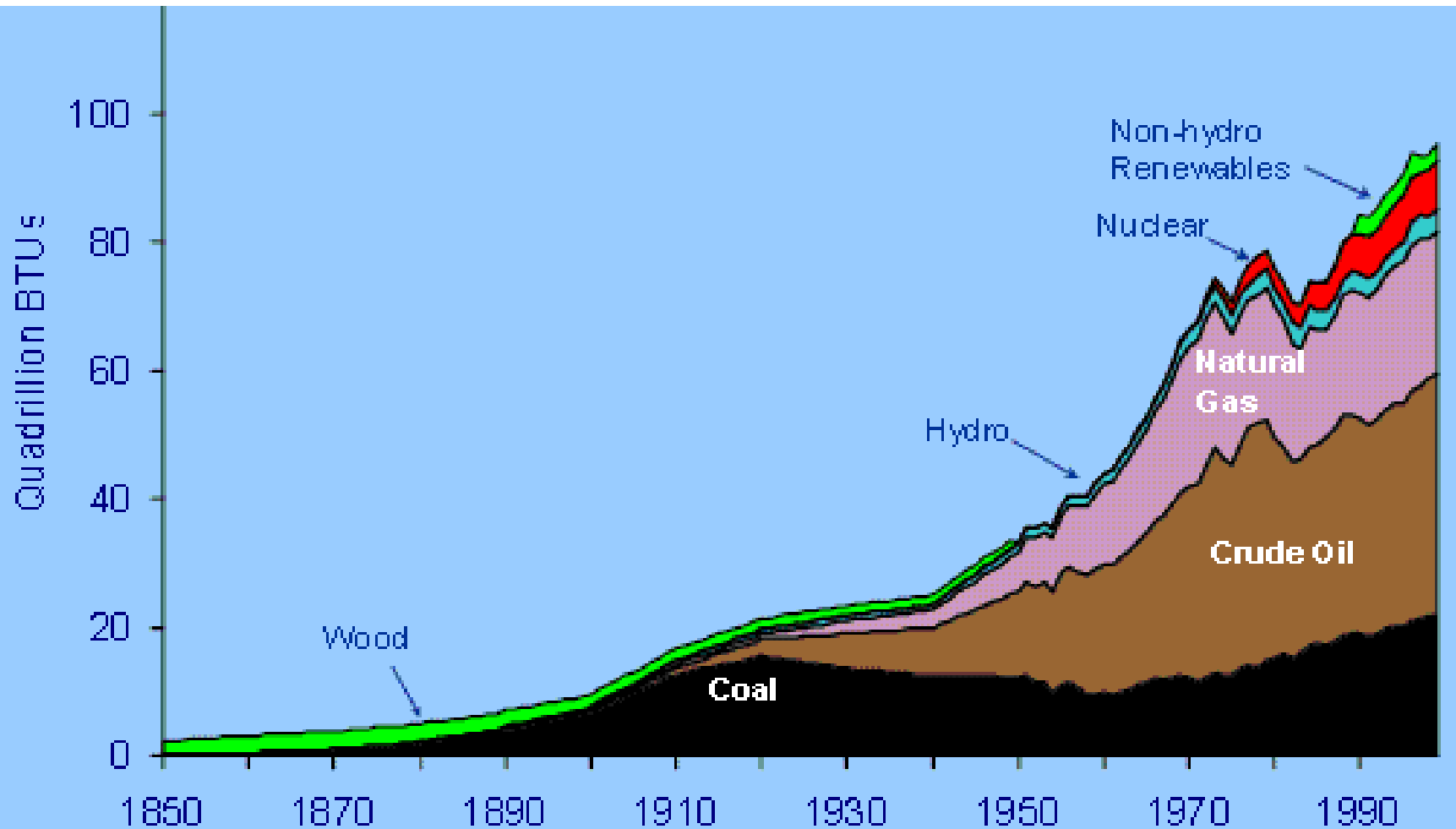
CO₂, CH₄, and N₂O – A Thousand Year History



Source: IPCC Third Assessment Report (2001)

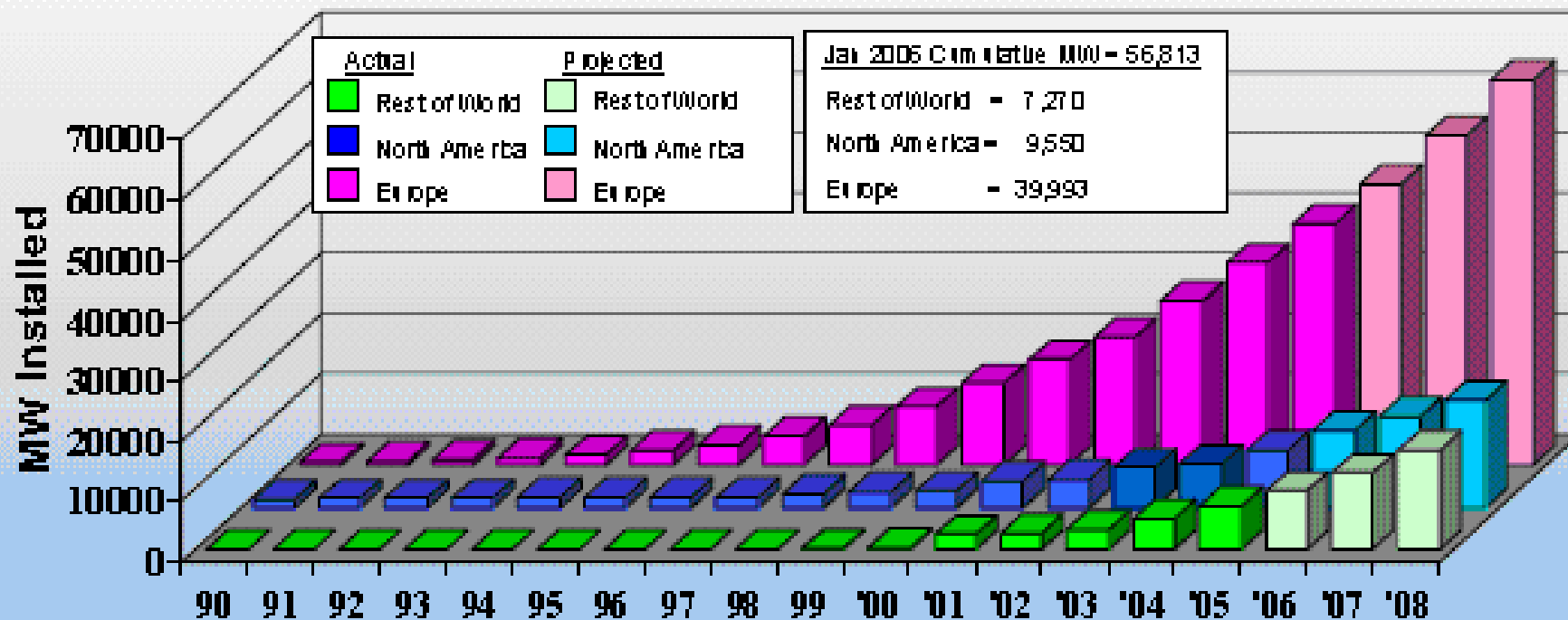
The U.S. Energy Picture

by source - 1850-1999



Source: 1850-1949, Energy Perspectives: A Presentation of Major Energy and Energy-Related Data, U.S. Department of the Interior, 1975; 1950-1996, Annual Energy Review 1996, Table 1.3. Note: Between 1950 and 1990, there was no reporting of non-utility use of renewables. 1997-1999, Annual Energy Review 1999, Table F1b.

