



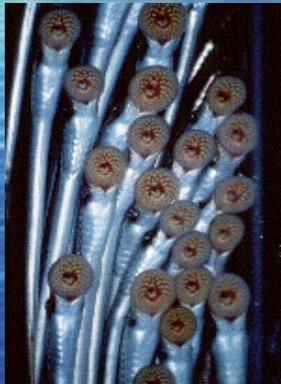
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Aquatic Nuisance Species



**in
Lake Huron**



Great Lakes Fisheries Leadership Institute

September 27, 2003

Anjanette Bowen
USFWS-Alpena FRO



U.S. Fish and Wildlife Service

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What is an Aquatic Nuisance Species?

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Lake Huron's Aquatic Nuisance Species

What is an Aquatic Nuisance Species?

An "aquatic nuisance species" is defined as a species that is 1) non-native (or alien) to the ecosystem under consideration and 2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health.



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Lake Huron's Aquatic Nuisance Species

Fish

Eurasian ruffe

Round goby

Sea lamprey – Roger Bergstedt

Crustaceans

Zebra mussels

Quagga mussels

Spiny waterflea

Rusty crayfish

Vegetation

Purple loosestrife

Eurasian watermilfoil



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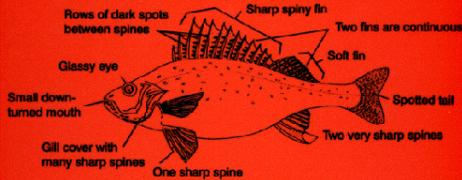
Eurasian Ruffe

Gymnocephalus cernuus

RUFFE IN LAKE HURON

The U.S. Fish and Wildlife Service is trying to identify the current range of ruffe in Lake Huron. Ruffe are an exotic fish from Europe that are thought to have entered the Great Lakes in the ballast water of ships. They were confined to Lake Superior until 1995 when they were caught in the Thunder Bay River in Alpena, Michigan. We need your help to locate these fish. Ruffe may be identified by characteristics listed below. Please inspect any perch-like fish you catch for these characteristics.

How to Identify Eurasian Ruffe



General Characteristics:
Very slimy when handled
Usually less than 6" (15.5cm) long
Perch-like body shape

Ruffe should be killed and placed in a bag with information on the date and location of your catch.
Freeze or refrigerate the contents of the bag and drop it off or call



The U.S. Fish and Wildlife Service
Alpena Fishery Resources Office
Federal Bldg. Rm. 204, 145 Water Street
Alpena, Michigan 49707
(517) 356-5102



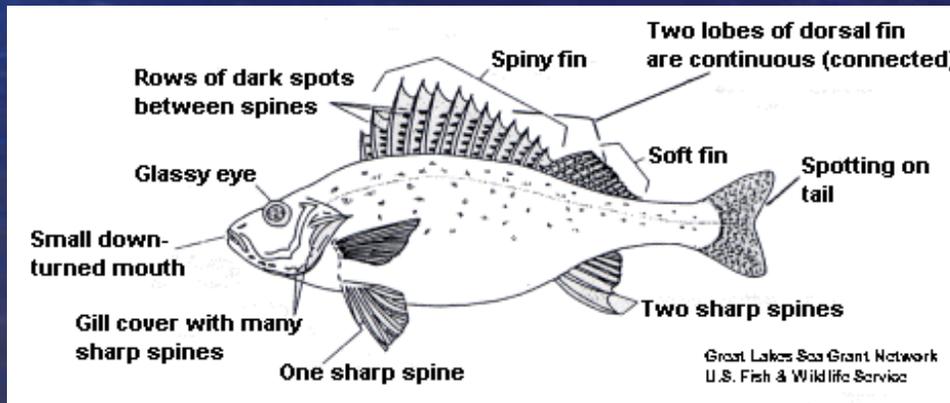
Perch family
Prolific spawner
Nighttime feeder



