



From: Senator Kathy Bernier
To: The Senate Committee on Natural Resources & Energy
Re: Testimony on Senate Bill 234

Relating to: biomanipulation projects to improve the water quality of lakes and impoundments and making an appropriation

Date: April 8, 2021

Chairman Cowles and members of the committee, thank you for hearing Senate Bill 234 today. This bill came out of the Speaker's Task Force on Water Quality and is one of many tools that we would hope to give the people of Wisconsin when addressing water quality issues in our many waterways.

Senate Bill 234 would create a one-time grant allocation to fund water clean up projects using biomanipulation in the state. Biomanipulation is the process of introducing or removing species in the lake's ecosystem in order to reduce algae blooms and other hazards that are harmful to water quality. The DNR is already able to do these projects under current law, this bill would just provide the Department with resources to help lake groups that want to use this method as a means of cleaning up their lake.

Everyone understands that biomanipulation is not a silver bullet for improving water quality in every situation, but it has proven to be a critical step in many challenging lakes and other waterways across the globe. The more we can find out about it and its effectiveness, the more Wisconsin lakes can be rehabilitated.

For a relatively small investment, we can see what sort of results we can achieve using this scientific method to help lakes get healthy. I hope you will join me and Representative Summerfield in supporting SB 234 and ensuring that everyone has access to clean, healthy water in Wisconsin.



Senate Committee on Natural Resources and Energy

2021 Senate Bill 234

Biomanipulations to improve the water quality of lakes and impoundments

April 8, 2021

Good afternoon Chair Cowles and members of the Committee. My name is Meredith Penthorn, and I am the Fisheries Management Policy Specialist for the Wisconsin Department of Natural Resources. I am joined by Todd Kalish, Fisheries Management Deputy Bureau Director, and Carroll Schaal, Lakes and Rivers Section Chief with the Bureau of Water Quality. Thank you for the opportunity to testify, for informational purposes, on Senate Bill 234, related to biomanipulations to improve the water quality of lakes and impoundments and making an appropriation.

This bill would provide an additional funding source for biomanipulation studies and activities with the overarching goal of improving water quality for lakes and impoundments on the impaired waters list. While the Department of Natural Resources periodically conducts biomanipulation projects for various purposes, including enhancing sport fisheries and rehabilitating aquatic ecosystems, this bill would create a new appropriation to assist local water improvement groups in conducting similar projects specifically for improving water quality. Local water improvement groups would conduct these projects under the oversight of the department.

The new appropriation could benefit waters of the state by allowing more work to be conducted on certain impaired waters that the department alone cannot accomplish with current funding or staffing levels. This would also allow local water improvement groups to assume a greater role in management of the waters in their communities. However, the department cautions that biomanipulation may not be efficient or effective at improving water quality on waters with excessive nutrient or pollutant inputs, without concurrent reduction of those inputs. Experience and research suggest that biomanipulation may also be less successful on shallow waterbodies connected to flowing waters due to an increased risk of recolonization by detrimental fish species. In addition, anoxic conditions could limit the success of fish introductions aimed to control undesirable fish species.

Some biomanipulation projects, namely those involving the removal or addition of fish, could impact angler activity on the water. This could lead to a perception of user conflict if anglers feel excluded from any plans to remove fish by methods other than fishing, especially if game fish such as overabundant panfish are considered to be detrimental in the waterbody, or on waters with high angler harvest pressure on stocked piscivorous fish. Outreach and education to anglers in the vicinity of the waterbody could help reduce any concerns and increase public buy-in.

The DNR estimates that the proposed one-time appropriation of \$150,000 would fund biomanipulation projects on one to two waterbodies during the biennium. To ensure that the projects are feasible for meeting the goal of improved water quality, the department could utilize an existing surface water grants

program to administer these grants, which would draw from a pool of eligible applicants and would require a formal plan to be submitted with the application materials. Grants could also be solicited and awarded for surveys, studies, and developing plans for biomanipulation projects. The department could publish an announcement soliciting applications for biomanipulation projects, including the screening process and procedures for monitoring grant activities, in its annual grant application guidance. These processes would entail collaboration between the Bureaus of Fisheries Management, Water Quality, Watershed Management, Office of Applied Science and potentially other DNR programs. Costs associated with implementing this bill would include staff time to create the needed guidance, review applications, process grants, participate in public outreach efforts at the request of local water improvement groups, and oversee grant project activities, as well as to ensure that the project is supported by biological survey data and management plans.

