



# The Lake Belle View Restoration Project

The Restoration of a Hypereutrophic Millpond  
by River Diversion

Siggi Sigmarsson (Montgomery Associates)

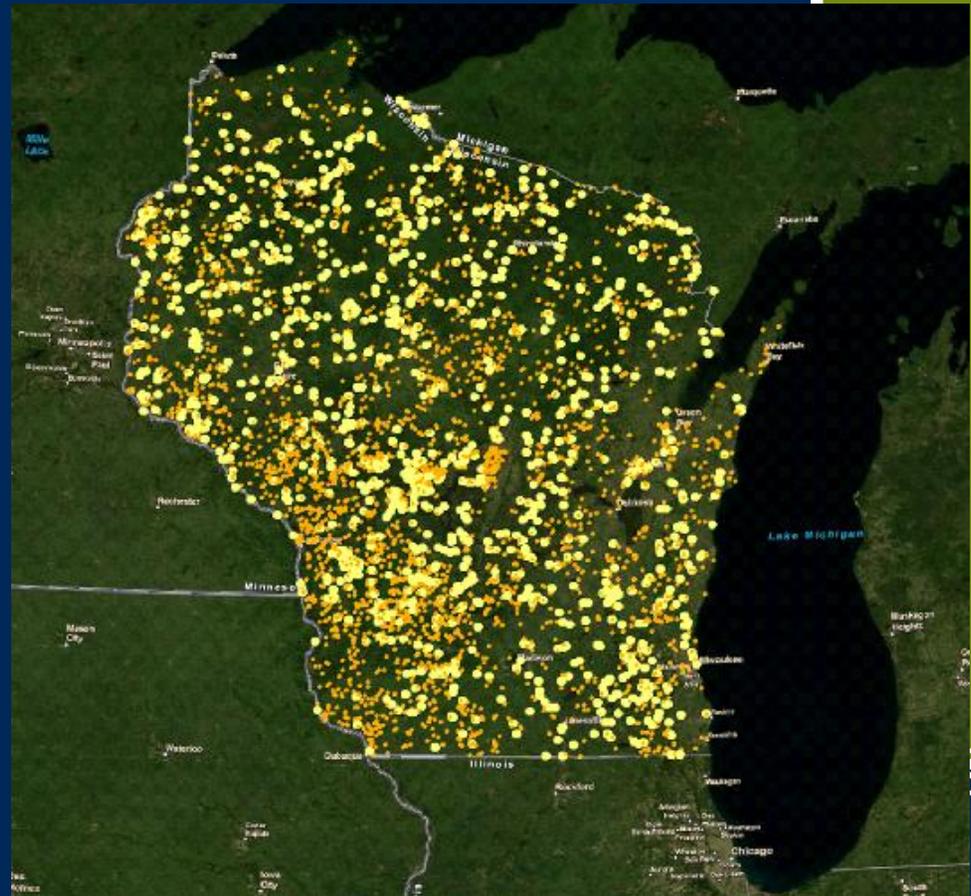
Dave Marshall (Agrecol Environmental Consulting)

2012 Wisconsin Lakes Partnership Convention

April 11, 2012

# Wisconsin Dams and Millponds

- Wisconsin has over 4,900 dams
- Over 1,000 millponds



# Centerpiece of Communities

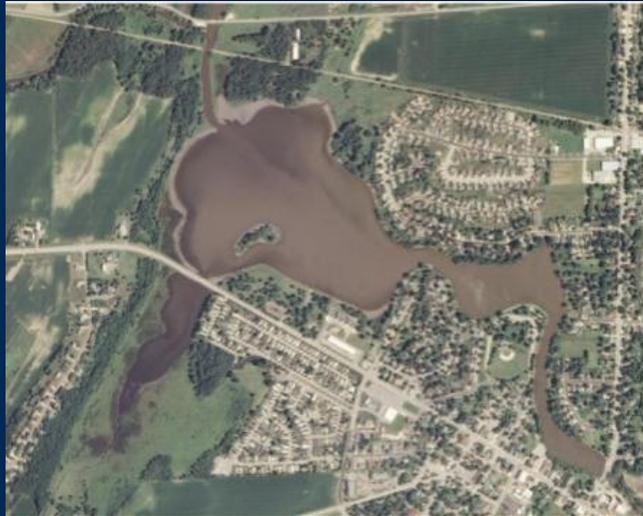


- Historical Value
  - Power, Transit, Commerce
- Current Value
  - Recreation, Commodity, Property, Therapy

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# Millpond Degradation



- Water Quality
- Fishery
- Vegetation
- Sedimentation



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# Typical Mitigation Practices



