

Mississippi River Basin



NASA

Nonnative and Invasive Fishes and Mollusks in the Mississippi River Basin: Implications for Possible Genetic Biocontrol

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Zebra Mussels on
native mussel



Silver Carps
(Photo INHS)



Common Carp

A Christmas Carol

- Ghost of Christmas Present shows Scrooge two children that are the symbols of the children of man
 - Named “Want” and “Ignorance”
 - Of the two symbols, Ignorance symbolized the doom of man

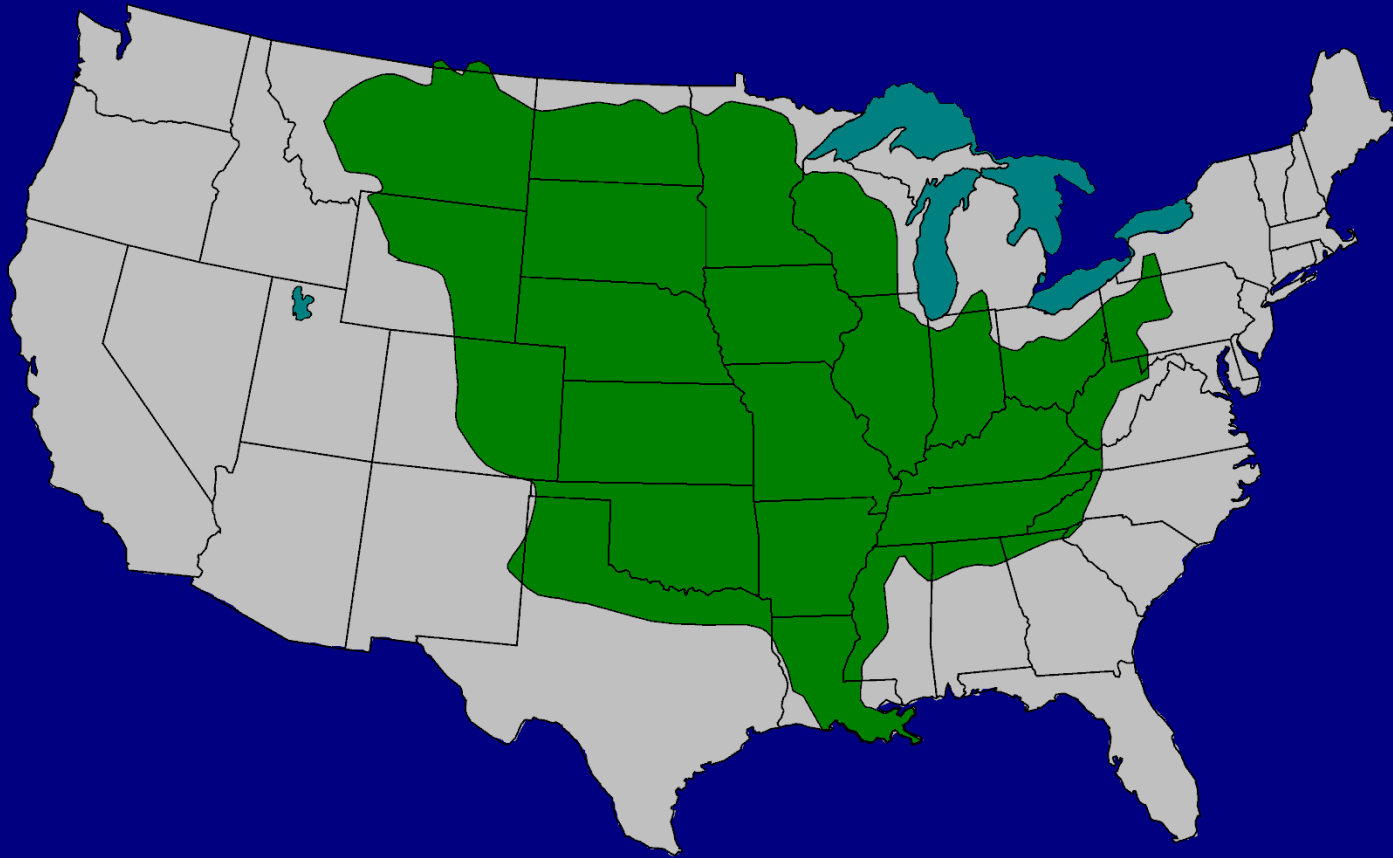
Want and Ignorance

- **Want:**
 - Certainly those here **want** to prevent species invasions, and control established populations of fishes and mollusks in the Mississippi Basin
- **Ignorance:**
 - We remain **ignorant** about how we can control AIS in an effective, efficient, and environmentally sound manner
 - We need to develop IPM for AIS
 - Where, when, how does genetic biocontrol fit?

