



Zebra mussel



# Aquatic Invasive Species Identification

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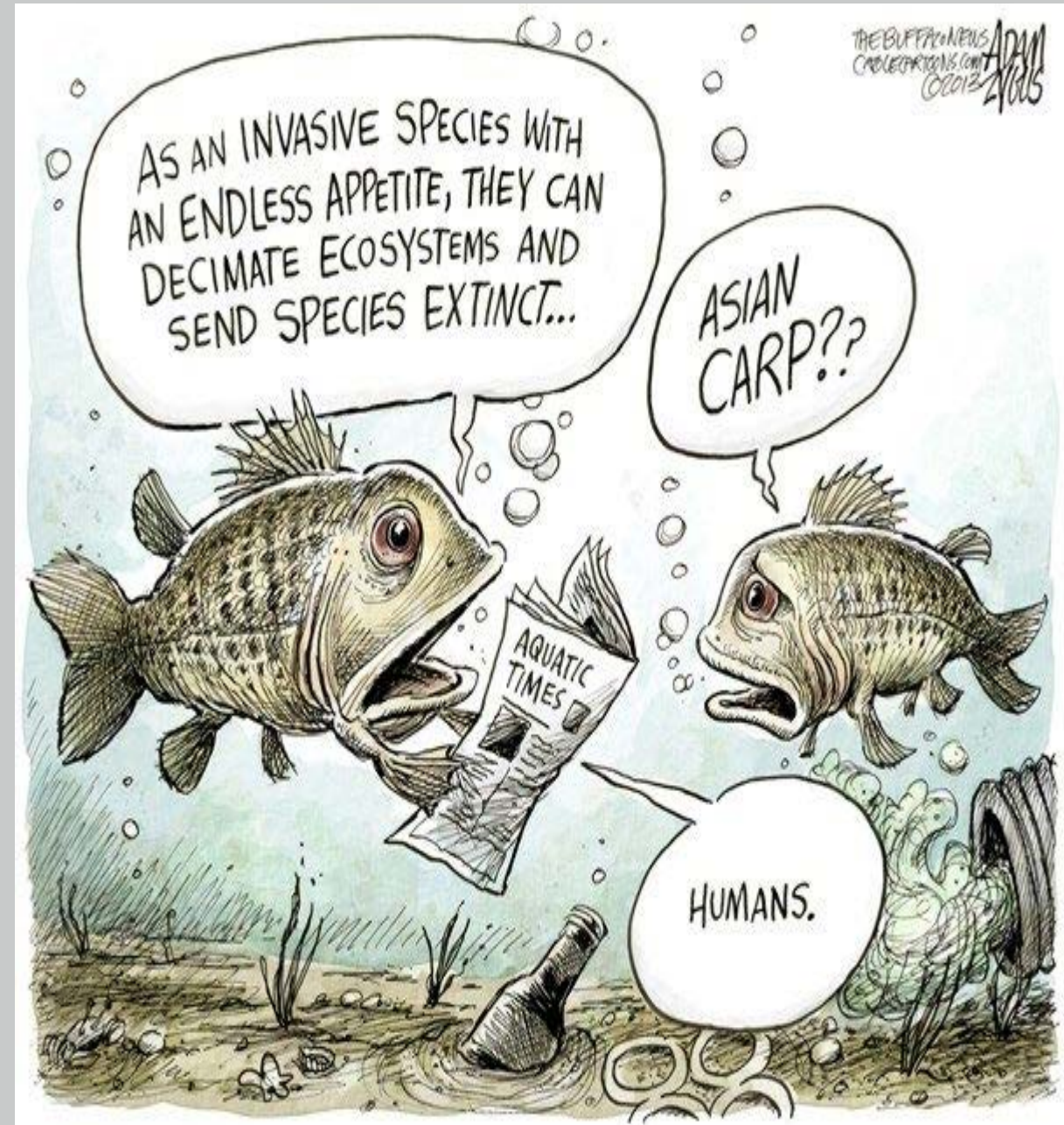


# Overview

- What are AIS?
- Aquatic Invasive Species Identification
  - Fish
  - Aquatic Plants
  - Mussels
  - Crayfish & Other!
- Hands On Activities for Identification

# Invasive vs. Exotic

- What is an INVASIVE Species
  - Non-Native
  - Damage to environment/economy
- What is an EXOTIC Species?
  - Non-native
  - May or may not raise concerns
- Can an Exotic Species NOT be Invasive?
- Nuisance species?



# Invasive Species – Where are they coming from?



**STOP AQUATIC  
HITCHHIKERS!**

## Unintentional (Hitch-hiking)

- Coming in on boats, trailers, bait buckets
- Floods
- Wind/wildlife carrying seeds
- Ballast waters

## Intentional

- People releasing no longer wanted species
- People planting/stocking species

**Dispose of bait on  
land or in the trash**

Bait and non-native plants and animals hitchhiking in bait can harm our lakes and rivers.

**PROTECT OUR  
WATERS...**



For more  
information  
about non-  
natives, visit  
[www.sgnis.org](http://www.sgnis.org)

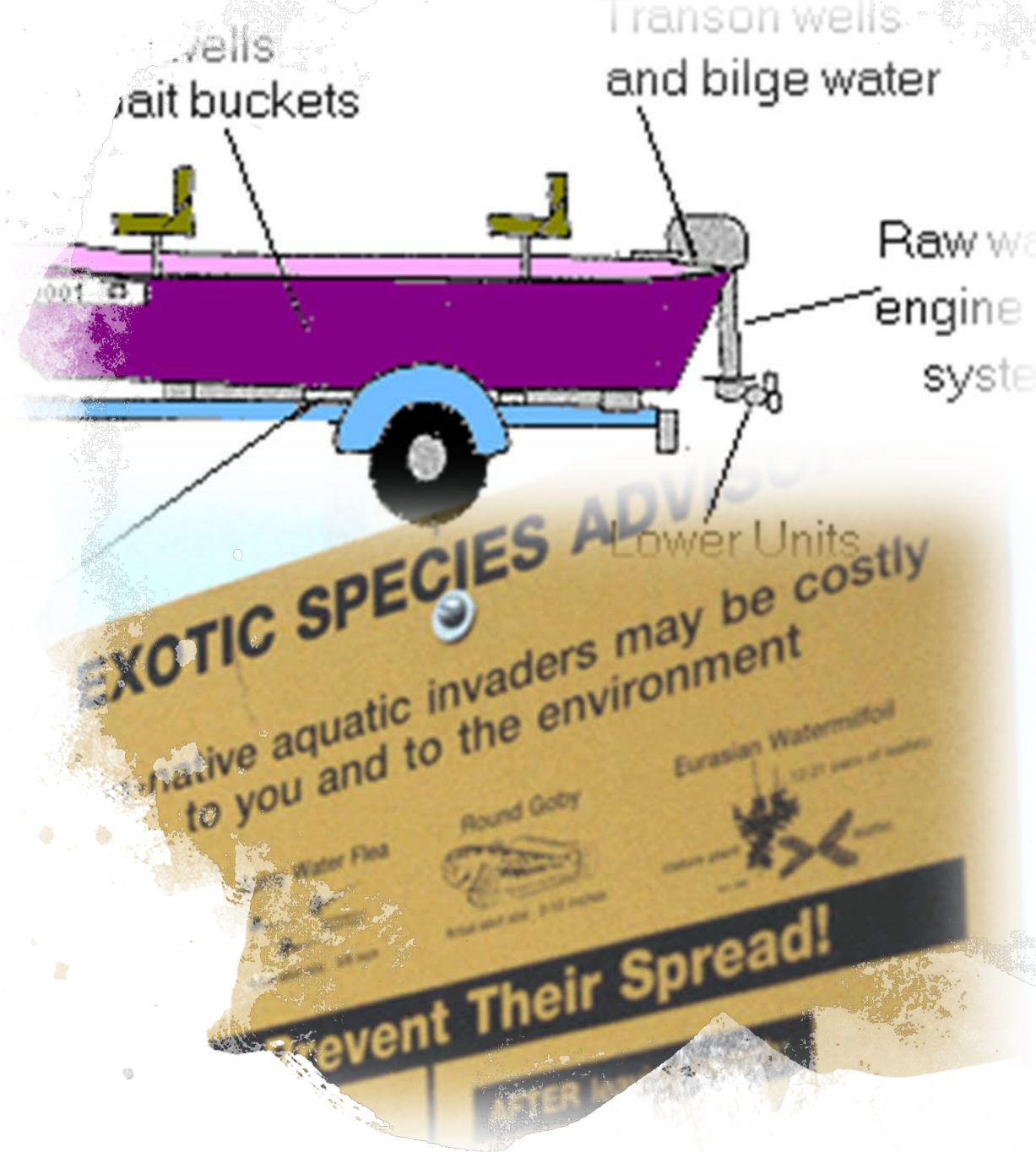
**Sea Grant**  
Great Lakes Network

Developed by Illinois-Indiana Sea Grant, Illinois Natural History Survey, and Department of Natural Resources and Environmental Sciences at University of Illinois.



# Invasive Species: What is being done?

- Education:
  - Signs at ramps, “Watch Cards”, boat washes, volunteers at ramps, etc.
- Laws and Ordinances:
  - IL, MN, WI
- In Illinois it is illegal to release or introduce any plant, animal, or fish into any waterbody other than the one from which it came.
- Illinois prohibits certain plants & animals from being bought and sold within the state.







## Why are we concerned with Invasives?

- Outcompete native
- Disrupt habitat for native species
- Reproduce more rapidly
- More tolerant – live in a variety of conditions where natives do not thrive





•••••  
Aquatic  
Invasive Fish



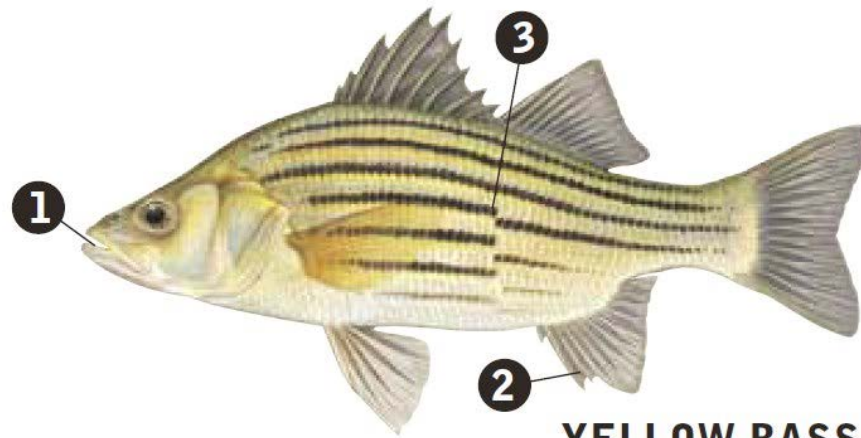
# Yellow Bass

- Member of the Temperate Bass (Moronidae) Family
- Primarily restricted to the Mississippi River from Minnesota to Louisiana
- Introduced populations occur as far west as Arizona, as far north as Wisconsin and as far east as central Tennessee.
- Yellow bass are often found in schools
- Due to their small size they are not highly sought by most anglers
- Provide good sport on light tackle
- A good food fish with white, flaky meat



# Yellow Bass

- It has a small head
- A large mouth
- Connected dorsal fins.
- Body is moderately long and stocky with the deepest part between the dorsal fins
- Coloration is a brassy, silvery, or bright yellow with a grayish olive on the back
- It has clear to blue-gray fins
- Five to eight distinctively dark horizontal stripes line the sides, and the lower stripes may be irregularly interrupted and offset above the anal fin



**YELLOW BASS**

1. No tooth patch on tongue, 2. Second and third anal spines nearly same length, 3. Stripes distinct and broken above anal fin

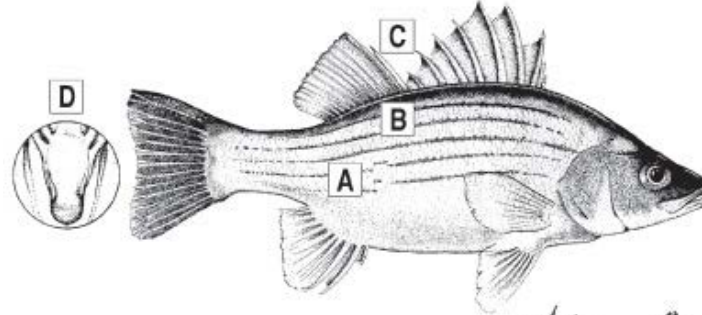
# Yellow Bass

- Differentiating between similar species
- Yellow Bass:
  - Broken stripes above anal fin
  - Dorsal fins connected
  - No tooth patch
  - 2<sup>nd</sup> anal spine is longer and thicker than the 3<sup>rd</sup>

# Yellow Bass

## Identifying Yellow, White, Striped and Hybrid Striped Bass

The following characteristics may be used in identifying species:

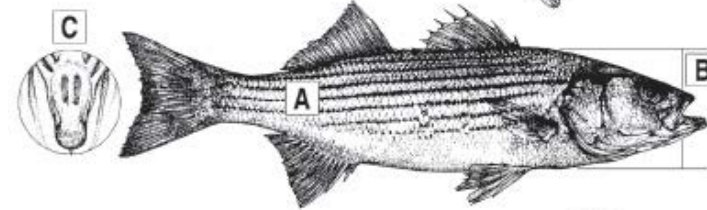
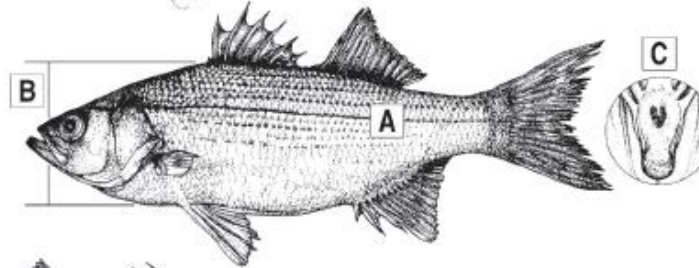


### Yellow Bass

- A** Stripes distinct, broken above anal fin.
- B** Color - silvery yellow.
- C** Dorsal fins joined.
- D** Does not have a tooth patch near the midline towards the back of the tongue.

### White Bass

- A** Stripes faint, only one extends to tail.
- B** Body deep, more than 1/3 length.
- C** Has one tooth patch near the midline towards the back of the tongue.

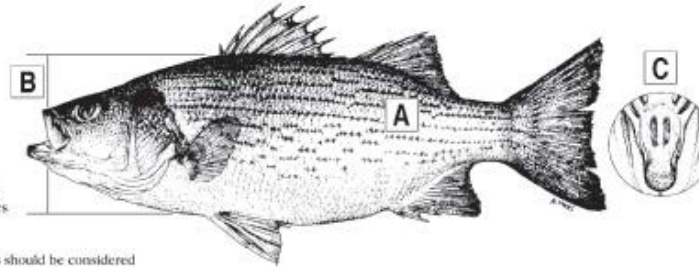


### Striped Bass

- A** Stripes distinct, several extend to tail.
- B** Body slender, less than 1/3 length.
- C** Has two, distinct tooth patches near the midline towards the back of the tongue.

### Hybrid Striped Bass

- A** Stripes distinct, usually broken, several extend to tail.
- B** Body deep, more than 1/3 length.
- C** Has two tooth patches near the midline on the back of the tongue. Tooth patches may be distinct or close together.



Note: For hybrid striped bass, all characteristics should be considered for identification as characteristics in individual fish may vary.



