

Bighead and Silver Carp in the Mississippi River Basin



Jerry L. Rasmussen
Mississippi Interstate Cooperative Resource Association
Bettendorf, Iowa

Bighead Carp



Bighead carp (*Hypophthalmichthys nobilis*)
■ Drainages with introductions

- Imported from China in 1972, and have now been reported from at least 23 states.
- Native to the large rivers and lakes of Eastern China (18-64° North latitude), including parts of Siberia.
- Typically spawn at river confluences (usually April to June) producing 280,000 to 1,000,000 eggs.
- Consume phytoplankton and zooplankton (mainly zooplankton).
- Grow to 50 in. in length and reach weights in excess of 90 pounds.
- Can withstand fairly low DO (<2 mg/l).

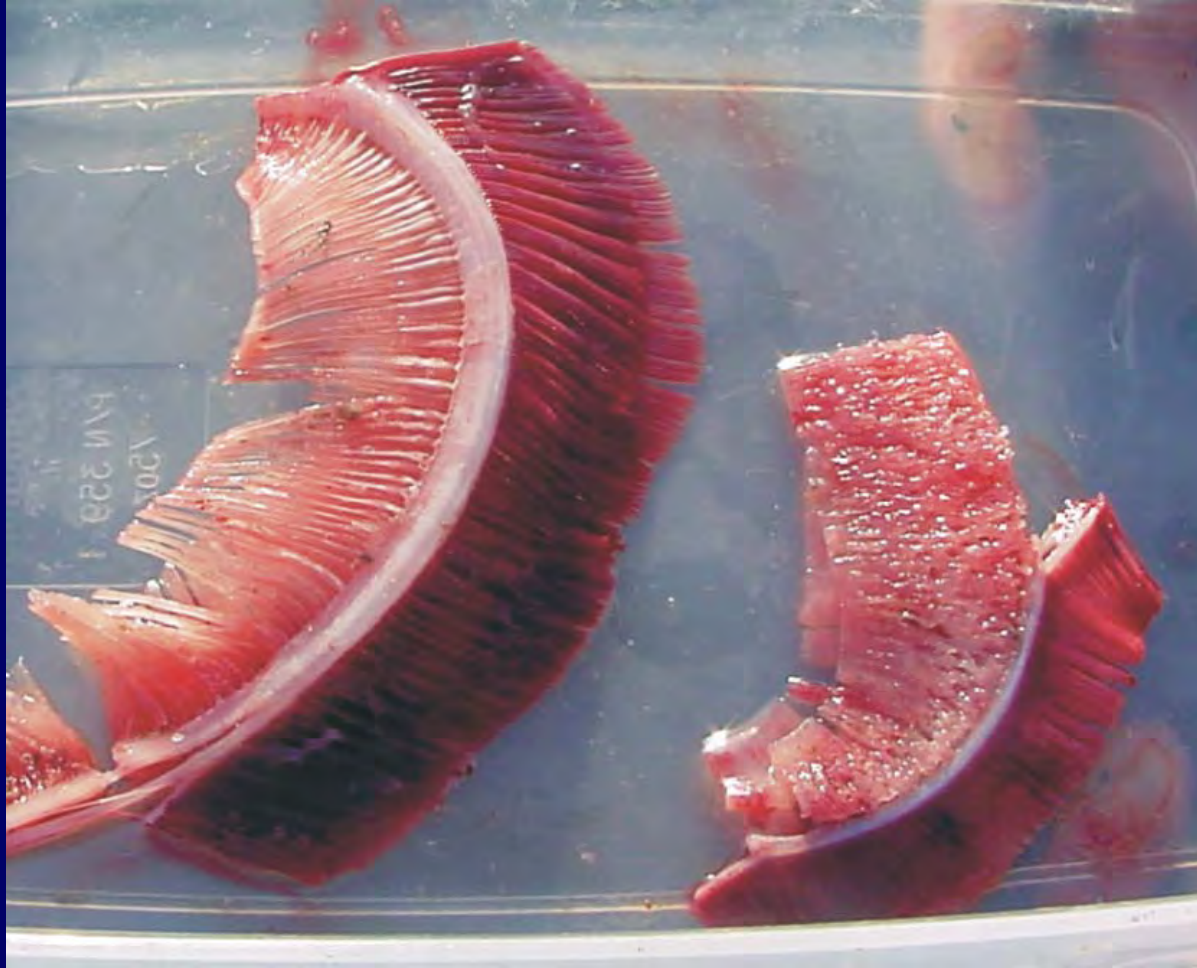
Silver Carp



Silver carp (Hypophthalmichthys molitrix)
■ Drainages with introductions

- Imported from China and Eastern Asia in 1973, and now occur in at least 15 states.
- Native to lakes and lowland rivers of China (43-64° North latitude), including parts of Siberia.
- Typically spawn at river confluences (usually May to June) producing 145,000 to 4,300,000 eggs.
- Consume phytoplankton and zooplankton (mainly phytoplankton), but are more efficient, straining suspended material as small as 3 microns in diameter from the water.
- Grow to 50 in. in length and reach weights of 110 lbs.
- Can withstand fairly low DO (<2 mg/l).
- Very active, mobile, jumping species.

Bighead and Silver Carp Gill Rakers



Bighead

Silver

