

# Cage Culture of Freshwater Mussels



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Genoa National Fish Hatchery

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Genoa



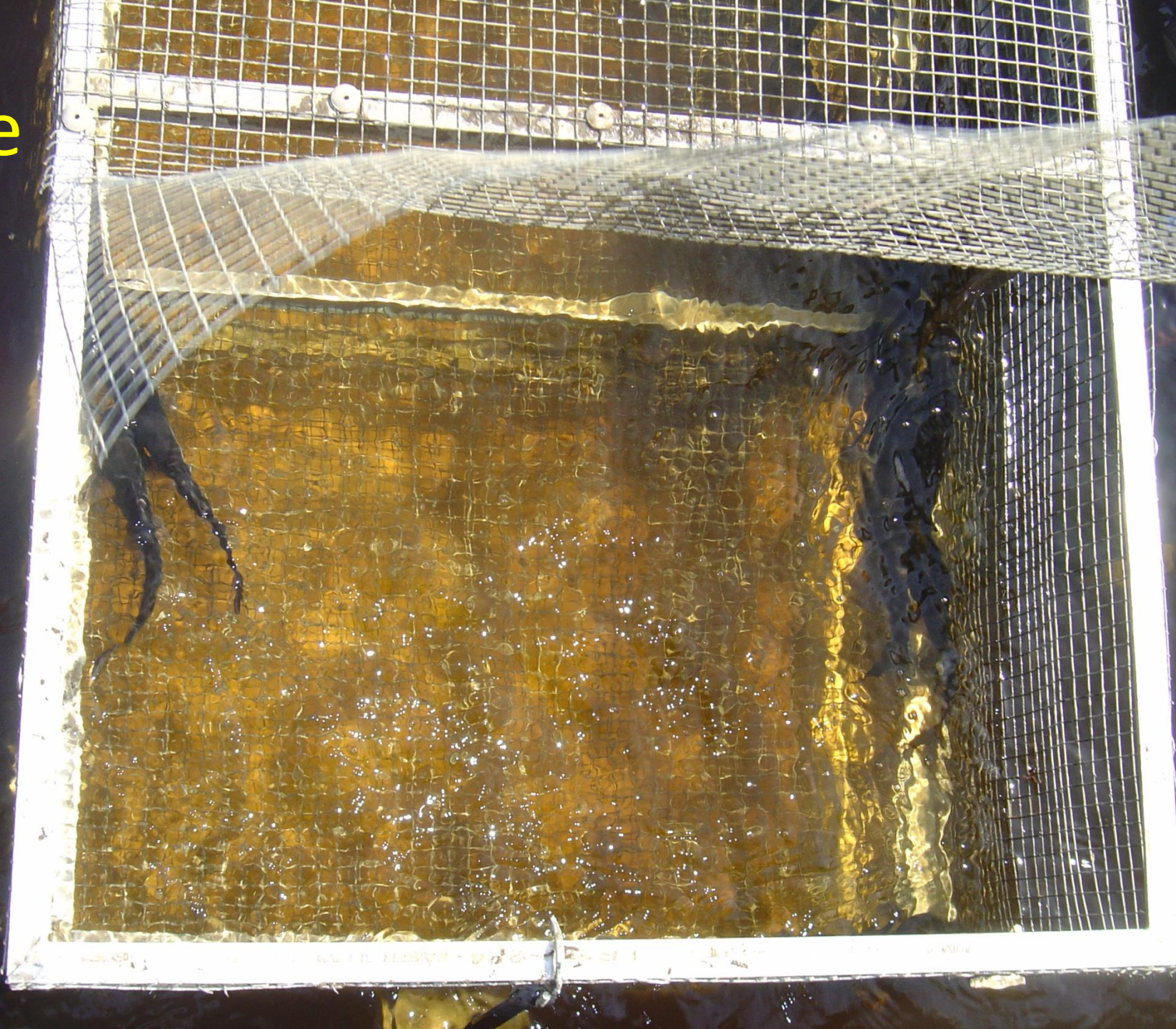
NATIONAL FISH HATCHERY



U.S. Fish and Wildlife Service  
Department of the Interior



In the  
Field















# Successful Culture

- Higgins' eye
- Black Sandshell
- Mucket
- Fatmucket
- Snuffbox
- Plain Pocketbook
- Hickorynut