# Yellow Bass

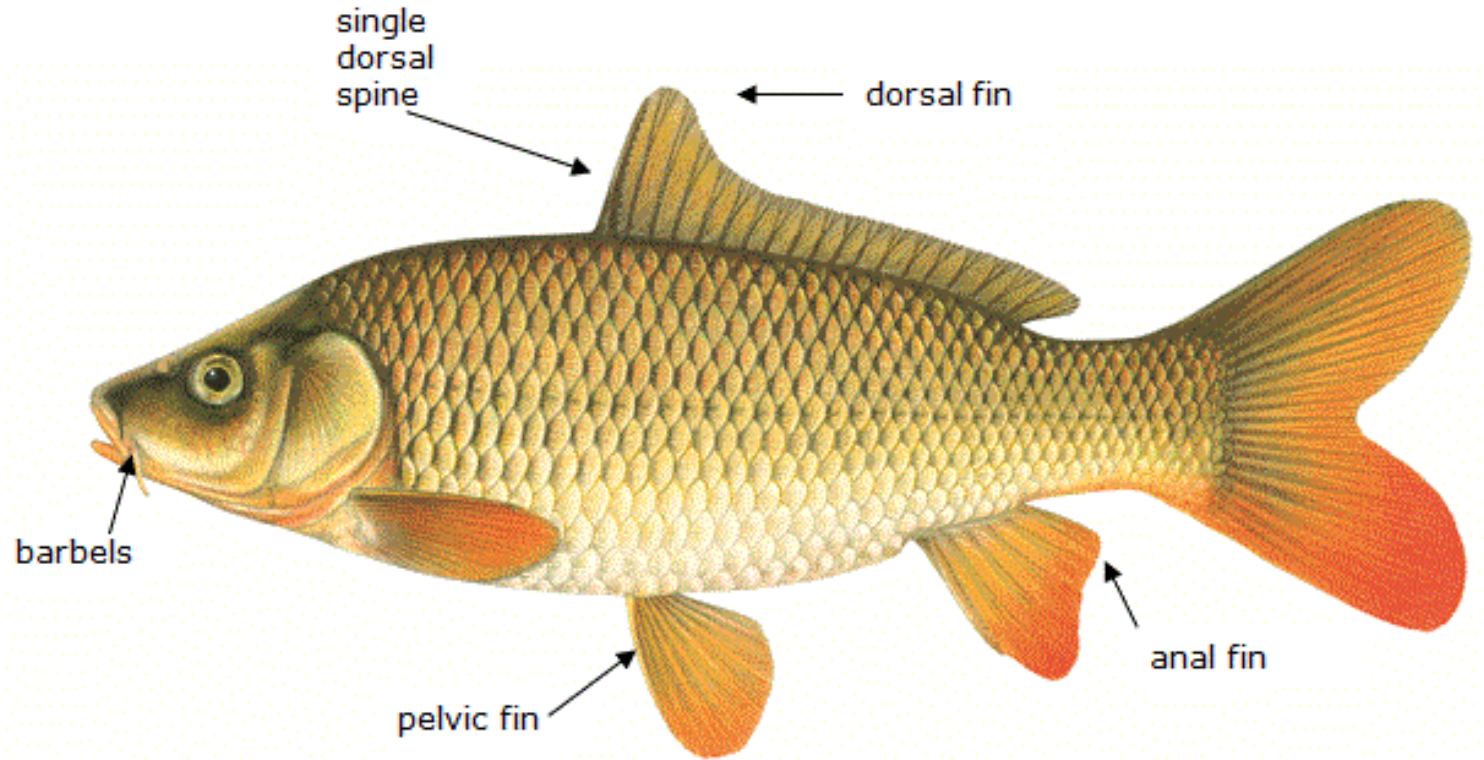
- Very prolific
- Compete with desirable panfish
- Often become stunted
- Feed on fish eggs

# Common Carp

- Member of the Minnow (Cyprinidae) Family
- Native to Europe and Asia
- First fish species whose populations were regulated to increase production
- Propagated for centuries and distributed widely
- In North America, they are abundant but among the least favored targets of freshwater anglers.
- Included in the list of the world's 100 worst invasive species

# Common Carp

- Short head
- Rounded snout
- Single long dorsal fin
- Forked tail
- Large scales
- Toothless mouth adapted to bottom feeding
  - Two pairs of barbel on each side of the mouth
- Upper jaw projects slightly past the lower
- Single serrated spine at the front of the dorsal and the anal fins





# Common Carp

- Coloration ranges from gold to olive to brown, with a yellowish coloring on the lower sides and belly and a reddish tint to the lower fins
- Males reproduce at age 2 and females reproduce at age 3
- Carp spawn in the spring and the summer, becoming active once water temperatures reach 60°
- A female average 100,000 eggs per pound of body weight.
- Common carp fry grow fast and can reach 9 inches in year 1

# Common Carp

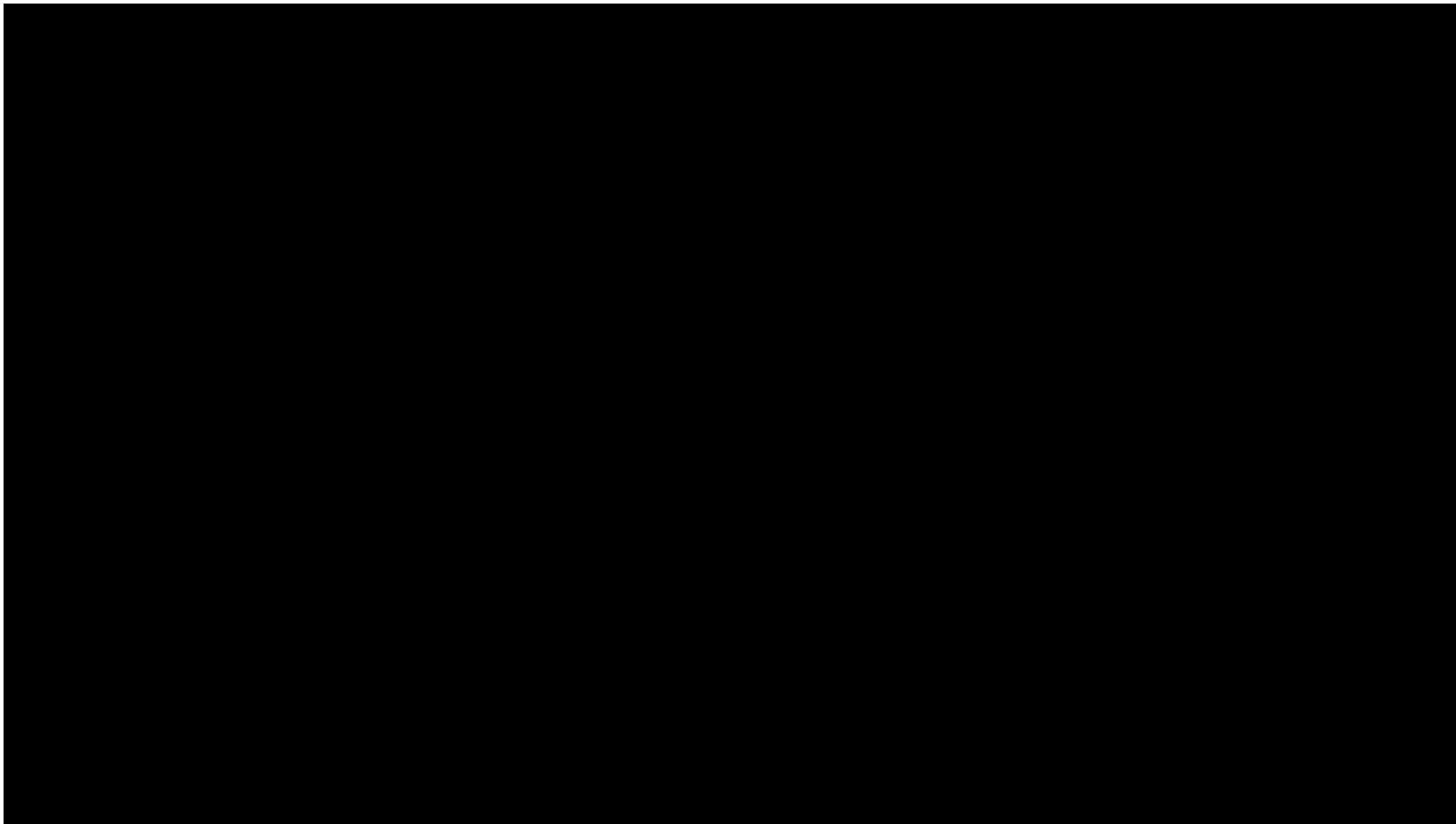
- Very prolific
- Rout around feeding in bottom substrates
- Cause turbidity to increase
- Dis-lodge aquatic vegetation
- Destroy beneficial aquatic habitat
- Out compete other desirable fish species

# Asian Carp = Flying Carp??

- Silver Carp
- Bighead Carp
- Grass Carp
- Black Carp

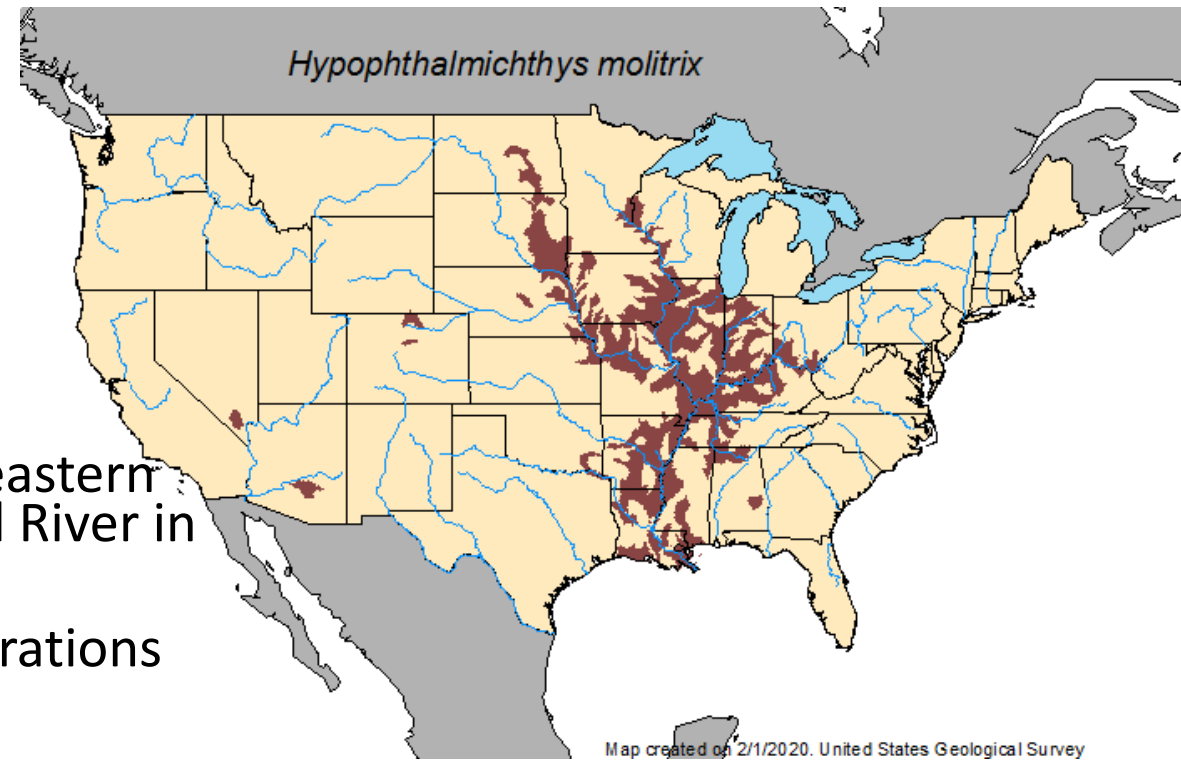


# Silver Carp

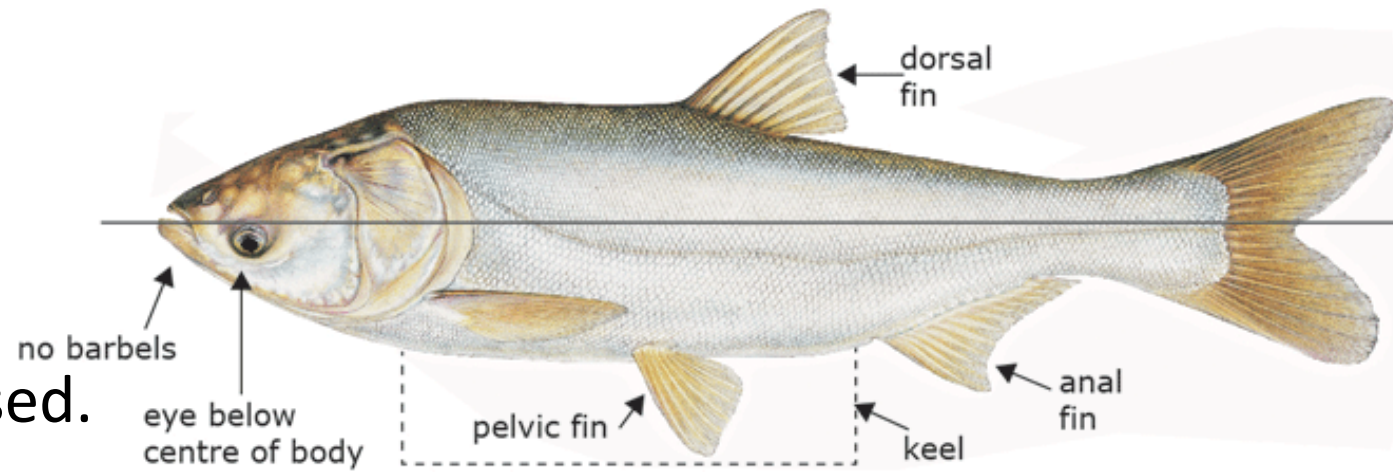


# Silver Carp

- Member of the Minnow (Cyprinidae) Family
- Native range includes the Pacific drainages in eastern Asia from the Amur River in Russia to the Pearl River in China
- Introduced to control algae in fish farming operations
- Escaped during flood events
- Current U.S. distribution – Mississippi River Drainage
- Very fast growth rate
- Primarily filter feeders
  - Zooplankton
  - phytoplankton
  - detritus
- Out-compete native species (e.g. Bigmouth Buffalo)



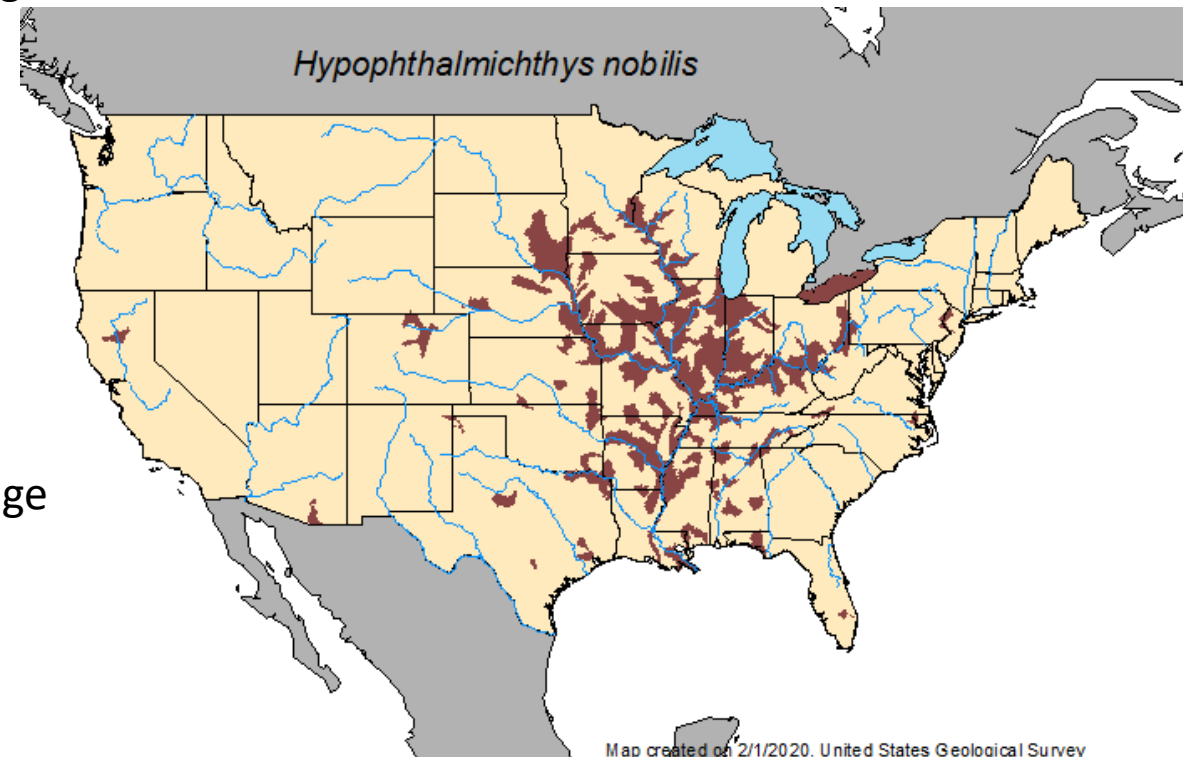
# Silver Carp



- Deep-bodied, laterally compressed.
- They have very tiny scales
  - head and the opercles scaleless
- Large mouth without teeth-but have pharyngeal teeth
- Eyes are situated far forward on the midline of the body and are slightly turned down.
- Similar to bighead carp (*H. nobilis*) but have a smaller head, upturned mouth without teeth, a keel that extends forward past pelvic fin base, lack the dark blotches characteristic of bighead carp and have highly branched gill rakers.
- The species is known for leaping out of the water when startled