Bighead and Silver Carp Concerns



- Reproduce in large numbers, and grow quickly to large size (up to 12 in. in one year), exceeding sizes usable to all native predators.
- Compete for food and space with other plankton feeders, including all species of young native fish and mussels, and disrupt food chains, potentially depleting plankton populations.
- Disrupt commercial fisheries by displacing species and clogging nets with unwanted fish.
- Threaten fishermen, boaters and water skiers with physical injury.

Current Distribution of Bighead and Silver Carp in the Mississippi River Basin





White River, IN



Ohio River, OH/IN



Barkley Reservoir, TN



Lower Mississippi, TN



Cumberland River, TN



Lake Kirby, TX

Starved Rock Dam, Illinois River

May 13, 2004

"For the past two days the silver and big head carp have been jumping just below the power house on the downstream side of the dam. It is the most awesome sight I have ever seen! It looks like something from outer space. There are these HUGE fish jumping 6-8 feet out of the water...one, two and three at a time...it was just incredible. You don't even need binoculars. They are as clear as a bell out there. And they are scary too. Just think what they can do to the ecosystem of the river and also...to the recreational boaters."

- email message from Kathy Higdon, Illinois DNR



How Did This Happen?

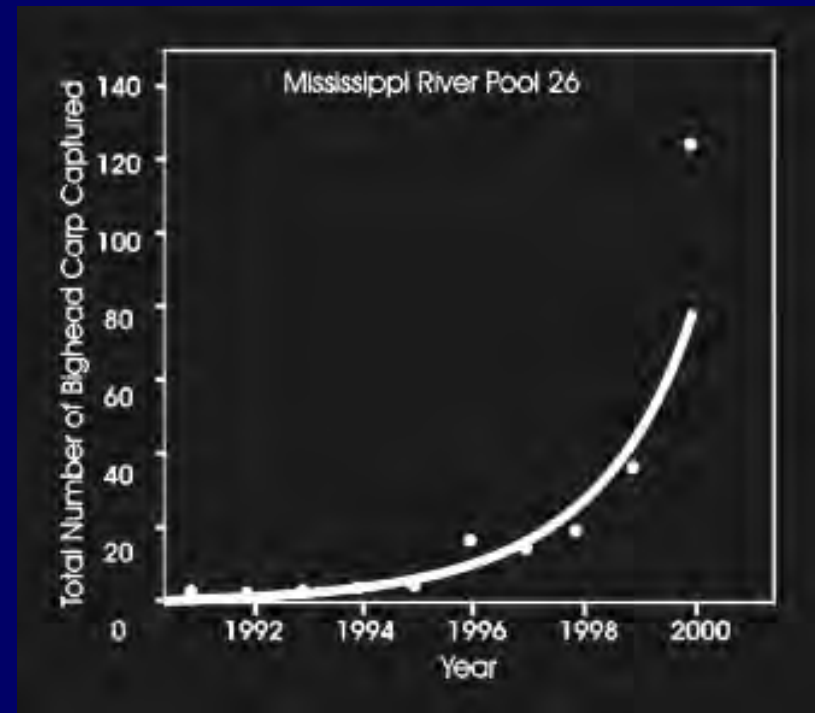
Both Species Were Introduced by Fish Farmers in the South.

