

# Lake Michigan Islands: A biodiversity and conservation overview

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# Lake Michigan islands

- Distribution
- Ecological significance
- Conservation issues



# Islands by lake

	Number islands	Area of islands (ha)	Coastline length (km)
L. Superior	2,591	197,360	2,468
L. Michigan	726	34,818	530
L. Huron	1,687	119,917	1,438
Georgian Bay	22,196	334,879	6,355
L. St. Clair	403	22,844	689
L. Erie	1,773	17,330	1,233
L. Ontario	1,847	34,638	964
St. Lawrence R.	852	8,545	594

# Lake Michigan islands

- 726 islands
  - 88,437 acres
  - 40,381 acres protected
  - 318 miles shoreline
- Major island groups
  - Grand Traverse archipelago
    - Washington Island
  - Eastern Lake Michigan
    - Beaver Island archipelago
    - Fox Islands
    - Manitou Islands
- Other islands



# Ecologically diverse

- Communities

- Beaches, dunes
- Cliffs
- Lakes
- Streams
- Wetlands (bogs, fens, marshes)
- Forests (hardwood and conifer)
- Endangered and threatened species



# Island area and ecological diversity

Island	Acres	Plant communities	Land Vertebrates
Beaver	37,400	30	120
North Manitou	13,000	25	88
South Manitou	5,000	27	77
South Fox	3,400	16	68
North Fox	895	10	38
Gull	270	10	37
Whiskey	130	5	27
Trout	115	6	36
Squaw	75	10	42
Hat	16	4	19
Shoe	3	1	4
Pismire	3	3	8



Green's Bay dunes, Beaver Island



Barney's Lake, Beaver Island



E. Hog Island shoal



Hat Island

# Threatened/endangered species



Photos: Thanks to Bill Parsons



NICK ULIVIERI  
PHOTOGRAPHY

# Ecologically distinct

- Lake-moderated climate
  - Cooler summers, warmer winters
- Isolation
  - Evolution of distinct lineages
    - Deer mice skulls smaller on Grand Traverse archipelago
  - Subset of mainland flora and fauna
    - No bear, mink, long-tailed weasel
    - Absence of some invasive spp/pathogens
  - Vulnerable to change



# Island isolation: small % mainland species

Beaver Island: 17 mi. from mainland  
North Fox Island: 20 mi. from mainland



	All islands		Beaver Island		North Fox Island	
	Number	%	Number	%	Number	%
Amphibians	10	62	9	56	3	19
Snakes	6	60	5	50	4	40
Turtles	2	66	2	66	0	0
Birds	110	87	95	72	27	21
Mammals	17	39	9	20	4	9

# Ecological oddities

- Island or shoal?
- Absent
  - Squirrels
    - Tree squirrels not on eastern L MI islands except where introduced
    - Chipmunks on Beaver Isl archipelago, absent from Grand Traverse archipelago
  - Deer, raccoon, weasels, skunks, grouse
    - Except where introduced
- Island-specific or superabundant
  - Snakes
  - Woodland deer mice
  - Colonial nesting waterbirds
  - Amphibians breeding in beach pools

# Birds

- Colonial nesting waterbirds
- Piping Plovers
- Stopover sites

# Colonial nesting waterbirds

- Cormorant, gulls, terns, pelican, herons



# Colonial nesting waterbirds

Species	Estimated Gt Lks pop. (pairs)	Comments
American White Pelican	750	Spreading east
D.-c. Cormorant	115,000	33% N. American pop. (2005)
Snowy Egret	<180	Northern limit of range
Black-cr. Night Heron	<8,000	
Ring-billed Gull	586,000	94% N. American pop.
Herring Gull	77,000	50% N. American pop.
Gt. Black-backed Gull	44	Western limit of range
Caspian Tern	6,500	10% N. American pop.
Common Tern	11,000	<10% N. American pop.
TOTAL	802,474	

# Colonial nesting waterbirds: USA

Figure 4.1. Distribution of colonial waterbird nesting sites in the U.S. Great Lakes region, 1977-1999 (from Cuthbert et al. 2003a).