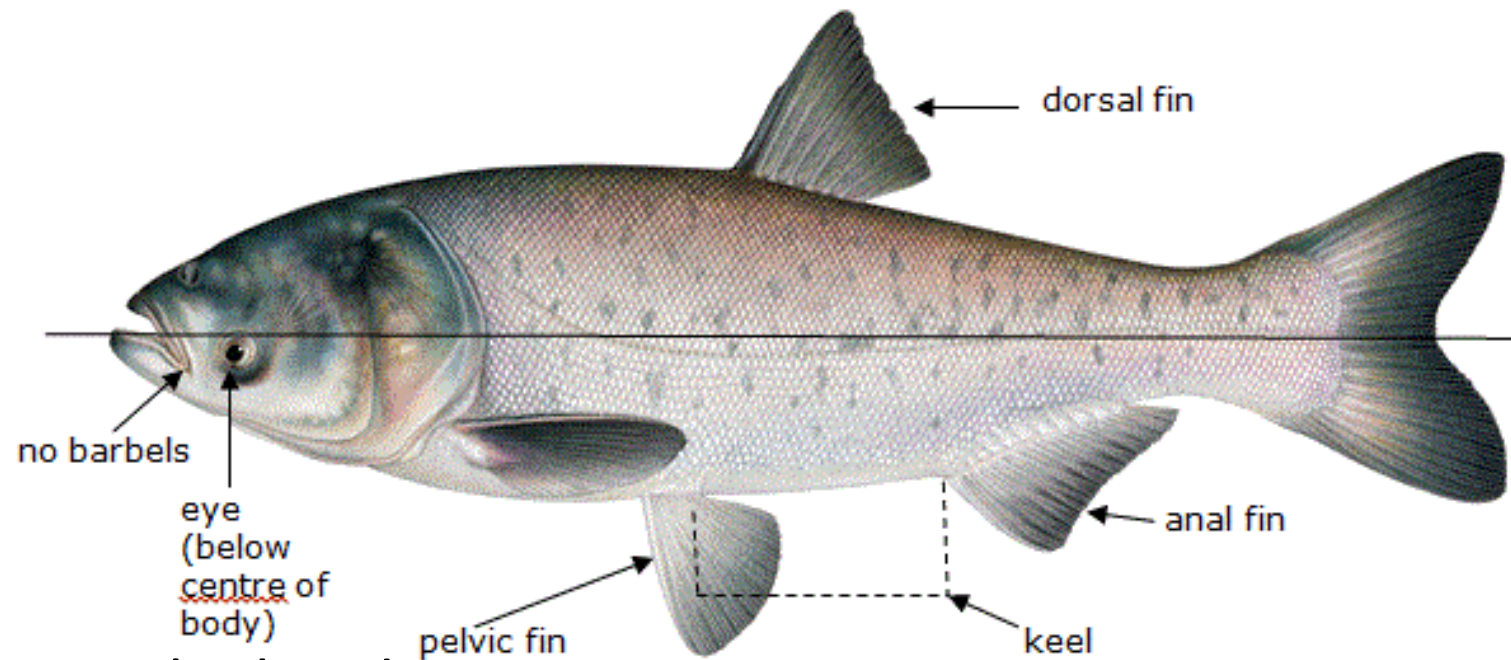
# Bighead Carp

- Member of the Minnow (Cyprinidae) Family
- Native to the large rivers and floodplain lakes of eastern Asia
- Native range extends from southern China north to the Amur River system, which forms the border between China and Russia
- Introduced widely outside their native range to control algae in fish farming operations
- Escaped during flood events
- Very fast growth rate
- Primarily filter feeders
  - Zooplankton
  - phytoplankton
  - detritus
- Out-compete native species (e.g. Bigmouth Buffalo)
- Current U.S. distribution includes Mississippi River Drainage



# Bighead Carp

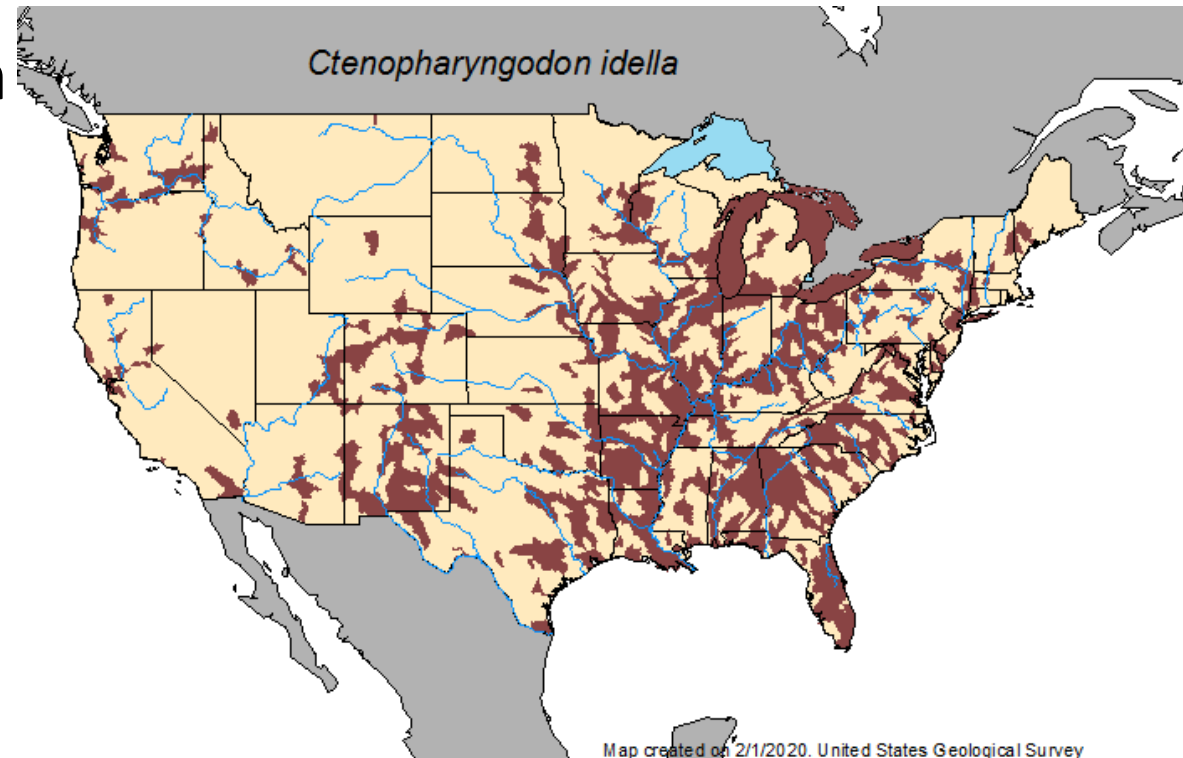
- Large, scaleless head
- Large mouth with no teeth
- Protruding lower jaw
- Eyes located forward and low on the head
- Adults usually have a mottled silver-gray coloration
  - dark gray, fading to white toward the underside
  - dark blotches on the sides.
- Similar to the silver carp
  - distinguished by the dark coloration on its sides
  - smooth keel between the anal and pelvic fins that does not extend anterior of the base of the pelvic fins.





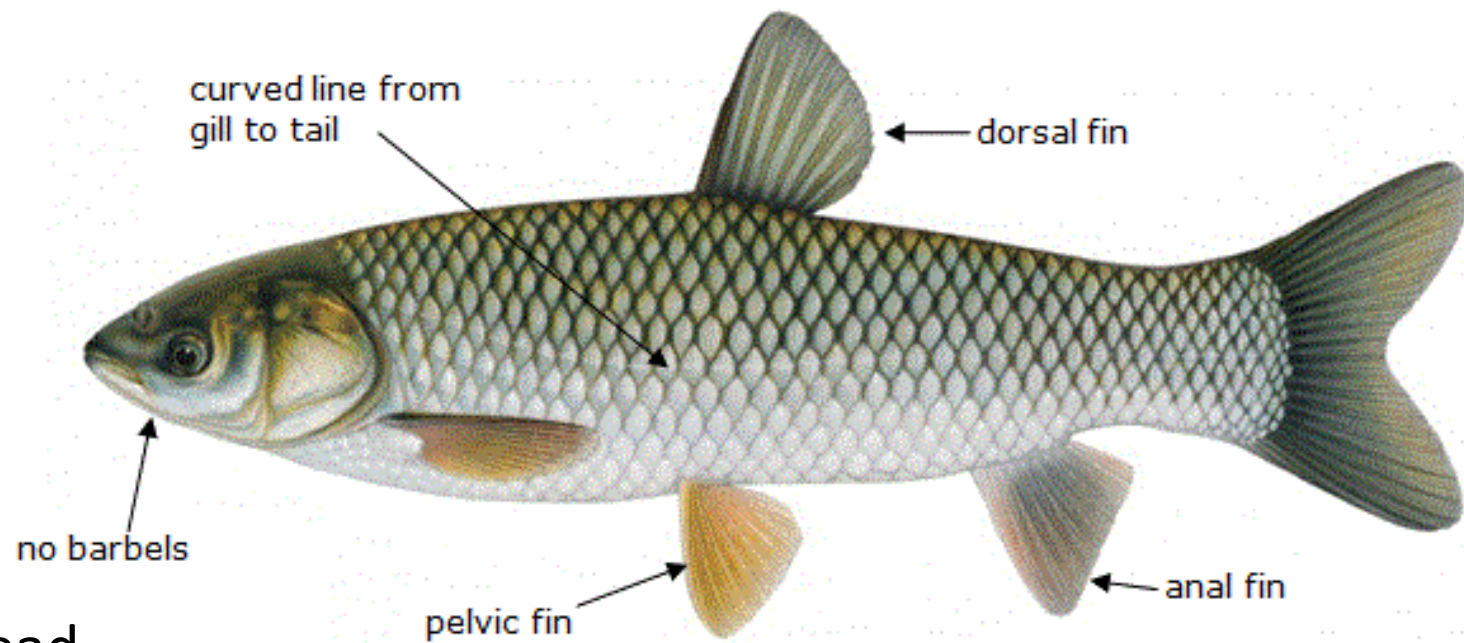
# Grass Carp

- Member of the Minnow (Cyprinidae) Family
- Native to eastern Asia
- Native range from northern Vietnam to the Amur River on the Siberia-China border
- Cultivated in China for food
  - Introduced in Europe and US for aquatic weed control



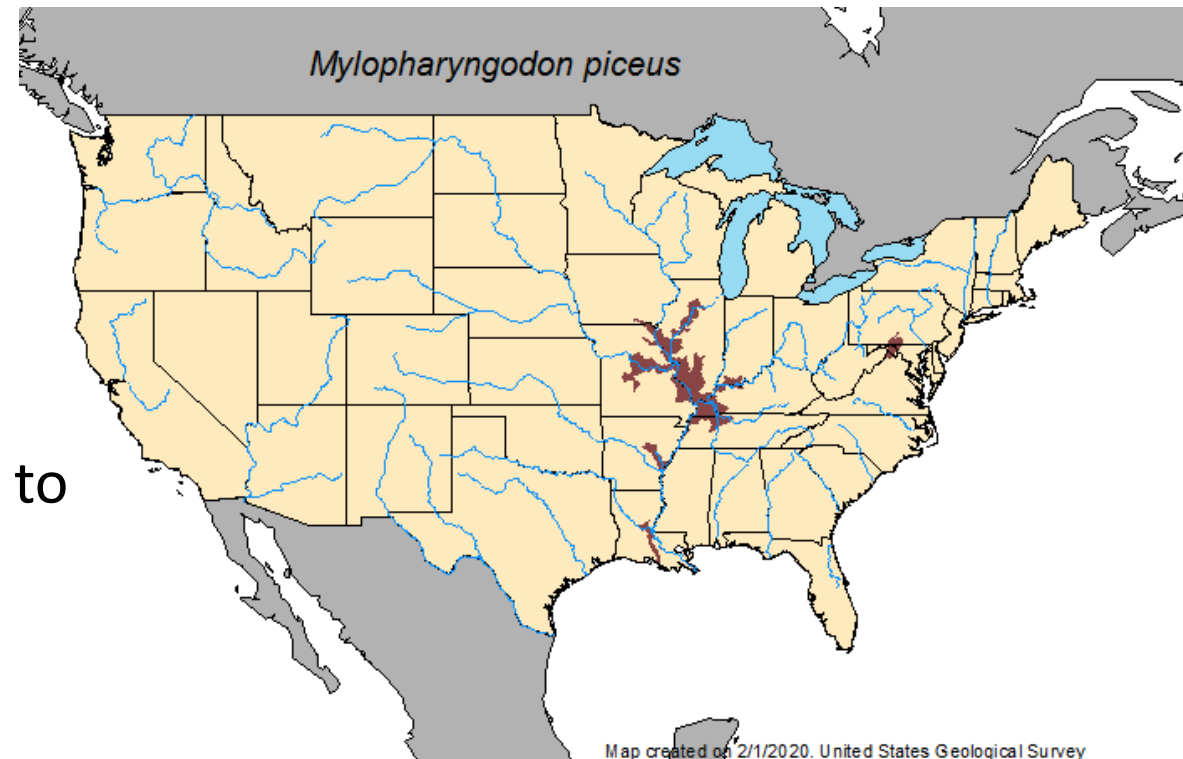
# Grass Carp

- Body compressed laterally
- Mouth is terminal, lacks barbels
- Wide head
- Eyes are small and low on the head
- Olive-brown on the dorsal side, with silver sides, white belly
- Scales are large with dark edging
- Dorsal fin origin is anterior to the pelvic fin origin S
- Short caudal peduncle
- Differs from goldfish (*Carassius auratus*) and common carp (*Cyprinus carpio*) in having a shorter dorsal fin (only 7-8 rays) and from *Hypophthalmichthys* species (Bighead and Silver carps) in having fewer anal rays (9 or fewer) and fewer but larger lateral scales.



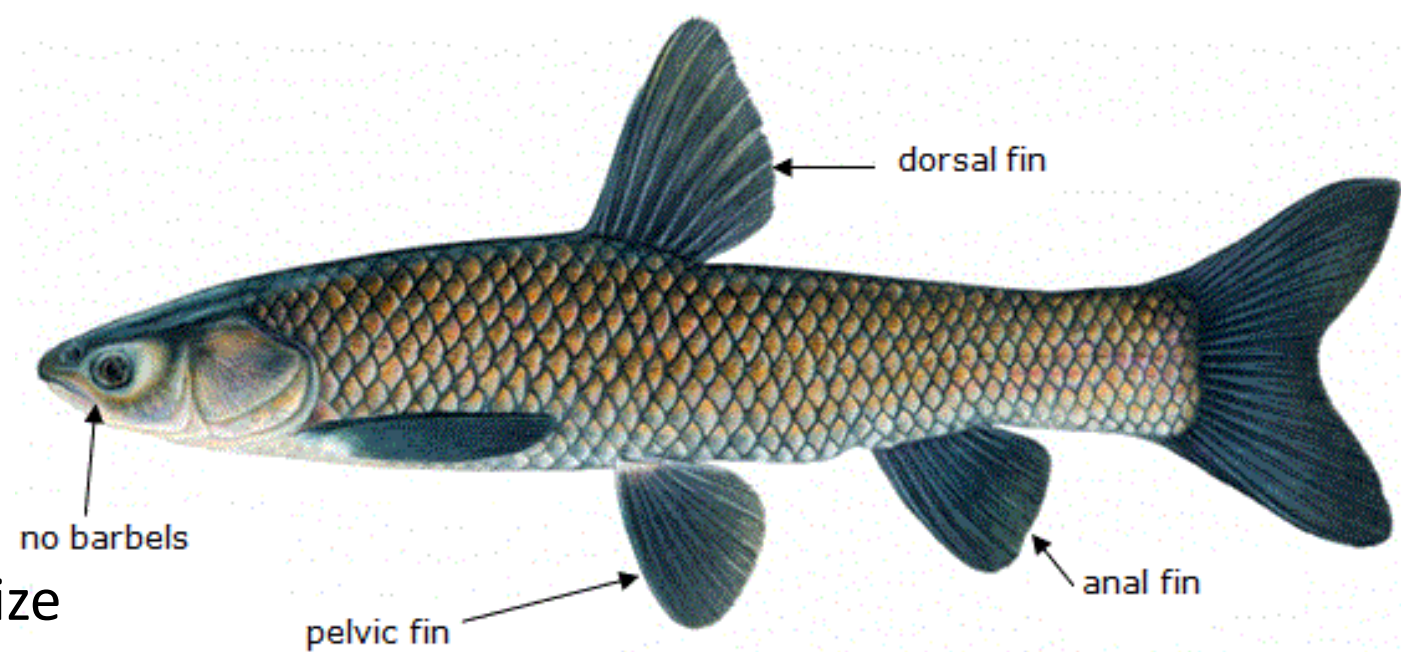
# Black Carp

- Member of the Minnow (Cyprinidae) Family
- Native to East Asia, ranging from the Amur Basin, through China, to Vietnam
- Cultivated for food and Chinese medicine
  - Introduced in US to control snails in aquaculture
  - Considered a threat to mollusks native to the United States



# Black Carp

- Closely resembles the grass carp
  - Similar in overall body shape, size and placement of fins
  - Very large scales
  - Black carp is slightly darker in coloration (not black)
  - Pharyngeal teeth are large for crushing the shells of mollusks
  - Black carp have a pointed snout





# Invasive Fish Activity Time

Check out the fish mounts supplied by IDNR

••• Aquatic  
••• Invasive  
••• Plants



# Eurasian Watermilfoil

*Myriophyllum spicatum*

- Native to Europe, Asia and northern Africa
- How to Identify:
  - Slender stem with feathery leaves
  - Stems can grow >10 ft.
  - 12-21 leaflet pairs per leaf.
    - Native Milfoil only has 7-11
- Found in places with lots of nutrients – likes heavily used lakes, disturbed lake beds. Warmer lakes can cause milfoil to flower and reproduce more often in one summer



# Eurasian Watermilfoil

*Myriophyllum spicatum*

- Reproduction
  - Seeds
  - Fragmentation
- Impacts
  - Dense leaf canopy that shades out native aquatic plants, decrease diversity
  - Impedes recreational activity ( boating, swimming)
  - Disrupt predator-prey relationships by keeping out larger fish





# Eurasian Watermilfoil

*Myriophyllum spicatum*

- Prevention
  - Inspect and remove all plants from boat, motor trailer and fishing equipment before you leave a lake or river
- Control
  - Mechanical: harvester
  - Biological: milfoil weevil
  - Chemical: herbicides (2,4 D , triclopyr, sonar)



# Curlyleaf Pondweed

*Potamogeton crispus*

- Native to: Eurasia, Africa, Australia
- Wavy, lasagna like leaves.
- Approximate half-inch wide and 2-3" long
- Leaves have midvein and "toothed"/serrated edges.
- Leaves arranged alternately along stem.
- Main stem various colors
- Flower stalk grows above water surface typically in June.
- Reproductive structure called turions



# Curlyleaf Pondweed

*Potamogeton crispus*

- Turions look like sharp small pinecones
- Tolerates low water clarity and disturbed areas.
- Turions sprout in the fall and curlyleaf is generally the first pondweed to come up in the spring. It typically flowers, fruits and produces turions in June before dying back in mid summer (unique life cycle)



# Brazilian Elodea

*Egeria Densa*

- Native to: South America
- Introduced: Aquarium release
- Forms dense mats that crowd out natives
- Leaves are bright green with 4-8 whorls that are close together
- Spreads by fragments!