- They were used widely in Arkansas and Mississippi in the 1970's and 80's to control plankton and remove excess wastes from catfish rearing ponds. They were also used experimentally in waste treatment ponds.
- Both species escaped captivity and became established in Arkansas waters in the 1980s, and reached the Upper Mississippi River by the early 1990's.
- The floods in the 1990's provided extensive spawning and rearing habitats, giving the invaders the opportunity needed to attain high survival rates and become established.



UMR Population Explosion

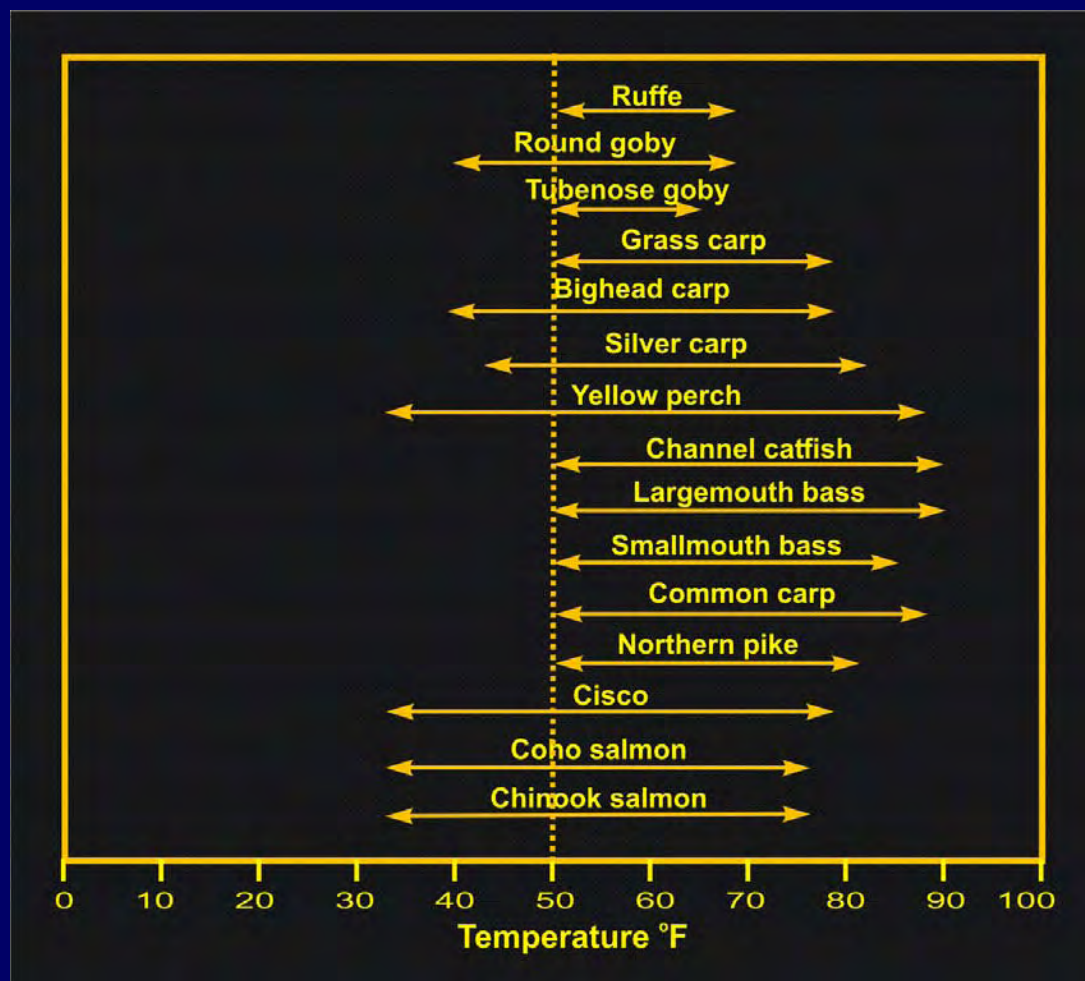
- **Mississippi River backwater fish kills in 1999 and 2000 consisted of 97% bighead and silver carp.**
- **Commercial fish catches grew from 5.5 tons in 1994 to over 55 tons by 1997. Fishermen complained of reduced catches of desirable species, and no market for Asian carp.**
- **Scientific data documented a 100 fold increase in bighead carp numbers in Mississippi River Pool 26 between 1991 and 1993.**
- **Data collected on the lower Illinois River documented a 600 fold increase in bighead carp numbers between 1999 and 2000**