Growth of Wind Energy Capacity Worldwide

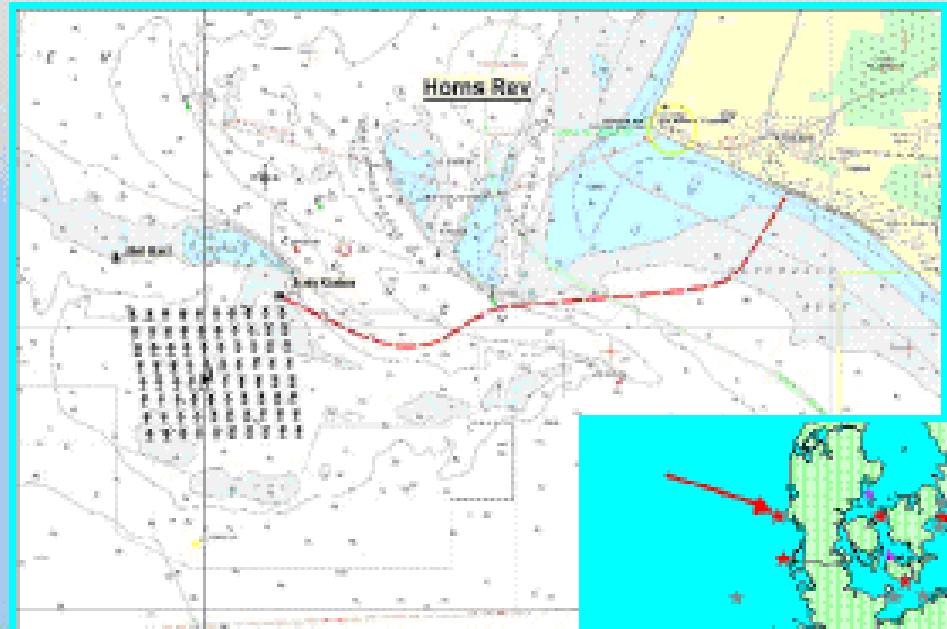


Sources: BTM Consult ApS, Sept2005
Windpower Monthly, January 2006

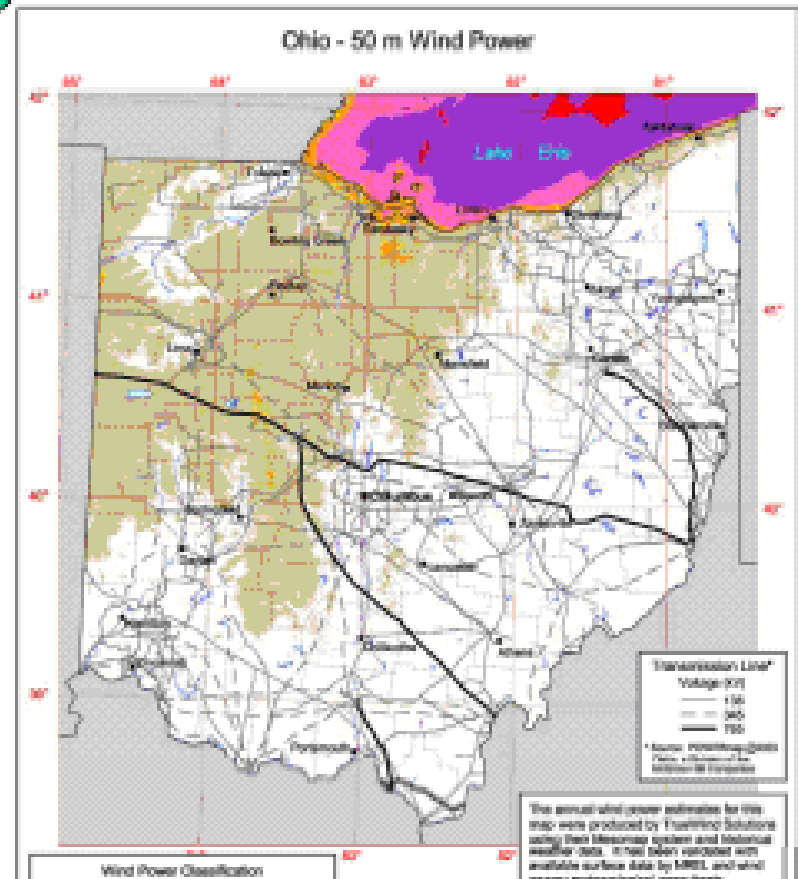
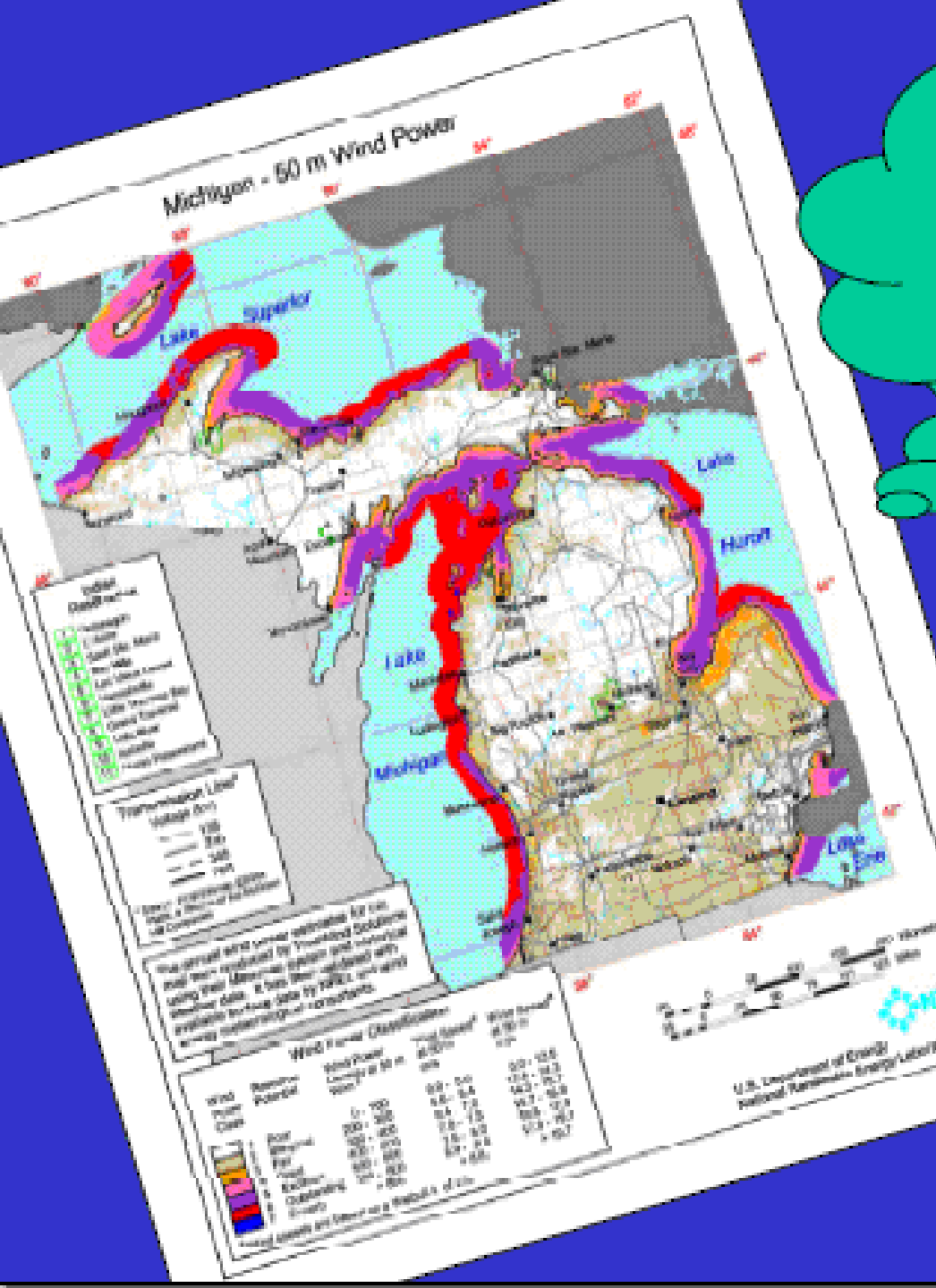
Horns Rev Wind Farm Installation