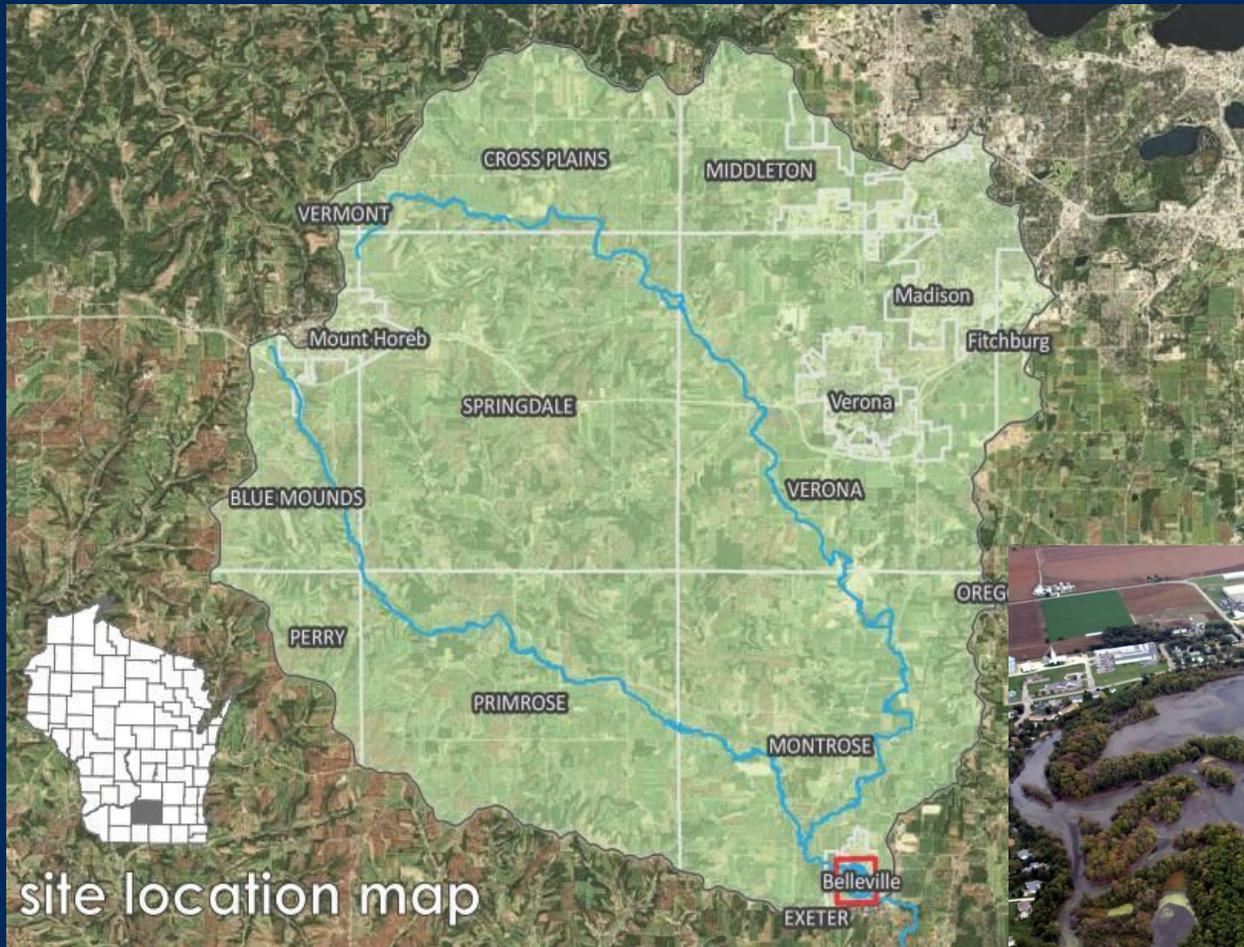
- Watershed Initiatives
- Dredge
- Dam Removal



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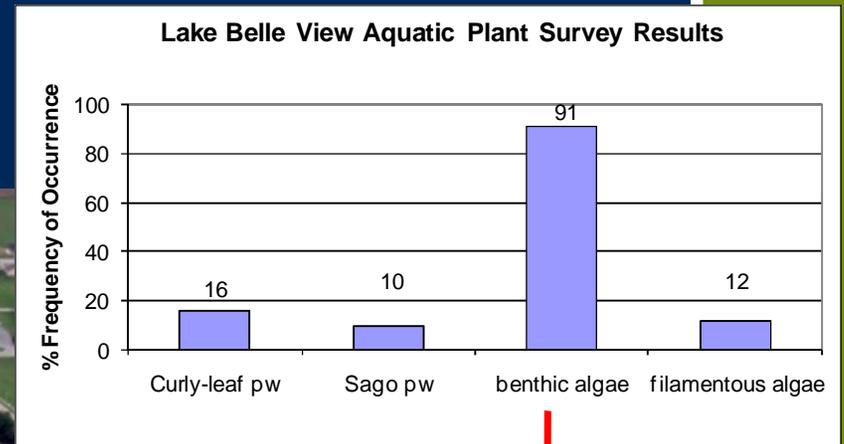
# Lake Belle View



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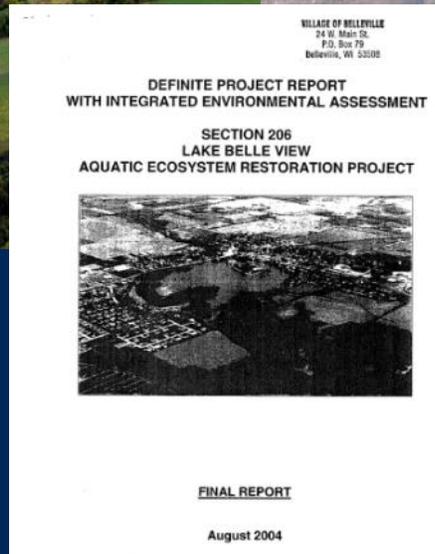
# Lake Belle View Conditions