# Brazilian Elodea

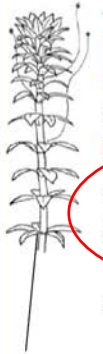
*Egeria Densa*

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Michael J. Grodowitz, U.S. Army Engineer Research and Development Center

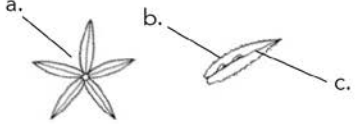


**HYDRILLA**

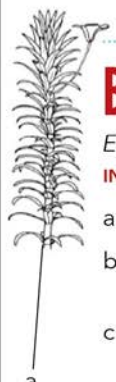
*Hydrilla verticillata*

INVASIVE

- a. whorls of **more than 3** leaves
- b. leaves often have **visibly toothed** edge
- c. leaf vein often has **small visible spines**



Christian Fischer, www.commonswikimedia.org

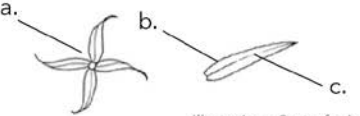


**BRAZILIAN ELODEA**

*Egeria densa*

INVASIVE

- a. whorls of **more than 3** leaves
- b. leaves do **not** have visibly toothed edge
- c. leaf vein is **smooth** underneath



Illustrations: Center for Aquatic and Invasive Plants, University of Florida



Paul Skawinski, Aquatic Plants of the Upper Midwest

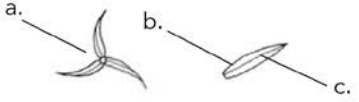


**AMERICAN ELODEA**

*Elodea canadensis*

NATIVE

- a. whorls of **exactly 3** leaves
- b. leaves do **not** have visibly toothed edge
- c. leaf vein is **smooth** underneath



# Hydrilla

- How to identify:
  - Pointed, bright green leaves
  - Grow in whorls of 3-10, 5 most common.
  - Leaves have small teeth/serrations
  - Tubers!
- Hydrilla grows aggressively
  - Can grow up to 1 foot a day!
  - Early in season grows horizontally along bottom where side shoots and new tubers can develop. As water temp increases, stems elongate and grow towards surface water
  - Shade out other vegetation.



# Hydrilla

- Native to: India
- Reproduce via fragments, turions, and seeds
- Aquarium plant
- Blocks sunlight and displaces native plants with dense canopy
- Weight and size of sportfish can be reduced when open water and natural vegetation are lost
- 5 whorls most common





# Invasive Species – Hydrilla

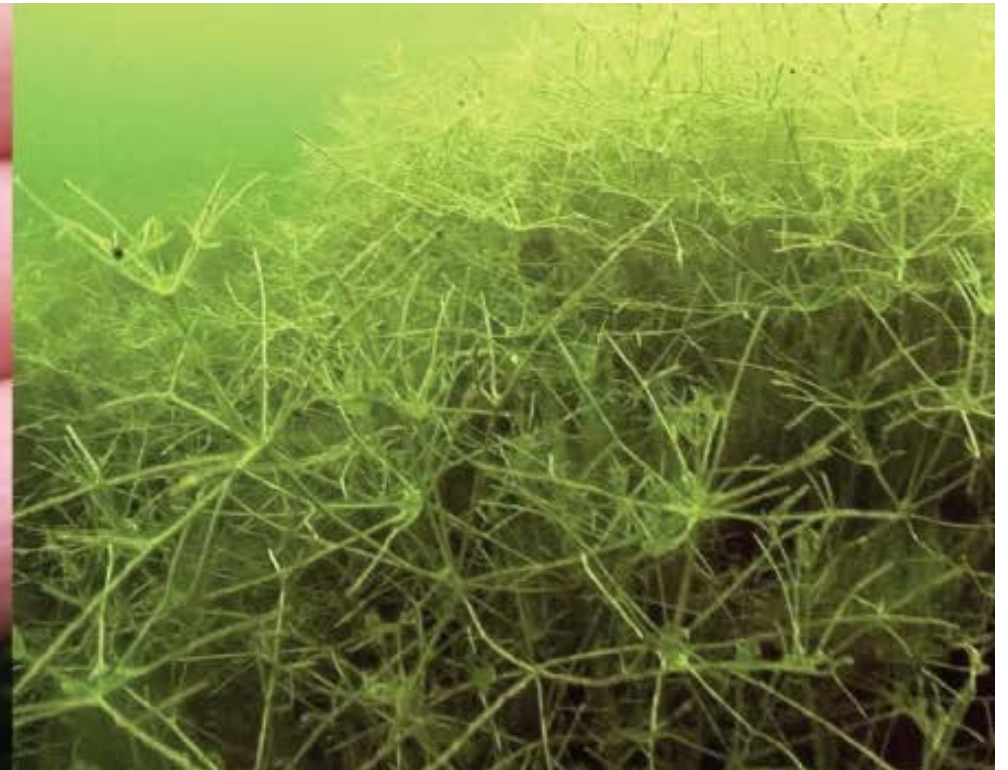
- Hydrilla – found in Lake County in 2019
- Likely an aquarium release (found with Brazilian elodea as well)
- Hydrilla Rapid Response Plan set into action
  - Area treated
  - Will likely have to be treated for the next 5-7 years until no more tubers present
- Spreads by fragmentation



IGHT THE SPREAD  
JATIC INVAD

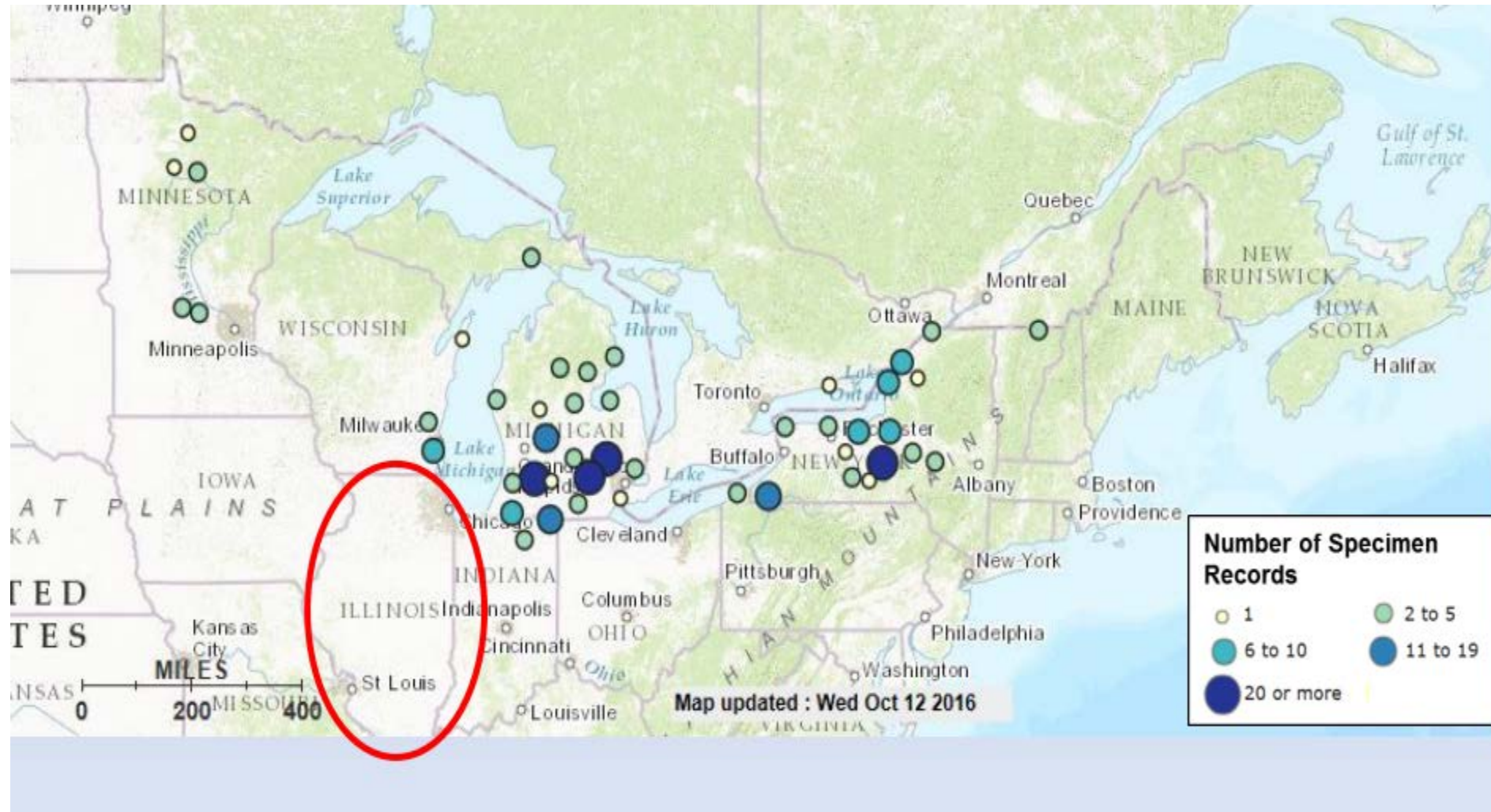
# Starry Stonewort

- Native to Eurasia, first documented in St. Lawrence River in 1970's likely transported via ballast water
- Bushy, bright green macro-algae.
- Thin, bright green branchlets (branch-like structures) – can be variable in length



# Starry Stonewort

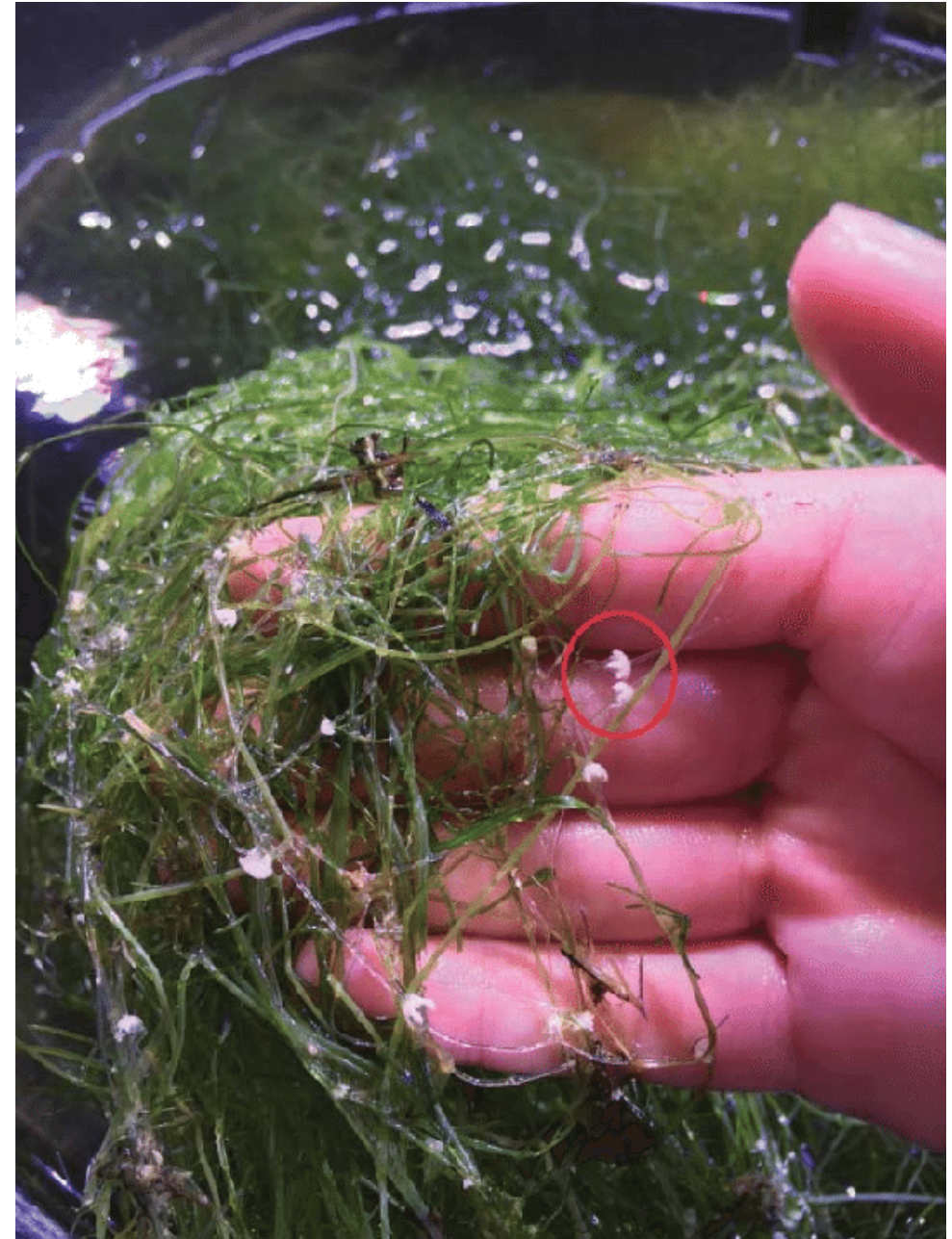
## Distribution



# Starry Stonewort

*Nitellopsis obtusa*

- Reproductive structure: white, star-shaped bulbils the size of a grain of rice
- Macro-algae meaning it does not have a vascular system like true plants
- Bulbils become more evident in late summer (Detroit River peak in September)
- Reproduces by fragments
- Primarily moved by boats, trailers, anchors,



# Water Lettuce

- Aquarium/ water garden plant
- Free floating, forms a rosette of leaves that resemble head of lettuce
- Native range: unknown - likely tropical.
- Creates thick mats that reduce oxygen levels, block sunlight, and prevent growth of submerged vegetation.



# Purple Loosestrife

*Lythrum salicaria*

- Origin: Europe & Asia
- 1800's brought o North America by settlers for flower gardens. Seeds also present in ballasts of ships where soil was used to weigh down the vessels for stability
- Flowers: Individual flowers have 5-6 pink purple petals surrounding small yellow centers. Each flower spike is made up of many individual flowers, there can be 1-50 spikes per plant



# Purple Loosestrife

*Lythrum salicaria*

- Seed: Each mature plant can produce up to 2.7 million seeds each year!
  - Easily spread by water, wind, wildlife and people
  - Germination can happen following year but seeds can also lay dormant for several years
- Look –a-likes: Swamp Loosestrife, Fireweed, Blue Vervain, Winged Loosestrife, Blazing Star



# Purple Loosestrife

*Lythrum salicaria*

- Control:
  - Biological Control: Loosestrife beetle (*Galercuella* beetles)
  - Physical Removal:
    - Digging/hand pulling when plants are young – when old they have tough roots- remove entire root system!
    - Cutting: remove flowering spikes to prevent this year's seeds from reproducing. Remove last year's dry seed heads put seed heads in plastic bags so seeds can't spread. Cut stems at the ground to prevent growth.