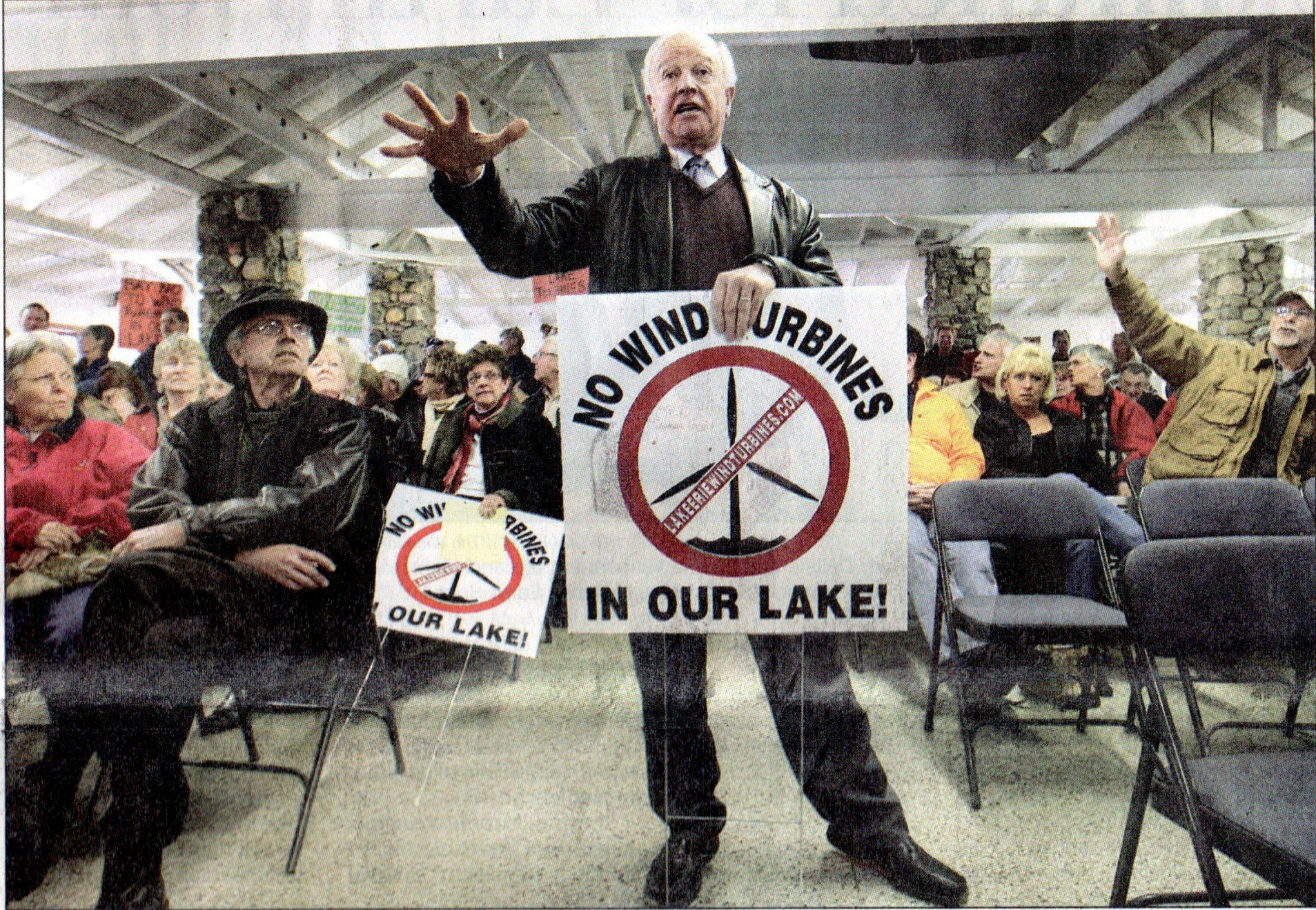


Country: Denmark
Location: West Coast
Total Capacity: 160 MW
Number of Turbines: 80
Distance to Shore: 14-20 km
Depth: 6-12 m
Capital Costs: 270 million Euro
Manufacturer: Vestas
Total Capacity: 2 MW
Turbine-type: V80 - 80m diameter
Hub-height: 70-m
Mean Windspeed: 9.7 m/s
Annual Energy output: 600 GWh



The Great Lakes have good to outstanding wind resource.