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# Lake Belle View - Opportunities



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# Lake Belle View Restoration Project

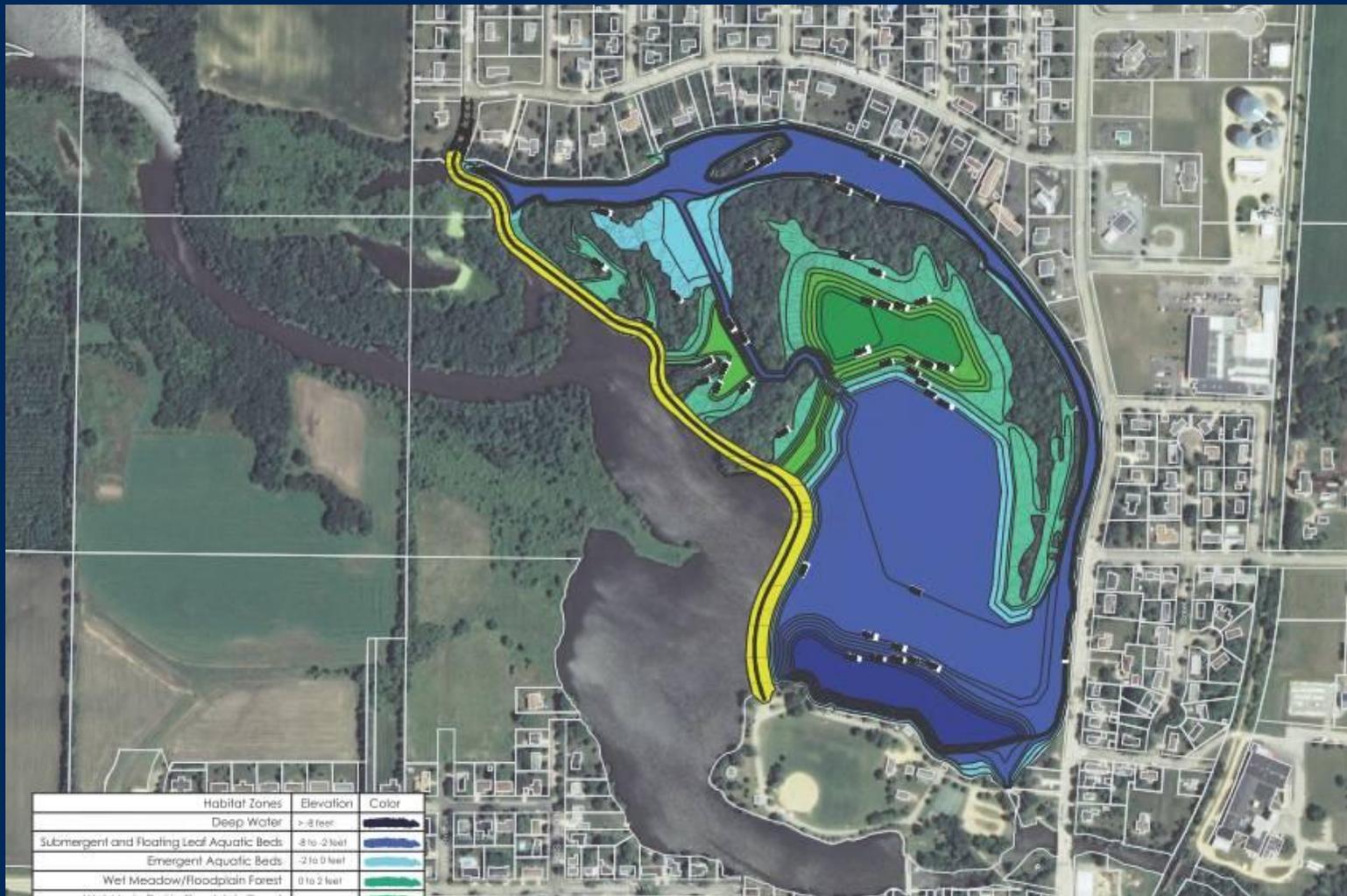
- Problem
  - Degraded Resource
- Multiple Stakeholders
- Goals
  - Restore the Public Asset
  - Improve Fishery
  - Sustainable
  - Maintain Views
  - Maintain Specific Area of Concern
  - Project Cost Must Respect Funding Reality



# Design Elements

- **Separation Berm** to decrease amount of sediment and nutrients delivered to Lake Belle View from the Sugar River
- **Dredging** to provide enhanced recreational opportunities
- **Habitat Enhancement/Restoration** by
  - placement and vegetative restoration of dredged sediment around existing islands,
  - establishment of emergent and submergent vegetation, and
  - establishment of a viable fishery





Habitat Zones	Elevation	Color
Deep Water	> -8 feet	Dark Blue
Submergent and Floating Leaf Aquatic Beds	-8 to -2 feet	Medium Blue
Emergent Aquatic Beds	-2 to 0 feet	Light Blue
Wet Meadow/Floodplain Forest	0 to 2 feet	Light Green
Wet-Mesic Prairie Floodplain/Forest	2 to 5 feet	Medium Green
Mesic Prairie/Forest	> 5 feet	Dark Green
No Mow Fescue (Berm)	0 to 4 feet	Yellow
Bike Path Surface	4 feet	Yellow