# Marginally Successful

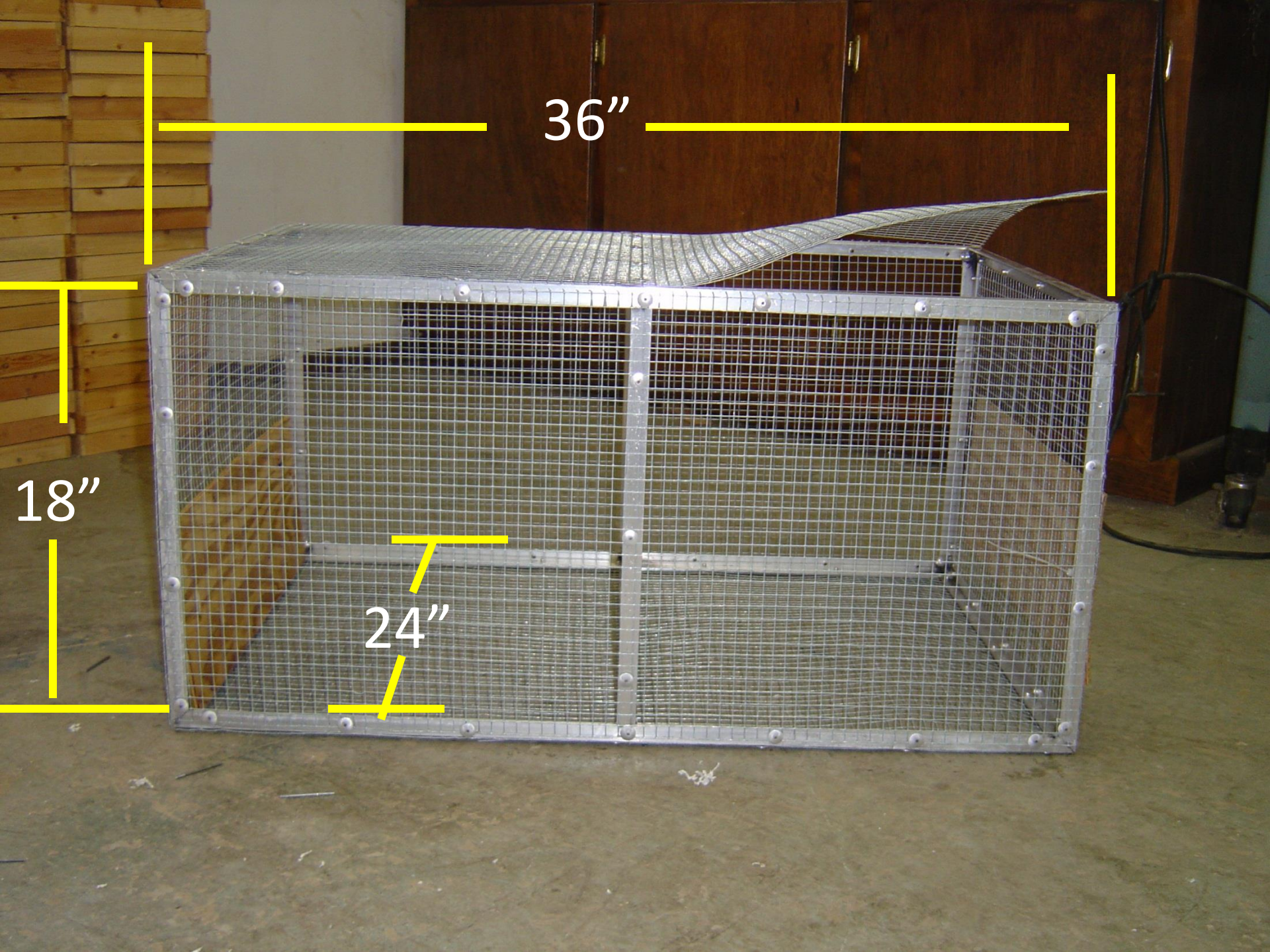
- Winged Mapleleaf (20)
- Pink Heelsplitter (12)
- Sheepnose (1)
- Pistolgrip (5)
- Monkeyface (1)
- Purple Wartback (3)



# Cage Design

-  Consists of a two part cage/base unit.
-  Upper cage constructed of welded aluminum angle, skinned with .50 inch galvanized hardware cloth.
-  Base constructed of welded aluminum angle, fitted with .25 inch plywood on 9 inch legs.





