

# MUSSEL OVERVIEW

ASK an EXPERT  
ABOUT THE MINNESOTA RIVER

## History

Mussels are often the dominant community found in the substrate of streams and lakes. Historically, mussels were abundant across Minnesota's Rivers and lakes. At one time, across the US and Minnesota, there were large and diverse population of mussels. Humans have used mussels for millennia. Mussels and their shells have played a significant role in many different cultures around the world. North American Indian tribes ate mussels and crafted tools, jewelry and utensils out of the shells. Their importance to Native Americans can be seen by the large shell mounds associated with historic village sites.



## Explorer's Account (1830s)

Wisconsin Electronic Reader



George Featherstonhaugh was an Englishman who explored the Minnesota River from Fort Snelling to Lake Traverse in 1835.

Canoeing from the Blue Earth River confluence to Granite Falls, he remarked on a "great profusion of unios [mussels] lying on the sandy bottom."

Downstream from the Redwood River confluence, "We found the river diminish from two feet and a half to one foot, the water beautifully transparent, and the unios [mussels] stuck in countless numbers in the pure white sand, so that I could, by baring my arm, select them as we went along."

## Did You Know? Mussels from Minnesota River used for Buttons



## Button Industry (1900s)

In the late 1800s and early 1900s enormous numbers of freshwater mussels were harvested for button-making to make pearl buttons for clothing. This became a multi-million dollar business. New Ulm was a center for this industry in the Minnesota River. the industry collapsed in the 1940s and 1950s due to the invention and widespread use of plastic buttons. A new market for freshwater mussels developed using cultured pearls for jewelry in the 1950s by the Japanese, specifically using the washboard and threeridge mussels. Mussel shells were cut and inserted into an oyster to serve as a nuclei for cultured pearls. Mussels are now protected in Minnesota and a permit is required to collect live mussels.



Timeline

1916

A crew of clambers arrived in Granite Falls to dig for mussels. They used boats with rakes between Montevideo and Mankato to gather 10 tons of shells worth \$30,000 to ship to the button factories in Iowa.

1917

The mussel harvest was a poor one with the beds worked over from the previous summer.

1921

Fourteen tons of shells were shipped from Granite Falls and 16 tons from Wegdahl to the Muscatell Button Factory.

1926

Minnesota Conservation Department banned clamming on the Minnesota River between the Yellow Medicine and Lac qui Parle rivers.

1933

Twenty to thirty men were hired by the Smith Brothers of Granite Falls to dig mussels with 80 tons of shells shipped to button factories. The meat from the mussels were boiled and sold for hog feed.

Today

No live mussels may be collected in Minnesota without a special permit.  
Source: <http://www.karipearls.com/pearl-buttons.html>

# MUSSELS

## Today – Canaries of Water Quality Despite declines in historic diversity, mussels now show static trends



The presence or absence of mussels is a biological indicator of a river's health. This freshwater organism can be found in rivers and lakes on every continent except Antarctica. As a member of the second largest group of animals in the world – the Mollusks – mussels spend their entire life partially or wholly buried in mud, sand or gravel in permanent bodies of water.



### Nationally

The Nature Conservancy reports that about 70 percent of mussels in North America are extinct or imperiled, compared to 16.5 percent of mammalian species and 14.6 percent of bird species. Of the 297 known species and subspecies of freshwater mussels in North America, 213 are listed as either endangered, threatened or of special concern. The US Fish and Wildlife Service states that the fact that so many species of mussels are imperiled in the Midwest shows that there has been significant, long-term changes to our lakes and waterways. And those changes have been so dramatic that these aquatic species are having trouble surviving.

### Minnesota

Of the almost 300 species found in North America (more than any other continent), 48 are considered native to Minnesota. Unfortunately, 25 of those species are listed as endangered, threatened, or of special concern, and two are believed to be extirpated.