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# Before Construction



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# Construction Phase Complete



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# Separation Berm



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# Separation Berm Construction



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 Consulting



[www.ma-rs.org](http://www.ma-rs.org)

# Separation Berm Construction



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# Separation Berm Construction



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# Separation Berm Complete



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# Lake Dredging



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# Lake Prior to Dredging



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# Lake Dredging Construction



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# North Channel Dredging



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# Lake Dredging Construction



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# Main Lake After Construction



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# Habitat Area Fill



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# Habitat Area Fill Construction



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# Habitat Area Fill Construction



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# Habitat Area Fill Construction

March 11, 2011



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# Self Seeded Native Establishment

August, 2011

## Native Species Observed:

Rice Cutgrass – *Leersia oryzoides*

Arrowhead – *Sagittaria latifolia*

Softstem bulrush – *Scirpus validus*

Darkgreen bulrush – *Scirpus atrovirens*

Narrow-Leaved Cattail – *Typha angustifolia*

Broadleaf Smartweed – *Polygonum pensylvanicum*

Blue vervain – *Verbena hastata*

Marsh milkweed – *Asclepias incarnata*

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# Wetland and Habitat Area Vegetation Establishment

- Stabilization Period
  - Quickly stabilize dredge spoils
  - Allow for native seed bank to establish
- Final Restoration Period
  - Identify and protect naturally occurring native species (arising from seed bank and previously existing)
  - Remove existing invasive and newly establishing invasive species from the site
  - Establish climax species including herbaceous native species and trees
- Invasive Species Control over entire site for 10 growing seasons