Egg feeder
Native to Eastern Europe



Ruffe WATCH



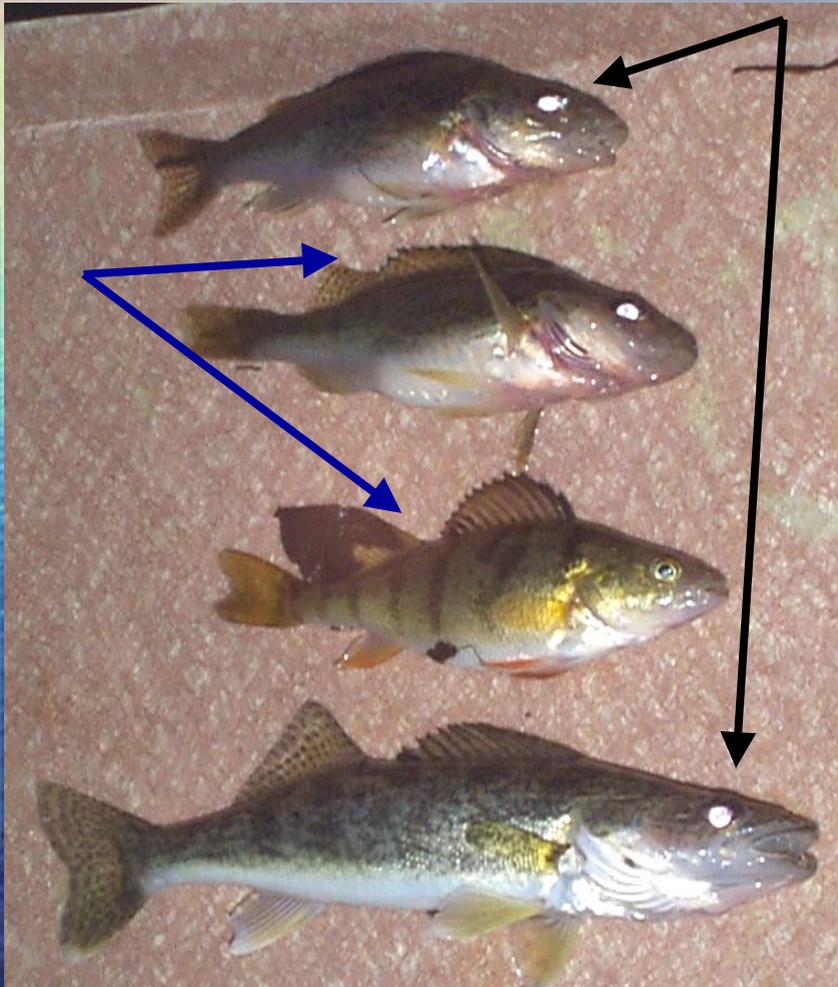
Great Lakes Sea Grant Network
U.S. Fish & Wildlife Service

Ruffe WATCH
courtesy of
Sea Grant and
U.S. Fish and
Wildlife Service.



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Eurasian Ruffe



Walleye and Ruffe

- **Glassy eyes** of ruffe and walleye (*Corpus luteum*) which allow these species to feed and see in darkness

Yellow Perch and Ruffe

- Similarities in ruffe and perch **body shape**
- Distinction in **dorsal fin** of ruffe (continuous) and perch (not continuous)
- Distinction in **coloration** between perch and ruffe



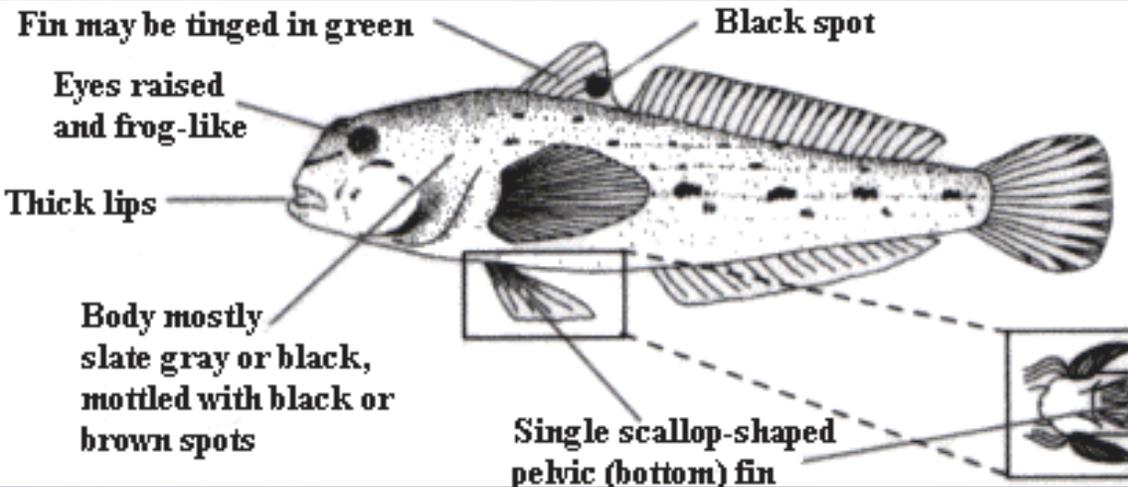
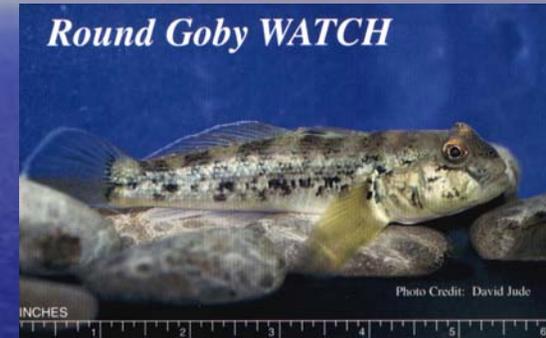
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Round Goby