36"

18"

24"

# Method

- Fish are large batch inoculated to ensure consistency of infestation.
- Infested fish are held on hatchery until just prior to excystment to reduce stresses and mortality. (2 weeks-7 months)
- Fish are transported to site without tank additives at low densities.
- Hosts are stocked in cages at rate ~2.8 fish/ft<sup>3</sup> LMB/SMB, 3.3 fish/ft<sup>3</sup> WAE/CCF. 20 – 30/cage



# Methods Continued

- Use Bungee chord to hold cage base and top together
- Select cage locations with very little flow, static if possible
- Place cages during normal flow, avoid flood conditions
- Harvest cages after water drops below 65°F and growth has slowed





# Variations

 Open bottomed cages for high flow environments.

 Floating cage arrays for protected areas.

 Small mesh cages for minnows.

 Stacked cages for bottom dwellers.

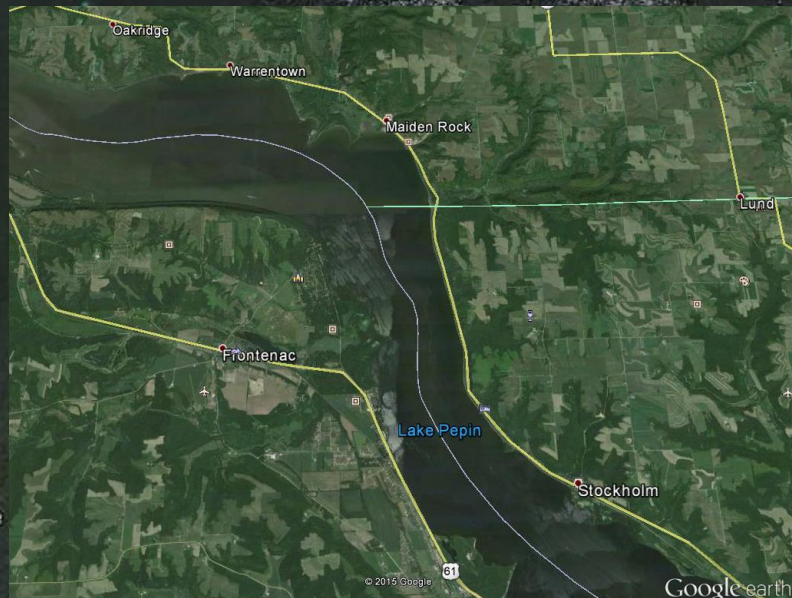






Lake St

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**Frontenac cage propagation site July 2008 – cage fouled with zebra mussels**



Many individuals from the 2006 year-class were smothered by zebra mussels and died





# Positive Dubuque Floating Results

Species	Year	#Sub-adults	Per Cage AVG
Fatmucket	2010	1,730	173
Higgins' eye	2011	53	5.3
Higgins' eye	2012	2,755	275.5
Higgins' eye (N)	2013	4,622	243
Higgins' eye	2014	3,677	193