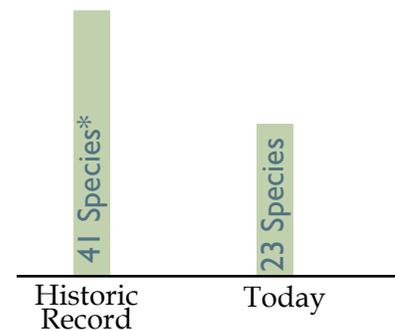
### Minnesota River Basin

At one time, the Minnesota River Basin supported 41 species of mussels. Today only 23 can be found, some of which are critically imperiled in the system. Researchers estimate that today 50 percent of mussels have disappeared from the Basin as a whole. It is worse in the Lower Minnesota where 66 percent of mussel species have been lost. Compared to other river basins in the state, Minnesota River Basin mussel diversity ranks near the bottom. However, a number of the watersheds still contain healthy mussel assemblages. In particular, the headwater watersheds like the Chippewa and the Pomme de Terre.

### What is killing Mussels?

- Dredging,
- Chemical pollution,
- Sedimentation,
- Channelization,
- Wetland drainage,
- Overharvesting of mussels,
- Excessive tiling – causing rapid bounces in river levels,
- Dams - prevent fish migration,
- Industrial pollution,
- Competition from exotic species

### Number of Mussel Species in the Minnesota River Basin



\* 40 species are confirmed with a historic record of scaleshell. There is an unresolved discovery of a *Quadrula* species.

## What is a mussel survey?

Mussels act as sentinels for water quality by telling us about the health of that particular river's habitat, ecosystem and water quality. Their presence or absence is an indicator of the river's health. The Minnesota Department of Natural Resources (MDNR) conducts surveys across the state to record the distribution and abundance patterns of mussels. This information is used to protect areas with healthy mussel populations and target areas that have seen a loss of species and numbers. To conduct a survey, mussel experts (malacologists) will search the bottom of a river in a particular area by using their hands to feel for the mussels. If the water is low enough they wade through the river on their knees or use scuba equipment if the water level is higher. Typical surveys include a count of live species and species no longer found except for their shells.

## What trends do the surveys show?

MDNR Mussel experts have identified a number of patterns in the Minnesota River Basin. The lower Minnesota River and its corresponding watersheds have been hit harder with loss mussels compared to those watersheds found in the upper portion of the basin. There has been a loss of 65% of the mussel species once found in the lower Minnesota River mainstem. The Greater Blue Earth River Watershed (including the Watonwan, Blue Earth, and Le Sueur River river watersheds) is one of the most degraded. MDNR surveys show a 48% loss of species diversity (only 13 of the 25 historic mussel species in the watershed were found). Even some of the most common mussel species – fat mucket, three ridge and Wabash pigtoe – found in other areas of the basin are rare or have disappeared from the Greater Blue Earth River system.