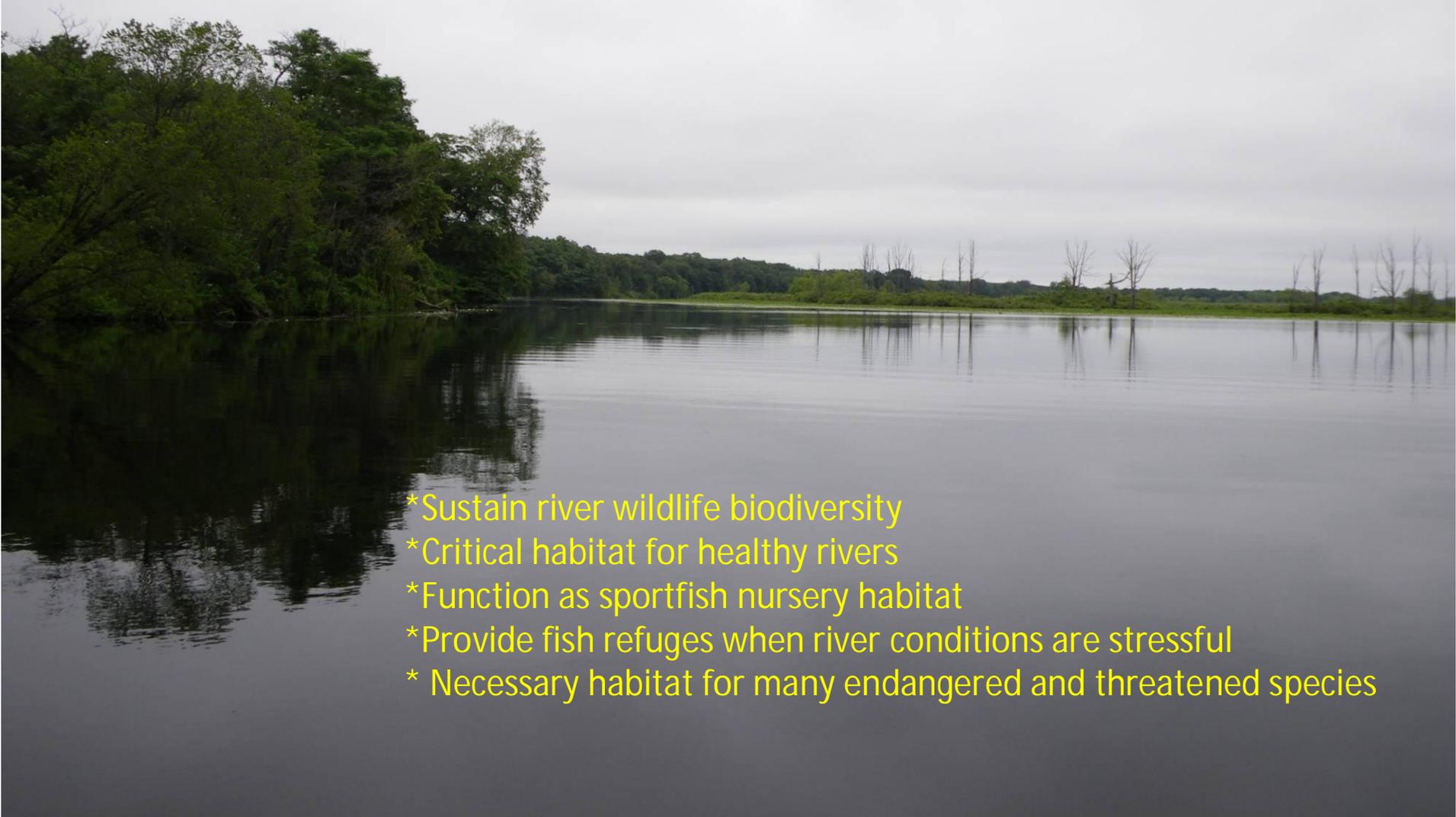


# (Floodplain) Lake Belle View

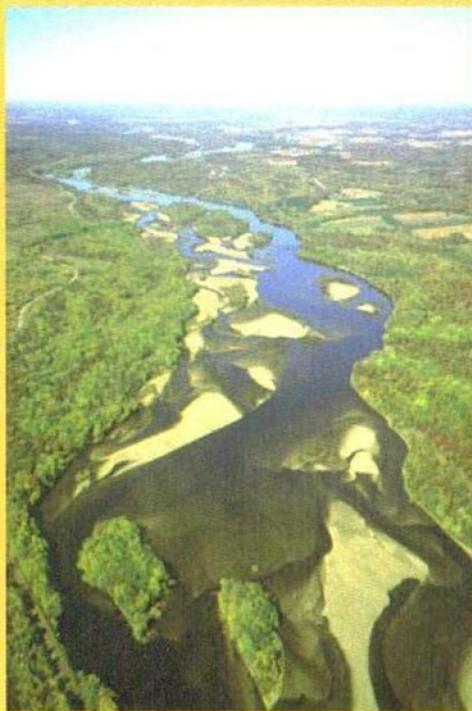


# Oxbows: Ignored class of lakes

(Perhaps the most threatened class of lakes in Wisconsin)

- 
- \*Sustain river wildlife biodiversity
  - \*Critical habitat for healthy rivers
  - \*Function as sportfish nursery habitat
  - \*Provide fish refuges when river conditions are stressful
  - \* Necessary habitat for many endangered and threatened species

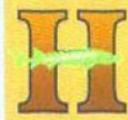
# Rare & Unusual Fishes of the LOWER WISCONSIN RIVER



**RIVER HABITATS CHANGE RAPIDLY** as flowing waters build and reduce sandbars. Sometimes sandbars survive to become forested islands. River flow becomes *braided* around the islands where fallen trees line the shore and become magnets for insects, birds, turtles and fish.



**BACKWATER SLOUGHS AND OXBOWS FORM** when braided channels are cut off from the river. They are nurseries for some river fish, and home for others that avoid fast currents. The fishes in the sloughs and oxbows depend on clean waters that arise from springs and tributaries far beyond the floodplain.

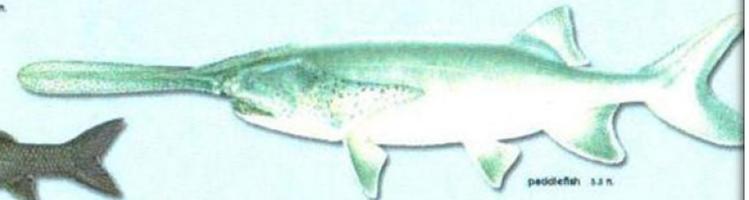
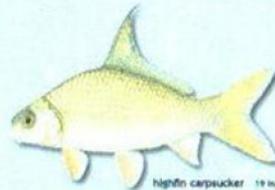


**H**OME TO 98 SPECIES OF FISH, THE LOWER WISCONSIN RIVER is one of the most ecologically diverse large river systems in the United States. This section of the river flows from Prairie du Sac west across the unglaciated Driftless Area to the Mississippi River.

THE DIVERSE ARRAY OF FISH AND OTHER ANIMALS in this protected 92-mile Lower Wisconsin State Riverway reflects the intricate connections of the free-flowing river with its floodplain lakes.



SHIFTING SAND MAKES A HARSH ENVIRONMENT FOR MANY ANIMALS but important niches for others. The *western sand darter* dives into the sand to escape predators while the primitive armored mayfly burrows near the sandy shores. The river hosts many unusual and rare fish, such as the *shoal chub*, *crystal darter*, *bullhead minnow*, *starhead topminnow*, *primitive lampreys*, *gars*, *paddlefish*, and *shovelnose sturgeon*.







Habitat loss due to sedimentation and  
loss of groundwater connectivity

# Orange spotted sunfish (*Lepomis humilis*)



# Blackstripe topminnow (*Fundulus notatus*)



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“Slough pickerel” (*Esox americanus  
vermiculatus*)

