



Aquatic Invaders

Federation of Monroe County
Environmentalists Forum

November 16, 2010

Charles Knauf

Zebra mussels- Irondequoit Bay 2002

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Phytoplankton and zooplankton...



Cercopagis pengoi (upper) and *Bythotrephes longimanus* (lower) courtesy of Wikimedia

Photo provided by Bill Reed

Plants.....

Nitellopsis Obtusa- Braddock Bay

08/10/2005

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Invertebrates.....



Hemimysis anomala photo courtesy of Wikimedia Commons

Birds....



Mute Swan (Cygnus olor) photo courtesy of Wikimedia Commons

Photo by Katrina Korfmacher

Fish...

Pacific Salmon (Onchyrincus sp) near Seth Green Island Genesee River 2009

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Problem or Panacea? - Perspective

Carp - Cyprinus carpio
averages 15 - 20 inches
(can reach 40 pounds)



Introduced from Europe, where it was an important food fish

Intended to supplement native fisheries.

Came to be seen as trash fish due to:

- Competition with native fish for food
- Disruption of habitat due to bottom rooting

Three Significant Aquatic Invasives

- Alewife (*Alosa pseudoharangus*)



- Zebra and Quagga Mussels (*Dreissena polymorpha* and *Dreissena rostriformis bugensis*)



- Round Goby, (*Neogobius melanostomus*)



Alewife

NYSDEC illustration



Alewife - *Alosa pseudoharengus*
averages 5-6 inches

- Herring native to the Atlantic coast
- Entered Lake Ontario through Hudson System and Erie canal
- Entered upper Great Lakes with the opening of the Welland Canal 1931

Photo courtesy of This Date in Chicago History

- **Visible manifestation of the Lake Ontario Ecosystem problem in the late 1960's**

- Nuisance condition along Lake Ontario beaches after alewife die-offs led to the NYSDEC program of Pacific Salmon and Trout introduction

Steelhead Fishing at the Lower Falls of the Genesee River

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Photo by John Burrows Maine Rivers

- **Suppressed perch population in Lake Ontario and embayments caused by predation during spawning**
- **Contain thiamenese, an enzyme which breaks down thiamin. This interferes with reproductive success of native Lake Trout and Atlantic Salmon**
- **Were themselves vulnerable to collapse when nutrient control brought a reduction in phytoplankton in the pelagic waters of the lake while pressure from predators, especially Pacific Salmon, remained high**

