# North Dakota
# Aquatic Nuisance Species Management Plan

Approved December 2018
By Governor Doug Burgum
Updated 2025

Prepared by North Dakota Game and Fish Department
Aquatic Nuisance Species Program

This management plan is a revision of the 2018 *North Dakota Statewide Aquatic Nuisance Species Management Plan* that was prepared by Jessica Howell, formerly of the North Dakota Game and Fish Department, and the North Dakota Aquatic Invasive Species Committee. Revisions of the 2018 plan were prepared and approved by the Aquatic Invasive Species Committee on _____

## 2025 AISC MEMBERS

DEVILS LAKE JOINT WATER MANAGEMENT BOARD
FRIENDS OF LAKE SAKAKAWEA
MINNKOTA POWER COOPERATIVE
NORTH DAKOTA GAME AND FISH DEPARTMENT
NORTH DAKOTA PARKS AND RECREATION
NORTH DAKOTA SPORTFISHING CONGRESS
NORTH DAKOTA TOURISM DEPARTMENT
NORTH DAKOTA WILDLIFE FEDERATION
RED RIVER BASIN COMMISSION
NORTH DAKOTA STATE AGRICULTUREDEPARTMENT
NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY
NORTH DAKOTA DEPARTMENT OF WATER RESOURCES
THREE AFFILIATED TRIBES

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# Executive Summary

According to North Dakota Century Code (N.D.C.C.) § 20.1-01-02, an aquatic nuisance species (ANS) is defined as any nonindigenous, obligate aquatic species of plant or animal which is injurious to native and desirable aquatic species, or which has a negative effect on aquatic habitats, environment, or the economy of the state. Although it can be difficult to predict or define ANS environmental impacts, some species have pronounced impacts and are well-studied. Estimating the economic consequences of invasive species can be much more challenging, since private and public entities share costs, however, significant economic impacts are associated with many ANS. Primary impacts to society include, costs associated with maintaining water infrastructure, diminished recreational activities and a decline in aesthetic and waterfront land value.

North Dakota is blessed to have tremendous water resources and is fortunate to have relatively few ANS and thus far experienced minimal impacts. Eight ANS have been documented in the state, curly-leaf pondweed, Eurasian watermilfoil, flowering rush, bighead carp, silver carp, grass carp, common carp, and zebra mussels. The spread of ANS in North Dakota is attributed to anthropogenic pathways and water connectivity. Key vectors of ANS spread have been identified and the state and its partners work collaboratively to address those pathways. The volatility associated with aquatic environments in North Dakota is thought to present unique challenges for newly introduced ANS. Natural flood and drought cycles create dynamic aquatic resources, which at times may inhibit some ANS from becoming established.

Since ANS do not adhere to geopolitical boundaries, managing ANS at a state level can have repercussions across jurisdictional boundaries. A coordinated effort began with the adoption of the North Dakota Statewide ANS Management Plan and the establishment of the North Dakota Aquatic Invasive Species Committee (AISC) in 2005. The AISC was established with the acknowledgment that ANS issues span several state and federal authorities and across public and private interests. The group continues to address ANS issues in this state to this day.

A comprehensive statewide ANS plan is needed to guide the efforts of North Dakota's ANS program. The first North Dakota Statewide ANS Management Plan was adopted in 2005. Since then, authorities have shifted and ANS knowledge has advanced significantly. In 2018, a new plan was developed and implemented. To account for new legislation, changes in species distribution and program priorities, the AISC identified the need to revise the 2018 plan in the fall of 2022. Major supporting sections of content were also incorporated to provide the reader with more background about North Dakota and the ongoing efforts to address the ANS problem in the state. New sections added during the 2025 update include: Scope, Overlapping Jurisdictions, History and Development of the Plan, Discussion of Key Pathways, Species of Priority Concern, and Program Monitoring and Evaluation. The updated plan was approved by the AISC on…