# Phragmites (Common Reed)

*Phragmites australis*

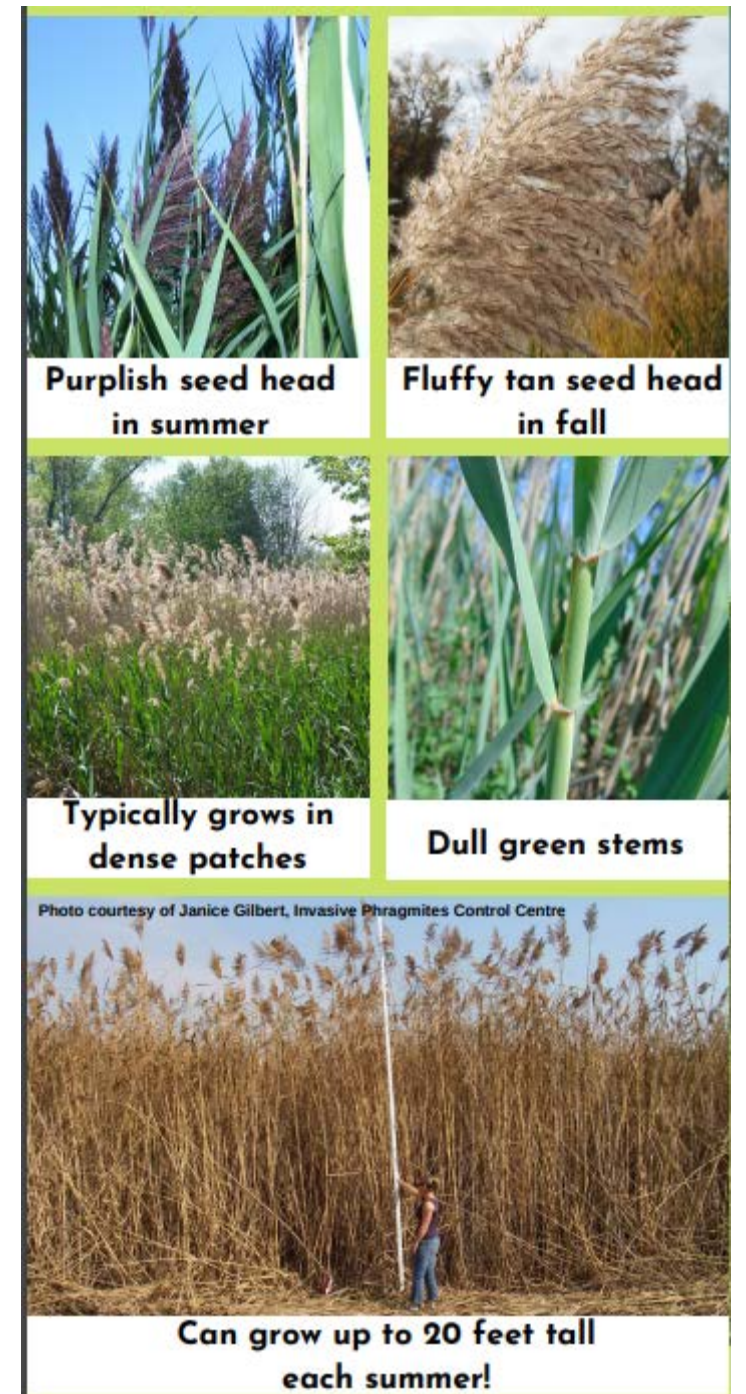
- Invasive perennial grass that outcompetes native wetland plants
- Reddish seed head in summer and fluffy tan in fall/winter
- Can grow as high as 20 feet each summer.
- Spreads aggressively through seeds and rhizomes.
- Phragmites can quickly invade wetlands, interfering with hunting, fishing, and recreational activities.



# Phragmites

*Phragmites australis*





- Phragmites can quickly invade wetlands, interfering with hunting, fishing, and recreational activities.
- Decrease value of beachfront/waterfront property
- Thrives in difficult conditions
- Can retain water
- Eliminates nesting habitat for piping plover and other threatened wildlife
- Degrades habitat quality for wildlife – including shorebirds, reptiles, amphibians, fish & mammals



# Phragmites Native Vs. Invasive

*Phragmites australis*



Characteristic	Native	Invasive
Stem color	 <p>Stem nodes are shiny and reddish-purple</p>	 <p>Stem nodes are tan-green, dull and rigid</p>
Leaf color	 <p>Lighter, yellow-green</p>	 <p>Dark blue-green</p>
Rhizome	Yellow	White to light yellow
Growth habit	Co-occurs with other plants	Tend towards mature, dense, monotypic stands
Other	Leaf sheaths fall off during the winter, leaving bare stems standing in the spring	Leaf sheaths do not fall off, litter from the previous year has remnant leaves.



# Invasive Plant Activity Time

Check out the pressed specimens

••••• Aquatic  
Invasive  
Mussels!



# Zebra Mussels and Quagga Mussels

- Native to Ukraine and Russia
- Invaded North America
  - Late 1980's via ballast water
- Quickly spread throughout the Great Lakes, Mississippi River drainage and neighboring lakes
- Prolific breeders – can produce up to 1 million eggs!
- Adults attach to hard surfaces (zebra) or soft (quagga)
- Filter Feeders



# Zebra Mussels and Quagga Mussels



Zebra Mussel

Lateral View

Highly variable  
dark and light  
stripes; or solid  
brown or yellow

Up to nearly  
2" long but  
most are  
less than 1"

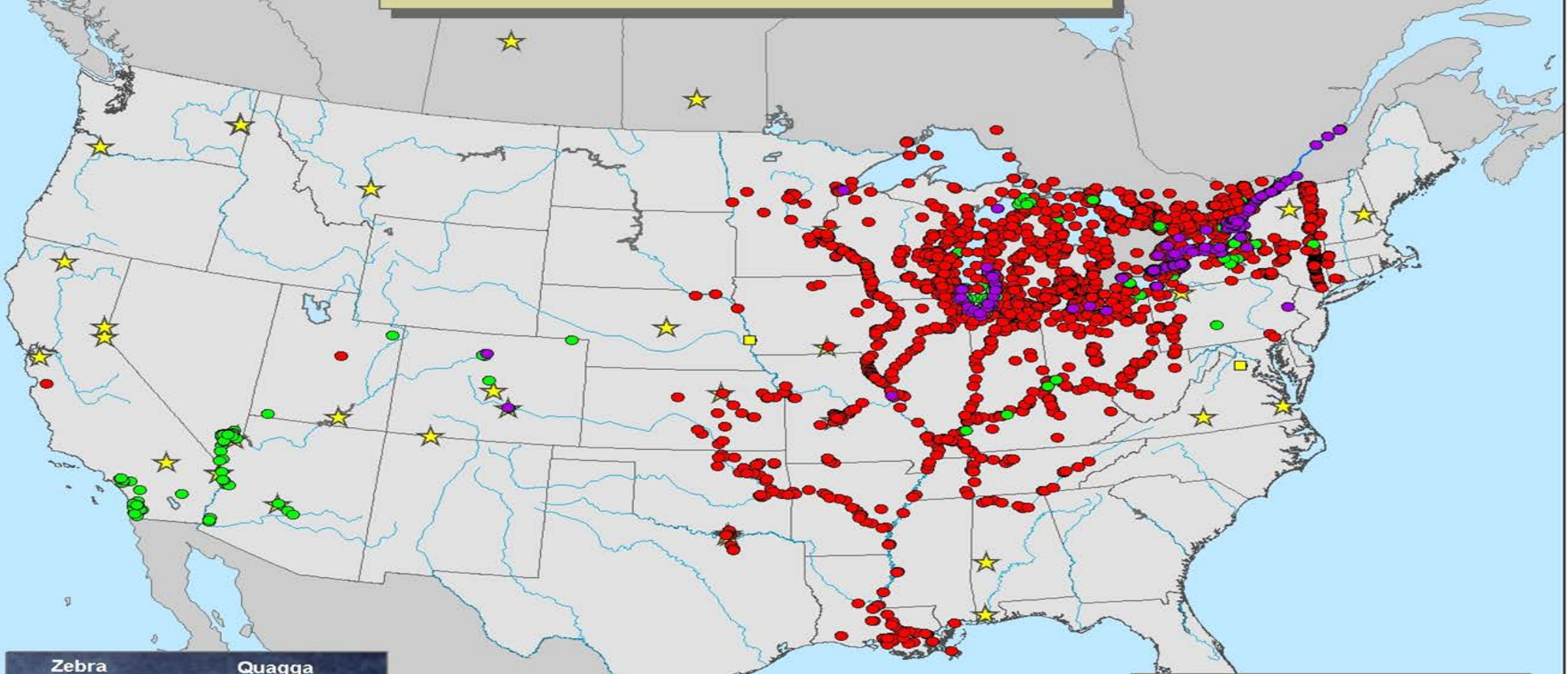


Quagga Mussel

Lateral View

Photos: John Karl

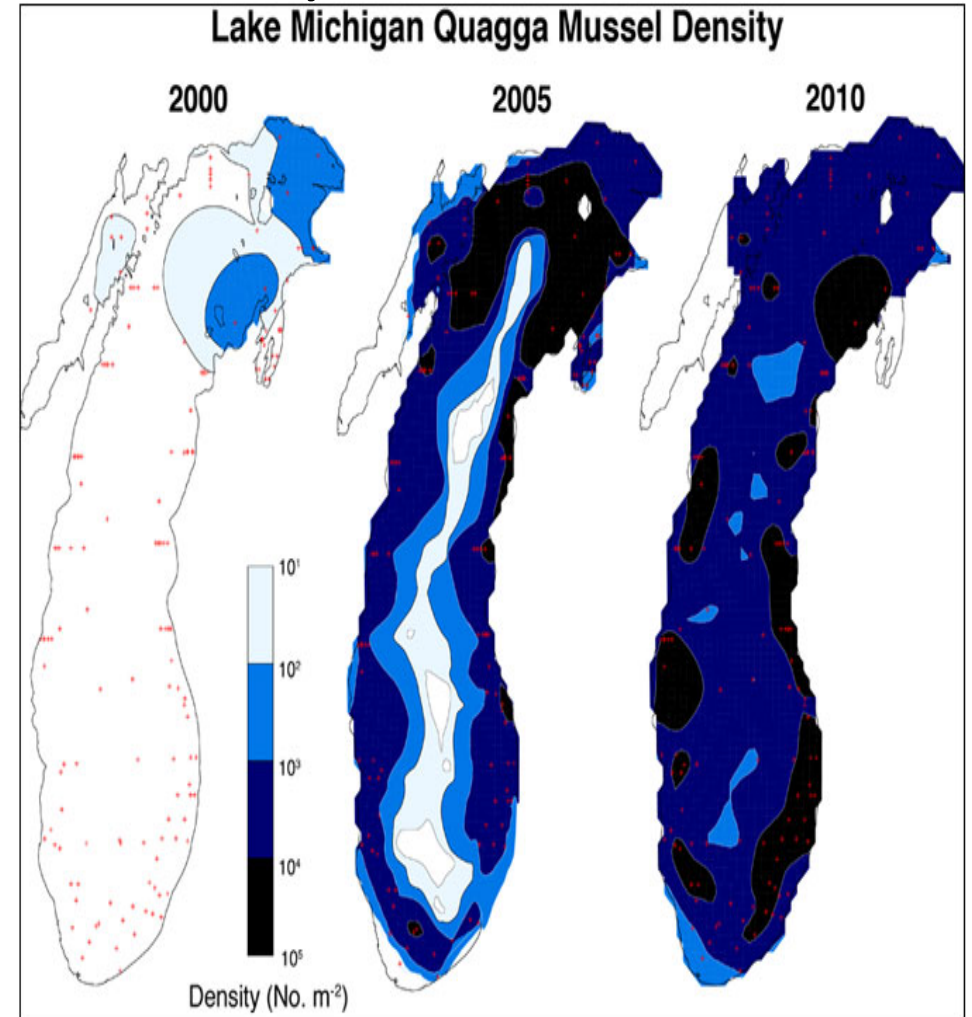
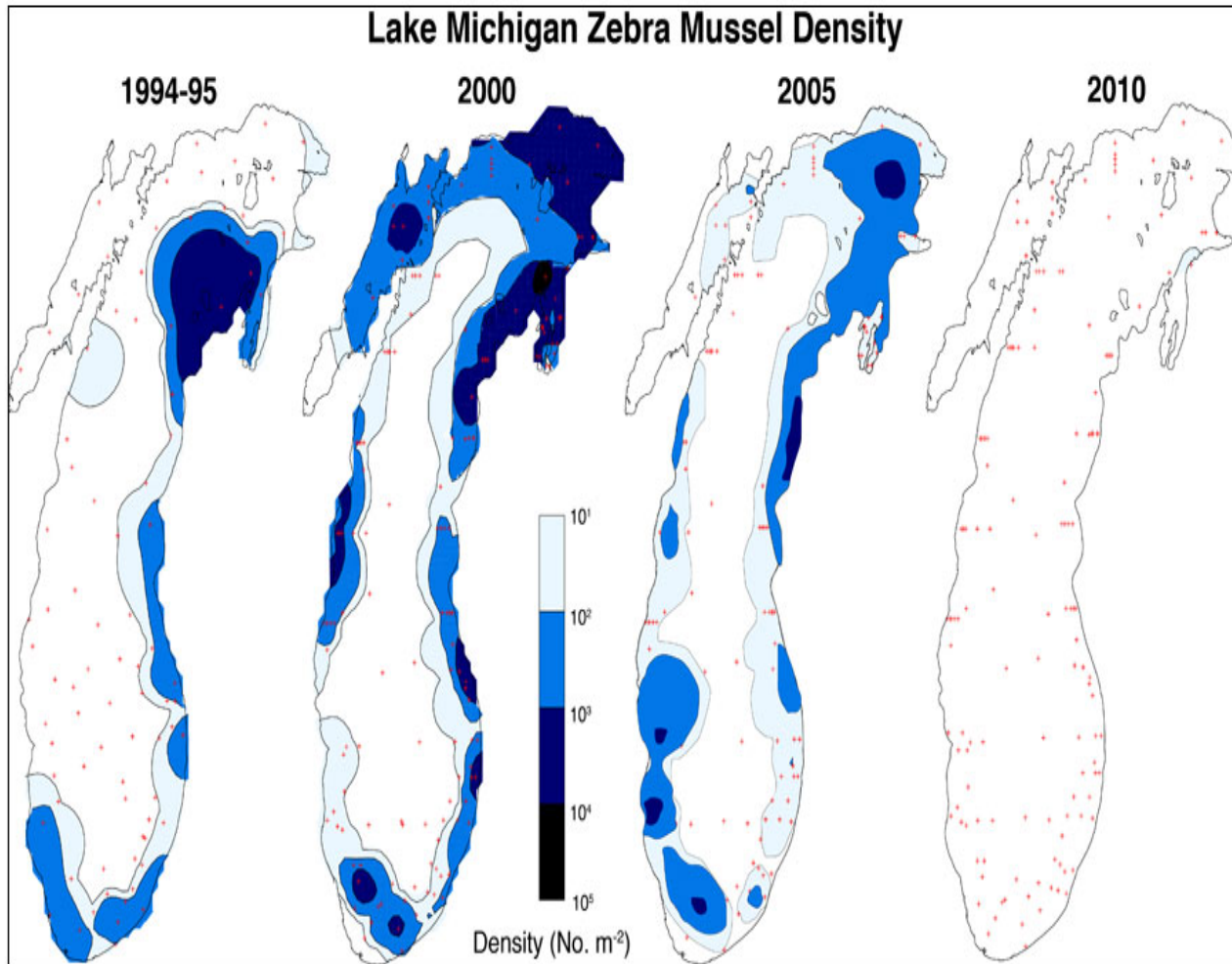
**Zebra and Quagga Mussel Sightings Distribution**  
*Dreissena polymorpha* and *D. rostriformis bugensis*



- Zebra mussel occurrences
- Quagga mussel occurrences
- Both species occurrences
- Zebra mussels eradicated
- ★ Mussels trailed overland on boat hulls



# Zebra Mussel & Quagga Mussel Density



Quagga are more efficient than Zebra mussels and outcompete them for nutrients  
Lake Michigan alone contains nearly 450 trillion quagga mussels