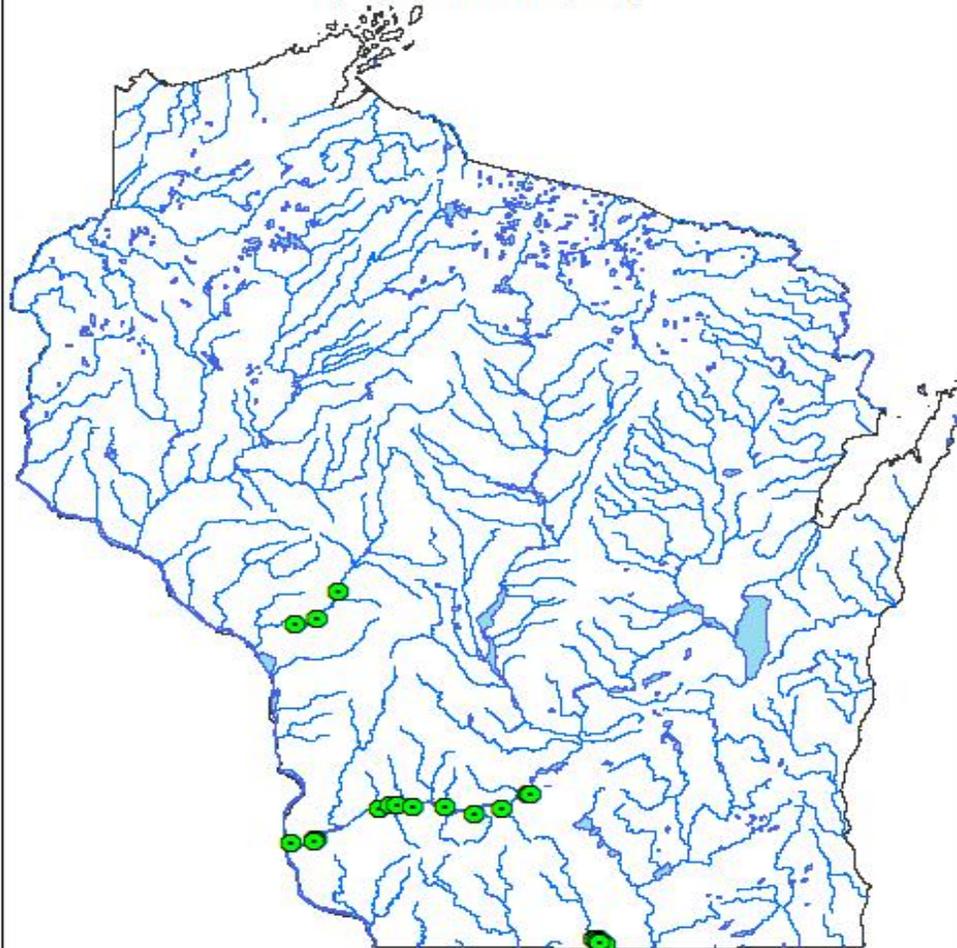
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Starhead topminnow  
(*Fundulus dispar*)  
Endangered

Starhead Topminnow  
(*Fundulus dispar*)



- Distribution in Wisconsin



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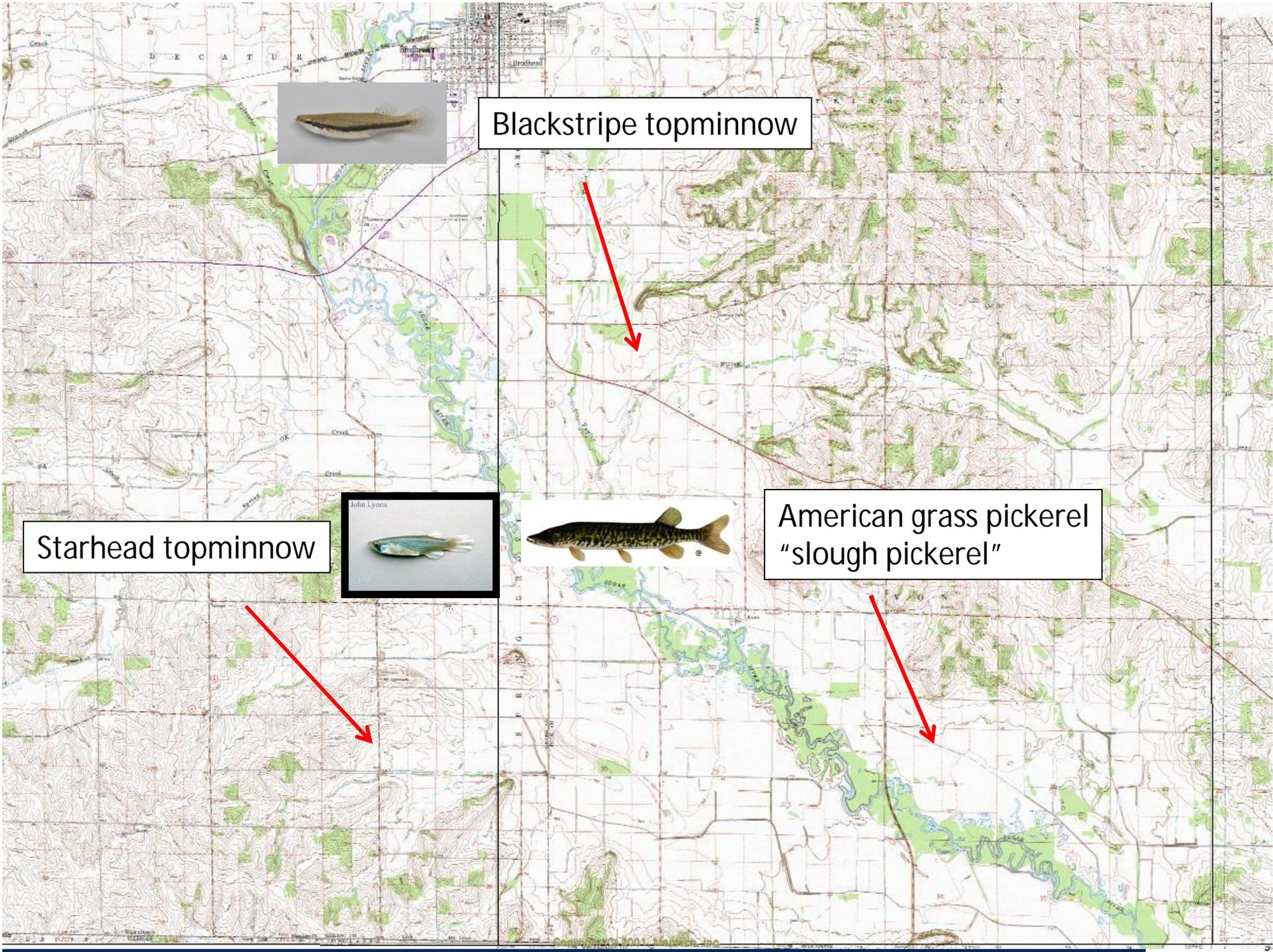
Blackstripe topminnow