Current Status

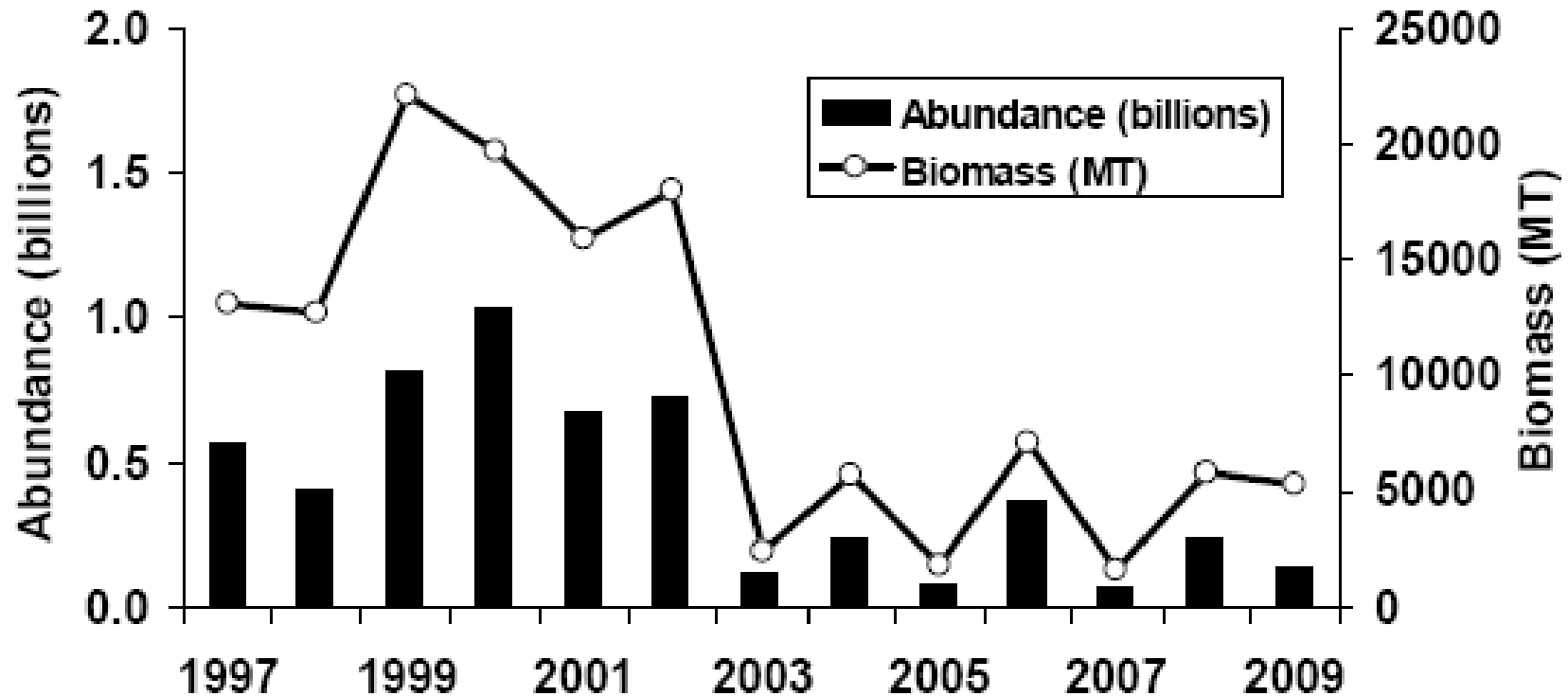


FIGURE 2. Abundance and biomass of yearling-and-older alewife from 1997-2009. Abundance estimates were obtained directly from hydroacoustic surveys, biomass estimates were obtained by multiplying average weights of alewife measured in midwater trawls to hydroacoustic abundance estimates. Average weights used in biomass calculations in 2002, 2004, 2005 and 2008 were based on pooled data from other sources. Note an error in the 2008 biomass estimate was corrected: biomass should have been reported as 5,832 MT (not 8,178 MT, Connerton and Schaner 2009)