We would like to thank the authors of this bill for acknowledging our comments on last session's Senate Bill 725, which required projects to include both zooplanktivorous and benthivorous fish removal and piscivorous fish introductions, as well as comprehensive fish studies, to be eligible for a grant. While Senate Bill 234 would require the department to prioritize projects that include all three activities, the bill allows for a combination of fish removals or introductions and comprehensive fish studies. We appreciate the additional flexibility in this bill, which would allow the department to also consider projects that encompass other types of ecological activities that may achieve water quality goals, such as water level management, in addition to the specified biomanipulation activities. Such flexibility will expand the pool of local water improvement groups that may be eligible to apply for this grant.

On behalf of the Department of Natural Resources, we would like to thank you for your time today. We would be happy to answer any questions you may have.

04-08-2021

I am writing to support Biomanipulation introduced in Senate Bill 234.

Dear Committee on Natural Resources and Energy,

My name is Dr. Scott McGovern I am a researcher in cyanobacteria mitigation and the public health concerns that these algae-like organisms pose by the toxins these organisms produce. Most of the lakes that are stated as having an algae problem are affected by cyanobacteria, a photosynthetic prokaryotic organism. Most watershed mitigation techniques mainly focus on the reduction of phosphate through the control of agricultural runoff to address problems such as cyanobacteria blooms. However, research has shown that these techniques have often not achieved the desired results (Sharpley et.al., 2014). Consequently, I have been interested in an approach to watershed mitigation that implements multiple techniques. The scientific literature has demonstrated that using multiple techniques rather than a single approach to watershed mitigation has been significantly more successful and biomanipulation has been a common element in these lake studies (Anandotter, 1999). Biomanipulation offers an inexpensive and effective addition to mitigating lakes infested with cyanobacteria caused by excessive nutrients. Biomanipulation is widely used in Europe and is becoming more common in the United States as well as other parts of the world (Triest, Stiers and Van Onsem, 2015). This bill introducing support for biomanipulation can provide an important tool for the reduction of harmful cyanobacteria and I strongly believe it to be an important step for water quality improvement.

Biomanipulation is balancing a lake ecosystem so that the natural food webs that exist within a lake can alleviate an imbalance such as excessive cyanobacteria growth. Three aspects of the lake ecosystem must change to realize an improvement in water clarity, an increase in the number of zooplankton, increased coverage of the lake with macrophytes (large aquatic plants) and the fish population must change to a more balanced population. Zooplankton such as daphnia, copepods, and seed shrimp consume photosynthetic organisms, therefore; increasing zooplankton reduces cyanobacteria improving water clarity. Benthivorous or bottom-dwelling fish destroy macrophytes and their young consume zooplankton making their reduction important for two reasons. Similarly, lakes have zooplanktivorous fish that can negatively impact a lake by also eating zooplankton. Predator fish stocking to reduce zooplanktivorous fish and benthivorous fish removal are techniques to stop the consumption of zooplankton. The root cause may be nutrient enrichment, however; managing a lake with biomanipulation will allow less predation on zooplankton. As a result, the reduction of the green organisms is accomplished by increased grazing. In addition, reducing benthivorous fish will increase macrophyte growth. Consequently, increasing lake macrophytes, (large aquatic plants) will provide refuge habitat for zooplankton and a method of reducing nutrients making it unavailable for cyanobacteria. Nutrient reduction is important, but this method reduces harmful cyanobacteria by direct consumption, macrophyte competition for nutrients, and the removal of benthivorous fish through stopping their perturbation of the bottom sediment and macrophyte destruction. Macrophytes, therefore, increase when benthivorous fish are removed and if further increases of macrophytes are needed seeds and entire plants can be added to increase the coverage to further benefit the lake ecosystem.

Biomanipulation is said to work the best in shallow eutrophic (nutrient-rich) lakes although it has been used extensively in all types of lakes. The method is inexpensive compared to many other lake

remediation techniques, effective, it can use nets rather than toxic chemicals to remove fish and can be adjusted to fit individual lake ecosystems. The biomanipulation process will improve the fish populations and habitat of lakes restoring the water to a balanced state. There is not a negative side to using biomanipulation techniques.