Starhead topminnow



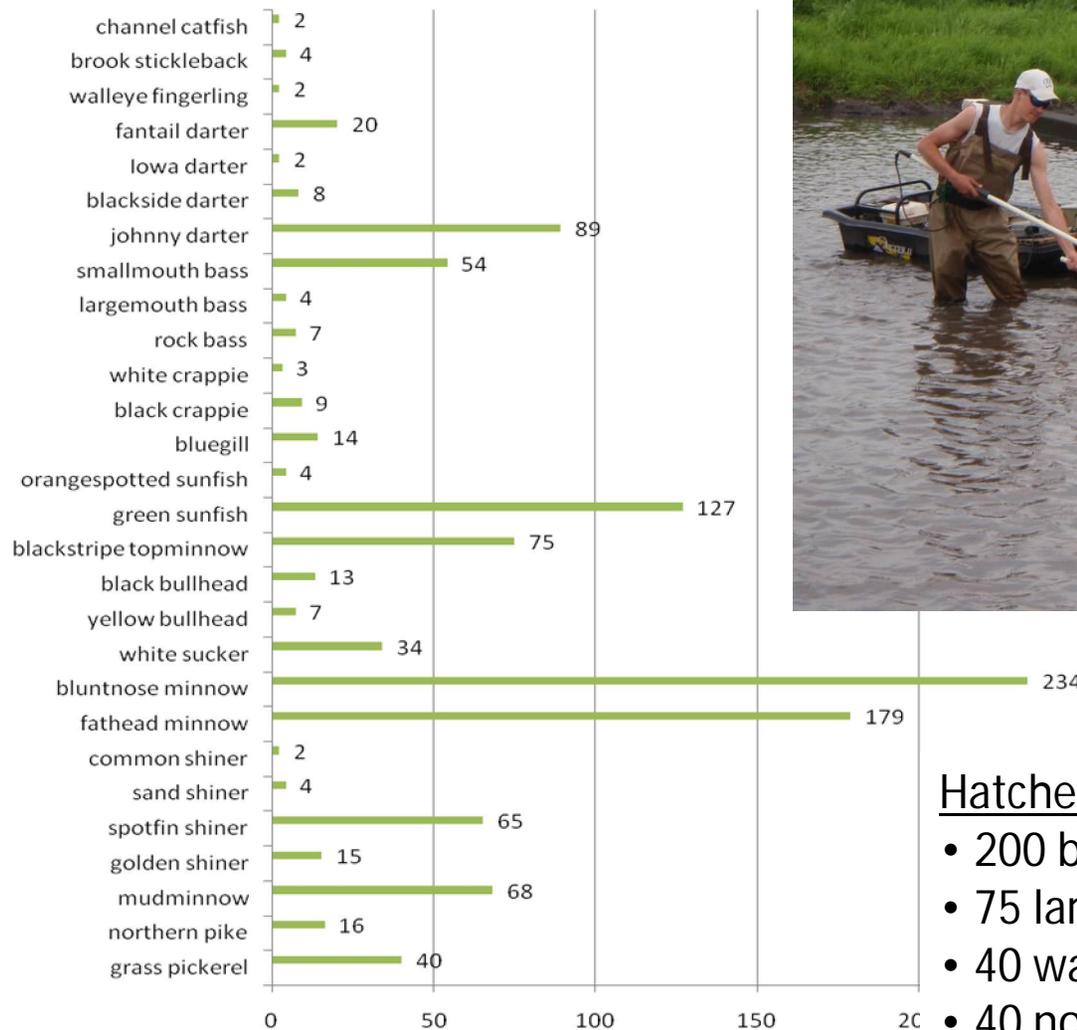
American grass pickerel  
"slough pickerel"





# Fish Transfers/Stocking

2011 L. Belle View Fish Transfer



## Hatchery fish stocking:

- 200 bluegill, 200 black crappie,
- 75 largemouth bass,
- 40 walleye,
- 40 northern pike, and
- 50 lbs. golden shiners

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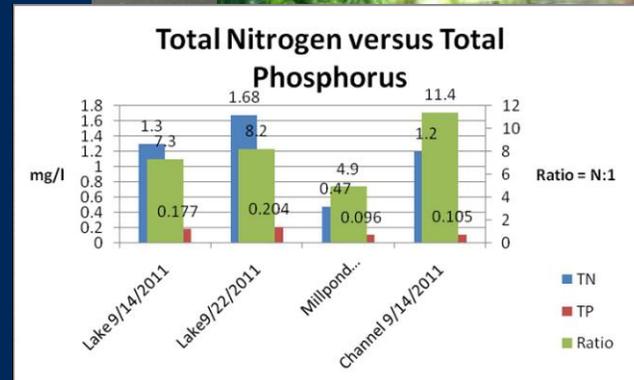