The goal of the North Dakota ANS Management Plan is to prevent the introduction and spread of ANS into and within North Dakota while mitigating ecological, economic, and social impacts of existing populations where feasible. To achieve this goal, four broad objectives were established in 2018 and then expanded upon with the current rendition of the plan for the purpose of having true concise, measurable objectives. These objectives can be found on page iv and in the "Goal, Objectives, Strategies, and Actions" section. To support the four objectives, there are 16 strategies that are critical to execute. 39 direct actions are prioritized by AISC collaborators under each strategy. Seven of these actions are considered essential to maintaining North Dakota's ANS Program. While many of the strategies and actions of the 2018 plan have remained the same, the prioritization of actions has changed to reflect the current state of ANS in North Dakota. The totality of the actions, strategies, and objectives ultimately line out a path for reaching the plan goal.

Implementation of this plan will require cooperation and coordination across public and private interests. The AISC should act as a steering committee to facilitate collaboration and prioritize actions for appropriate entities. The group will review the Plan every 5 years to determine if the contents of the plan are still appropriate for guiding North Dakota's ANS efforts. The AISC will monitor and record the performance of the program's actions during biannual meetings of the group. As needed, adaptive management must be used to modify or add actions to address new ANS issues.

## ANS MANAGEMENT PLAN SUMMARY

*GOAL:*

TO PREVENT THE INTRODUCTION AND SPREAD OF ANS INTO AND WITHIN NORTH DAKOTA WHILE MITIGATING ECOLOGICAL, ECONOMIC AND SOCIAL IMPACTS OF EXISTING POPULATIONS WHERE FEASIBLE.

*OBJECTIVES:*

1. COORDINATION AND COMMUNICATION

   Learn the latest science, strategies, and techniques as well as leverage partnerships and resources to prevent the spread of ANS.

2. EDUCATION AND OUTREACH

   Effectively inform the public about ANS, their impacts and how to prevent their spread.

3. PREVENTION AND CONTROL

   Deploy strategies through regulation and actions to prevent the spread of ANS and mitigate their impacts to aquatic resources through control activities when possible.

4. SAMPLING AND MONITORING

   Implement plans for early detection of new ANS and assess the status of existing ANS populations to reach management objectives.

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# Introduction

Predicting or defining ANS environmental impacts can be difficult, though some species have pronounced impacts and are well-studied. Some species, such as zebra and quagga mussels, are better studied but have a wide range of potential impacts, making it difficult to predict impacts at specific locations. Zebra and quagga mussels have been documented to have positive effects on littoral invertebrates, negative effects on profundal benthic invertebrates, reduce zooplankton and phytoplankton, increased sediment-associated bacteria, and contribute to the overall benthification of energetic resources (Higgins and Vander Zanden 2010; Karatayev et al. 2015). Other species have more easily predicted environmental impacts, which are typically negative. For example, invasive aquatic plants have been documented to reduce species diversity, degrade water quality, increase detritus buildup, and change sediment chemistry (Gettys et al. 2014). Grass carp significantly decrease aquatic vegetation and alter vegetation composition, leading to the banning or restriction of grass carp use to triploid- (infertile) only fish in most states (Conover et al. 2007).

AQUATIC NUISANCE SPECIES (ANS) IS DEFINED AS ANY NONINDIGENOUS, OBLIGATE AQUATIC SPECIES OF PLANT OR ANIMAL WHICH IS INJURIOUS TO NATIVE AND DESIRABLE AQUATIC SPECIES OR WHICH HAS A NEGATIVE EFFECT ON AQUATIC HABITATS, ENVIRONMENT, OR THE ECONOMY OF THE STATE.

Given the unpredictable but generally negative impacts of ANS on the environment, it is no surprise that ANS can also have an impact on the economy. In the Great Lakes, biofouling species such as zebra and quagga mussels have caused major problems for water delivery infrastructure (Mackie and Claudi 2010). Increased maintenance costs for power and water suppliers are often passed onto consumers. Estimating economic impacts of invasive species can be challenging, but it is important for making fiscally responsible decisions to prioritize species for management. In 2021, Fantle-Lepczyk et al. estimated the total annual cost of invasive species in the Midwest was $1.11 billion. The North Dakota Department of Water Resources (2024) estimated that a hypothetical zebra mussel infestation of all North Dakota surface water would cost the state between $72.6 and $80.7 million annually in control and mitigation measures for infrastructure and industry. Tourism and outdoor recreation are also vulnerable to the impacts of ANS. North Dakota boasts a thriving recreational fishing industry. A North Dakota State University study estimated that the total angling-related expenditure during the 2017-2018 fishing season was approximately $787 million and generated a gross business volume of $1.69 billion (Ndembe et al. 2019).