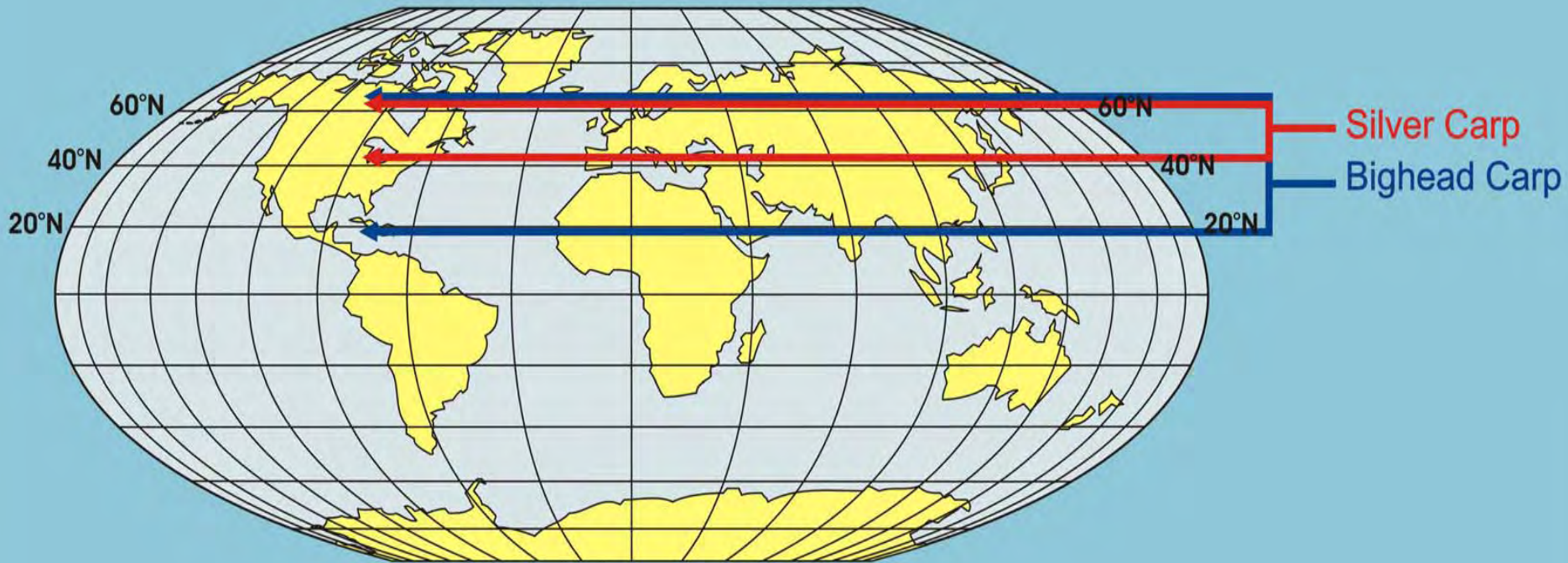


Data Source: Upper Mississippi River Long Term Resource Monitoring Program

Bighead and Silver Carp Temperature Preference

- Bighead and silver carp prefer temperature ranges similar to those preferred by yellow perch, salmon, trout, goby and ruffe.
- They seem well suited to invade the cold waters, including the Great Lakes ecosystem.





