The Oxbow

FROM THE NORTH DAKOTA STATE WATER COMMISSION

ECONOMIC IMPACTS & ASSOCIATED RISKS OF AQUATIC INVASIVE SPECIES

This summer we were reminded again of the risks to water infrastructure imposed by Aquatic Invasive Species (AIS), a subset of which cause harm to economic values and ecosystems, and are commonly referred to as Aquatic Nuisance Species (ANS). North Dakota Game and Fish Department reported that Zebra mussels, one of the family of mussels called *dreissenids*, were identified in Lake Ashtabula in 2019. One of the scary lessons of ANS, and especially Zebra and Quagga mussels, is that once they are in a system and breeding, it is too late to effectively control them within that water body.

Confirmation of breeding Zebra mussels in new areas of the state highlights the need to be diligent and proactive in protecting our lakes, rivers, streams and water infrastructure. It is also a call to better communicate what infrastructure and economic values are at risk. Infestation could have fiscal impacts to future local operational budgets, as well as, future state funding programs. The complex question that will ultimately be considered by the Legislature is where will the funding to address the need for resistive materials, design changes, filtration systems, and damages come from? One study in 2005, estimated that Zebra and Quagga mussels could cause nearly $1 billion in damages and control costs annually nation-wide, and that was over 15 years ago.

Two major impacts are clear, once established, Zebra mussels can reach densities of 100,000 individuals per square foot. This density clogs intakes, screens, and pipes, and hampers mechanical control mechanisms. Secondarily, even if chemically killed, the carcasses are still an impediment to flow, valves, seals, and must be flushed or manually removed. Understanding the intense proliferation and potential impacts begins to paint a worrisome picture for water managers.

THE REAL QUESTION IS
WHAT IS AT RISK?

One study by the University of Montana (Nelson et al., 2019) broke the risks down into eight categories. The study went on to estimate the annual cost of *dreissenid* infestation for each category in the Montana portion of the Missouri watershed. All costs below are per year estimates for eastern Montana.

1. Irrigation and Livestock Water: Pumps, distribution lines, gated pipes, sprinkler heads/jets and stock watering systems are all susceptible to damage and would require retrofitting and/or maintenance. Estimated costs are $25 million to $53 million for irrigation, and up to $180,000 for livestock water.

2. Water Treatment Facilities: Intakes, screens, pumps, small diameter piping and valve instrumentation, and water aesthetics all require mitigation in the presence of *dreissenid* mussels. The pseudo feces from *dreissenids* contains bacteria that produce geosmin, which can cause undesirable odor and taste in potable water that requires additional treatment to remove or mask. Estimated costs are $6 million.

3. Thermoelectric, Mining and Industrial *(Coal and gas fired electric generation, extraction of coal, sand, crude petroleum and natural gas fall under this category. ND may see even higher costs in this category due to the magnitude of these industries in ND vs eastern MT.)*: Intakes, screens, pumps, small diameter piping, distribution lines, tankers, and valve instrumentation would be impacted. Estimated costs for thermoelectric are $7.9 million - $8 million, mining $1.2 million – $1.3 million, and other industrial are up to $0.6 million.

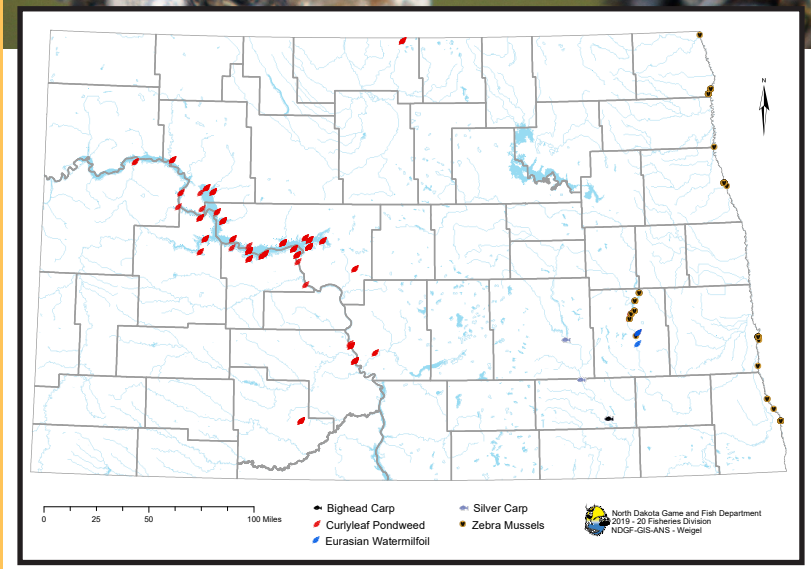
4. Domestic Self Supply *(This category will be minimal in ND)*: Retrofits with filtration and chlorine injection systems are estimated to cost less than $0.4 million.

5. Hydroelectric Power Generation: Requires a variety of system responses to mitigate the entirety of the affected infrastructure. Estimated costs for UV light systems and duplex strainers are $2.3 million, foul release coatings are $0.8 million, and generation downtime could be $2 million - $10 million.

6. Recreation Boating and Fishing: Estimated costs for boating are $7.4 million and fishing $2.7 million – $13.5 million.

7. Tourism: Water based tourism impacts from lost revenue could be $10.7 million – $53.4 million.

8. Property Values: These are linked to aesthetic and use values of properties on streams, rivers, and reservoirs. *Dreissenid* infestations increase incidence of blue-green algae blooms and cyanobacteria outbreaks. Estimated costs to property values are $18 million - $31 million.



The presence of ANS in North Dakota increases the risk of transportation between in-state waterbodies. The map indicates where ANS have been confirmed by the North Dakota Game and Fish Department.

We can expect several of the aforementioned costs in eastern MT to be similar in ND. However, the size of North Dakota's oil and gas industry is at least 600% larger than Montana's, so the previously outlined estimates could be very low. Based on the example from our neighbors to the west, the costs of a full infestation can be alarming. The magnitude of these small mollusks on discretionary budgets of the state, all the way down to the individual farmer, could seriously limit investment in other opportunities. In addition, local water authorities will have to be prepared to include additional maintenance costs in their budgets. And, the cost of industrial water for mining, power generation, and oil and gas extraction will have to absorb additional costs of production due to improvements, and operations and maintenance expenses.