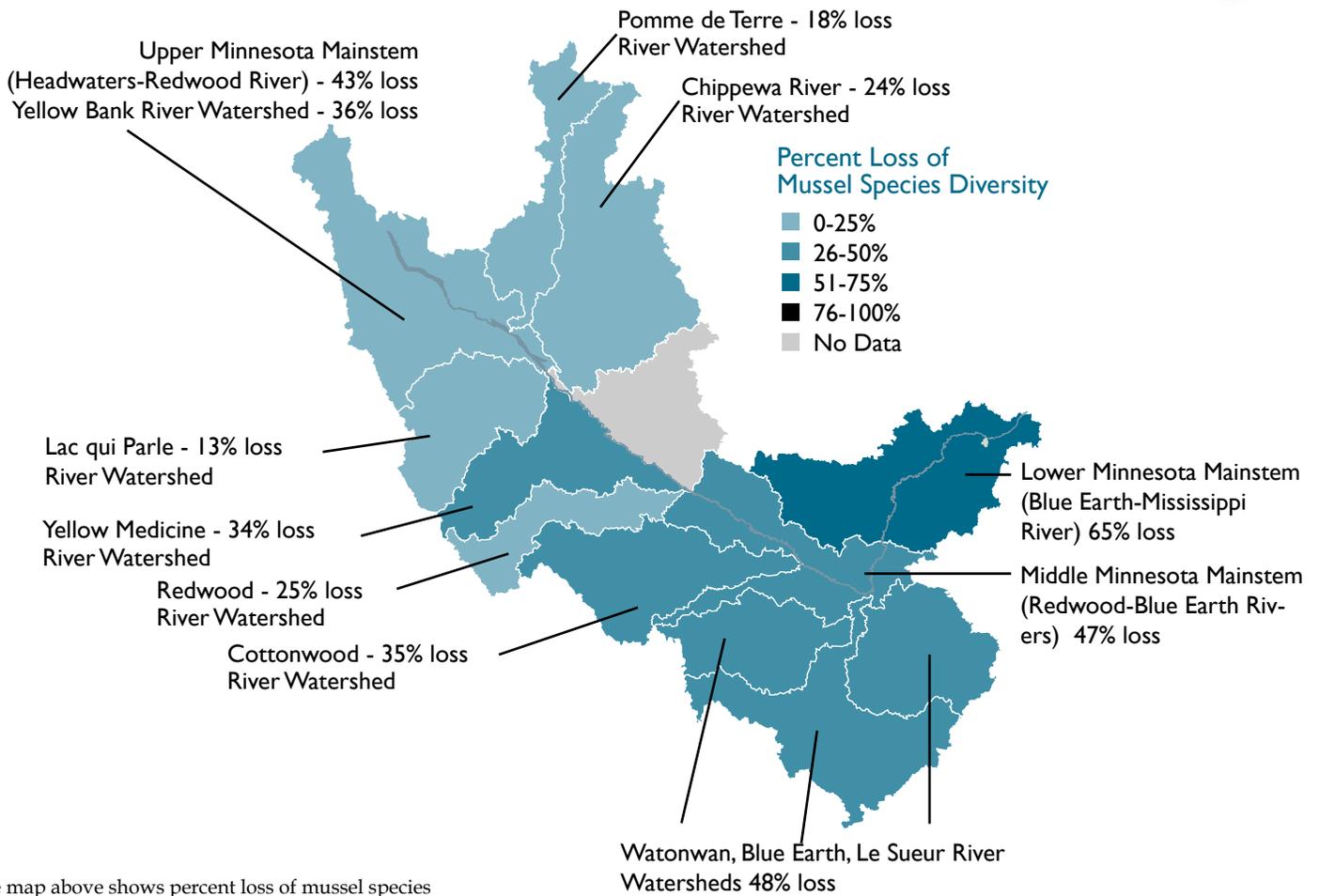
The Cottonwood River Watershed, researchers found a 35% loss (total of 13 out of 20 different species were recorded). The most common mussels found were the plain pocketbook and fat mucket. The Chippewa and Pomme de Terre watersheds hold some of the best remaining mussel assemblages in the entire Minnesota River Basin system. This includes reproducing population of black sandshell and elktoe, and the only remaining population of spike within the entire system. Both the spike and black sandshell (each listed as special concern) have disappeared from the main stem of the Minnesota River. The Chippewa and Pomme de Terre rivers retain a majority of the mussel species historically found in the two watersheds. The Chippewa River Watershed surveys note a 24% loss (16 out of 21 mussel species are still found) and the Pomme de Terre shows only a 18% loss of mussel diversity (14 out of 17 species).

See the "Minnesota River Basin Mussel Survey" handout for more information.