Neogobius melanostomus



- Bottom dweller
- Aggressive
- Prolific spawner
- Nest guarder
- Egg feeder
- Native to Eastern Europe



Round Goby WATCH courtesy of Sea Grant and U.S. Fish and Wildlife Service.



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Zebra Mussel

Dreissena polymorpha



Native to Eastern Europe
Rapid colonizers-widespread
Water filterer
Remove planktons
Problem for native mussels

Quagga Mussel

Dreissena bugensis



Photo-Myriah Richerson

Quagga prefers deeper waters



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Spiny Waterflea *Bythotrephes longimanus*



Photo- Radka Pichlova & Hank Vanderploeg

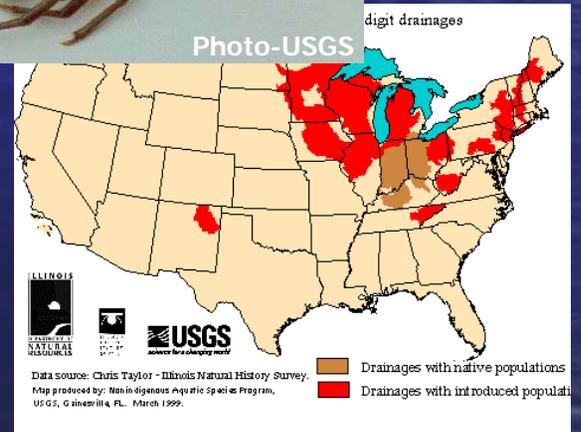
- Intimidating to juvenile fish
- Large body
- Long spiny tail

Rusty Crayfish *Orconectes rusticus*



Photo-USGS

- Feeds on vegetation
- Orange claw tips
- Orange spots on sides of carapace





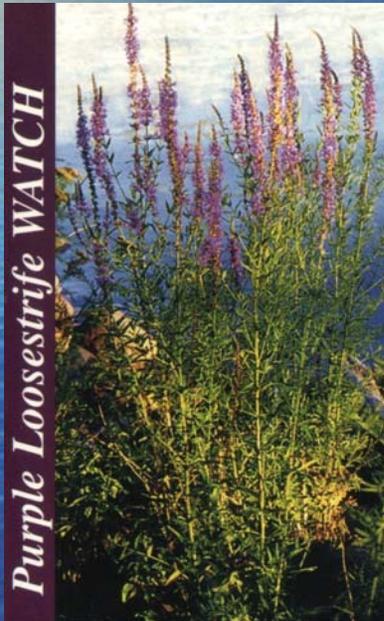
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Purple Loosestrife

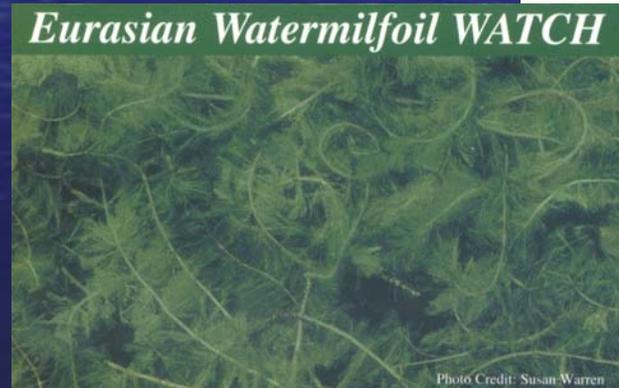
Lythrum salicaria

Eurasian Watermilfoil

Myriophyllum spicatum



Can mat on water surface
3-5 leaves in whorls
Shallow waters (<20 ft)
Hindrance to navigation
and poor fish habitat



Purple loosestrife and Eurasian watermilfoil WATCH courtesy of Sea Grant and U.S. Fish and Wildlife Service.