Dreissinid Mussels- Zebras and Quaggas



Photo courtesy of USGS

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Dreissena polymorpha

Zebra Mussel



Sits flat on ventral side

Triangular in shape

Color patterns vary

Dreissena rostriformis bugensis

Quagga Mussel



Will not sit flat on ventral side

Rounder in shape

Darker concentric rings on shell

Pale in color near the hinge



**Native to the Black And Caspian
Seas**

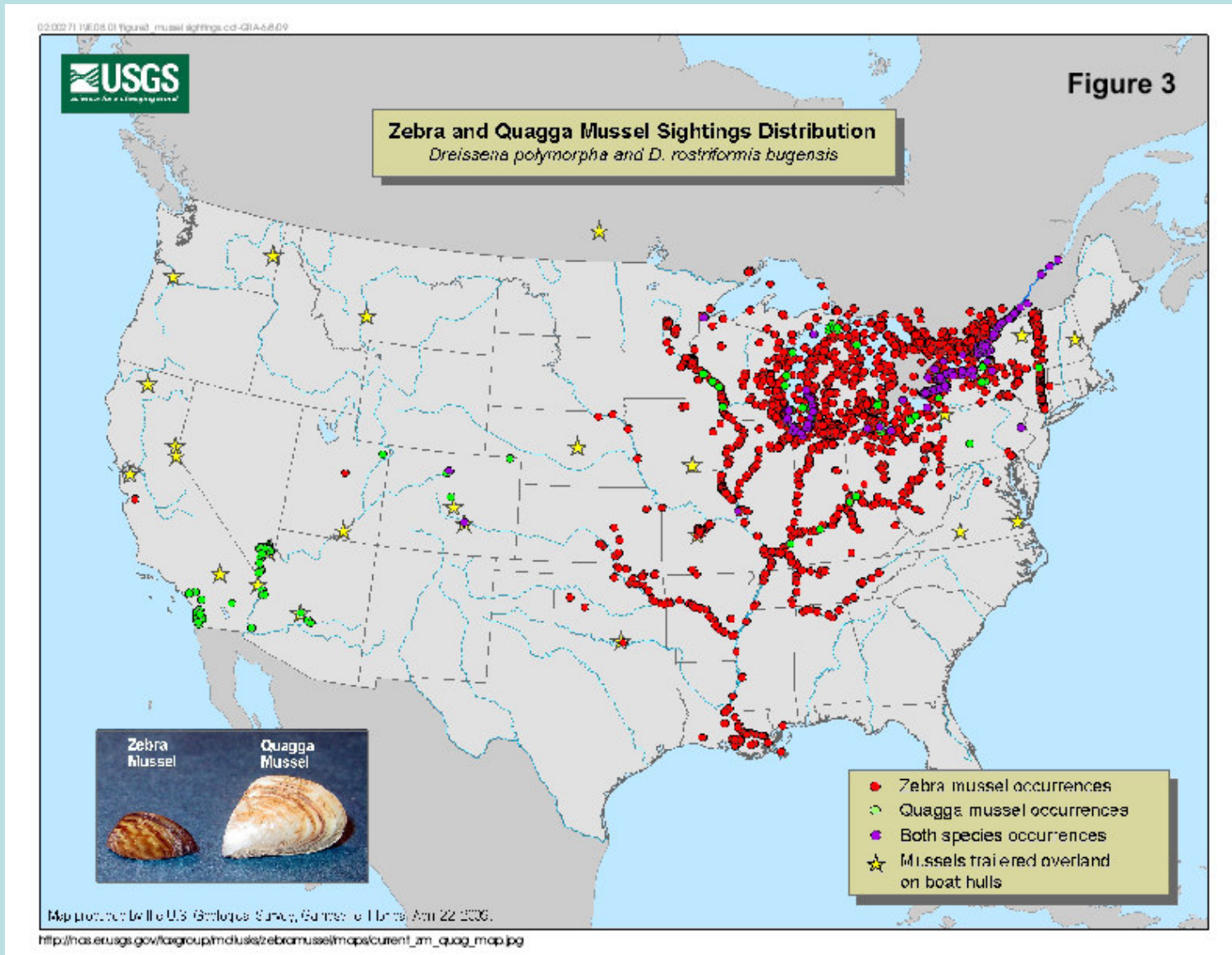
**First recorded introduction Lake
St Clair 1988**

**Confirmed in Lake Ontario by
end of 1989**

**Confirmed in all Great Lakes by
1991**

Mussel shells at Russell Station, 2002 C. Knauf photo

Extent of Mussel Proliferation in the Great Lakes and North America



United States Geological Survey 2006

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Filter Feeders

- Clog intakes to water and industrial plants
- Benthification of the Lake
- Improved water clarity
- Increased growth area for filamentous Algae
- Potential linkage to Type E Botulism