# Impacts of ZM & Quagga

- Removing valuable plankton (Example: Diporeia) → fish impacts
- Improving clarity allowing plants to grow deeper
  - Cladophora (benthic algae)
- Blue-green algae blooms – filter water but not microcystis!
- Sharp shells accumulate on shorelines/beaches

Diporeia

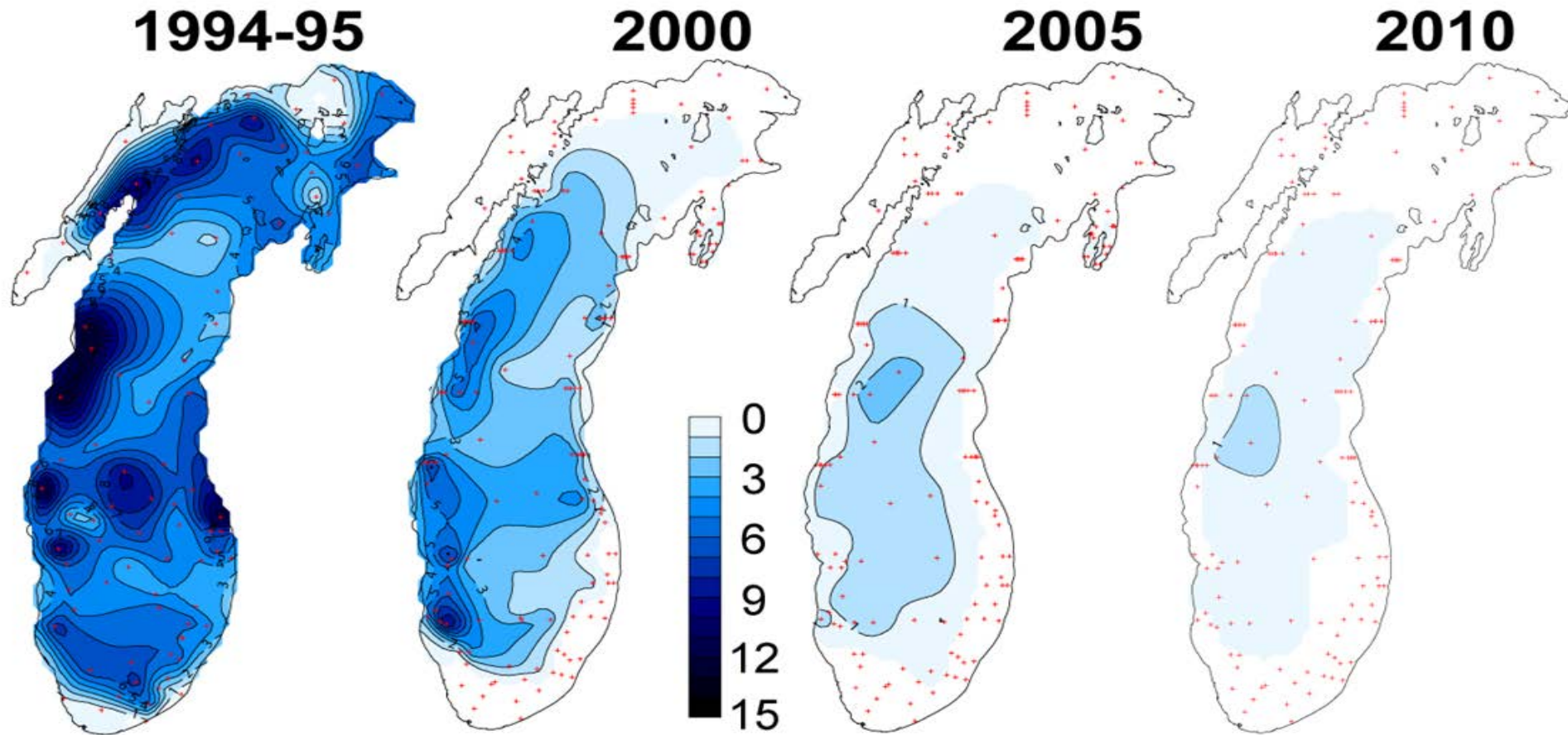


Cladophora



# Diporeia Abundance in Lake Michigan

>95% Decrease



Density (# in thousands per m<sup>2</sup>)

# Zebra Mussels & Dead Birds

- Mussels retain water-borne toxins within their tissue when they filter
- Expose mussel-eating fish and waterfowl to illnesses such as botulism



# Economic Impact

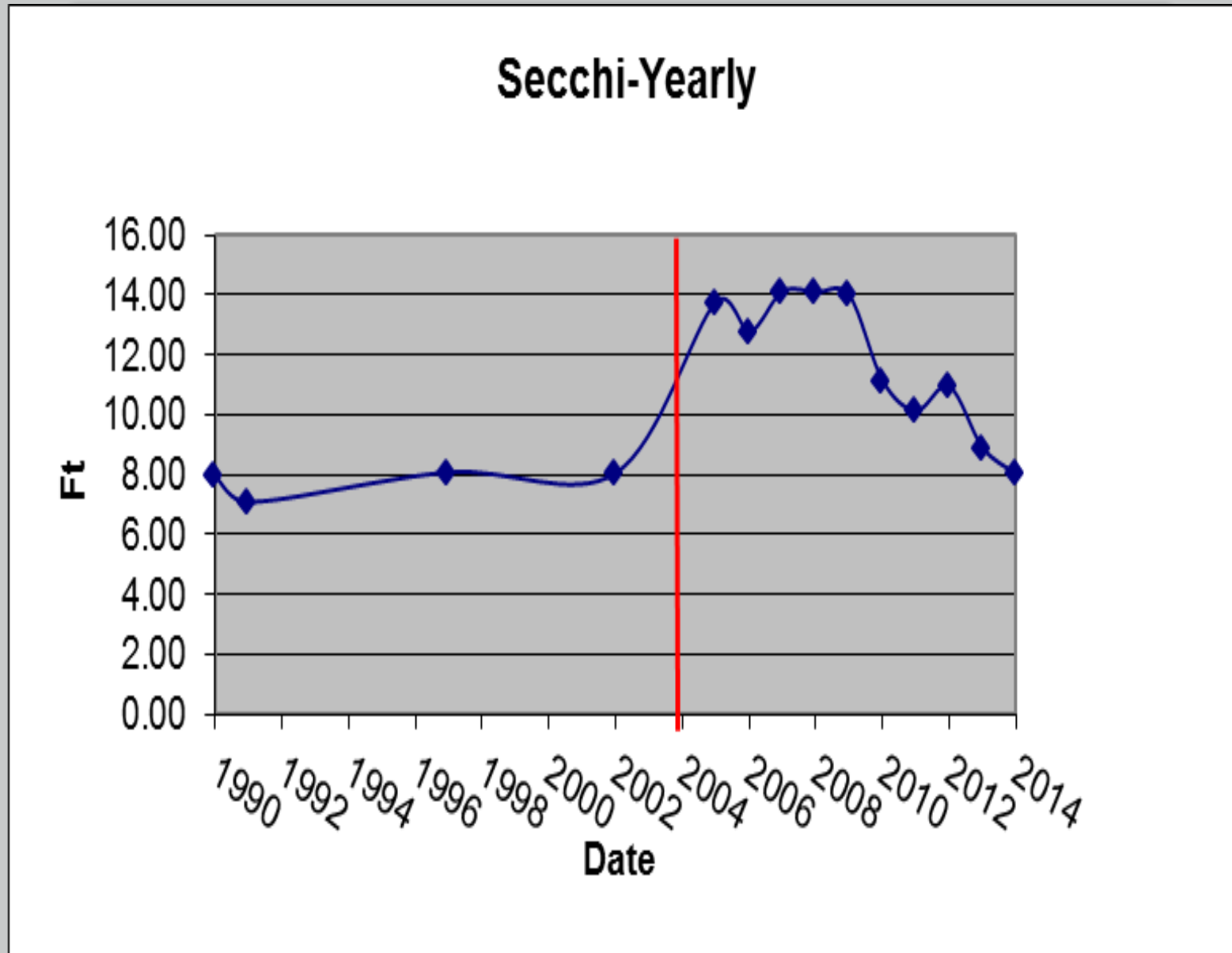
- Clog water intake pipes – reducing pump capacity and causing significant economic damage
- Recreation based industries impacted



# Invasive Species – Always bad news?

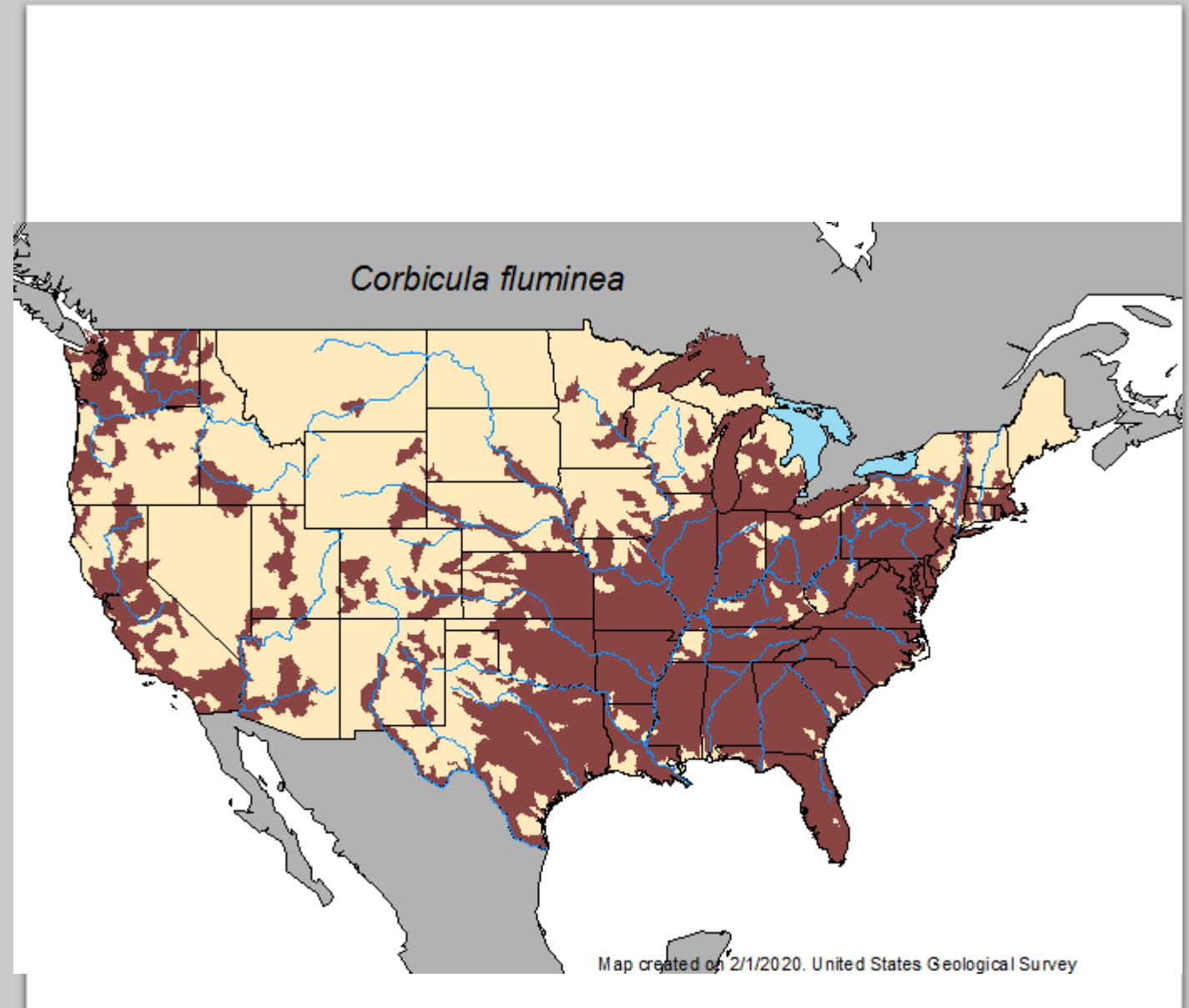
## Zebra Mussels

- Water Clarity – Bangs Lake



# Asian Clam - *Corbicula*

- Native to freshwater environments of Eastern Asia, including Russia, Thailand, the Philippines, China, Taiwan, Korea, and Japan as well as Africa
- Brought to North America around 1924 by immigrants who used the clams as a food source



# Asian Clam - Corbicula

- Filter Feeders
- Economic and social impact has been billions of dollars in costs associated with clogged water intake pipes
- Contributes to declines of highly vulnerable, already threatened native mussels









# Invasive Mussel Activity Time

Check out the specimens supplied by Illinois Natural  
History Survey and other literature

Aquatic  
Invasive  
Crayfish &  
Plankton



# Rusty Crayfish

## *Faxonius rusticus*

Reclassification (2017) Non-cave dwelling *Orconectes* to *Faxonius*

### Habitat

- Rocky substrates in rivers and lakes

### Identification

- Top forward edge of tail (abdominal) segments with rusty bands;
- Rusty spots on side, although sometimes very small or faint and occasionally absent.
- Claw tips orange with black ring; ring sometimes only partial or faint
- Rostrum edges curved inward. sometimes very slightly. occasionally straight.

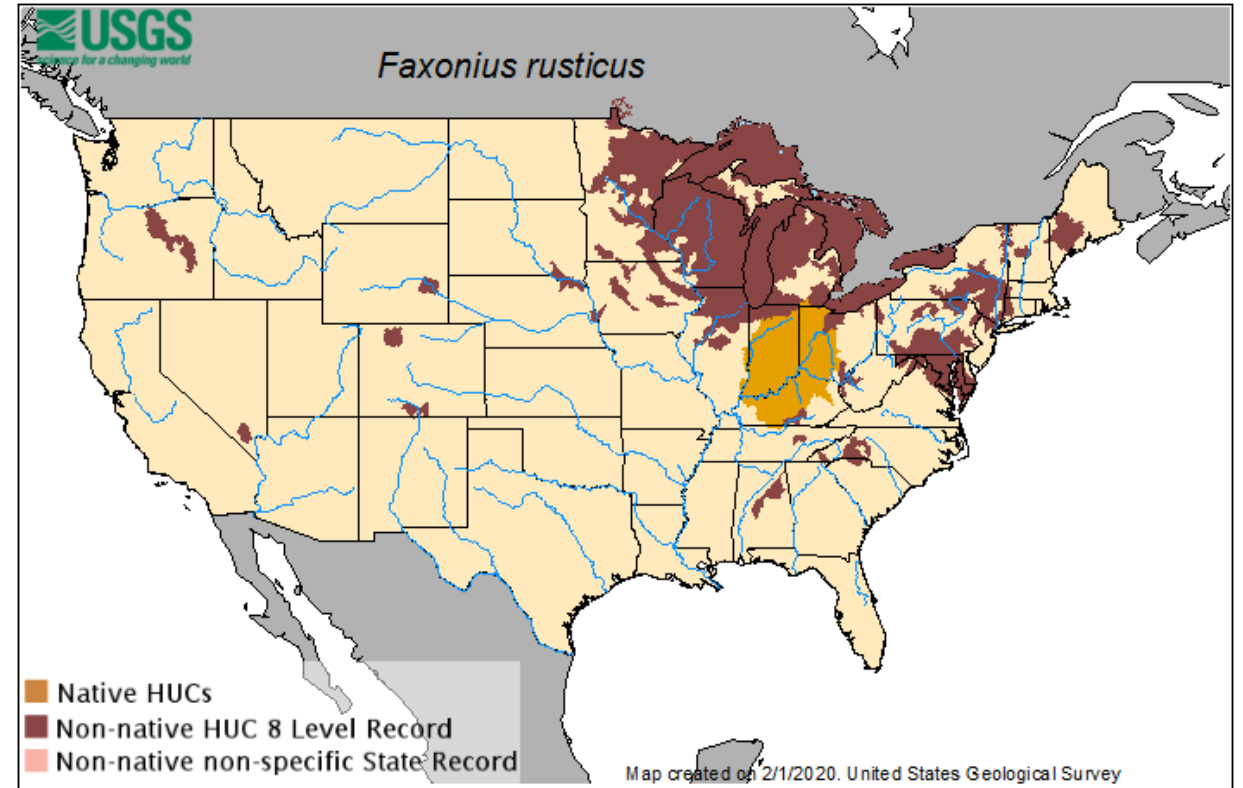
### Size

- Maximum of 10 cm (4 inch) in length
- Males tending to be larger than females
- Reaches maturity at about 3.5 cm (1.375 inch)
- 8-10 molts before mature, can occur during 1<sup>st</sup> year