Presentation Outline

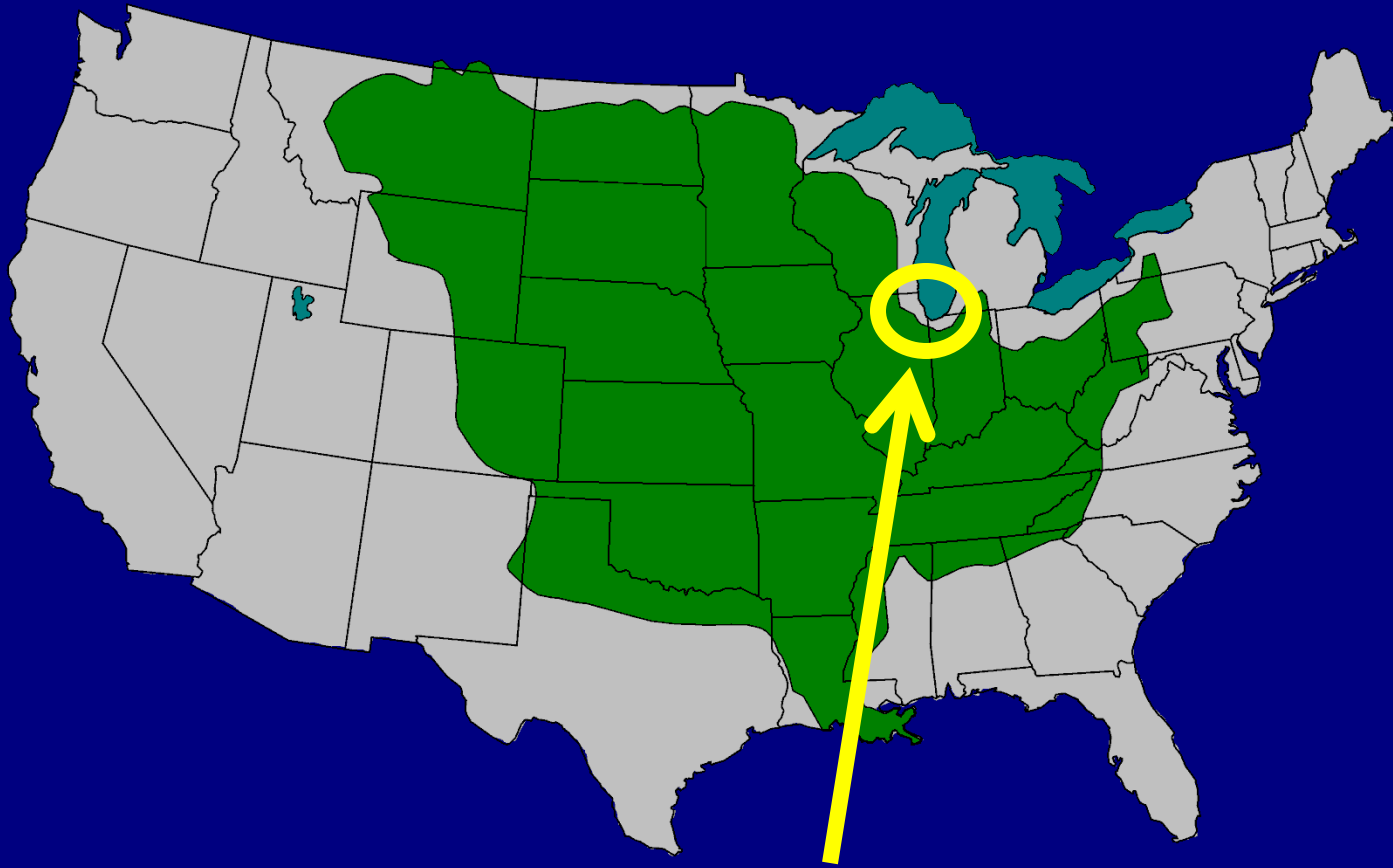
- Mississippi River Basin
 - Description of Basin
 - Nonnative and Invasive Species Overview
 - Most widespread and invasive fishes and mollusks
 - Implications for possible genetic biocontrol