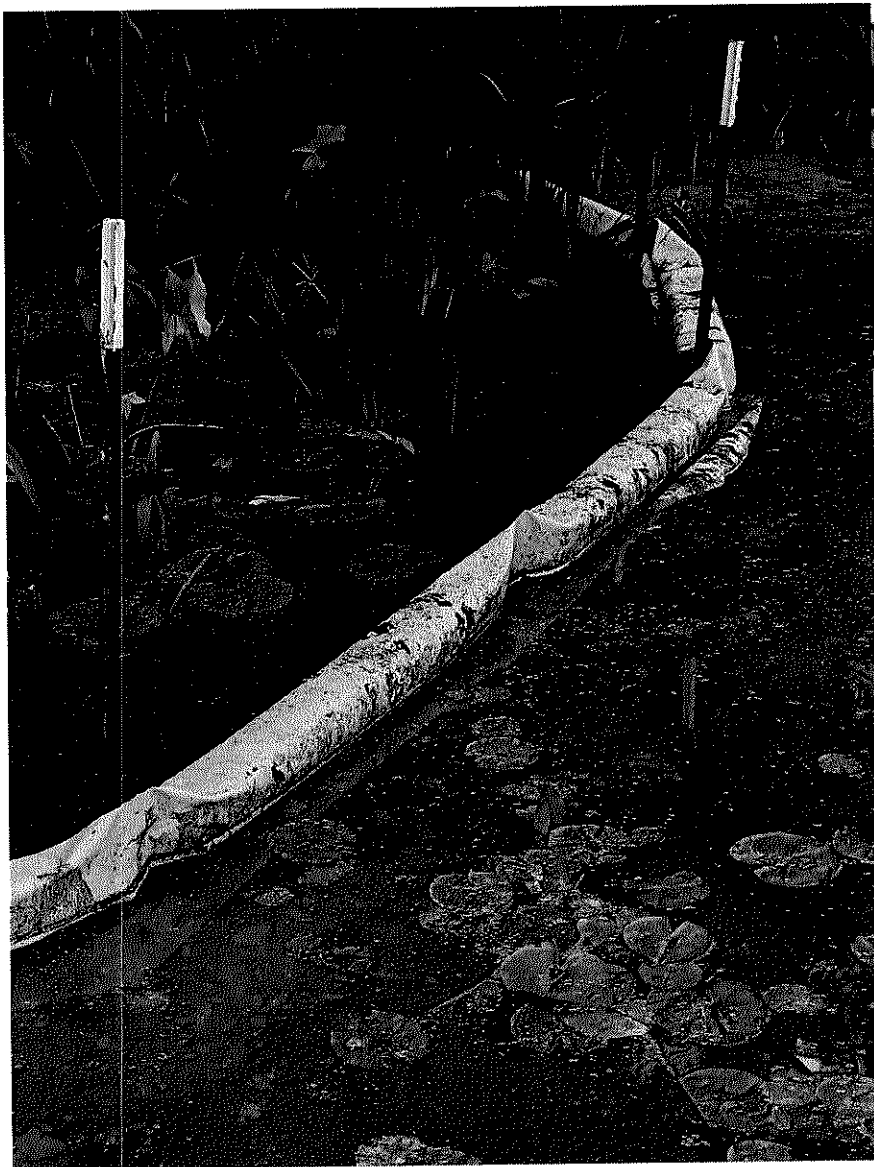
I strongly support Bill 234 and cannot emphasize enough that these techniques should be part of Wisconsin's efforts to improve water quality, public safety, and recreation of affected lakes.

Sincerely,

Scott McGovern PhD

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Important Quotes from Scientific Research Papers on Water Quality and Biomanipulation

“However, eutrophication-control policies based solely on P are coming under increasing scrutiny as evidence to support ecological improvements with P-based mitigation is proving elusive, especially regarding costly measures to reduce P loads from agriculture. Over the past four decades, many watershed nonpoint source projects have reported little or, in some cases, no net improvement in P loss reduction, even after extensive best management practice (BMP) implementation (Meals et al., 2010).”

“During the last decade, it has become apparent that many watershed-based conservation programs have failed to deliver improvements in water quality within timescales predicted by watershed managers and scientists (Jarvie et al., 2013; Meals et al., 2010; Mulla et al., 2008). Examples include the Chesapeake Bay watershed (USEPA, 2010; Reckhow et al., 2011), Mississippi River basin (Dale et al., 2010), Florida’s inland and coastal waters (USEPA, 2011), and the Lake Erie basin (Sharpley et al., 2012), where conservation practices to decrease nutrient losses (particularly P) from agriculture were put in place 20 to 30 years ago to minimize water quality degradation due to eutrophication. In trying to understand the apparent lack of water quality response, questions have been asked about the effectiveness of the conservation measures introduced and whether they are being correctly located or implemented at a sufficient scale and intensity across watersheds (Sharpley et al., 2009).”

“Accumulated P can be remobilized or recycled, acting as a continuing source to downstream water bodies for years, decades, or even centuries (McDowell et al., 2002).”

“Although it may be argued that we are expecting too much in too short a time frame, there are a number of compelling reasons why relying solely on P-based mitigation is not the most effective strategy for combating freshwater eutrophication (Jarvie et al. 2014).”