DAN JANISSE/The Windsor Star

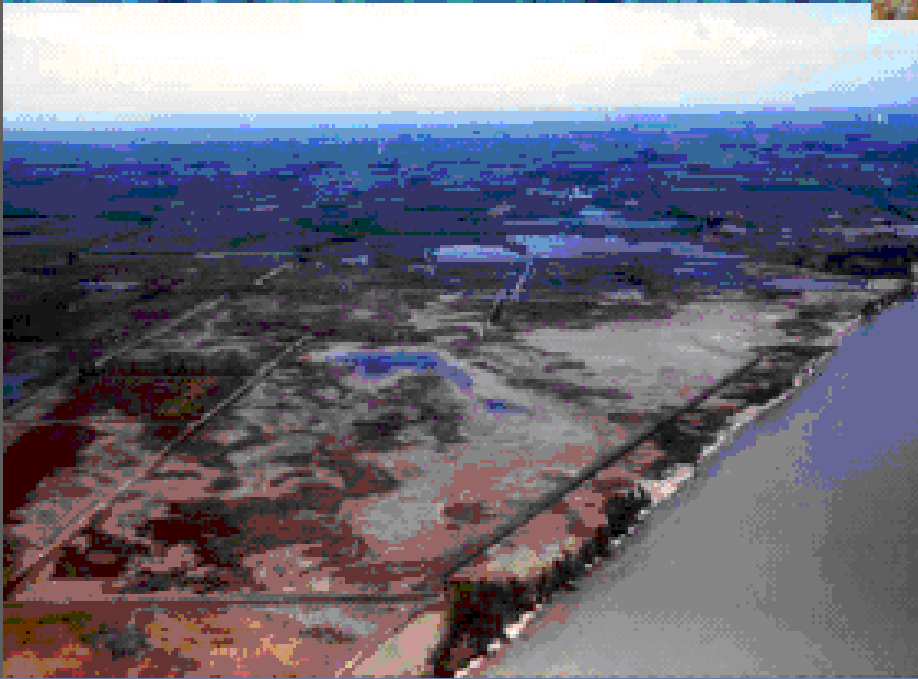
Stewart Wolf, a Kingsville lakefront resident, speaks during a public meeting on Saturday regarding a proposed wind turbine project. SouthPoint Wind, the company proposing to put turbines in Lake Erie, hosted the meeting.

Impact Types, Factors, and Significance

- Four impact types – habitat loss, displacement, barrier effects, collision mortality
- Seven impact factors: magnitude, type, extent, duration, intensity, timing, and probability.
- Significance of impacts – cumulatively with other projects and overall effect of all four impact types

Wind power projects have been documented to kill birds and bats





Lower Great Lakes Significance to Migratory Waterfowl

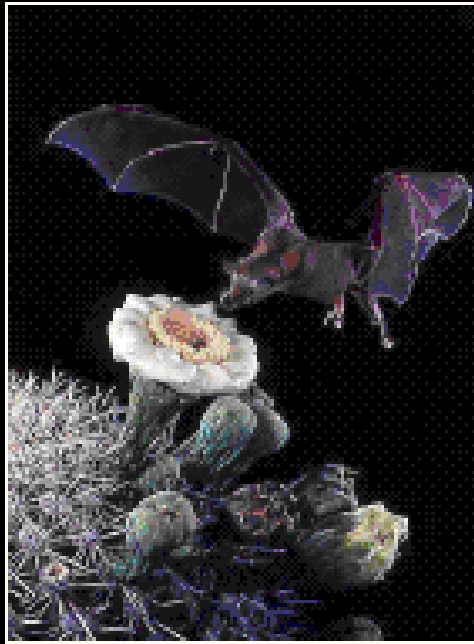


Lake Erie Marshes

Continental Importance

- **Focus Area – North American Waterfowl Management Plan**
- **Regional Site - Western Hemispheric Shorebird Reserve Network**
- **Globally Important Bird Area - Partners in Flight**
- **West Sister Is.- Most important Colonial Waterbird Breeding Colony in the U.S. Great Lakes**

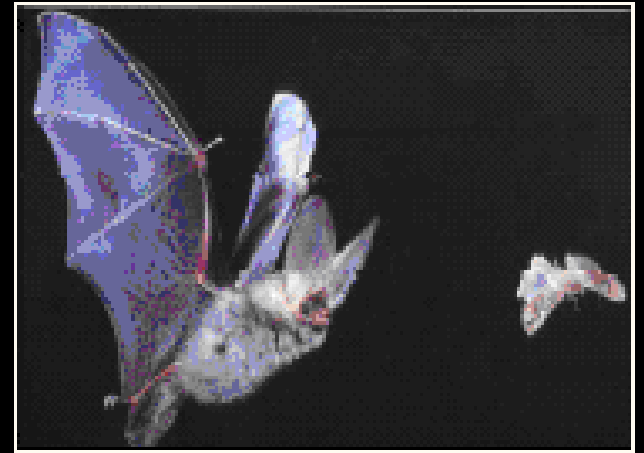
Bats Provide Important Ecosystem Services



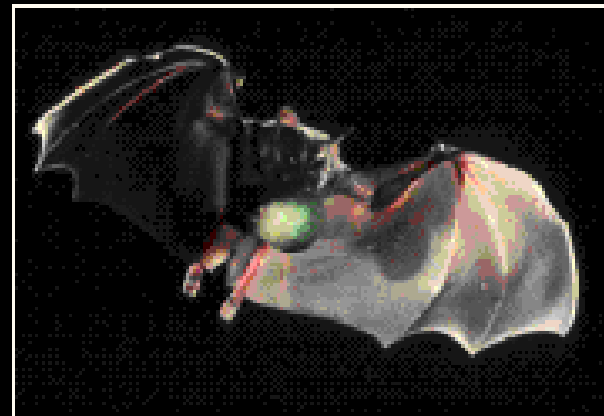
Pollination



Nutrient Transport



Insect Pest Control



Seed Dispersal

Why Are Bats at Risk?

Human Attitudes (most people don't love bats!)