Mississippi River Basin



Contains all or portions of 32 States and 1 Province

Mississippi River Basin



Connected with Great Lakes Basin

Great Lakes and Mississippi River Basins connected: Chicago Sanitary and Ship Canal and Cal-Sag Channel

Chicago Sanitary and Ship Canal

"Revolving door"

Great Lakes species
(zebra & quagga
mussels, round goby)

Lake Michigan

Cal-Sag Channel

Mississippi River basin
species (bighead carp,
silver carp)

**Experimental
Electrical Dispersal
Barriers**



Great Lakes Basin Connections



Animals Introduced into Mississippi Basin

- 291 nonnative animals introduced
 - 60 from outside US
 - 37 fishes
 - 9 mollusks
 - 5 frogs
 - 5 crustaceans
 - 3 jellyfish
 - 1 reptile
 - 1 tubificid worm
 - 1 mammal
 - Not all are established



37 Nonnative Fishes Introduced

- 8 Cyprinidae (carps, goldfish, rudd)
- 6 Characidae (piranhas, pacus)
- 6 Cichlids (tilapia)
- 6 Poeciliidae (swordtails, platyfish)
- 3 Salmonidae (trout)
- 1 Belontiidae (paradisefish)
- 1 Channidae (snakeheads)
- 1 Cobitidae (weatherfish)
- 1 Gobiidae (gobies)
- 1 Loricariidae (catfish)
- 1 Melanotaeniidae (rainbowfish)
- 1 Percidae (zander)
- 1 Pimelodidae (redtail catfish)



Northern Snakehead



Redtail catfish

12 Nonnative Fishes Established

- Common carp
- Silver carp
- Bighead carp
- Grass carp
- Blue tilapia
- Oriental weatherfish
- Goldfish
- Rudd
- Tench
- Brown trout
- Vermiculated sailfin catfish
- Southern platyfish



Oriental Weatherfish



Tench

5 Nonnative Amphibians and Reptiles Introduced

- Amphibians-Frogs
 - Giant toad
 - Cuban treefrog
 - Greenhouse frog
 - African clawed frog
- Reptiles-Crocodylians
 - Common caiman



Greenhouse frog



Common Caiman

9 Nonnative Mollusks Introduced

- Mollusks-Bivalves
 - Asian clam
 - Quagga mussel
 - Zebra mussel
- Mollusks-Gastropods
 - Faucet snail
 - Chinese mysterysnail
 - Japanese mysterysnail
 - Red-rim melania
 - New Zealand mudsnail
 - Big-ear radix



Quagga Mussel



New Zealand mudsnail

5 Nonnative Crustaceans Introduced

- Cladocerans
 - *Daphnia lumholtzi* (water flea)
 - *Eubosmina coregoni* (water flea)
 - *Bythotrephes longimanus* (spiny water flea)
- Crabs
 - Chinese mitten crab
- Lice
 - Carp louse



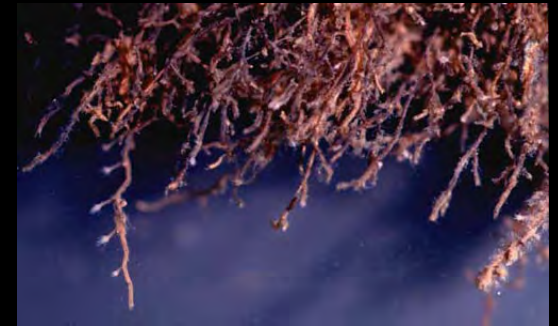
Spiny Water Flea



Carp louse

4 Nonnative Worms, Hydroids, Jellyfish Introduced

- Oligochaetes
 - tubificid worm
- Coelenterates - Hydrozoans
 - freshwater hydroid
 - freshwater jellyfish
- Coelenterates - Scyphozoans
 - spotted jellyfish