“There is now a good case for moving beyond single P-based nutrient criteria and for more actively engaging watershed stakeholder communities to help define and prioritize pollution issues and help explore possible mitigation solutions. For nutrient criteria development, regime-based water quality standards (Poole et al., 2004) provide an alternative and more sophisticated approach, describing desirable distributions of nutrient concentrations over time and space across a river network. Criteria will also likely need to consider other nutrient and pollutant controls and physical habitat, together with top-down controls linked to invertebrate and fish interactions, to promote more resilient ecosystem functioning. Simple, pragmatic, and easily applicable management tools linked to public perceptions of “good” water quality are needed, and while nutrient criteria and nutrient management can contribute as a part of a wider toolbox of environmental management interventions, alone they are not necessarily a panacea for controlling eutrophication and improving aquatic ecology (Jarvie et al., 2014).”



**WISCONSIN LEGISLATIVE COUNCIL
ACT MEMO**

2011 Wisconsin Act 180 [2011 Assembly Bill 377]	Rough Fish
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2011 Wisconsin Act 180 designates Asian carp as rough fish and allows the taking of rough fish by crossbow.

DEFINITION OF ASIAN CARP AS “ROUGH FISH”

Background

The statutes recognize two categories of fish that are not game fish. Under the authority of s. 29.424, Stats., the Department of Natural Resources (DNR) has declared that all species of fish that are not indigenous to the state are *nonindigenous detrimental species*. As such, the Asian carp is a detrimental species. There is no closed season on any waters of the state for taking nonindigenous detrimental fish. However, a person may only take these species by hook and line. Further, a person may only take one fish, and must immediately kill the fish and deliver it to the DNR.

The second category, *rough fish*, is not precisely defined, but s. 29.001 (74), Stats., specifies that the term *includes* “suckers, not listed as endangered or threatened under s. 29.604 (3), common carp, goldfish, freshwater drum, burbot, bowfin, garfish, sea lamprey, alewife, gizzard shad, rainbow smelt and mooneye.” In general, there is neither a closed season nor a bag limit for the taking of rough fish. Rough fish may be taken by hook and line, by hand, by dip net, and by spear, which includes bow and arrow.

Many species of both categories are also treated as *invasive species* under s. 23.22, Stats. Of pertinence for this Memo, no person may transport any live specimen of an invasive species.

2011 Wisconsin Act 180

The Act amends the definition of “rough fish” by adding Asian carp to the list of included species. The result of this is to remove Asian carp from the strict regulations that apply to the taking of

This memo provides a brief description of the Act. For more detailed information, consult the text of the law and related legislative documents at the Legislature’s Web site at: <http://www.legis.state.wi.us/>.

nonindigenous detrimental fish species and apply instead the much more lenient regulations that apply to the taking of rough fish.

ALLOWING THE TAKING OF ROUGH FISH BY CROSSBOW

Under *prior law*, if the DNR adopts rules that establish an open season for taking rough fish with a bow and arrow on a particular body of water, the rules must allow that activity at night. [s. 29.405 (3), Stats.] *The Act* expands this provision to refer also to taking rough fish with a crossbow. The Act further specifies that, if the DNR establishes an open season for taking rough fish with a bow and arrow on a particular body of water, the rules must allow the taking of rough fish with a crossbow under the same terms as it allows the taking of rough fish with a bow and arrow.

Under *prior law*, a person who takes rough fish with a bow and arrow must equip the arrows with a metal barbed tip and a tethered line that allows the retrieval of the rough fish. Also under prior law, a person may not release a rough fish back into the water or leave them on the banks or ice of the water, regardless of whether the fish is living or dead. Rather, the person must remove the rough fish and dispose of it in an appropriate manner. [s. 29.405 (1) and (2), Stats.] *The Act* extends these requirements to the taking of rough fish by crossbow.

Prior law prohibits the shining of wild animals and creates a rebuttable presumption that a person casting the rays of light on a field, forest or other area which is frequented by wild animals is shining wild animals. Prior law further prohibits the use or possession with intent to use a light for shining wild animals while the person is hunting or in possession of a firearm, bow and arrow or crossbow and the use or possession with intent to use a light for shining wild animals between 10 p.m. and 7 a.m. from September 15 to December 31, but provides an exception to these prohibitions for a person who possesses or uses a light while using a bow and arrow for taking rough fish. [s. 29.314, Stats.] *The Act* extends this exemption to a person who possesses or uses a light while using a crossbow for taking rough fish.

In general, it is prohibited to discharge a firearm or shoot a bolt or an arrow from a bow or crossbow from or across a highway or within 50 feet of the center of a roadway. *Prior law* allows a person who is fishing with a bow and arrow to shoot an arrow within 50 feet of the center of a roadway if the person does not shoot the arrow from the roadway or across a highway. [s. 167.31, Stats.] *The Act* extends this exception to the use of crossbows.

Effective date: April 17, 2012

Prepared by: David L. Lovell, Senior Analyst

April 9, 2012

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