Thick growing plant
Crowd native plant and wildlife

Control with herbicide, submerged mats and native Milfoil Weevil



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Dispersal Vectors For ANS

Aquaculture Escape



Photo-www.aquarian.com

Bait Bucket Release



Photo-www.livebaittheater.org

Intentional Release

Waterway Migration



Photo-NE University and MIT



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Strategies to Combat ANS Problems

- **Ballast Control**
- **Regulation**
- **Education**
- **Research**
- **Monitoring and Removal (Control)**
- **Legislation**

proposed **National Aquatic Invasive Species Act of 2003 (NAISA)**

National Invasive Species Act of 1996 (NISA)

Nonindigenous Aquatic Nuisance Prevention and

Control Act of 1990

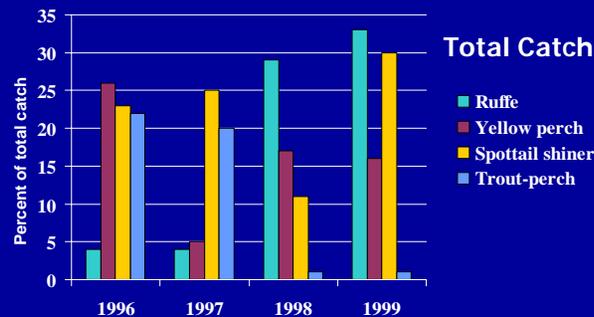
- **Early Detection – Rapid Response and Development of
an early detection and eradication protocol**



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Efforts to Combat ANS in Lake Huron

USFWS



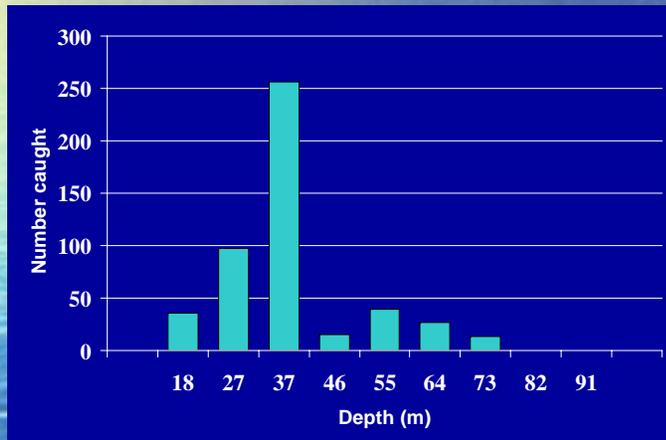
- Nearshore surveillance for early detection of Eurasian ruffe and round goby at shipping ports – 14 ports, St. Marys River to Harbor Beach – bottom trawling
- Monitoring of nearshore population dynamics of native and ANS – bottom trawling
- Removal of the Lake Huron population of adult spawning phase Eurasian ruffe – small mesh gillnetting
- Assist state, federal, and tribal efforts to combat ANS
- Angler and public education and outreach efforts from Sault Ste. Marie to Harbor Beach



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Efforts to Combat ANS in Lake Huron

USGS



Contact:

Jeff Schaeffer
USGS, Great Lakes
Science Center
Ann Arbor, MI

734-994-3331

- Offshore surveillance and population monitoring at 5 locations in the main basin – bottom trawling
- Offshore population dynamics of round goby (5 locations) in the main basin and interaction w/ natives – bottom trawling
- Benthic sampling – analysis of zebra and quagga mussel dynamics





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Efforts to Combat ANS in Lake Huron

MDNR/MDEQ



**Contact:
MDEQ, Office of the
Great Lakes
Lansing, MI**

517-241-7927

- Near and offshore surveillance during regular fishery index surveys – bottom trawling and gillnetting
- Funding of ANS projects through the Michigan Great Lakes Protection fund for work with:
 - U of M study of Diporeia and lake whitefish in Lake Huron – zebra mussel implications
 - GIS modeling and mapping of species infestations
 - Tip of the Mitt Watershed Council ANS education and outreach
- Updated Aquatic Nuisance Species Management Plan in October 2002
- Assisted in initiation of Michigan ANS Awareness Week