Freshwater Hydroid



Freshwater Jellyfish

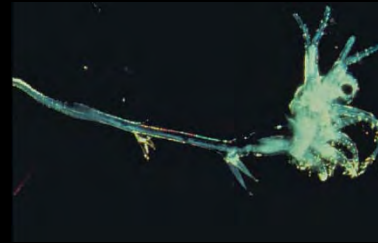
1 Nonnative Mammal Introduced and Established

Nutria



Most Troublesome Aquatic Invasive Species Mississippi Basin

- 46 species identified “most troublesome” in Basin (26 states responding)
 - 18 plants
 - 15 fishes
 - 5 mussels
 - 4 crustaceans
 - 3 microorganisms
 - 1 mammal



Plants Most Reported Troublesome Mississippi Basin States



Eurasian watermilfoil (18 states) Purple loosestrife (12)



Curly-leaf pondweed (8)



Hydrilla (7)

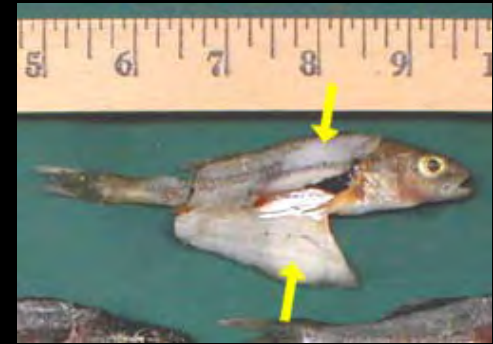


Salvinia (4)

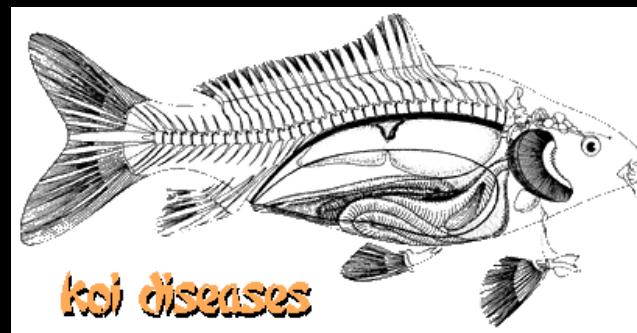
Microorganisms Most Reported Troublesome Mississippi Basin States



Whirling Disease (4 states)

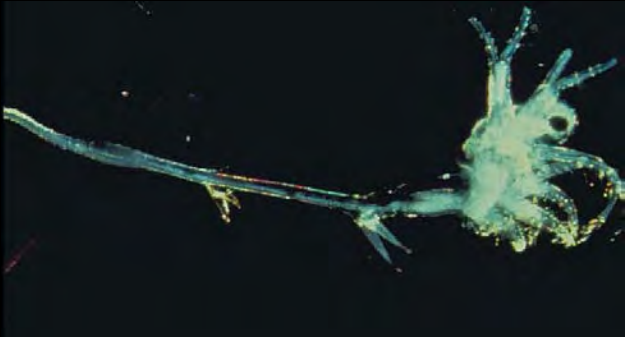


Yellow Perch Parasite (3)
Heterosporis

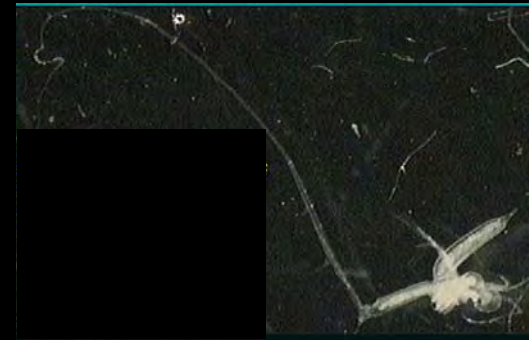


Carp Spring Viremia (3)

Crustaceans Most Reported Troublesome Mississippi Basin States



Spiny Waterflea (6 states)