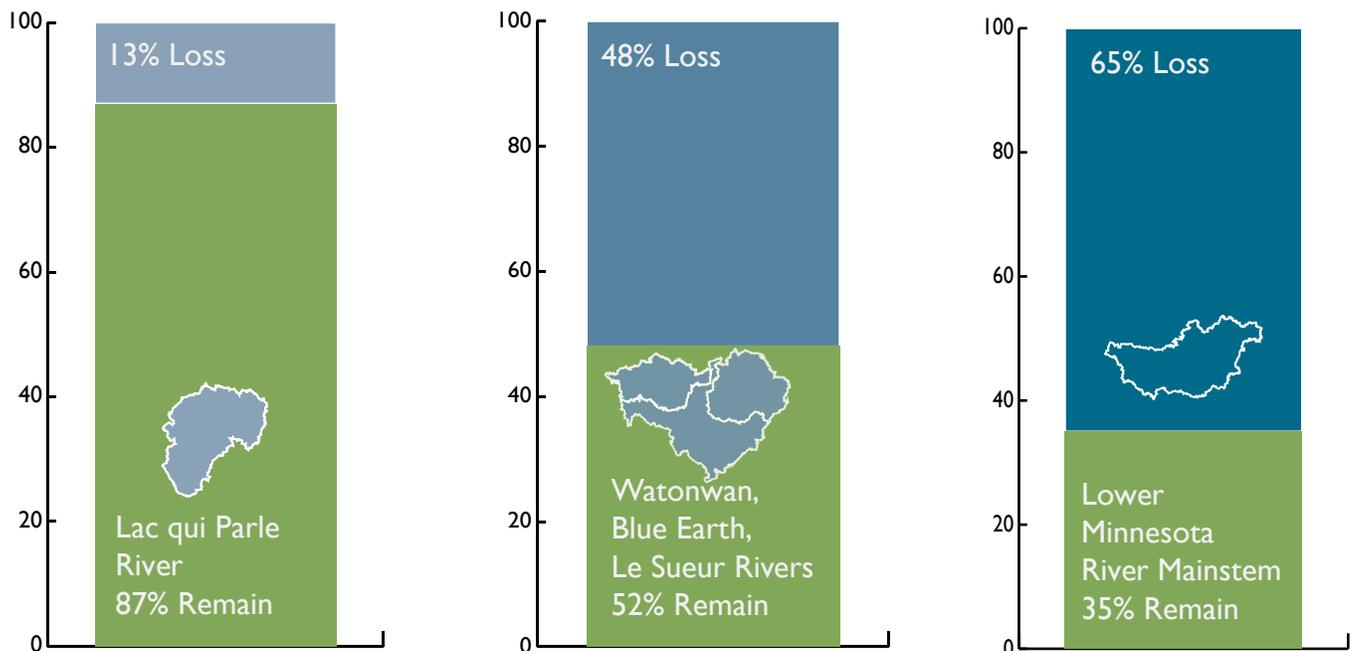


# MUSSEL SURVEY MAP

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The map above shows percent loss of mussel species in watersheds across the Minnesota River Basin based on mussel surveys performed by the Minnesota Department of Natural Resources.



The graphs above show percent mussel species diversity loss in selected watersheds across the basin.

## QUESTIONS & ANSWERS



Mike Davis

### What is the current status of mussels in the Minnesota River Basin?

“Historically, the Minnesota River Basin had an outstanding mussel assemblage of at least 41 different mussel species. Only 50 percent of those original species remain today.”

- Bernard E. Sietman

### Why have mussels declined in the Minnesota River Basin?

“Mussel diversity and abundance has declined due to elevated sediment load, unstable river beds, and unpredictable water levels.” - Bernard E. Sietman

### How do mussels the Minnesota River Basin compare to other basins in the state?

“Once the Minnesota River Basin had a similar diversity of mussels like you find today in the St. Croix and Mississippi River system. I think that the Minnesota River is at the bottom of the list statewide.” - Mike Davis

### Is there a pattern for mussel distribution across the basin?

“The Minnesota Department of Natural Resources (MDNR) has conducted surveys in the basin and found some bright spots. Both the Chippewa and Pomme de Terre Rivers support healthy populations of the very rare spike and black sandshell mussels.” - Mike Davis

“A number of rare mussels are found in the Chippewa River. The water quality and habitat are in good shape for them to survive and thrive. There are species present that are not found anywhere else in the Minnesota River Basin.”

- Paul Wymar

### What role do mussels play in the river ecosystem?

“As filter-feeders, they are pulling nutrients from the water column and extruding them in a different form that other algae, insects, and fish can eat. If you have enough mussels to create a mussel bed on the bottom, they stabilize the riverbed.”

- Mike Davis

Learn from these experts, video clips available at:  
[mrbdc.mnsu.edu/learn](http://mrbdc.mnsu.edu/learn)



Bernard Sietman



Paul Wymar

Thanks to Bernard E. Sietman and Mike Davis, MDNR and Paul Wymar, Chippewa River Watershed Project.

“Ask an Expert about the Minnesota River” project profiles scientists and citizens answering questions about the health of the Minnesota River. More answers to questions about the Minnesota River can be found at: [mrbdc.mnsu.edu/learn](http://mrbdc.mnsu.edu/learn)

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