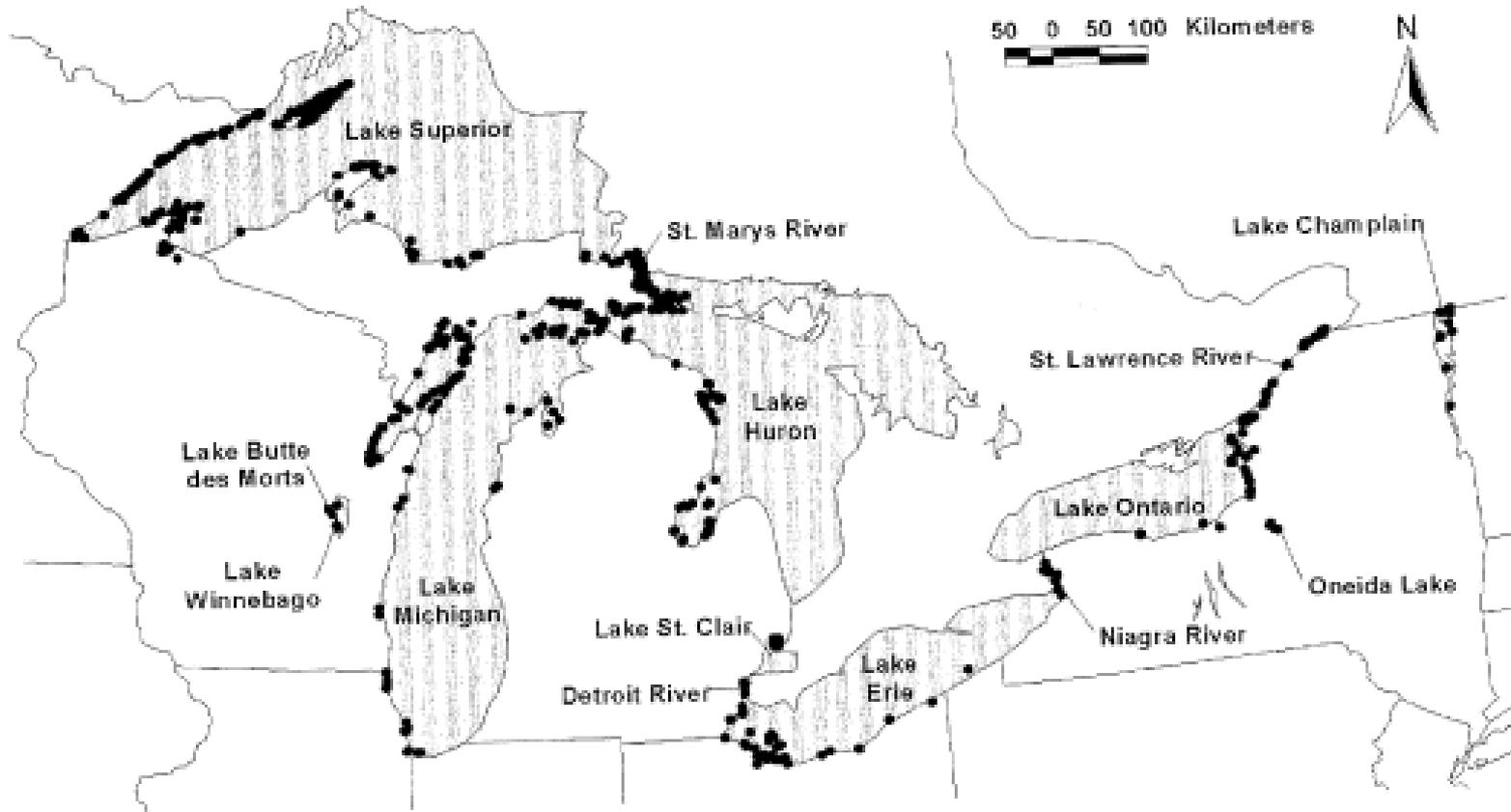
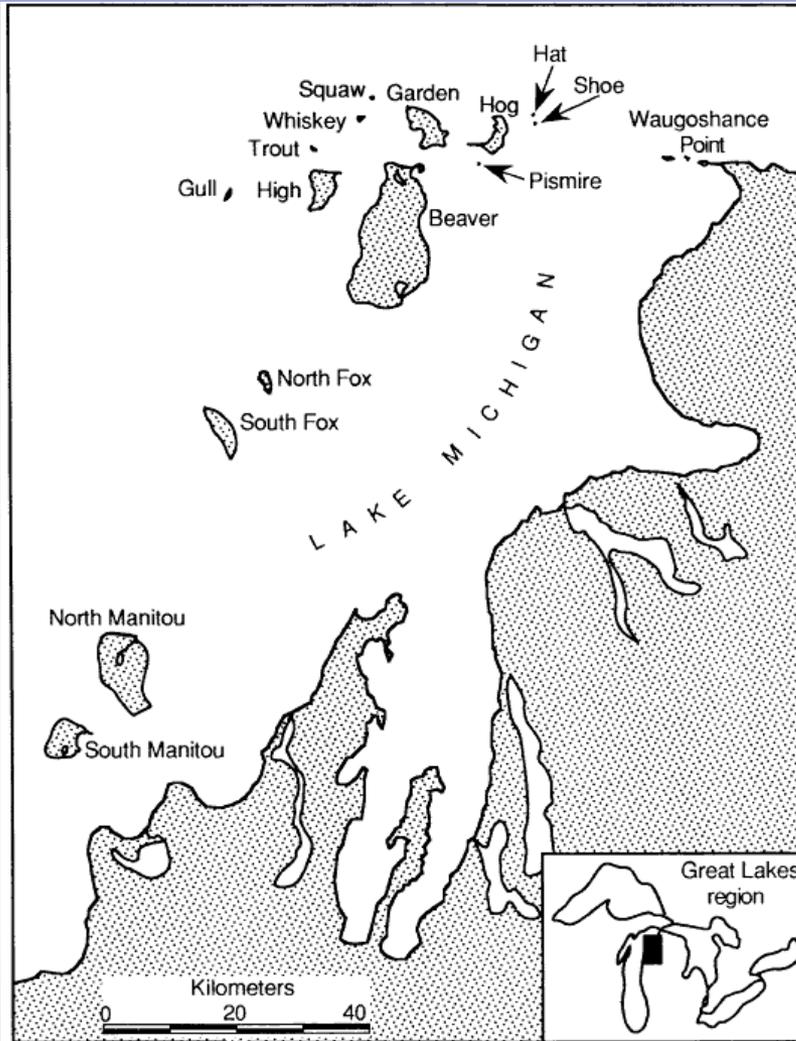