Fishhook Waterflea (3)



Rusty Crayfish (6)



Red Swamp Crayfish (2)

Mollusks Most Reported Troublesome by Mississippi Basin States



Zebra Mussel (20 states)



Quagga Mussel (3)



Asian Clam (7)

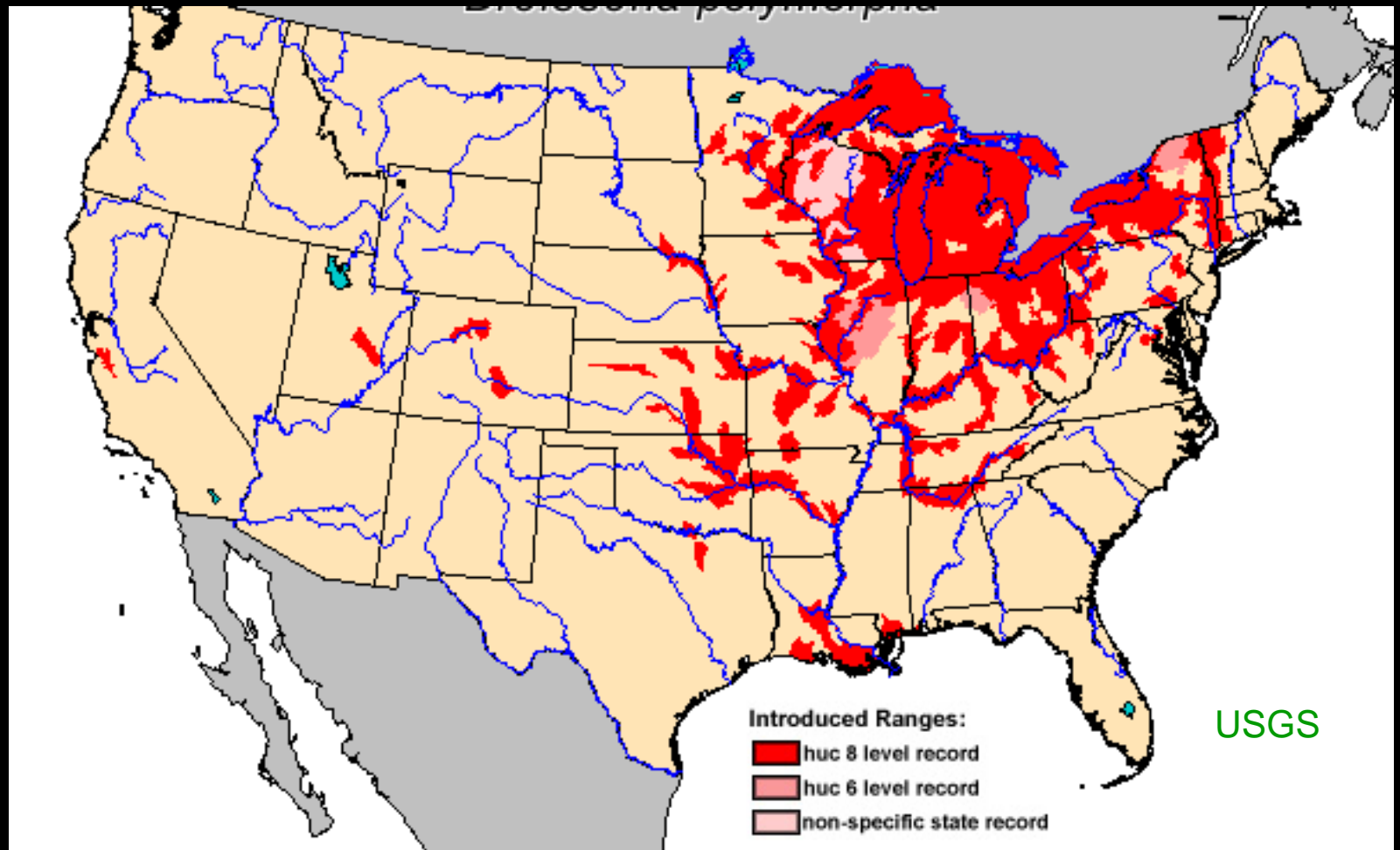


Southern Mapleleaf Mussel (1)