# Moving Forward

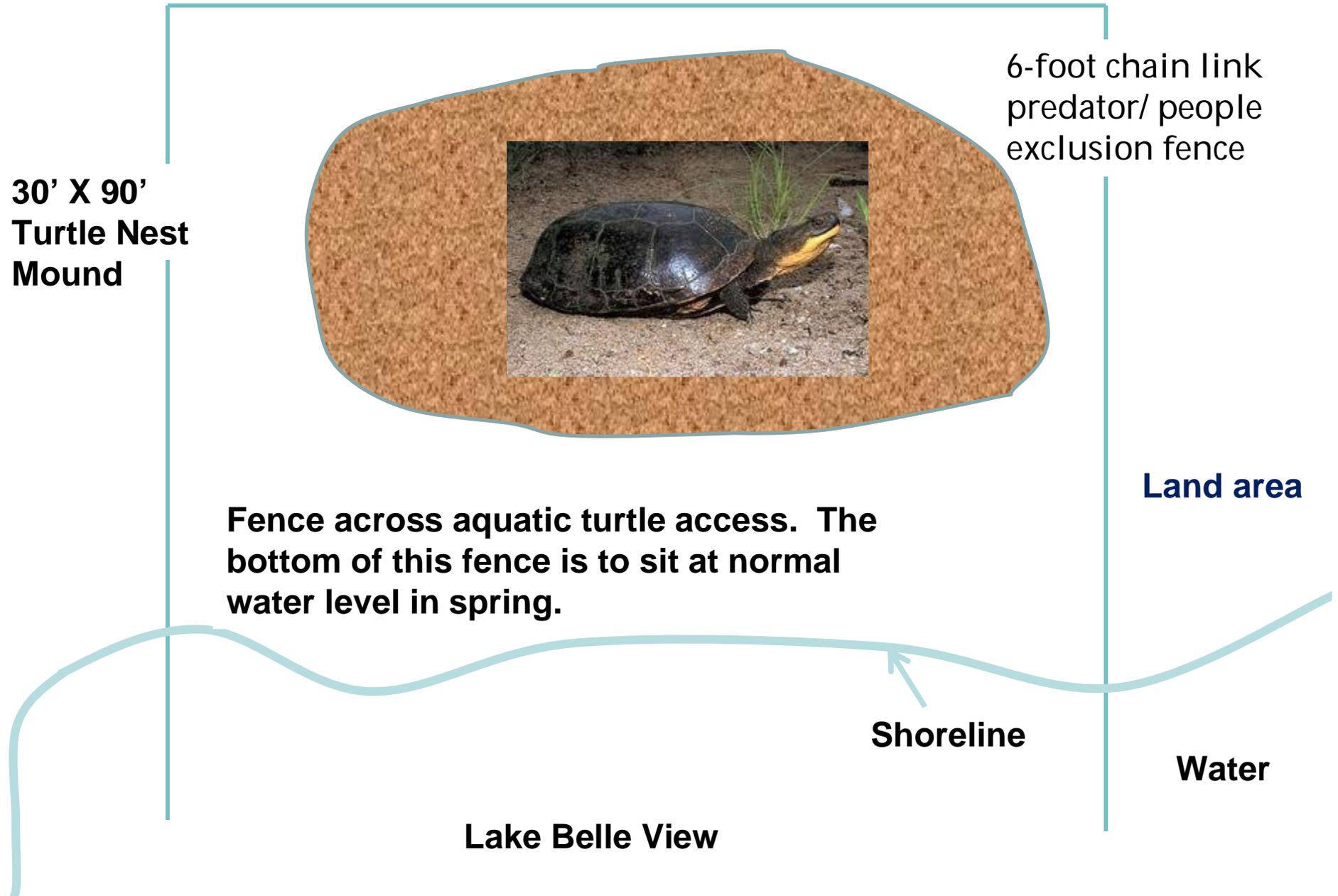
- 10-year maintenance and monitoring plan
- Monitoring of vegetation establishment
- Invasive vegetation control
- Monitoring of Lake water quality
- Monitoring of fisheries establishment
- **Adaptive management**



# (Floodplain) Lake Belle View



# Turtle Nest Site with Predator Fencing





## Lake Belle View - Volunteer Work Day!

Friday, April 13 starting at 9 AM &  
Saturday, April 14 at 9:30 AM.

Please meet at Community Park.  
You can now park in the parking lot.

**Our shipment of 2,000 wild celery tubers  
has arrived! We will have a tuber-planting work  
day. The tubers will require assembly into mesh  
bags with stones, and then will be planted.**

Please bring your canoe if you have one!

For Information: Call 424-1655 or [info@villageofbelleville.com](mailto:info@villageofbelleville.com)



**BELLEVILLE**

*Small community...big heart!*



# Acknowledgements

- Village of Belleville
- Town of Montrose
- Advance Construction (General Contractor)
- WDNR
- Dane County
- USACE
- Project Consulting Team Members (Multiple Firms)
- Jean Kringle for Photographs



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# Questions?



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