Figure 4.2. Most important sites for breeding colonial waterbirds in the western U.S. Great Lakes in the late-1990s (Wires and Cuthbert 2001).

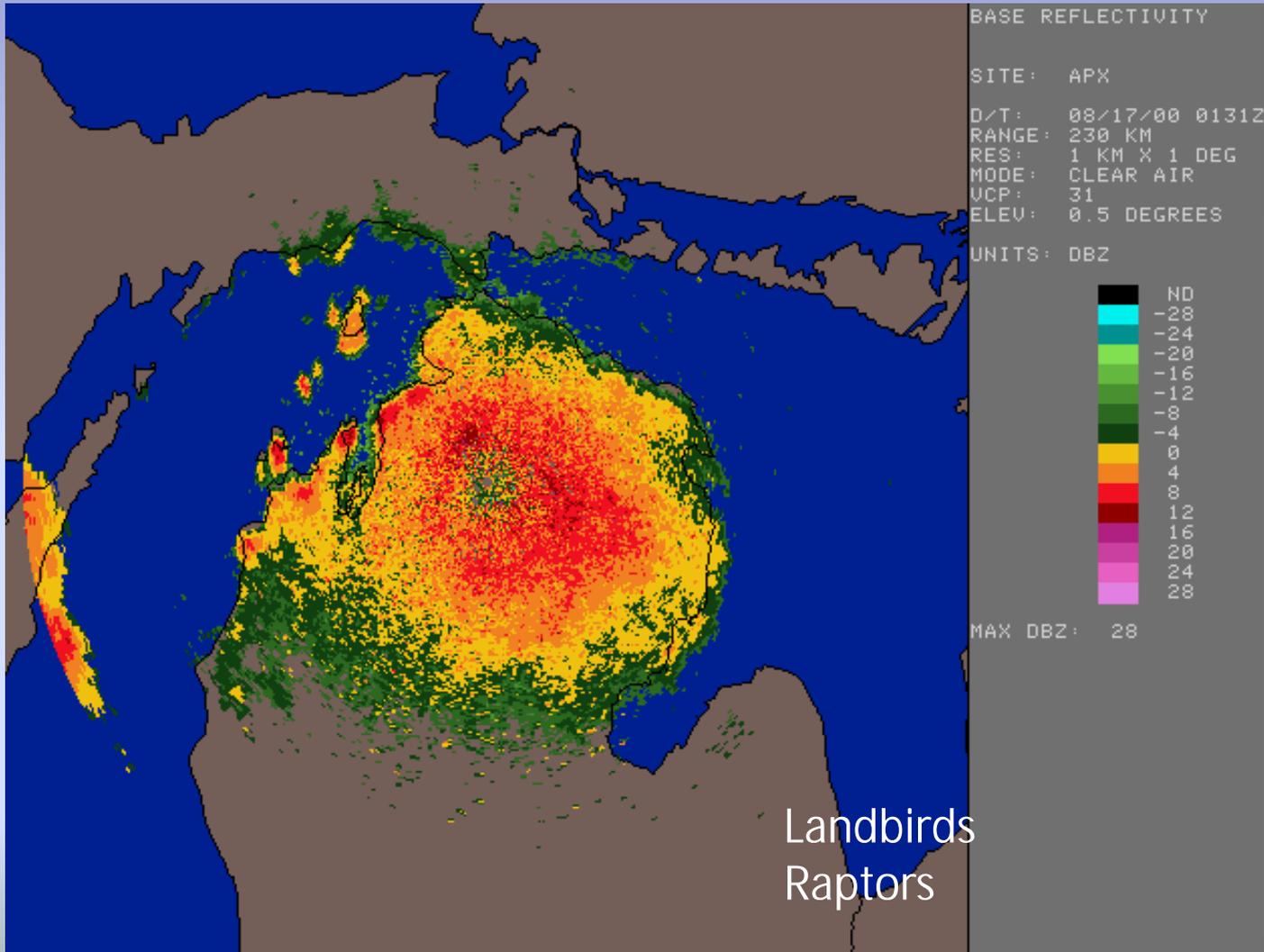


# Piping Plover



10-15% of Great Lakes population (75 pairs basin wide in 2015)

# Stopover sites



# Conservation issues



Grand Traverse archipelago



Little Hog Island



Beaver Island archipelago

# Threats to island biodiversity integrity

- Invasive/introduced species/pathogens
  - Disease (Lyme disease, botulism)
  - Emerald ash borer, beech scale
  - Deliberate species introduction
- Lack of sustainable ecological interactions
  - Balancing competing interests/ecological processes
  - Lack of appreciation of distinct island ecology
- Increased access/infrastructure
  - Development, roads etc.
  - Wind energy?
- Climate change

# Introduced species/pathogens

- Landscape changers

- White-tailed deer

- Plants

- Common reed grass

- Garlic mustard

- Glossy and common buckthorn

- Spotted knapweed

- Autumn olive

- Japanese knotweed



# Invasive species/pathogens

- In the wings: moving up and out
  - Emerald ash borer
  - Hemlock woolly adelgid
  - Wild boar
  - Kudzu
  - Lyme disease



# Tale of two islands: deer browse

## North Manitou

- Deer present
  - Forest understory minimal
  - 60 native plant spp present
  - Species gone/very rare
    - Canada yew
    - Yellow lady's slipper, lilies



## South Manitou

- Deer absent
  - Forest understory intact
  - 131 native plant spp present



# Climate change

- Projected loss of species
  - White spruce
  - Blackburnian Warbler



- Will islands be buffered by surrounding water to slow/reduce species loss?

# Increased access/infrastructure

- Selectively minimize/restrict access
  - Access can:
    - Spread invasive species/pathogens
      - Terrestrial and aquatic
      - Lyme disease
        - » Deer density >8-10/sq. mile
      - Emerald ash borer
    - Result in loss of
      - Waterbird nesting colonies
      - Piping Plover nests