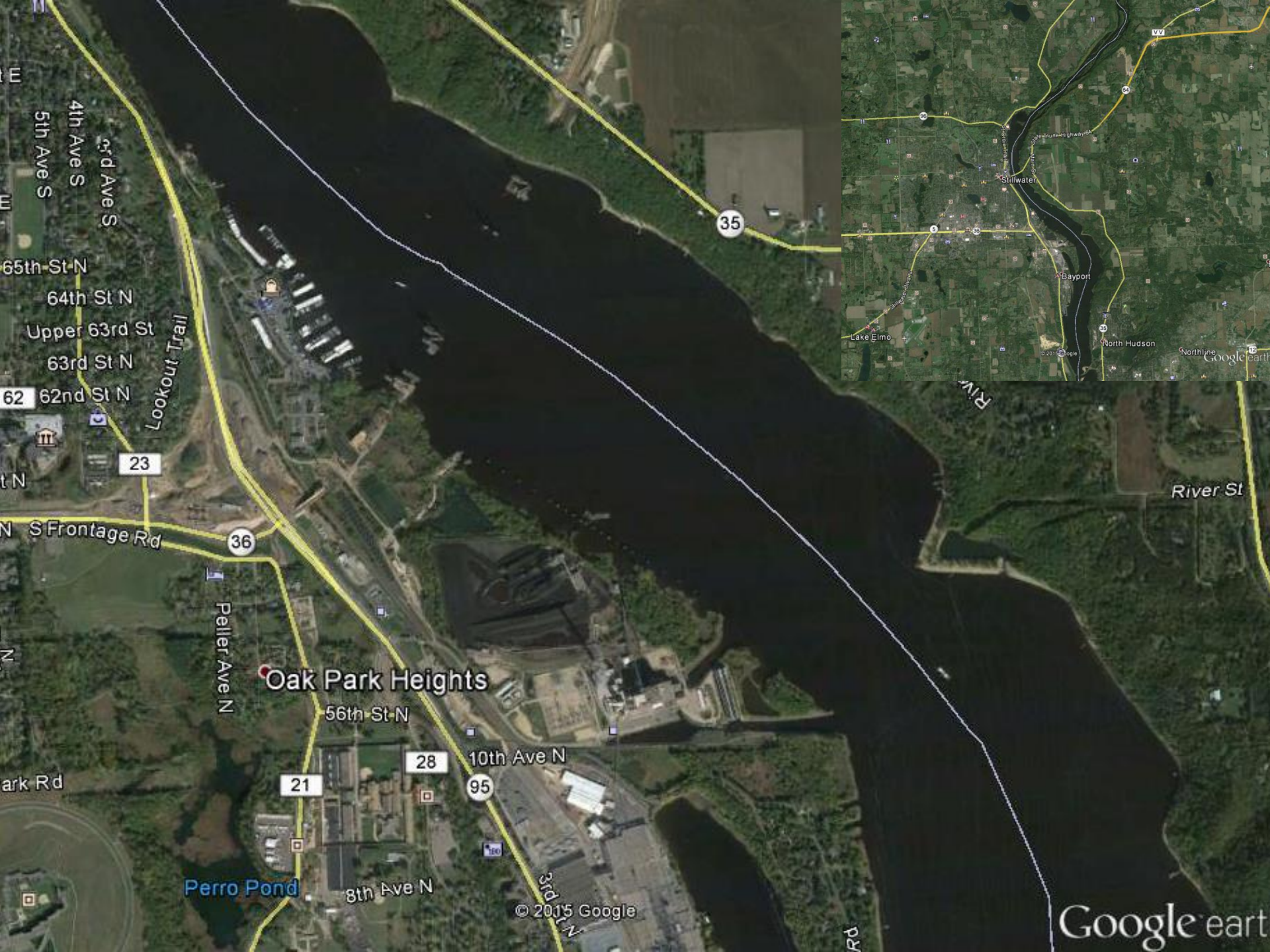
# Negative Dubuque Floating Results

Species	Year	#Sub-adults	Per Cage AVG
Black sandshell	2011	1	0.2
Yellow sandshell	2011	0	0
Pistolgrip	2013	5	2.5
Higgins' eye (S)	2013	23	4.6
Black sandshell	2014	11	2.2





- 1 Higgins' eye 372 -- 74/cage
- 2 mucket 205 -- 41/cage
- 3 Higgins' eye 5,196 -- 1,039/cage
- 4 Higgins' eye 441 -- 88/cage
- 5 fatmucket 4,981 -- 996/cage
- 6 fatmucket 7,035 -- 1,172/cage