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Efforts to Combat ANS in Lake Huron

OMNR



- Multi-year nearshore fish community assessment at 2 sites in each of the Main Basin and Georgian Bay- document round goby expansion – seining, fyke netting, small mesh gillnetting, and trapping
- Examine creel and angler reports for ANS sightings
- Conduct surveillance through index fishery assessments – 6 locations

**Contact:
Lloyd Mohr
OMNR, Lake Huron
Management Unit
Owen Sound, Ont.**

519-371-5669



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Current Research and Control

- **Ballast water treatment options to prevent new introductions**
- **Efforts to prevent zebra mussels from adhering to surfaces – mild electric fields**
- **Round goby predation on lake trout eggs and fry on natural historical lake trout spawning reefs in Lake Huron**
- **Removal of spawning phase ruffe in Lake Huron**
- **Examination of round goby and ruffe population dynamics with native species**



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New Threats to Lake Huron?

Northern Snakehead ?



Photo-USFWS

Asian Carp ?



Photo-USGS

Fishhook Waterflea?

Photo- Radka Pichlova & Hank Vanderploeg





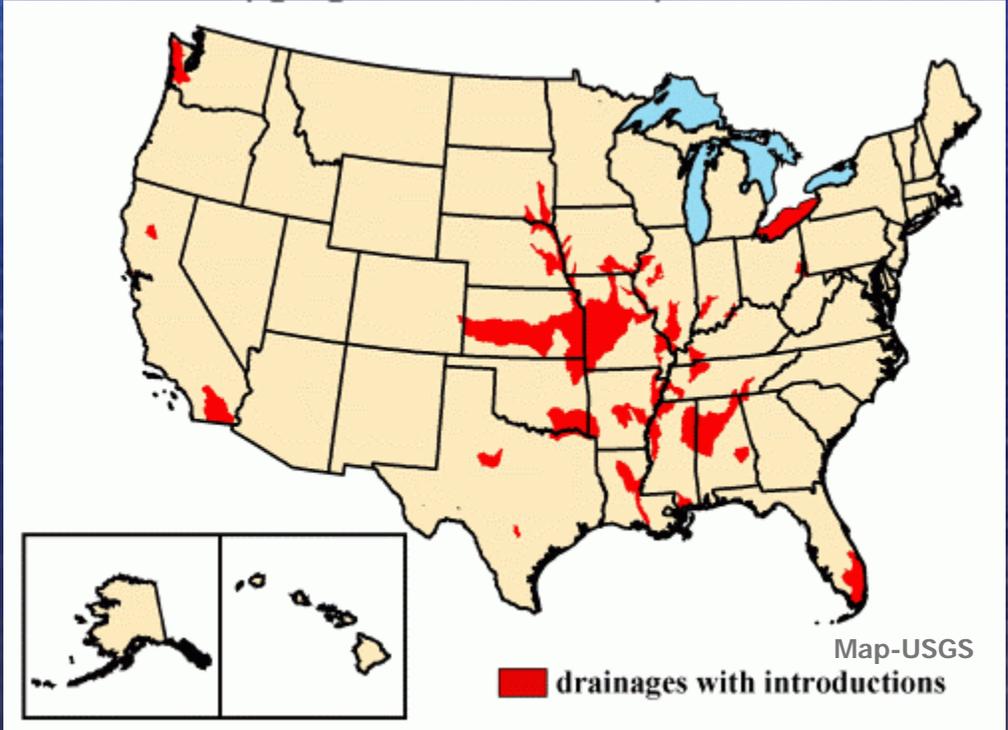
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New Threats to Lake Huron?