Mussel shells at Russell Station, 2002 C. Knauf photo

Possible connection to Diporeia die-off in the Lake

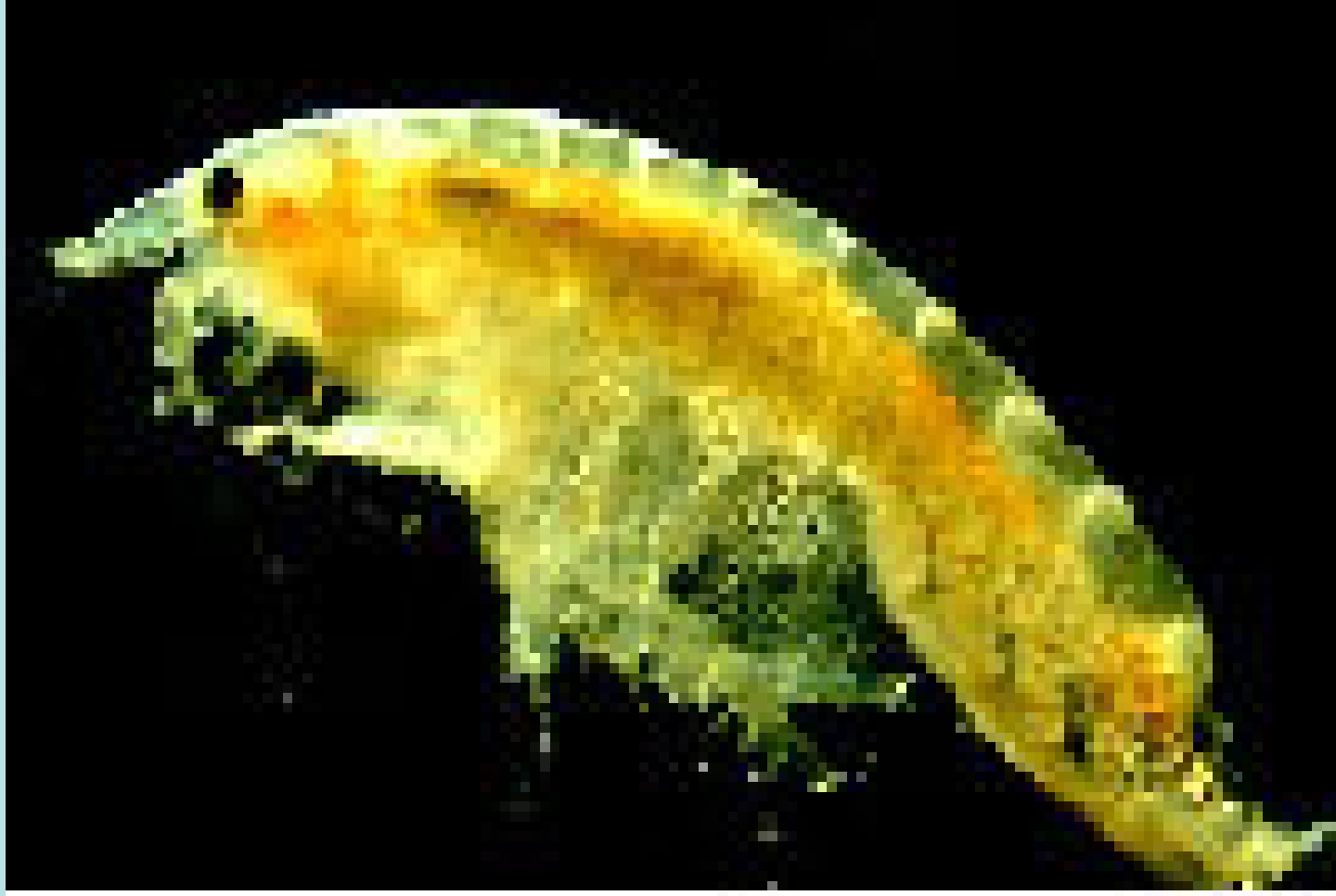
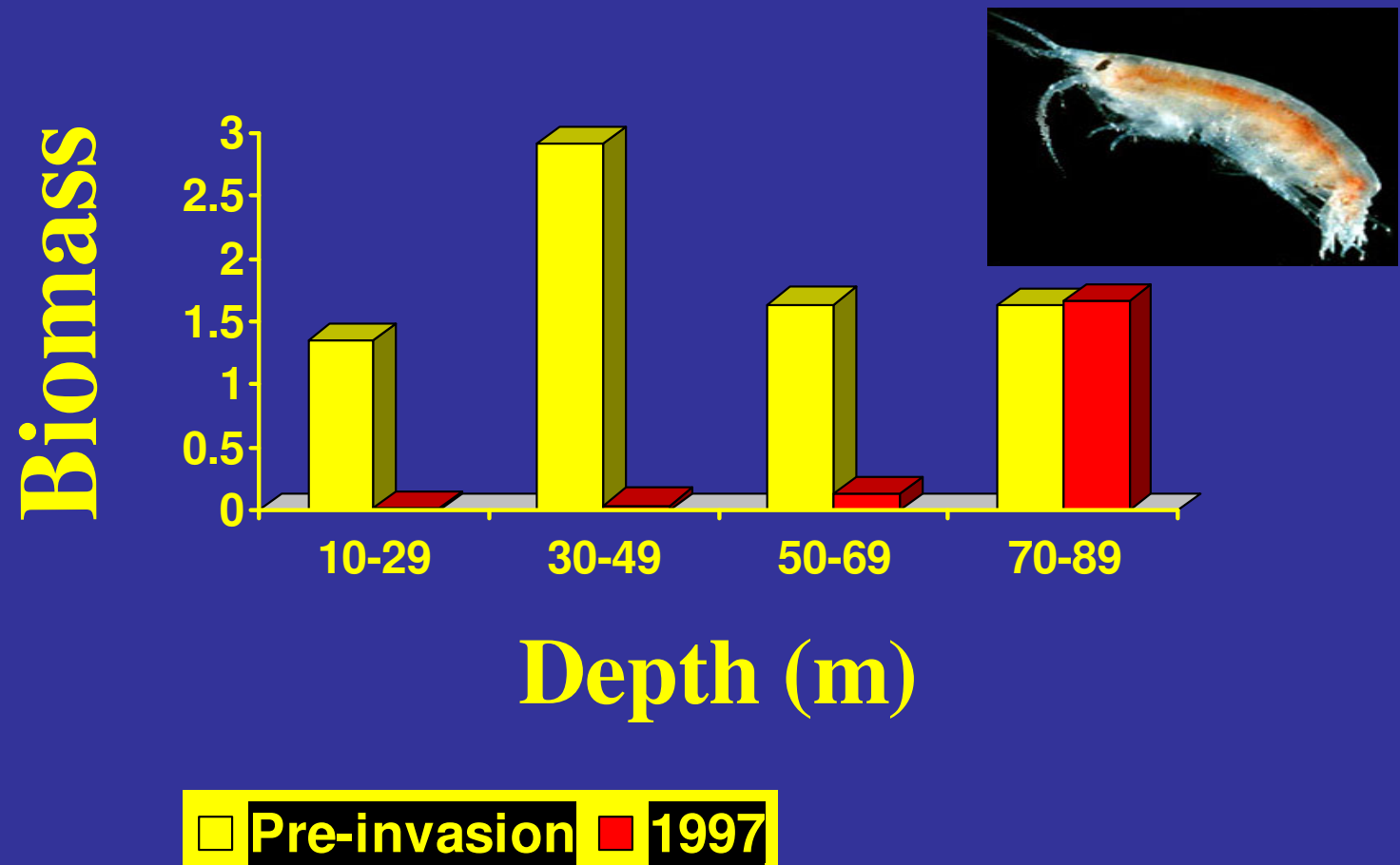