Myths and Folklore

Bad Press

Ignorance

Anthropogenic Factors

Deforestation

Global Climate Change

Habitat Alteration

Mining

Pesticides

Water Pollution

Wind Turbines

Bats Are Being Killed by Wind Turbines



Trajectory of a bat struck
by the blade of a modern
wind turbine



Photo by Ed Arnett

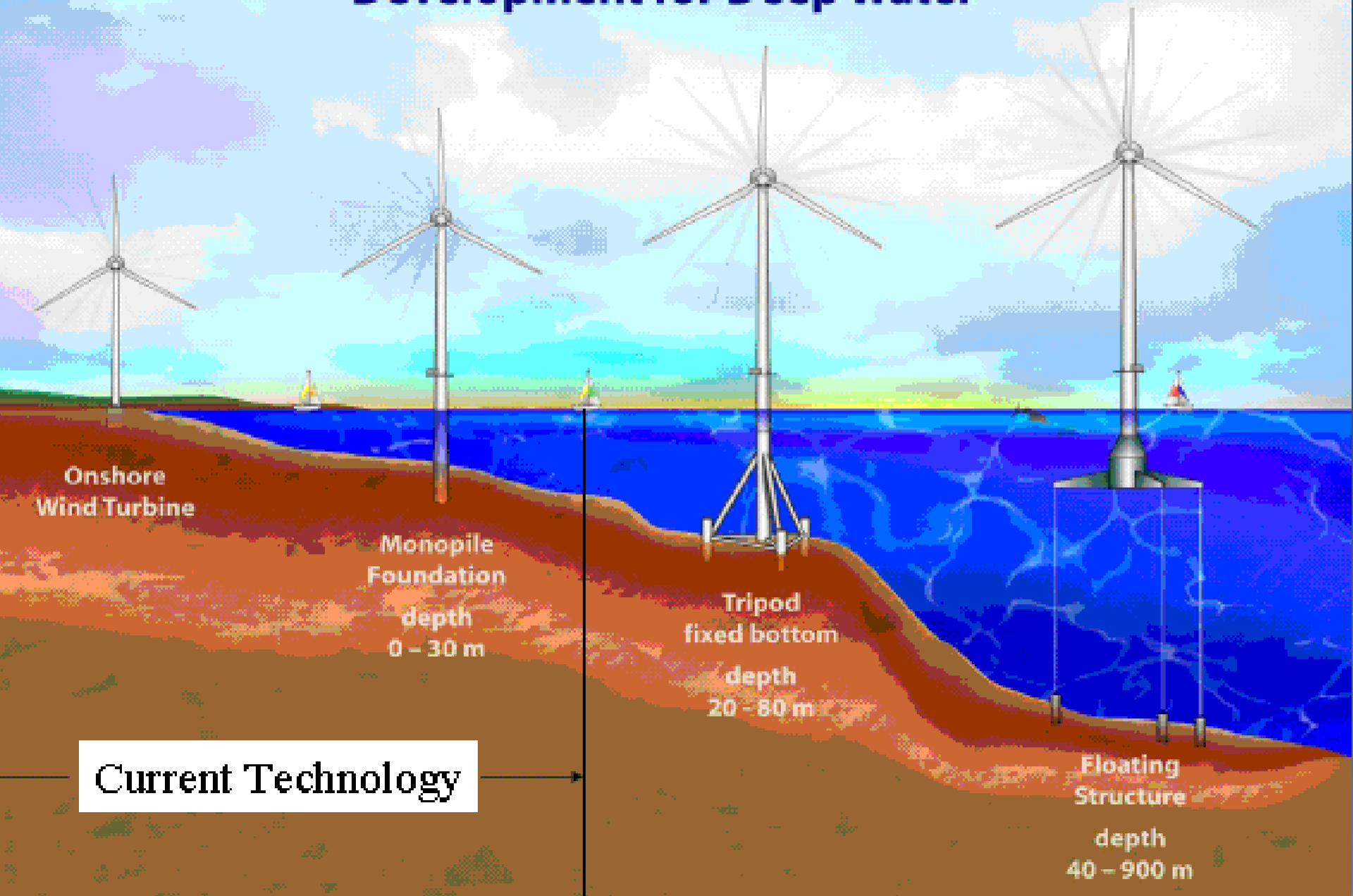
Collecting dead bats killed at
wind energy facilities



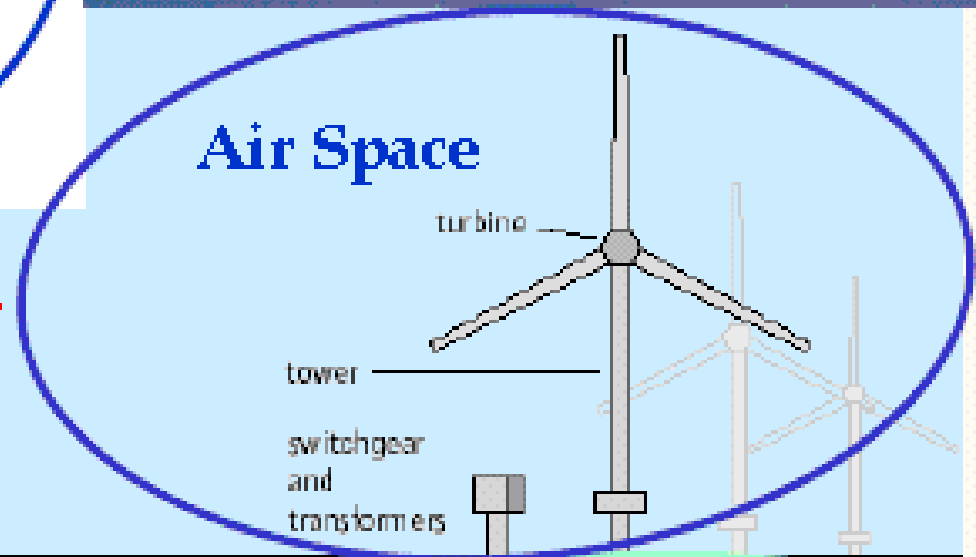
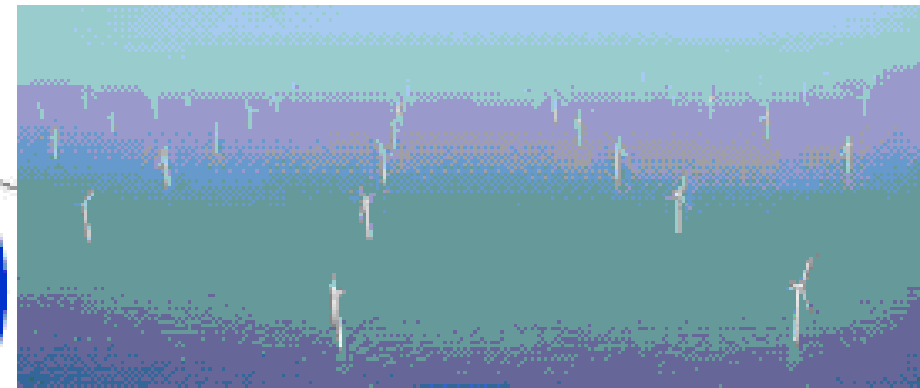
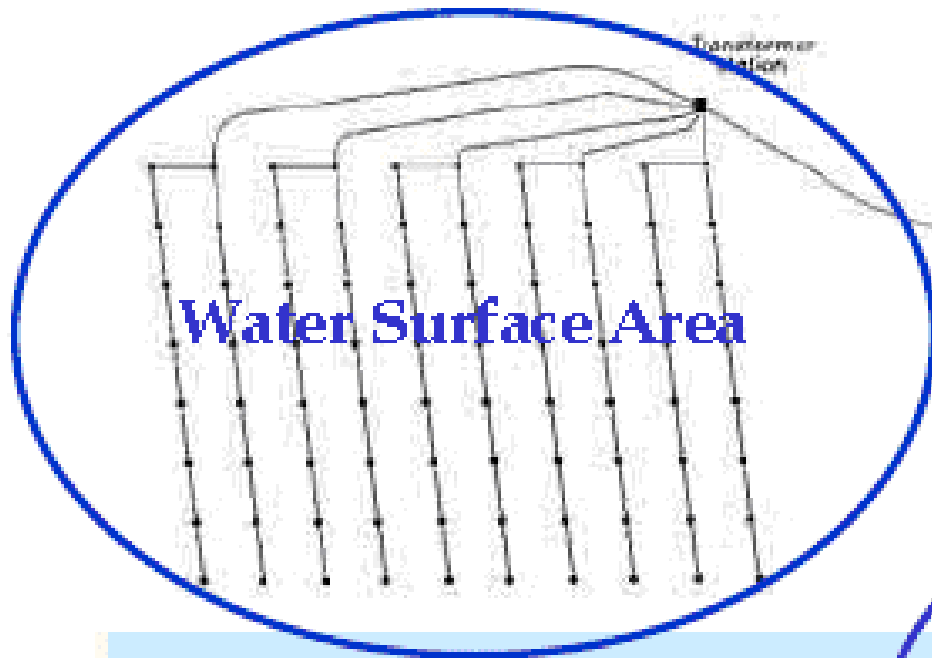
Photo by Jessica Kerns