Bighead Carp *Hypophthalmichthys nobilis*



Photo-USFWS





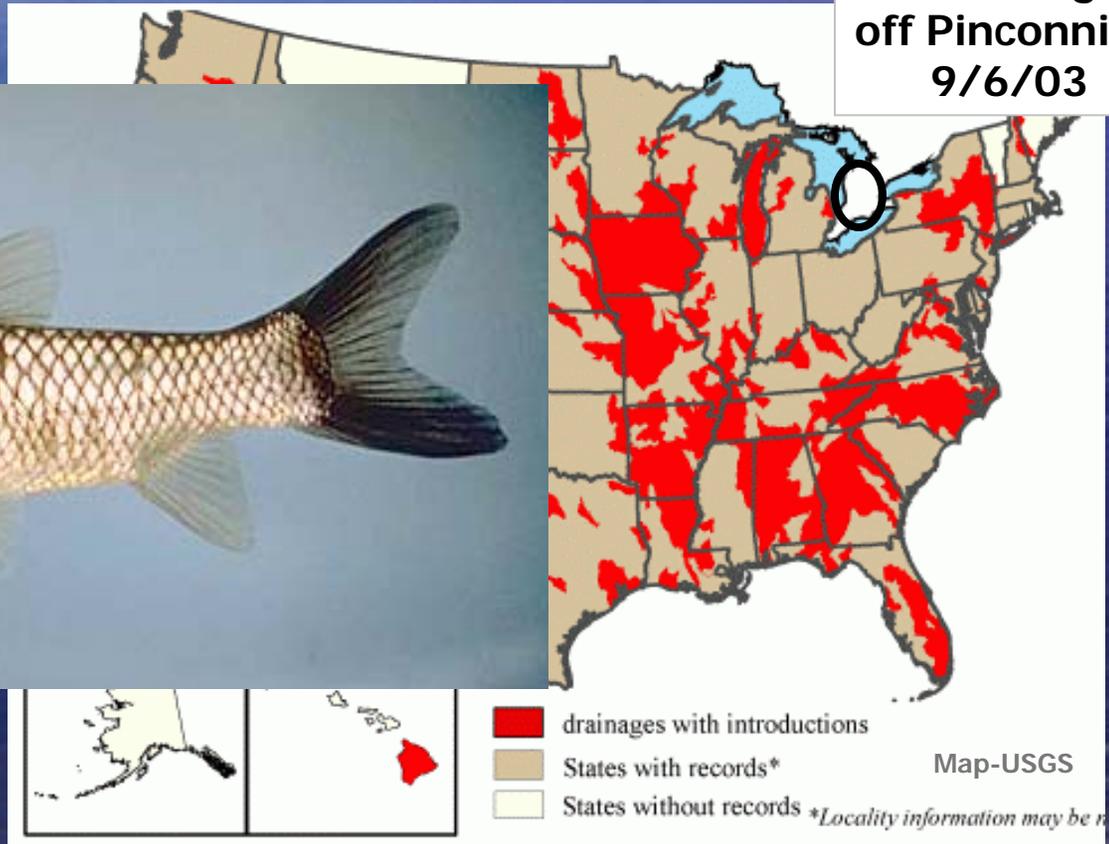
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New Threats to Lake Huron?

29 lb caught
off Pinconning
9/6/03



Photo-Virginia Polytechnic Institute



Grass Carp

Ctenopharyngodon idella



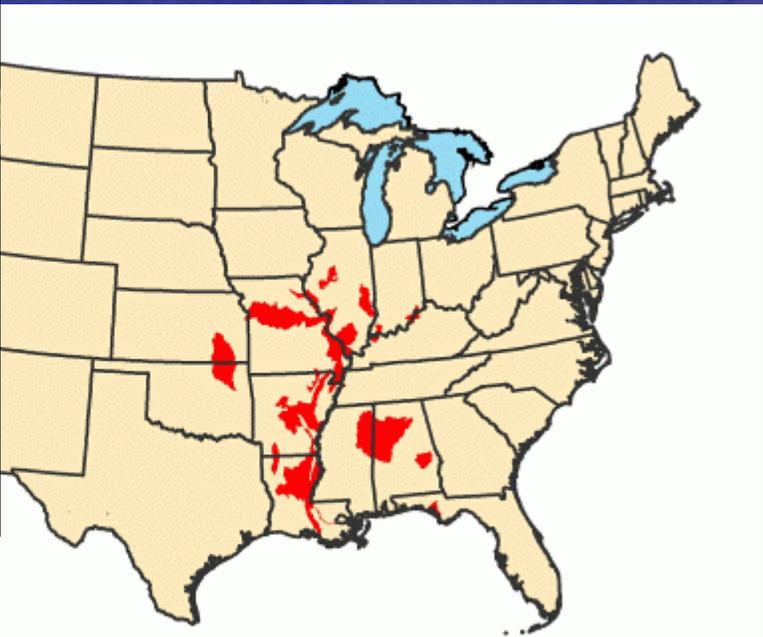
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New Threats to Lake Huron?