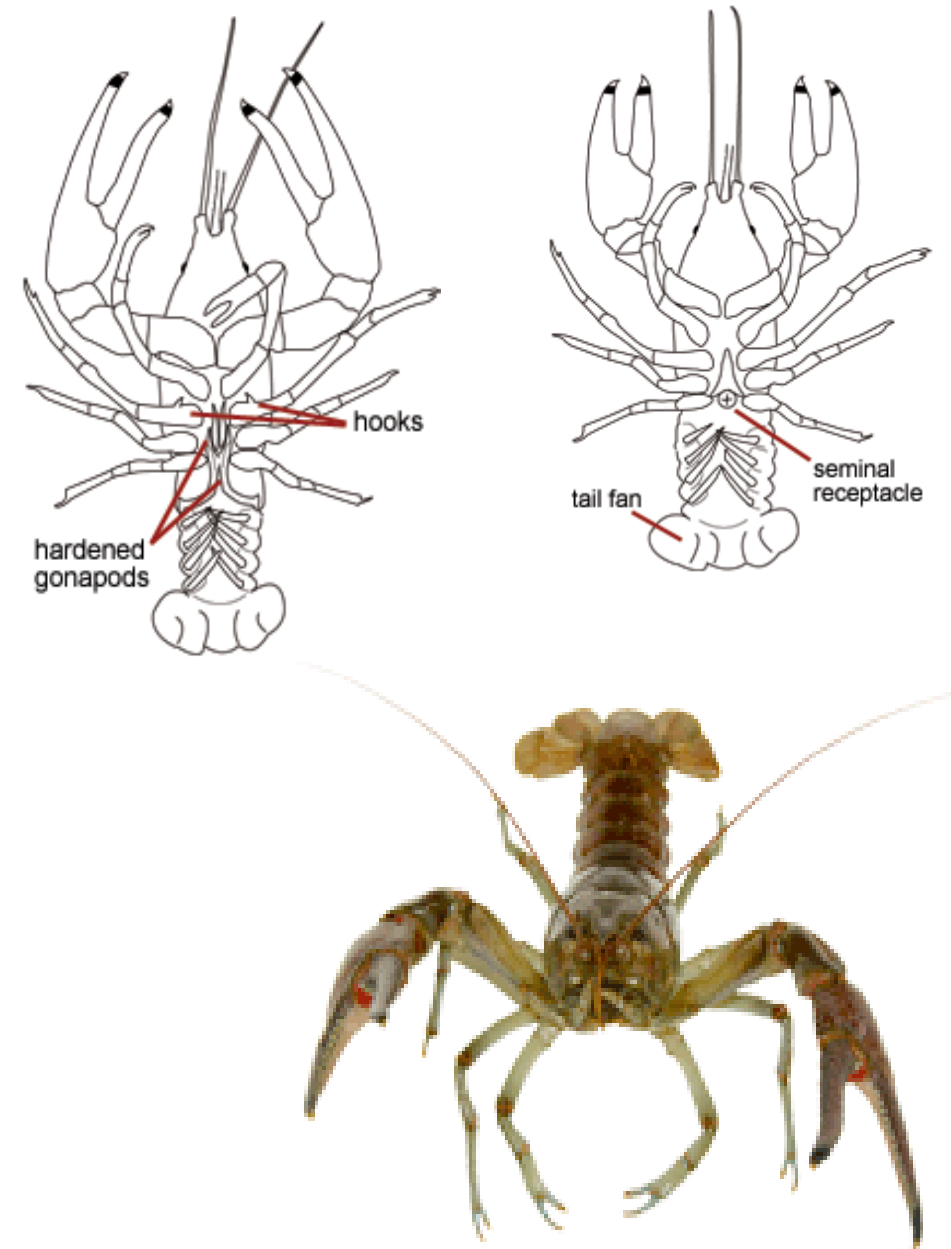
# Range Map

- Native Range- Ohio River basin, spanning tributaries in Western Ohio, Indiana, Kentucky, and Northern Tennessee; cryptogenic in Lake Erie
- First appearing in Illinois waters in 1973 from Peoria Lake
- Fishing bait bucket spread has been implicated as the primary dispersal mechanism of the species
- Tolerate a wide range of depths and pressures
- Requires well oxygenated water
- Often the most abundant and or only crayfish here encountered



# Ecology & Life History

- Rusty crayfish inhabit lakes, ponds, and streams.
- Prefer areas that offer rocks, logs, or other debris as cover.
- Bottom types may be clay, silt, sand, gravel, or rock.
- Rusty crayfish inhabit both pools and fast water areas of streams.
- They generally do not dig burrows other than small pockets under rocks and debris, rusty crayfish need permanent lakes or streams that provide suitable water quality year-round.
- Males have gonapods / Females have a seminal receptacle
- Mature rusty crayfish mate in late summer, early fall, or early spring
- A typical rusty crayfish lives three to four years.



# *Faxonius rusticus*- Impact on Native Species

- Predatory on native fishes eggs
- Disrupt lake ecosystems food webs
- Displaces native or existing crayfish species
- Better competitors for shelters and limited food resources
- Consume twice as much food as similar-sized *O. virilis*
- Hybridization with native crayfish
- Destruction of aquatic plant beds
  - habitat for invertebrates (which provide food for fish and ducks),
  - shelter for young gamefish, panfish, or forage species of fish,
  - nesting substrate for fish, and
  - erosion control (by minimizing waves



# *Faxonius rusticus*- Emerging Science

- Journal *Ecology* in 2019
- Habitat explains patterns of population decline for an invasive crayfish
- Eric Larson, Lead Author, Asst. Prof. the Depart. Natural Resources and Environmental Sciences at the University of Illinois
- Trends in 17 lakes from 1972 to 2017 and found that about half were experiencing population declines
- Declined only in lakes with mucky and sandy bottoms
- Highly active lakebed engineers
- Forage and burrow, constantly turn over rocks and uproot plants during search for food
- Destroying the aquatic plant habitat
- Crayfish removed their only refuge from predators





# Why Should We Care?

- Ways to eradicate introduced populations of rusty crayfish have not been developed, and none are likely in the near future.
- Preventing or slowing the spread of rusty crayfish into new waters is the best
- Invasive species cost the public more than \$137 billion dollars annually in control and lost revenue
- 100 nuisance species are introduced to U.S. waters annually
- Threaten valued native species diversity
- Cascading effects-cause far reaching indirect and cumulative impacts
- Education is the key



# Spiny Water Flea *Bythotrephes longimanus*

## Habitat

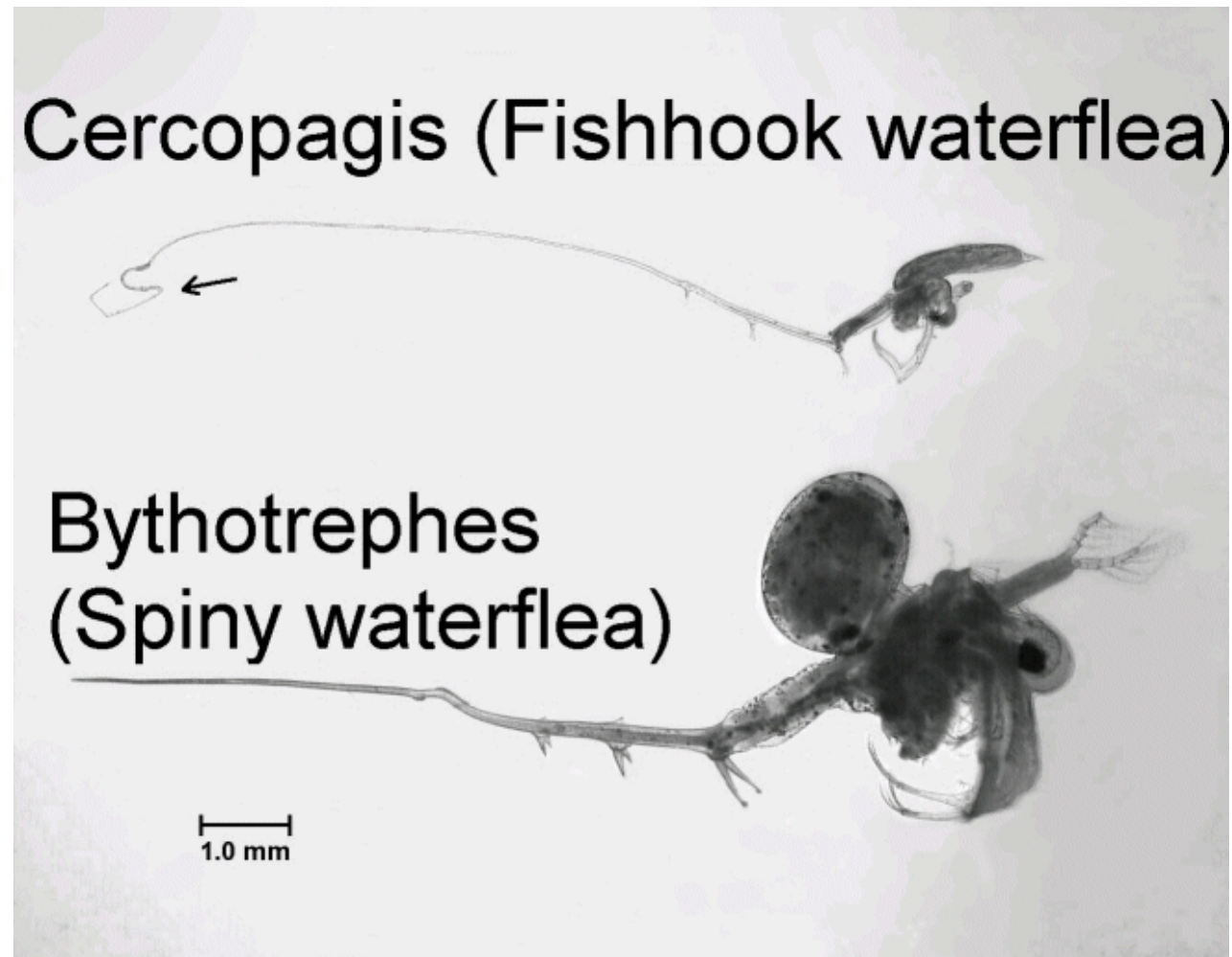
- inhabit the upper portion of the water column in large and small freshwater lakes

## Identification

- long caudal spine (2X as long as its body) equipped with 1 to 3 pairs of lateral barbs; a large compound eye; and four pairs of prehensile leg
- *Bythotrephes* appearance is similar to *Cercopagis pengoi*, fish Hook water flea, another Great Lakes invader
- Polymorphic species - 2 morphological variants

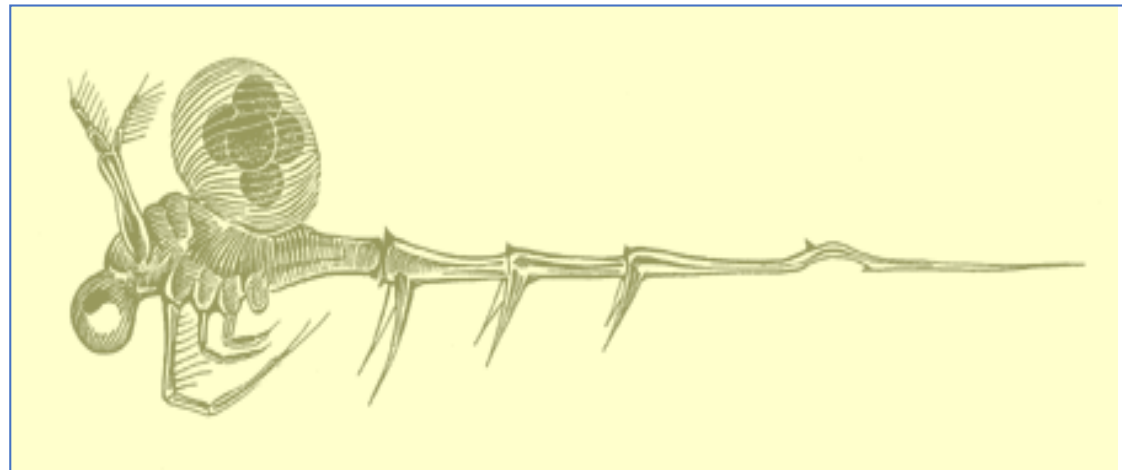
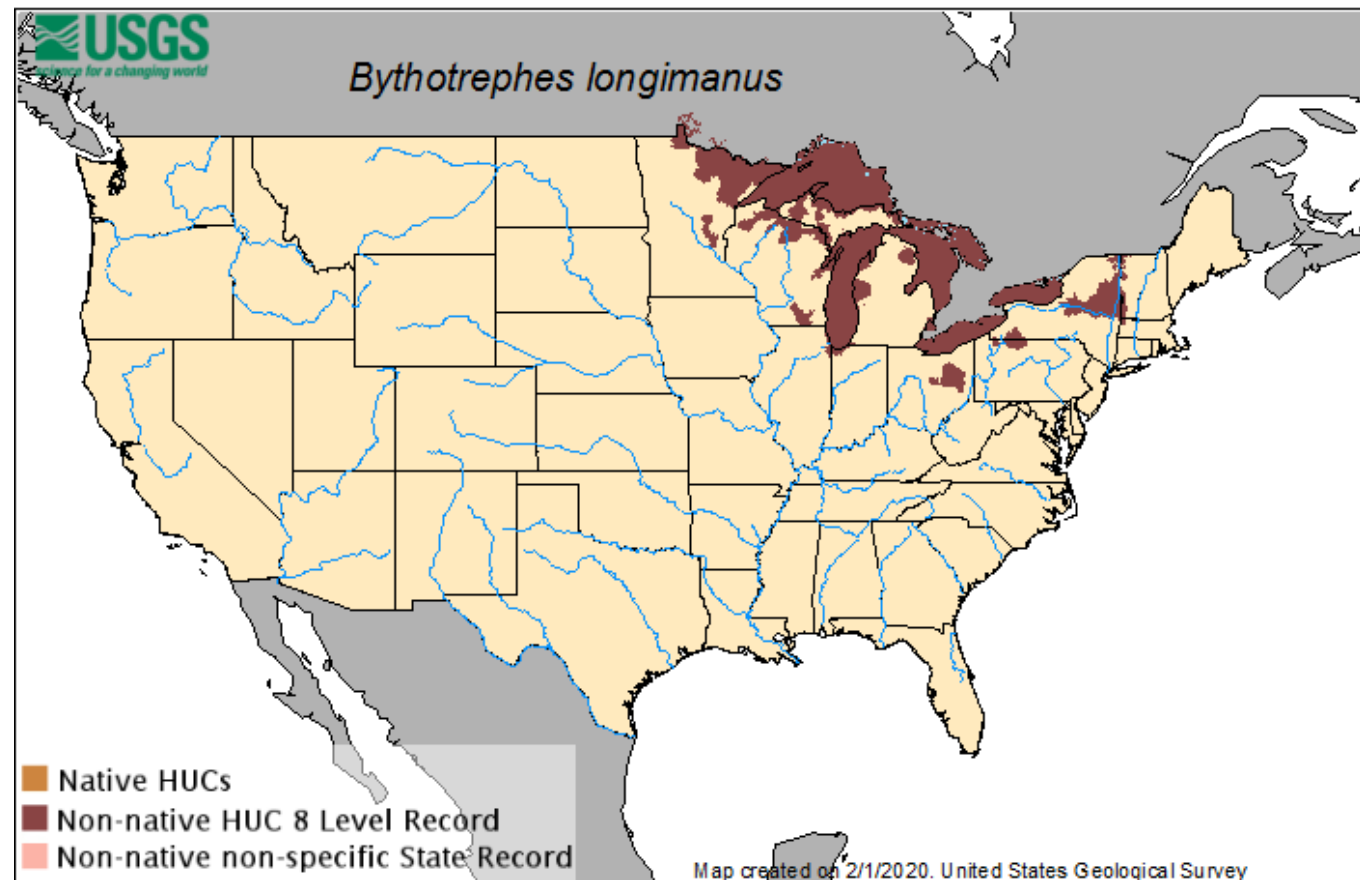
## Size

- Large zooplankton, can reach 1-2 cm
- Considerably larger than most North American zooplankton