# Inventory

- Hatt. 1948. *Island Life: A study of land vertebrates of eastern Lake Michigan*. Cranbrook Institute of Science
- Central Michigan University
- University of Wisconsin
- Michigan Natural Features Inventory
- The Nature Conservancy
- Little Traverse Band of Odawa Indians
- *Islands of Life*
- Breeding Bird Atlas
- Piping Plover surveys
- Colonial nesting waterbird surveys
- Michigan and Wisconsin DNR
- USFWS
- Amphibian and reptile surveys

# Planning

- Great Lakes Ecoregional Plan
- *Islands of Life*
- Natural Resources Ecological Sustainability Committee
  - Beaver Island archipelago
- Eastern Lake Michigan Dune Alliance
  - Beaver Island archipelago
- USFWS
  - Michigan Islands National Wildlife Refuge
- Michigan DNR
  - Lake Michigan Islands Management Plan
    - Beaver Island archipelago

# Strategies/actions

- Land protection: 46% of L MI island land area protected
  - Little Traverse Conservancy
    - 7 preserves (Beaver and St. Helena Islands)
  - Central Michigan University (Beaver Island)
  - Michigan DNR (Beaver, High, S. and N. Fox, Garden, High, Whiskey and others)
  - Wisconsin DNR (Rock Island, parts of other islands)
  - USFWS (Michigan Islands , Green Bay, Gravel Island National Wildlife Refuges)
    - Hat, Gull, Pismire, Shoe Islands; Hog, Plum, Pilot, Rocky, St. Martin Islands; Gravel Island
  - Others (USFS; Michigan Nature Association)
- Protect/monitor threatened/endangered species
  - Piping Plover, colonial nesting waterbirds
  - Pitchers's thistle, dwarf lake iris
- Forest management
  - Maintain viable populations of all tree species
- Maintain viable populations of game, nongame species
  - Terrestrial and aquatic
- ID, monitor, rapid response to invasive species (10 focal species)
  - Common reed control (*Phragmites*)
  - Wash trucks before arriving on island
  - Monitor sites most likely to receive invasive species
  - Quarantine hardwood logs, maybe hemlock
- Improve education, resource appreciation
  - Birding trail, festival (2014); bike trails
  - Blue water trail



# St. Martin Island, Lake Michigan