New Zealand Mudsnaill (3)

Zebra Mussel Distribution, 2010



Fishes Most Reported Troublesome Mississippi Basin States



Common Carp (15 states)



Silver Carp (11)



Bighead Carp (14)

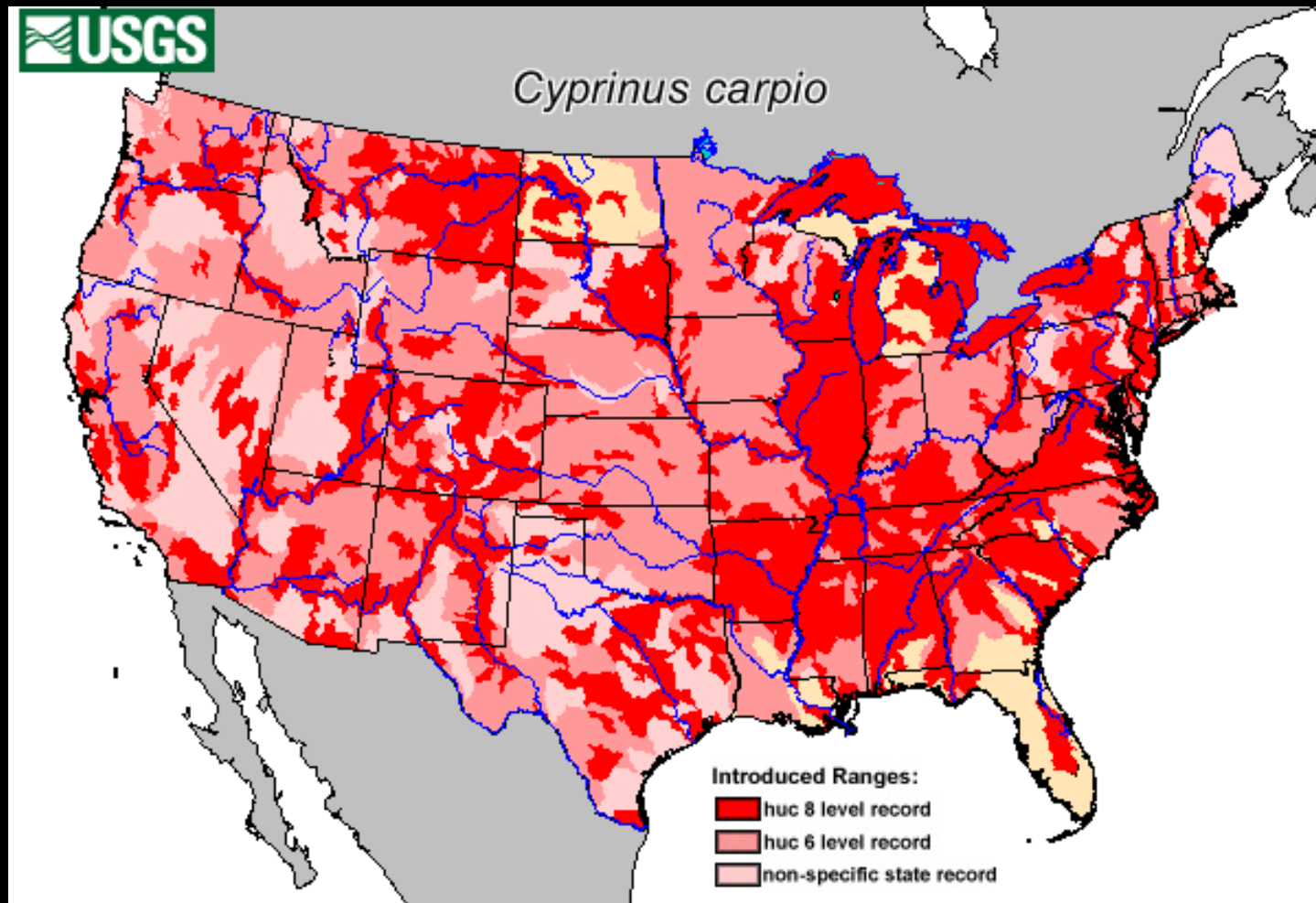


Grass Carp (7)