Latitudinal range of Bighead and Silver carp in China projected onto North America.

Cold Water Adaptation

- Research on the Missouri River shows bighead and silver carp guts filled with food in February at water temperatures of 2.5° C (36.5° F).
- Both species remain active all winter, especially the silver carp, with observations of silver carp “bumping” their heads into the ice trying to avoid capture, and even jumping right out onto the ice.
- Ovaries were large and well developed.



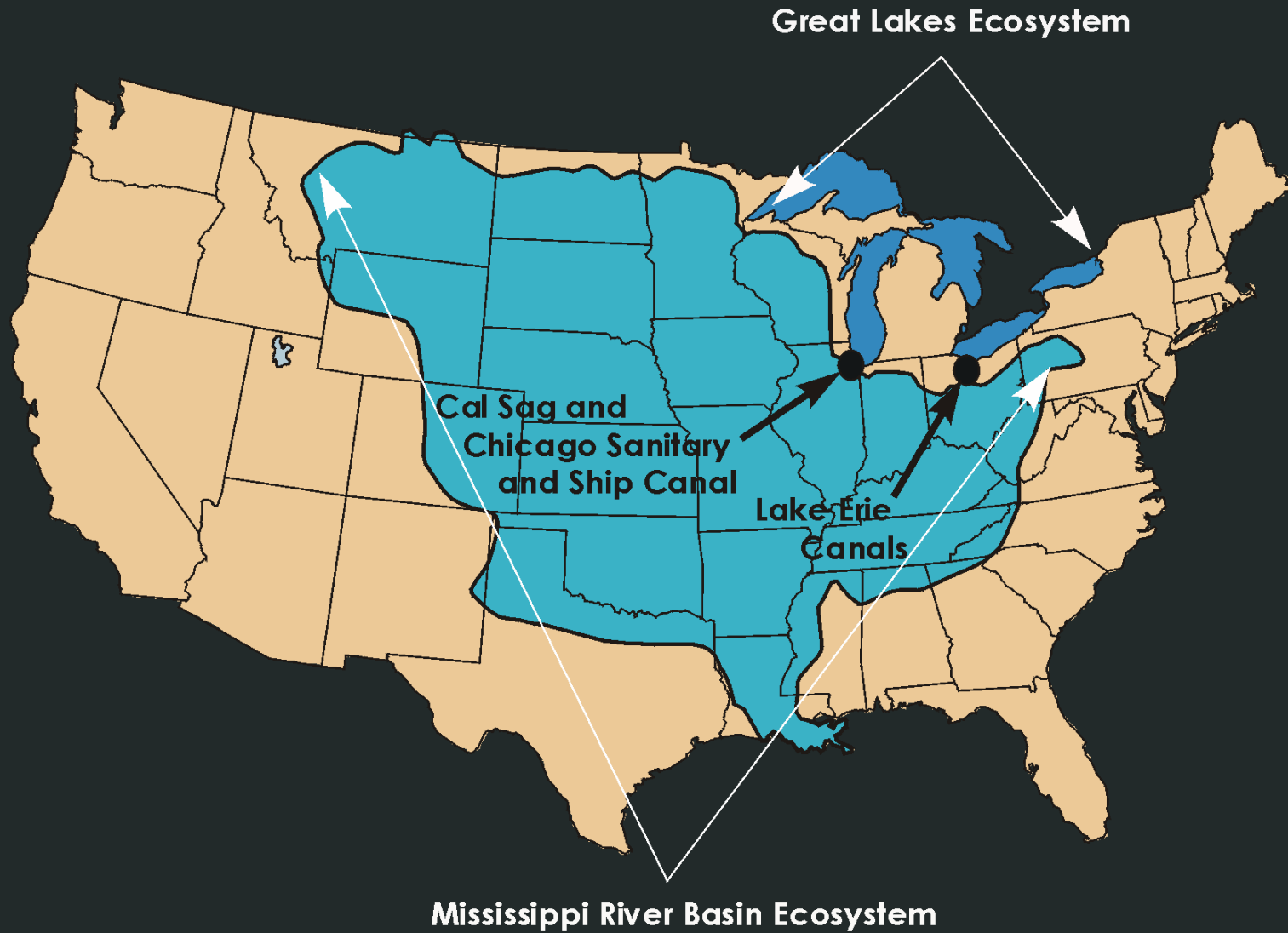
Photos courtesy of Duane Chapman, USGS, Columbia, MO

Bighead carp in the Great Lakes?