Photo-Virginia Polytechnic Institute

Silver Carp *Hypophthalmichthys molitrix*



drainages with introductions

Map-USGS



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New Threats to Lake Huron?

Black Carp

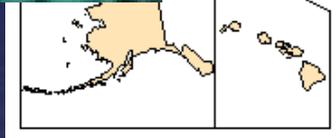
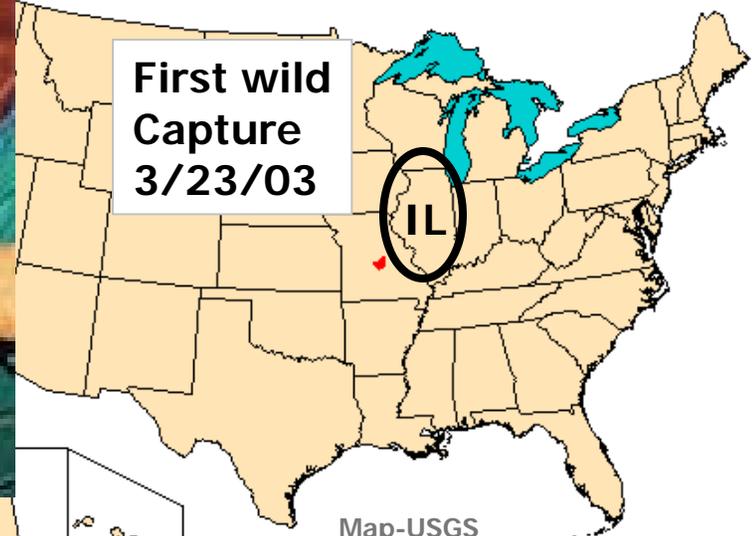
Mylopharyngodon piceus



Photo-L.G. Nico, USGS

Consumes vegetation

Mylopharyngodon piceus



Map-USGS
brown drainages in native range
red drainages with introductions



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New Threats to Lake Huron?