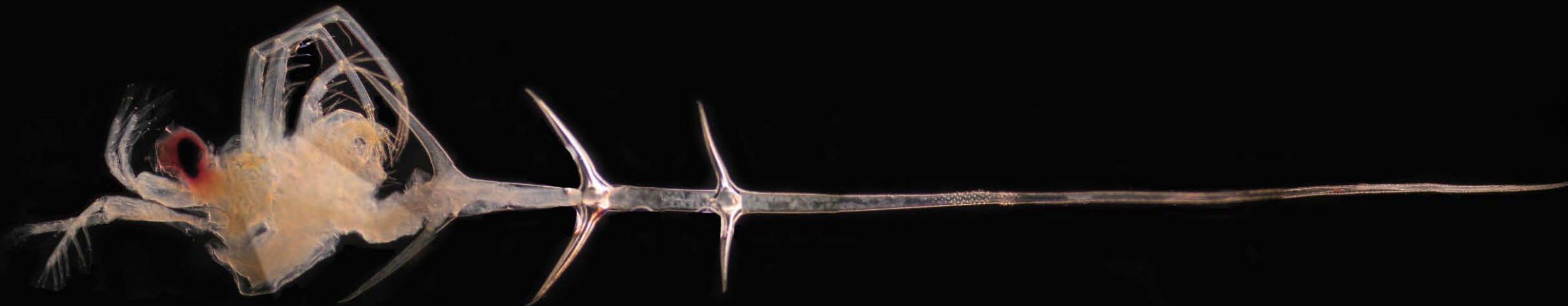
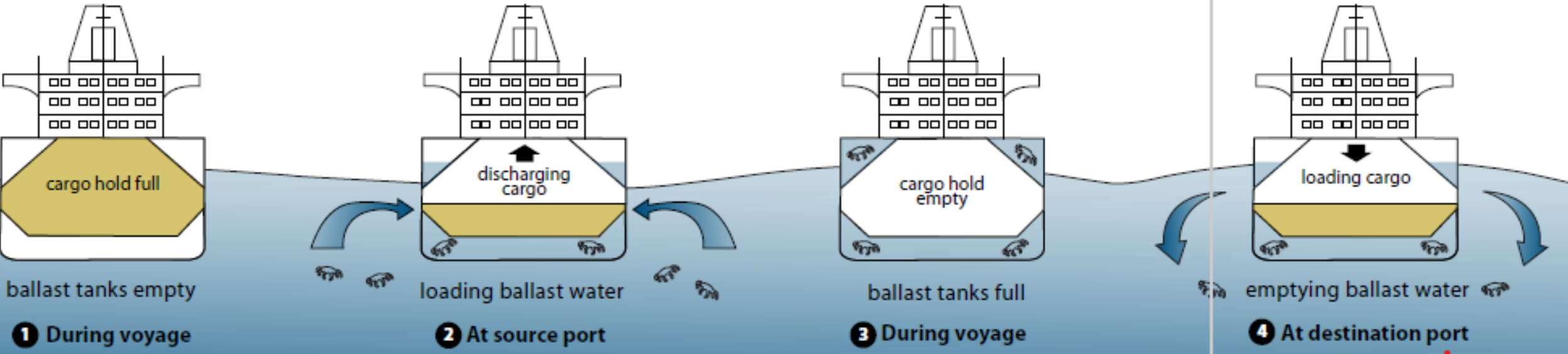


# Range Map

- **Native Range:** Northern Europe and Asia -the Palearctic from Great Britain to the Bering Sea, but its successful expansion into numerous European lakes
- First appearing in into Lake Ontario in 1982 and within five years the SWF was present in the Great Lakes
- Species was most likely introduced to North America via the release of ship ballast water
- Genetic evaluations have identified the Port of St. Petersburg in Russia as the “distinctive donor region”



# Ballast Water Dispersal Mechanism



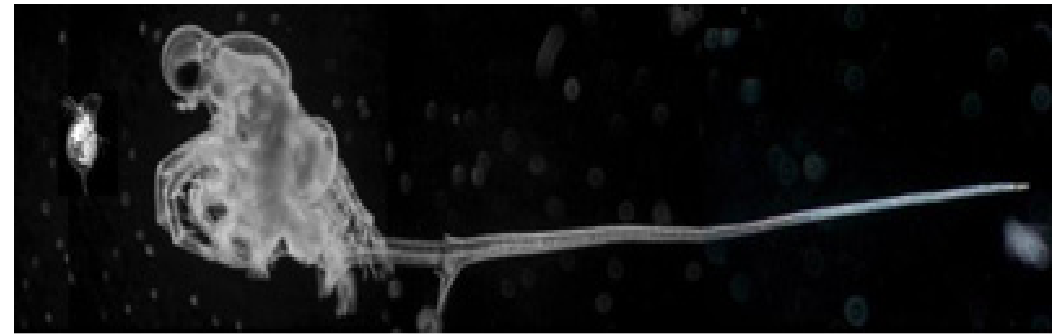
# Ecology and Life History

- Occurrence and density of *Bythotrephes* populations are determined mainly by water temperature
- In the Great Lakes, as they prefer cooler water and cannot tolerate very warm lake temperatures
- visual predator, using its large compound eye to detect zooplankton and devour
- Consume 75% of their body weight each day in prey items (*Daphnia* sp.)
- Reproduce both asexually and sexually; unfertilized eggs are carried in a brood pouch,
- Asexual-parthenogenesis. Produce up to ten eggs that develop into genetic replicas of the mother.
- Parthenogenesis produces a new generation of females in less than two weeks.
- Eggs can become dormant



# *Bythotrephes longimanus* Impacts

- SWF represents an interesting link in the aquatic food web
- Their size and long barbed caudal spine helps protect it from predation
- However it is more susceptible because it slow moving, less transparent and possesses a prominent eye spot
- Can impact various life stages in fish populations/both direct and indirect
- Impacts are felt at multiple levels within the food chain
- Larval fish, avoid; spines pierce stomachs
- Direct competition for food with native plankton and species
- Eat native plankton (*Daphnia*) that consume algae
- In direct effect; Algal blooms follow
- Biofouling of recreational and commercial fishing line
- Loss of fisherman can lead to the dramatic reduction in the income



# Stop Aquatic Hitchhikers



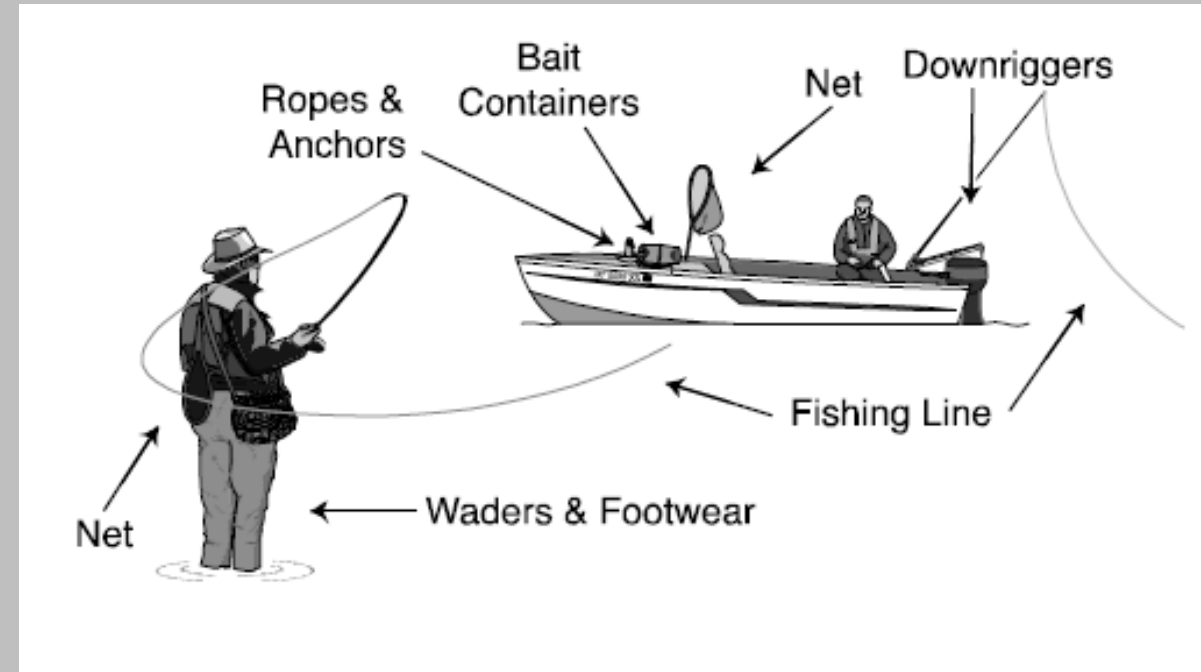
- Aquatic Nuisance Species Task Force November 2013

Voluntary guidelines to prevent the introduction and spread of aquatic invasive species: recreational activities

- [www.protectyourwaters.net](http://www.protectyourwaters.net)
- click on “Become a Partner”.
- As of 2013, over 1,100 entities including agencies (federal, state, tribal, county), universities, colleges, schools, businesses, industries, non-profit organizations, and clubs have joined helping to reach millions of recreational users

# Stop Aquatic Hitchhikers Fishing Anglers

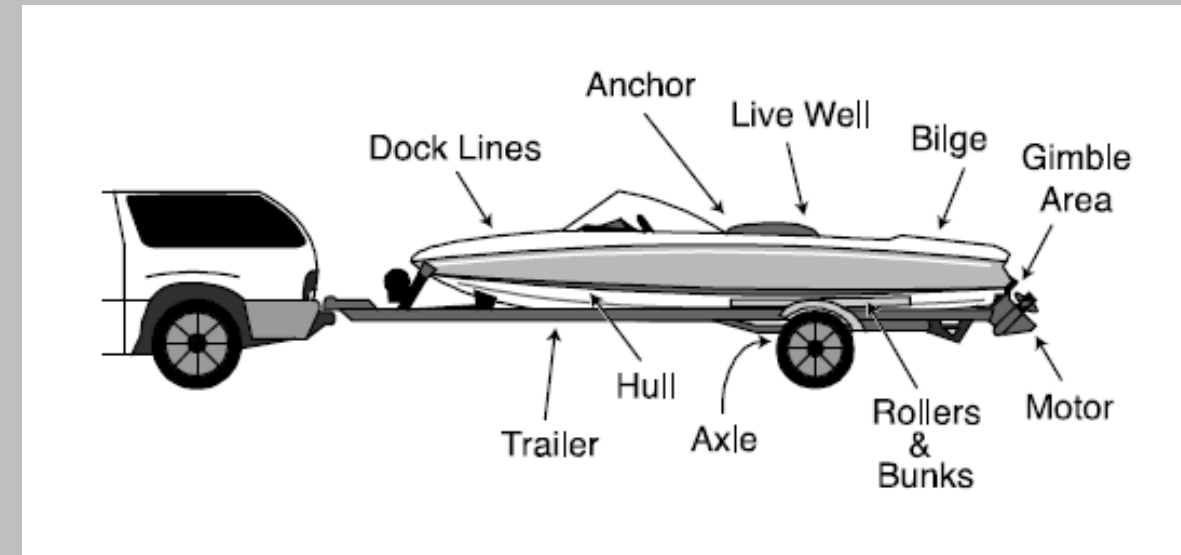
- **Clean** *Inspect* and **clean off** plants, animals, and mud from gear and equipment *before leaving water access*.
- **Scrub off** any visible material on footwear with a stiff brush.
- **Drain** water from watercraft, motor, bilge, bladder tanks, live well and portable bait containers *before leaving water access*.
- **Dispose** of unwanted bait, fish parts, and packing materials, in the trash; do not dump them in the water or on land.
- **Dry** everything **five days** or more, unless otherwise required by local or state laws, when moving between waters to kill small species not easily seen **OR wipe** with a towel *before reuse*.
- Use non-felt soled boots to reduce the risk of spreading AIS.
- Fish should be cleaned at designated fish cleaning stations or placed on ice.
- Never dump live fish/organisms from one water body into another





# Stop Aquatic Hitchhikers Motor Boats

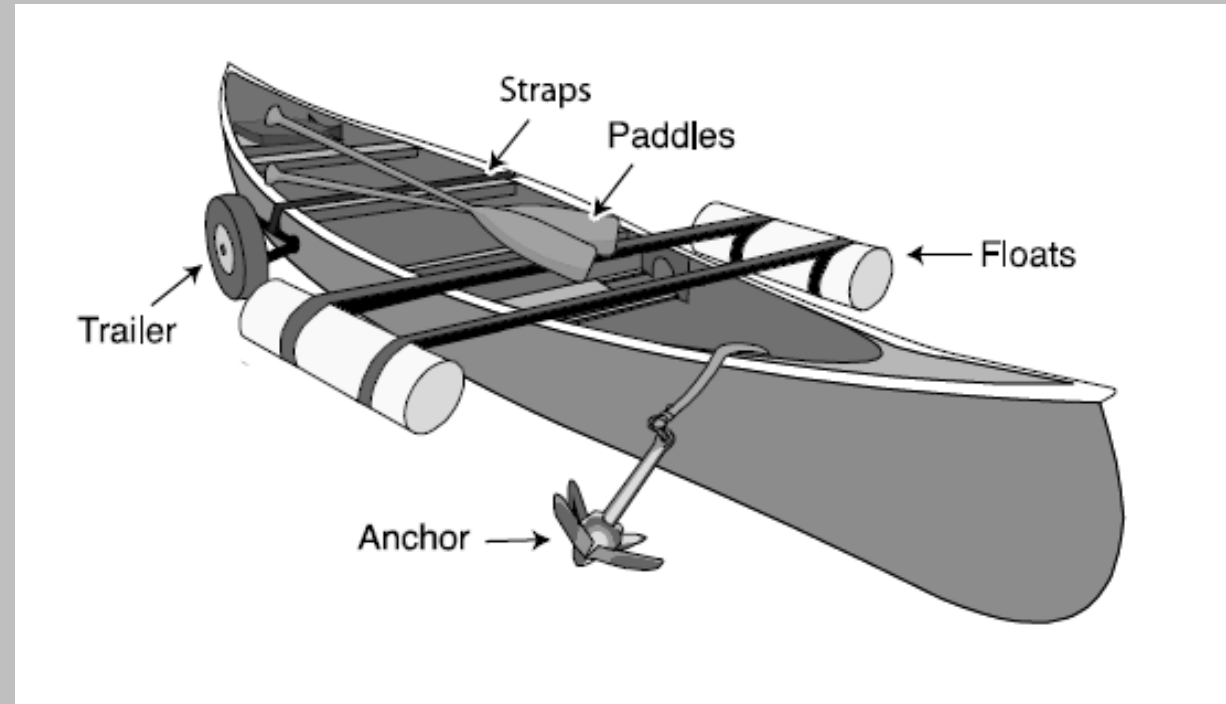
- **Clean** *Inspect* and **clean off** visible aquatic plants, animals, and mud from watercraft, motor, trailer, intake grate and steering nozzle and equipment *before leaving water access*.
- **Scrub** hull using a stiff brush.
- **Rinse** watercraft, trailer, and equipment with high pressure hot water when possible.
- **Flush** motor according to owner's manual.
- **Run** engine 5-10 seconds to blow out excess water/vegetation from internal drive *before leaving water access*.
- **Drain** water from watercraft, motor, bilge, bladder tanks, live well, and portable bait containers *before leaving water access*.
- **Dry** everything for **five days** or more, unless otherwise required by local or state laws, when moving between waters to kill small species not easily seen OR wipe with a towel *before reuse*.



# Stop Aquatic Hitchhikers

## Non-Motorized Boaters

canoes, boards, rafts, kayaks, rowboats, paddleboats, inflatables, sculls



- **Clean off** any visible aquatic plants, animals, and mud from watercraft, gear, paddles, floats, ropes, anchors, dip nets, and trailer *before leaving water access.*
- **Scrub** hull using a stiff brush.
- **Rinse** watercraft, trailer and equipment with high pressure hot water, when possible.
- **Drain** water from watercraft, sponges, bailers, and water containing devices *before leaving water access.*
- **Dry** everything **five days** or more, unless otherwise required by local or state laws, when moving between waters to kill small species not easily seen OR wipe with a towel *before reuse.*
- Completely dry inflatables and other recreational watercraft *before storing.*
- Wear quick-dry footwear or bring a second pair of footwear with you when portaging between waterbodies.

# How can we help?

- Prevention through education
- Be an Advocate
- Have a voice in your community
  
- <https://erc.cals.wisc.edu/music/song-conquer-spiny-water-flea/>
- This hope-filled indie folk rock song challenges boaters to stop spiny water fleas from further invading our inland lakes. Spiny water fleas—be warned!
- **Singer/Songwriter:** Ella Shaw, 2016
  
- Ella Shaw is a 6<sup>th</sup> grader at New Glarus Middle School. She is a talented singer/songwriter and wrote this song in a creative partnership with her father who does work to prevent aquatic invasive species



# Conquer the Spiny Water Flea by Ella Shaw

- Please don't spread the spiny water fleas  
We can do it, now  
Here's how.
- Clean equipment, lines and reels.  
Go to all the people see how they feel now  
Oh wow.
- Cause If you don't know how, we'll tell you  
If you don't know where, it's in our local lakes  
We'll use our tools,  
to conquer the spiny water fleas.
- They're in our lakes, taking up the plankton  
Oh, all their mistakes, are taken up the fish food supply,  
Oh why?
- So clean your bilge, live well and motors  
This is good advice for all you boaters  
Try this time
- Cause If you don't know how, we'll tell you  
If you don't know where, it's in our local lakes  
We'll use our tools,  
to conquer the spiny water fleas.

Questions?