- Three bighead carp have been reported from the Great Lakes (Erie and Ontario).
- A fourth was reported from a fountain in downtown Toronto.
- It is thought that the source of these carp is from interstate shipment of live Asian carp through the U.S. to Canada for use as food by persons of Asian ethnic origin.
- A concern among scientists and fishery managers in Canada is the Asian religious custom of enhancing one's fortune or karma for the next life by releasing one live fish for every one eaten!



Primary Avenues of Invasion



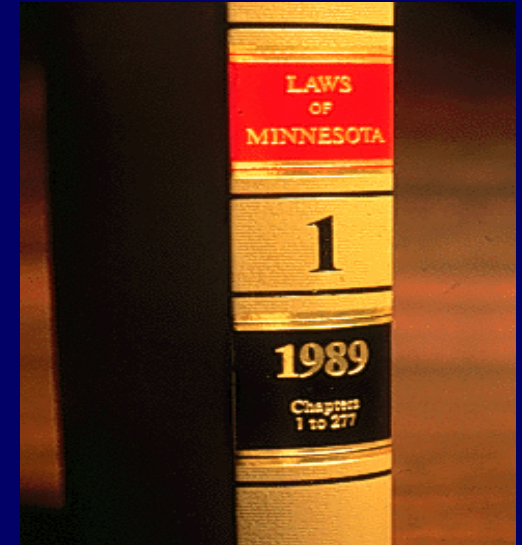


Where are the Bighead and Silver Carp Now?

Closing the Pathways of Invasion

PREVENTION, PREVENTION, PREVENTION

- Tighten importation laws.
- Develop and Maintain clean species lists.
- Educate the public on the risks of releasing new species.
- Increase fines and penalties for intentional illegal releases.

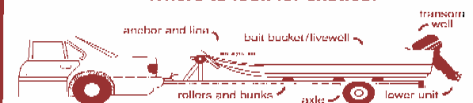


HELP . . . *Prevent the Spread of Aquatic Exotic Plants and Animals*

BEFORE launching . . . BEFORE leaving:

- **Remove** aquatic plants and animals.
- **Drain** lake or river water.
- **Dispose** of unwanted live bait on land.

Where to look for exotics:



UNLAWFUL under Minnesota laws to:

- **Transport** any aquatic plants or prohibited exotic species (such as zebra mussels, ruffe, milfoil) on public roads.
- **Place** a boat or trailer with attached aquatic plants or prohibited species into Minnesota waters.
- **Transport** water from infested waters.

Minnesota Department of Natural Resources

Closing the Pathways of Invasion (con't)

- Increase regulation of the fish farming, baitfish and aquarium industries; control shipment between watersheds - Lacey Act!



- Increase regulation of baitfish collection by fishermen.



Closing the Pathways of Invasion (con't)

Prevent escape through man-made waterways.

- Install organism barriers.
- Improve water and waste treatments.
- Modify the navigation system.
- Separate watersheds through hydraulic measures.



Closing the Pathways of Invasion (con't)

CONTROL

- Destroy captive stocks.
- Develop pheromones and attractants.
- Develop harvest methods.
- Develop commercial markets.
- Develop rapid response measures.



Who Pays for Asian Carp Control?

- How much is being spent?
- Who is paying?
- Who continues to benefit from Asian carp introductions?
- Who should pay for Asian carp eradication and control?
- How many natural resource management dollars should be spent on Asian carp control?
- How long before hunters and fishermen get fed up?
- When will license sales reflect the impact of ANS?
- When do we stand up and fight this?



Visit MICRA's Web Site:
<http://wwwaux.cerc.cr.usgs.gov/MICRA>

Jerry L. Rasmussen
(309) 793-5811
ijrivers@aol.com