Hoary bat

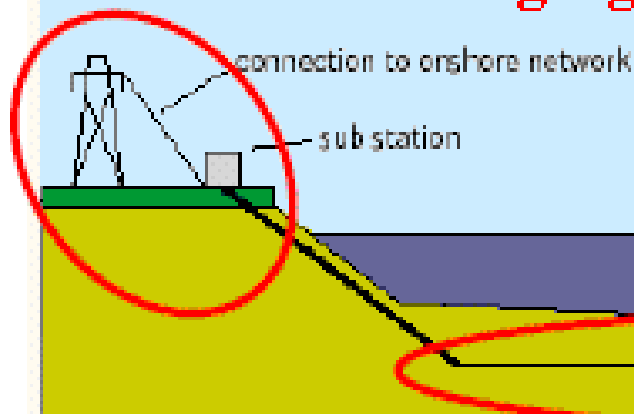
Offshore Wind Turbine Development for Deep Water



Offshore Wind Energy – Use Areas of Concern



On and near shore staging areas



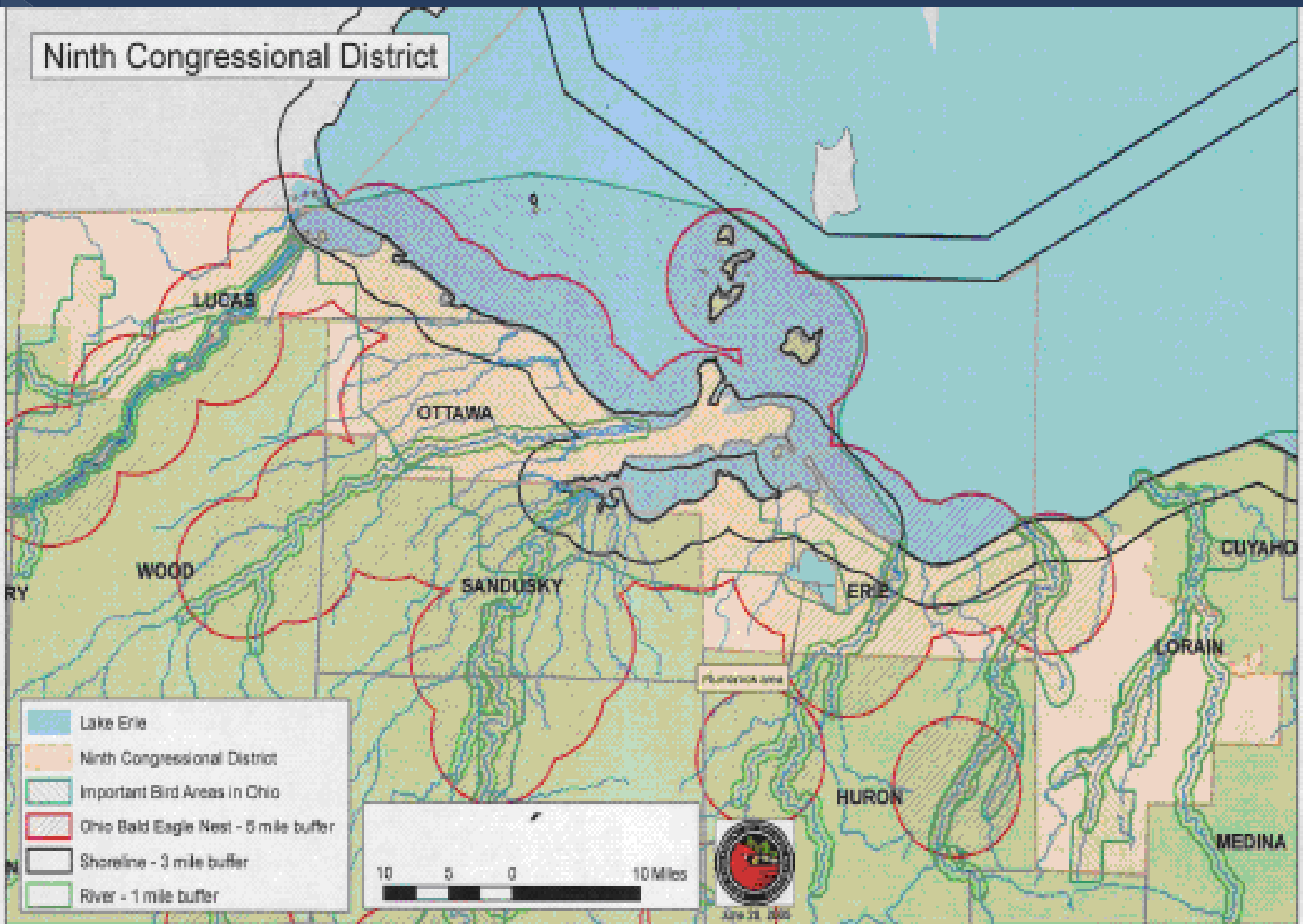
Benthic habitat and fauna

Offshore Environmental and Fish & Wildlife Concerns

- Lake Ice
- Vessel traffic
- Port Availability
- **Fisheries**
- **Migratory Birds/Bats**
- **Benthos**
- **Staging and Construction Effects**
- **Sediment Structure**
- **Noise/Vibrations**
- **Hydrology**
- **Transmission lines/Grid connections**
- **Submerged cables**
- **Electromagnetic fields**
- **Logistics and maintenance traffic**
- View shed
- Coastal Effects
- **Lake ecosystem**
- Navigation safety
- Air Traffic Safety
- Archaeology
- **Cumulative**