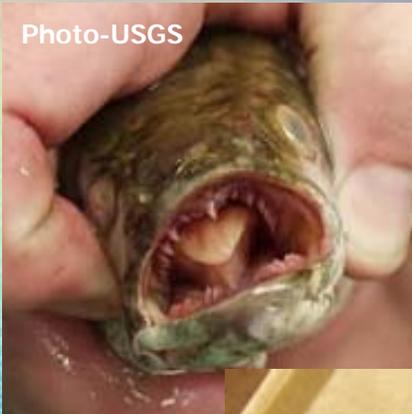


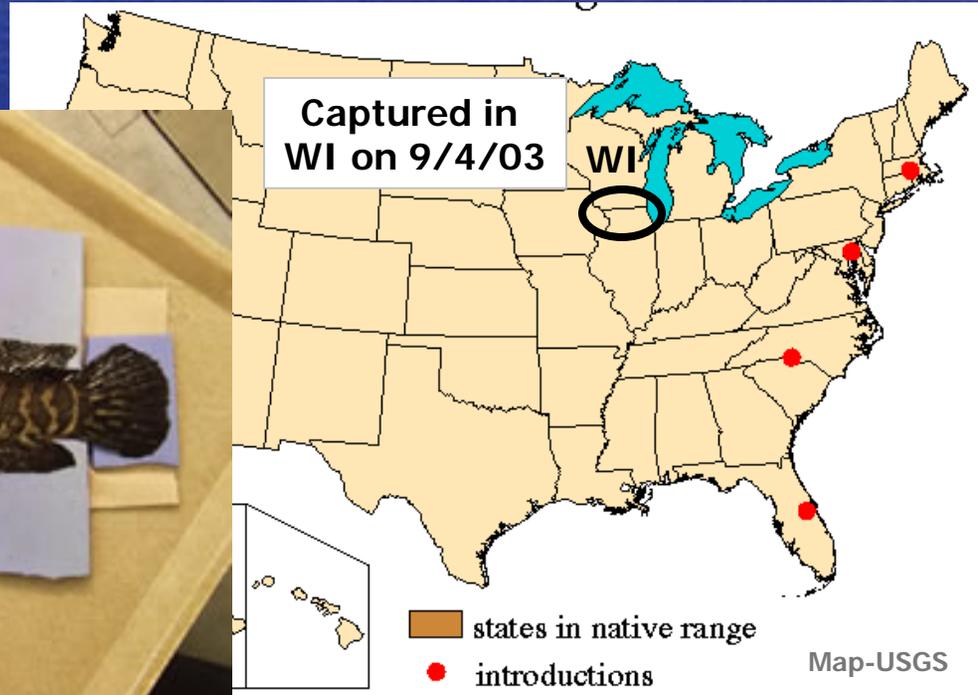
Photo-USGS

Voracious predator
Breathe air 7-10 days
No natural predators

Snakehead *Channa argus*



Photo-USGS





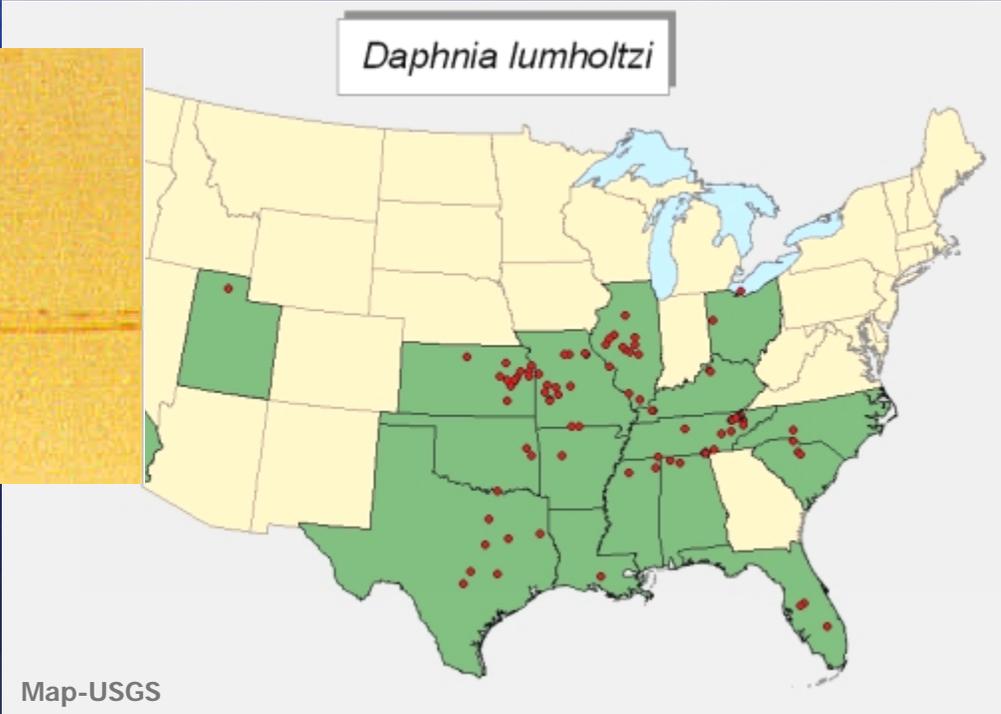
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New Threats to Lake Huron?

Water Flea *Daphnia lumholtzi*



Photo-Tom Ferro



Map-USGS



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New Threats to Lake Huron?

Fishhook Waterflea *Cercopagis pengoi*



Photo- Radka Pichlova & Hank Vanderploeg





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Efforts Toward Prevention

Education is Key!

Legislation

Research

In General -

Eradication impossible in large open systems

Introductions are difficult to control

Prevention is the best measure

Awareness is necessary for success

Cooperation is important

Control efforts can be expensive and planning lengthy



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Useful ANS Web Sites

<http://www.invasivespecies.gov> Federal Invasive Species Site

<http://www.glc.org/ans/> Great Lakes Panel on ANS

<http://www.glfc.org/fishmgmt/exotic.asp> Great Lakes Fishery Commission on Exotic Species

<http://www.uscg.mil/hq/g-m/mso/mso4/bwm.html> Coast Guard Ballast Water Management

<http://nas.er.usgs.gov/> USGS Nonindigenous Aquatic Species

<http://www.anstaskforce.gov/> Aquatic Nuisance Species Task Force

<http://www.sgnis.org/> Sea Grant Non-indigenous Species Site

http://www.michigan.gov/deq/0,1607,7-135-3313_3677_8314---,00.html MDNR ANS Control