4th Ave S  
5th Ave S

65th St N  
64th St N  
Upper 63rd St  
63rd St N  
62nd St N

S Frontage Rd

Peller Ave N

Oak Park Heights

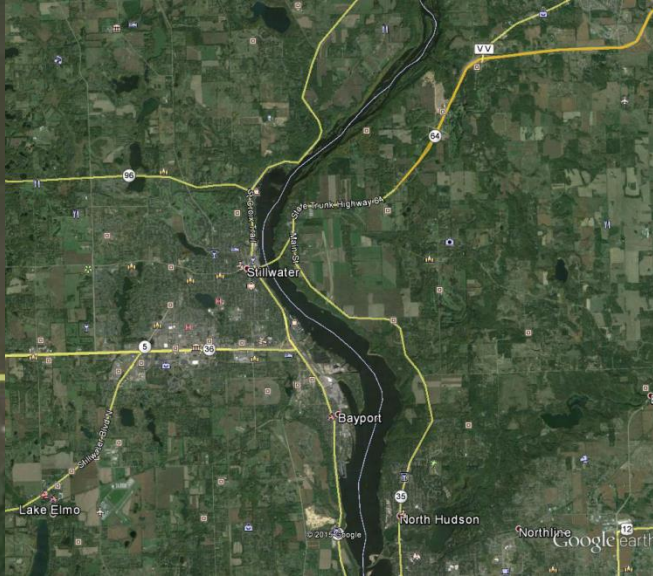
56th St N

10th Ave N

8th Ave N

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River St

Perro Pond

Lookout Trail

35

36

21

28

95

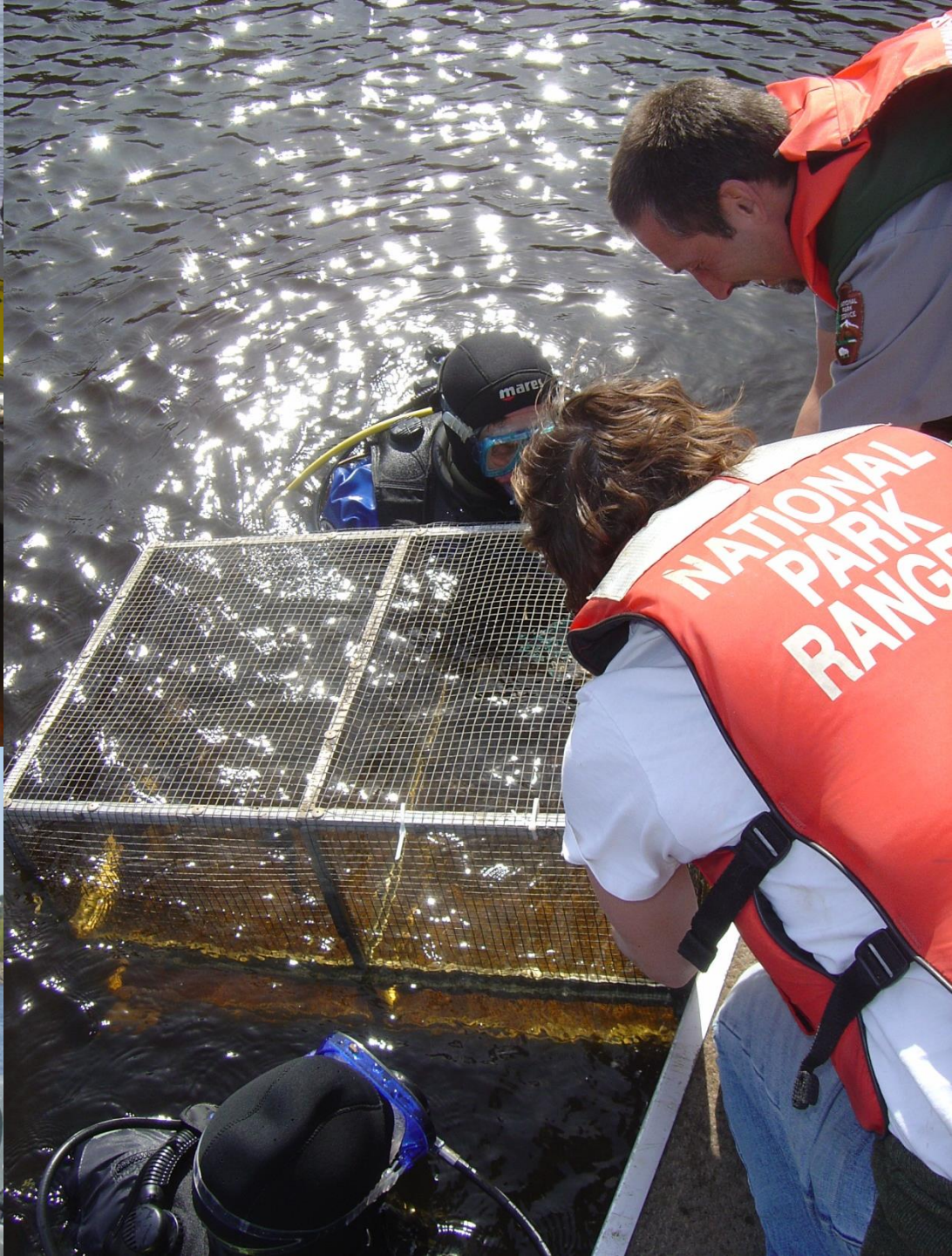
23

62



# 2005 WML Success Story







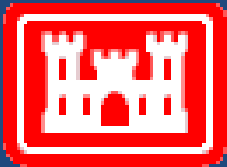




# 2014 Higgins' eye Monitoring

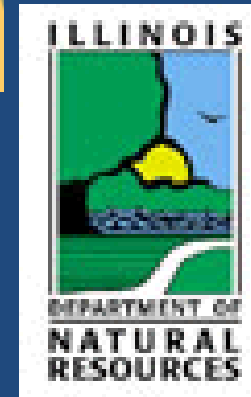






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of Engineers ®

# Team





The End