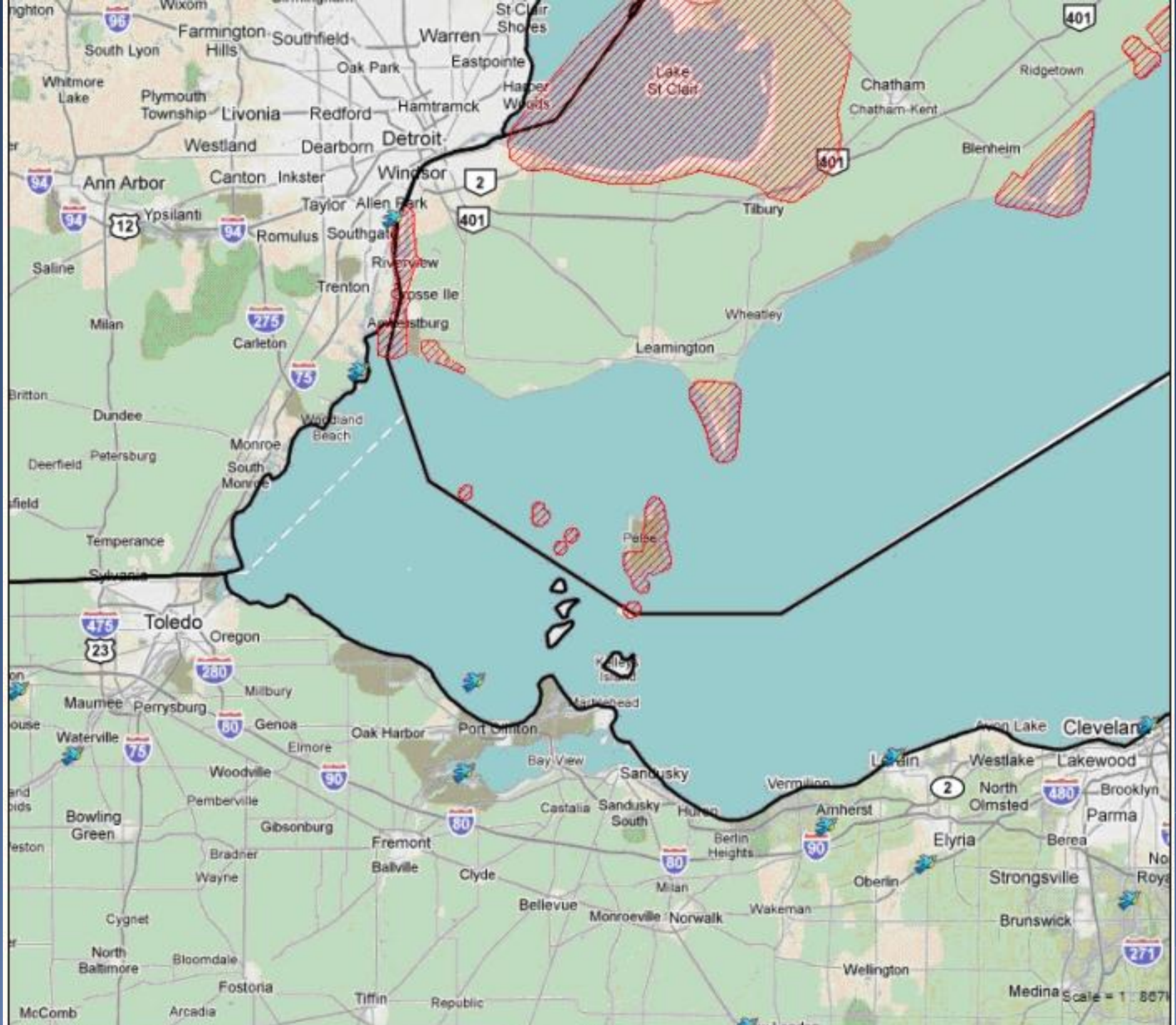


Ninth Congressional District

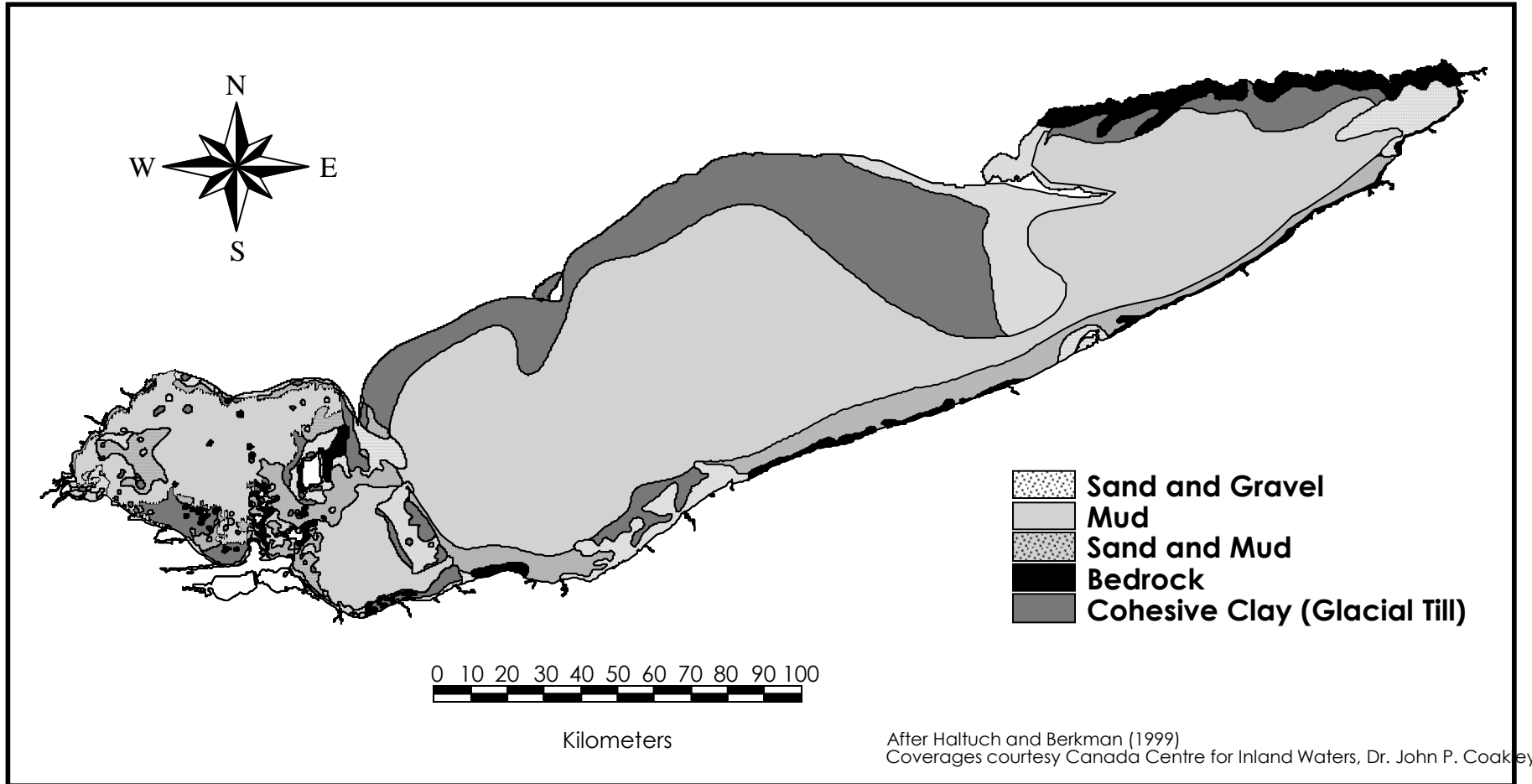


- Lake Erie
- Ninth Congressional District
- Important Bird Areas in Ohio
- Ohio Bald Eagle Nest - 5 mile buffer
- Shoreline - 3 mile buffer
- River - 1 mile buffer