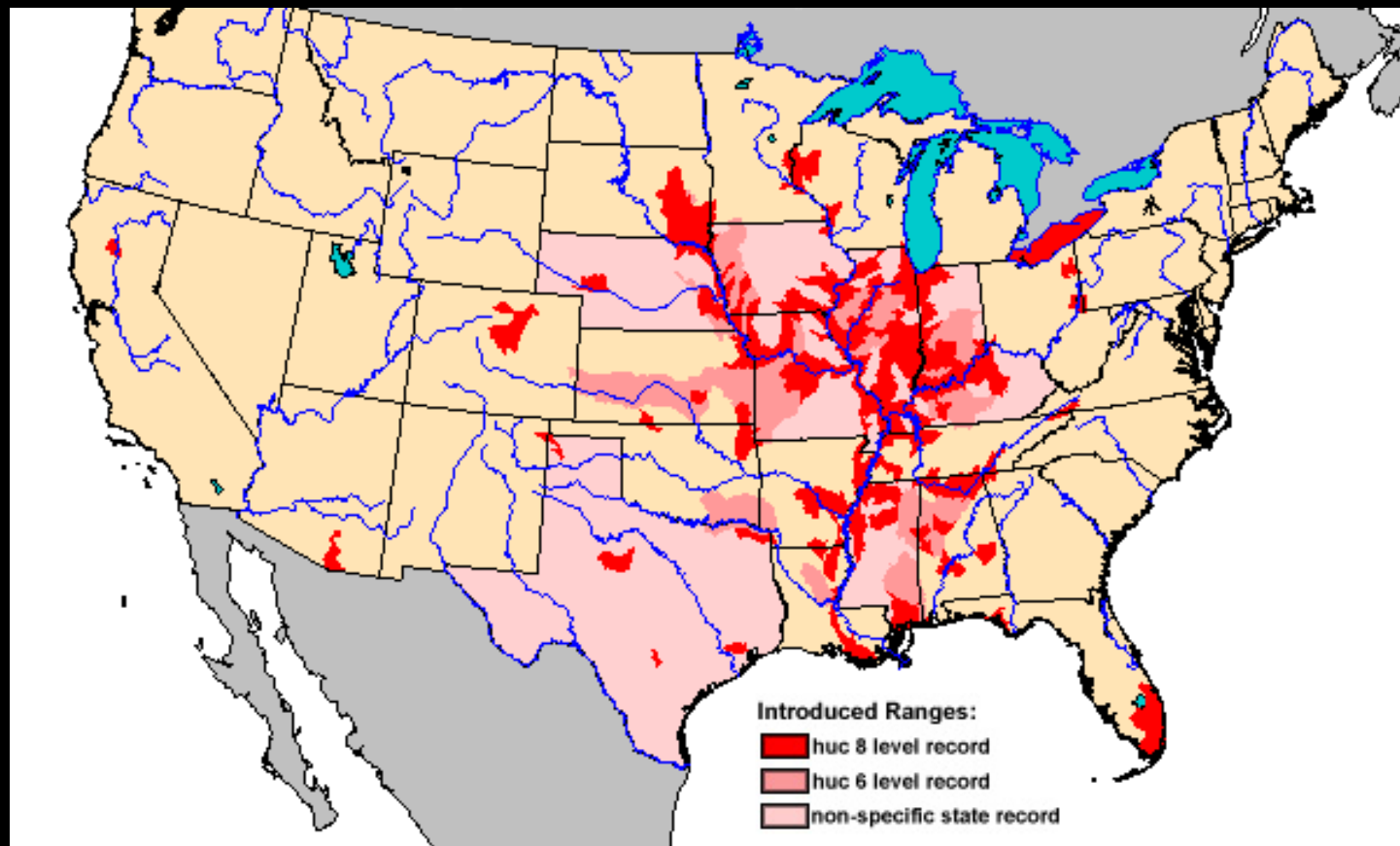


Black Carp (8)