Photo courtesy of Dr. Ed Mills, ret. Cornell University
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Lake Ontario *Diporeia* Biomass Pre & Post Zebra Mussel Invasion



Slide Courtesy of Dr Ed Mills,
Cornell University

Data courtesy of Steve Lozano, GLERL

The Core Squeeze!



*Slide Courtesy of Dr Ed Mills,
Cornell University*

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The Round Goby, *Neogobius melanostomus*

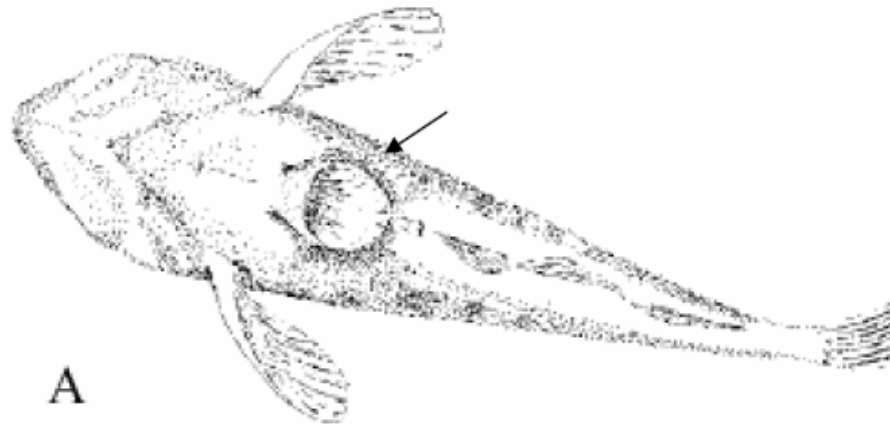


Photo courtesy of Wikipedia

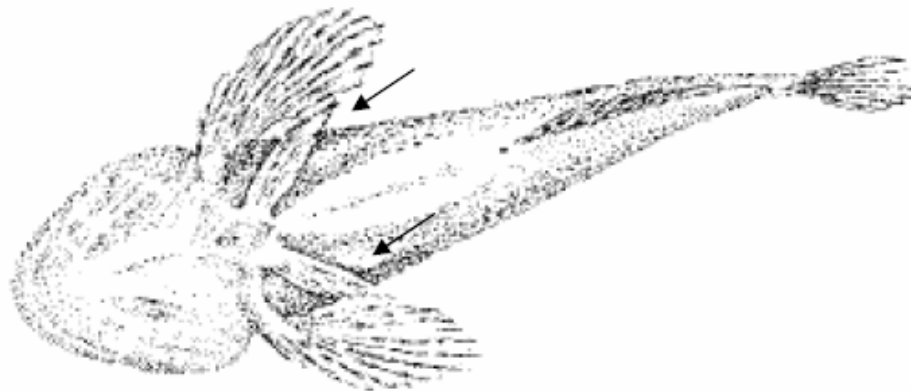
Identification

Distinguishing Characteristics

- Similar in appearance to native sculpin (Fig. 4) and tubenose goby (Fig. 5). For characteristics of the adult round goby see Fig. 6.