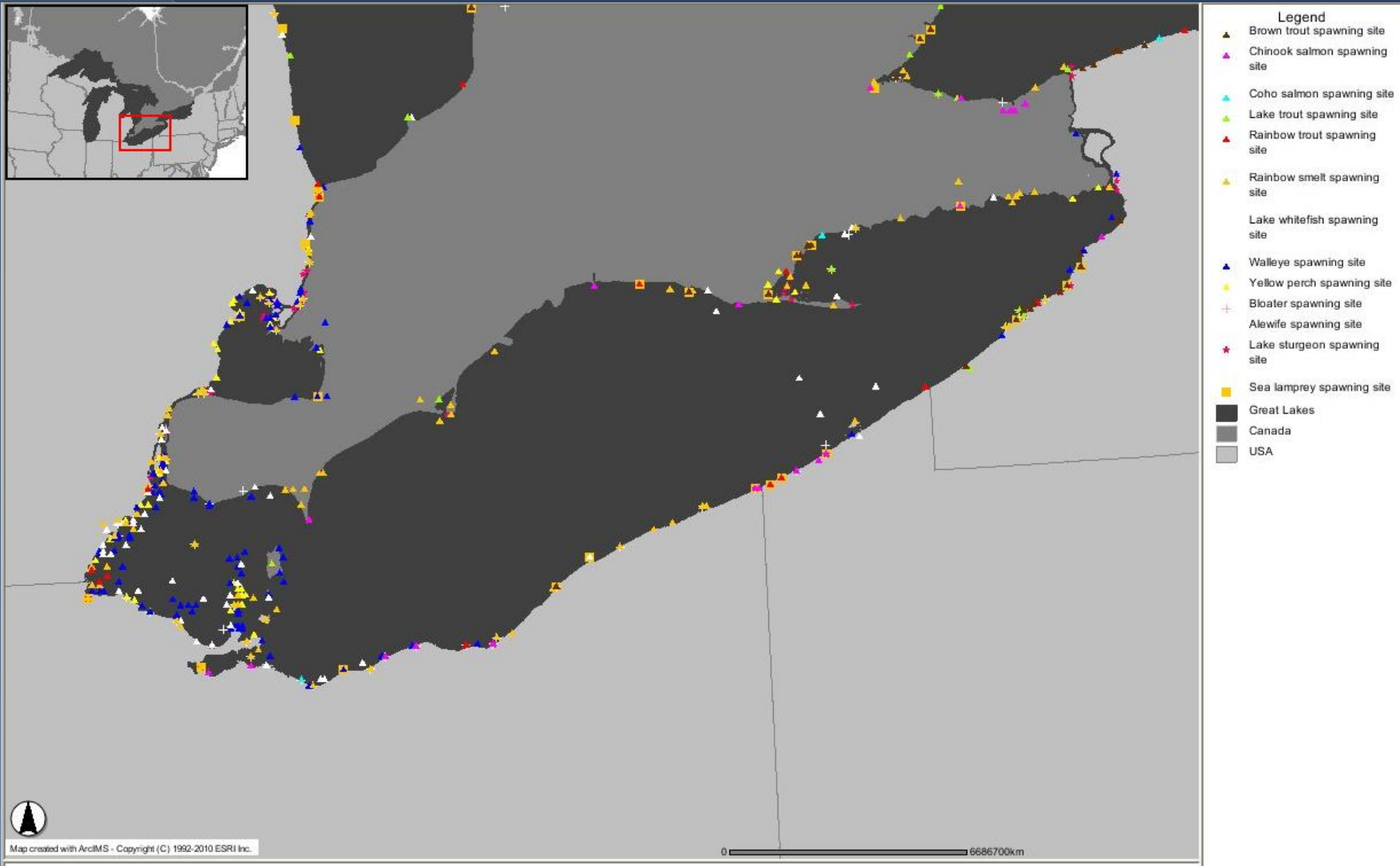




Lake Erie Sediment Distribution



Lake Erie: Fish Spawning Sites*



* Data source: <http://glein.er.usgs.gov/introduction.html>

Research Needs: Challenge and Opportunities

◎ Take an Ecosystem Approach

- > Terrestrial
- > Wetlands
- > Aquatic

◎ Biggest Scientific Challenges:

- > Cumulative Impacts: the changes to the environment caused by and activity with other past, present and reasonably foreseeable human activities
- > Policy moving fast: will offshore wind power policy wait for science-based guidelines and criteria?

◎ The NIMBY Factor

Towards an Ecology–Economy “Win-Win” *

- ◎ **Protect the most biologically active and productive zone for migratory birds, bats and nesting birds (e.g. Bald eagles and waterfowl)**
 - > No wind towers within 3 miles (4.8km) onshore of coastline or islands
- ◎ **Protect most biologically active and productive zone for fish spawning, nursery and feeding grounds and habitat for other aquatic biota**
 - > No wind towers within 3 miles (4.8km) offshore of coastline or islands
- ◎ **Address viewshed issue**
 - > Extend offshore wind power zone to 6 miles (9.7km)

Towards an Ecology-Economy “Win-Win” Cont’d

- ◎ **Avoid offshore year-round no fishing zones**
 - > Native lake trout rehabilitation
 - > Biodiversity protection
- ◎ **Avoid cross-lake migratory routes (e.g., Sandusky Bay to Point Pelee, Presque Ile to Long Point, and Huron-Erie Corridor)**
- ◎ **Avoid navigation routes**

Information Sources

- ◉ ***Conserving Great Lakes Aquatic Habitat from Lakebed Alteration Proposals***
<http://www.glfc.org/research/reports/Dempsey.pdf>
- ◉ ***GLFC Lake Erie Committee's 2009 Position Statement on Offshore Wind Power***
<http://www.glfc.org/lakecom/lec/lechome.php>
- ◉ ***Great Lakes Wind Collaborative's 2009 Offshore Siting Principles and Guidelines for Wind Development on the Great Lakes*** http://www.glc.org/energy/wind/pdf/Offshore-Siting-Principles-and-Guidelines-for-Wind-Development-on-the-Great-Lakes_FINAL.pdf
- ◉ ***Great Lakes Wind Atlas***
<http://erie.glin.net/wind/>

Acknowledgements

Thanks to the Following Authors of Talks of the 2006 Wildlife Friendly Wind Power Conference from which I used slides for this presentation:

**Robert W. Thresher
Alexander R. Hoar
Ronald B. Larkin
Thomas H. Kunz
Scott Petrie
Mark C. Shieldcastle**

USFWS Towards Wildlife Friendly Wind Power: A Focus on the Great Lakes

<http://www.fws.gov/midwest/greatlakes/windpower.htm>