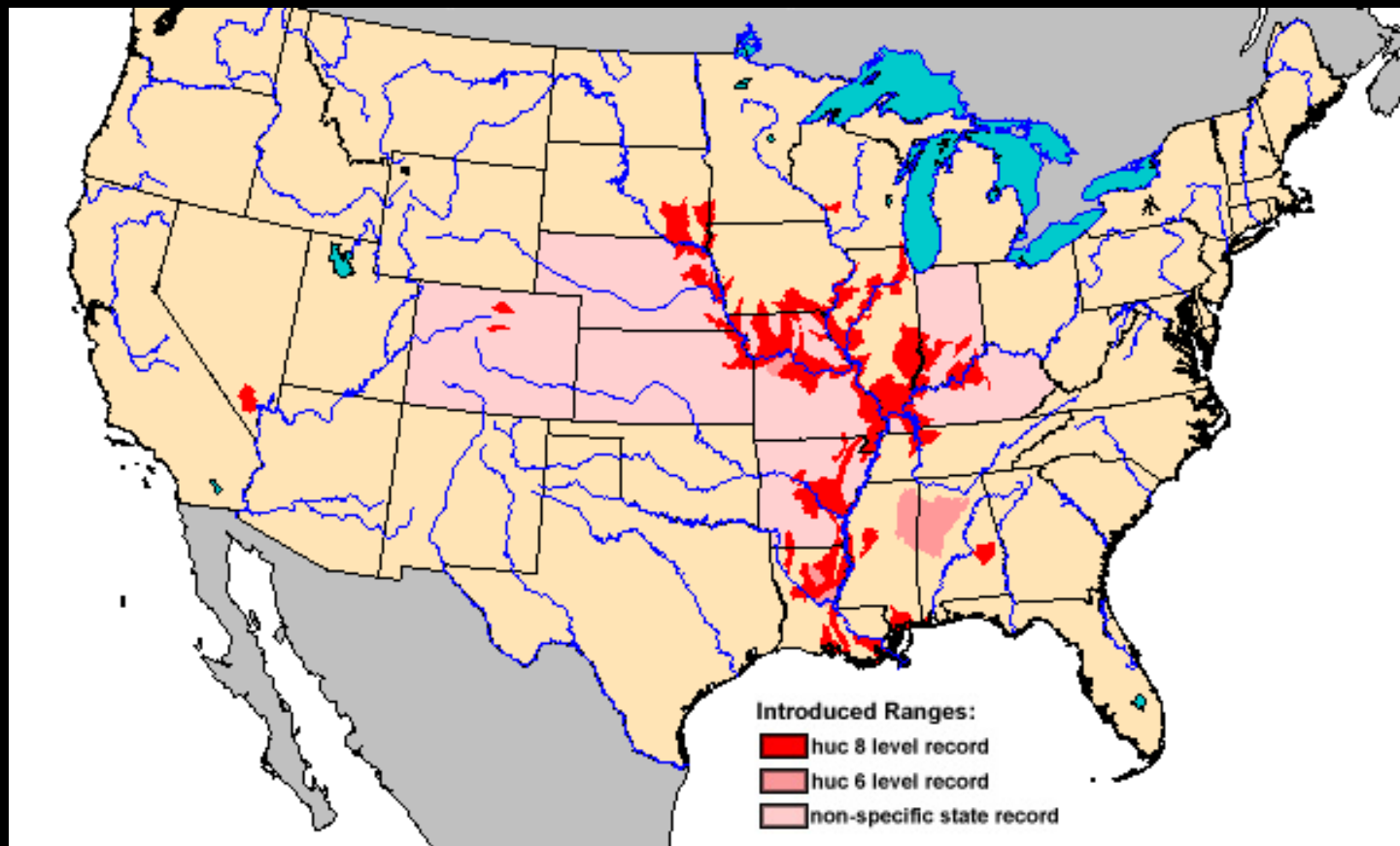
Common Carp distribution, 2010



Bighead Carp distribution, 2010



Silver Carp distribution, 2010



Mississippi Basin Candidates for Integrated Pest Management including possible Genetic Biocontrol

- Zebra mussel (20 states)
- Bighead & Silver carps (14)
- Common carp (15)



Zebra Mussel



Bighead Carp



Common Carp



Silver Carp

Survey Data Provided by



Mississippi River System