A



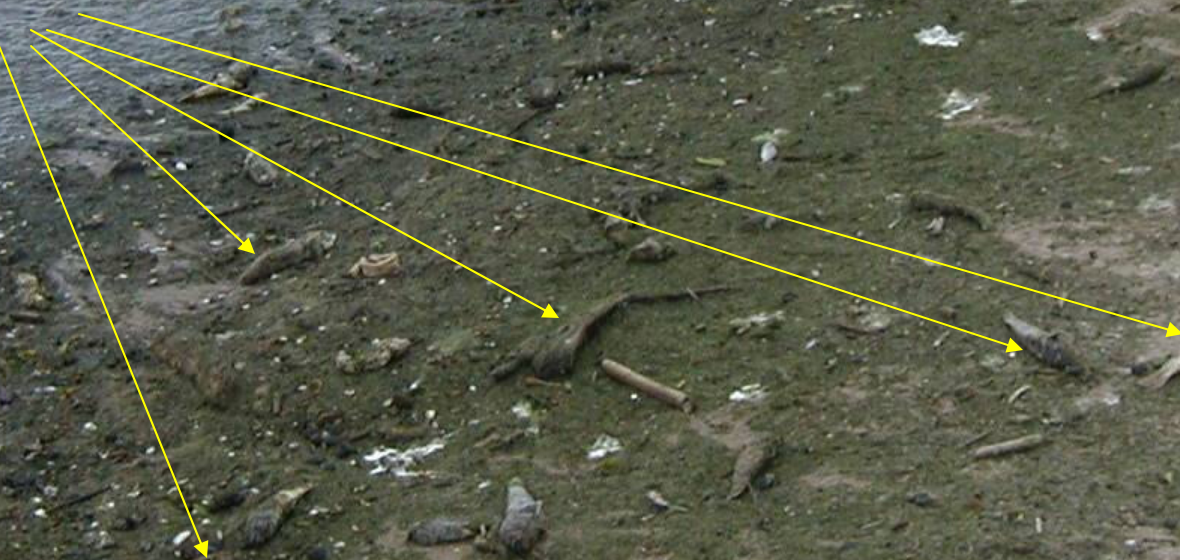
B

Fig. 4 A. The underside of a round goby – note the fused pelvic fins which form a suction disk. B. The underside of a mottled sculpin – note the separation of the two pelvic fins.⁴

Slide courtesy of USACE

- Originated in the Black and Caspian Seas
- First discovered in St Clair area, 1990
- Currently found in all Great Lakes and are moving inland

Dead Gobies



Fishkill at Ontario Beach Spring 2006

- 
- Competes with native species for food and habitat
 - Reproduces prolifically
 - Can climb vertical surfaces- worries for inland trout fisheries
 - Possibly implicated in Type E Botulism, VHS spreads
 - Decline in Smallmouth Bass fishery

Photo courtesy of USDA

UGA1354047

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Positives:

- Feed on Dreissinids
- Provide a food source for Cormorants and take pressure of game species
- Provide a food source for game species when preferred temperatures overlap



“A successfully established ANS in the Great Lakes ecosystem should be regarded as impossible to eradicate.”- Aquatic Nuisance Species Handbook for Government Officials, Michigan Department of Environmental Quality

How can you help?

- 1) Do not use round gobies as bait. Illegal in New York State.**
- 2) Dump bait buckets on land, well away from the water (>100 feet).**
- 3) Help stop the spread of all aquatic exotics by cleaning your boat and trailer before going to a new water body. This includes cartop boats, canoes, kayaks, etc. Desiccation for at least > 3 days (some say one week) is currently recommended.**
- 4) Drain the water from your boat motor and wells on land.**
- 5) Remove plants and debris from your trailer before leaving the launch ramp.**
- 6) A 10% bleach solution can be used to soak (30 minutes) gear that can be submersed.**