Besides large environmental and economic impacts, society can be impacted as well, primarily through the hindrance of recreational activities, decline in aesthetic value and impact to human health. ANS can impede recreational activities such as boating, fishing, and swimming by growing in dense stands (e.g., mussels and plants; Gettys et al. 2014), cutting unprotected flesh (i.e., mussels; Mackie and Claudi 2010), and injuring boaters (i.e. silver carp; Kolar et al. 2007). Also of serious concern is the ability of invasive aquatic plants to increase habitat for vectors, like mosquitos, which can carry life-threatening diseases including malaria, dengue fever, yellow fever, encephalitis and dog heartworm (Gettys et al. 2014).

## PURPOSE

Although the negative impacts of ANS have been well documented in some areas, North Dakota is fortunate to have relatively few ANS and minimal impacts thus far. ANS have become established in North Dakota, but most species have a limited geographical range. This management plan outlines a goal, four objectives, 16 strategies, and 39 actions to limit the further spread of ANS in the state's waters. The plan must be broadly applicable to large drainage basins, impoundments, rivers, streams, lakes, and the iconic prairie potholes wetlands (Figure 1). Prevention of the establishment of new nonnative plants, animals and pathogens is important for maintaining the current health of North Dakota's waters, while also avoiding the potential economic, ecological, and cultural harm associated with ANS establishment.

## SCOPE

North Dakota can be broken down into four major geographical regions, the Lake Agassiz Plain (Red River Valley), Northern Glaciated Plain (Drift Prairie), Northwestern Glaciated Plain (Missouri Coteau), and Northwestern Great Plains (Missouri Slope) (Omernik 1987, USEPA 1996) (Figure 2). The state progressively increases in elevation and aridness from east to west. The Red River Valley extends about 40 miles on either side of the Red River, and most of the region is blanketed by silt and clay deposits with very few wetlands present. The Missouri Coteau and Drift Prairie are glaciated land where most lakes and wetlands are found in the state. The Missouri Slope region was largely unaffected by glaciers and has irregular topography characterized by buttes and complex drainage systems. Water covers 9% (6,363 square miles) of the state (NDSWC 2014). Land practices, soil types and natural precipitation cycles drive the overall health of the state's waters. Approximately 39.3 million acres, or 89% of land is dedicated to farming and ranching (USDA 2021). Water usage supports agriculture, municipalities, and industry. However, not all areas of the state have enough quality or quantity of water to meet their needs, these areas depend on supplemental water supplies (NDSWC 2014). Therefore, water infrastructure plays a crucial part in the day-to-day municipal and economic operations in North Dakota.

The harshness of the North Dakota landscape presents unique challenges in preventing the introduction and spread of ANS. Dodson (2013) identified salinity, clarity, ice scour, substrate type, and trophic status as potential limiting factors for some ANS in North Dakota. Natural flood and drought cycles create dynamic aquatic resources through time. One example of major fluctuations includes Devils Lake, which rose over 30 feet (9.5 meters) from a recent low elevation in 1993 to a recent high elevation in 2011, transforming the approximately 44,200 acre (17,900 hectare) lake to an over 210,000 acre (85,500 hectare) lake, with relatively high peaks persisting through June 2017 (NDSWC 2017). The cyclic nature of North Dakota's waters may hinder the long-term establishment of ANS in some systems due to the stark changes in habitat availability that can exist with rising and falling water levels. In addition, North Dakota's long, harsh winters have shown at times to be hard on wildlife populations, including aquatic life. Winterkill due to oxygen depletion is quite common in the state, especially on shallow prairie pothole lakes.

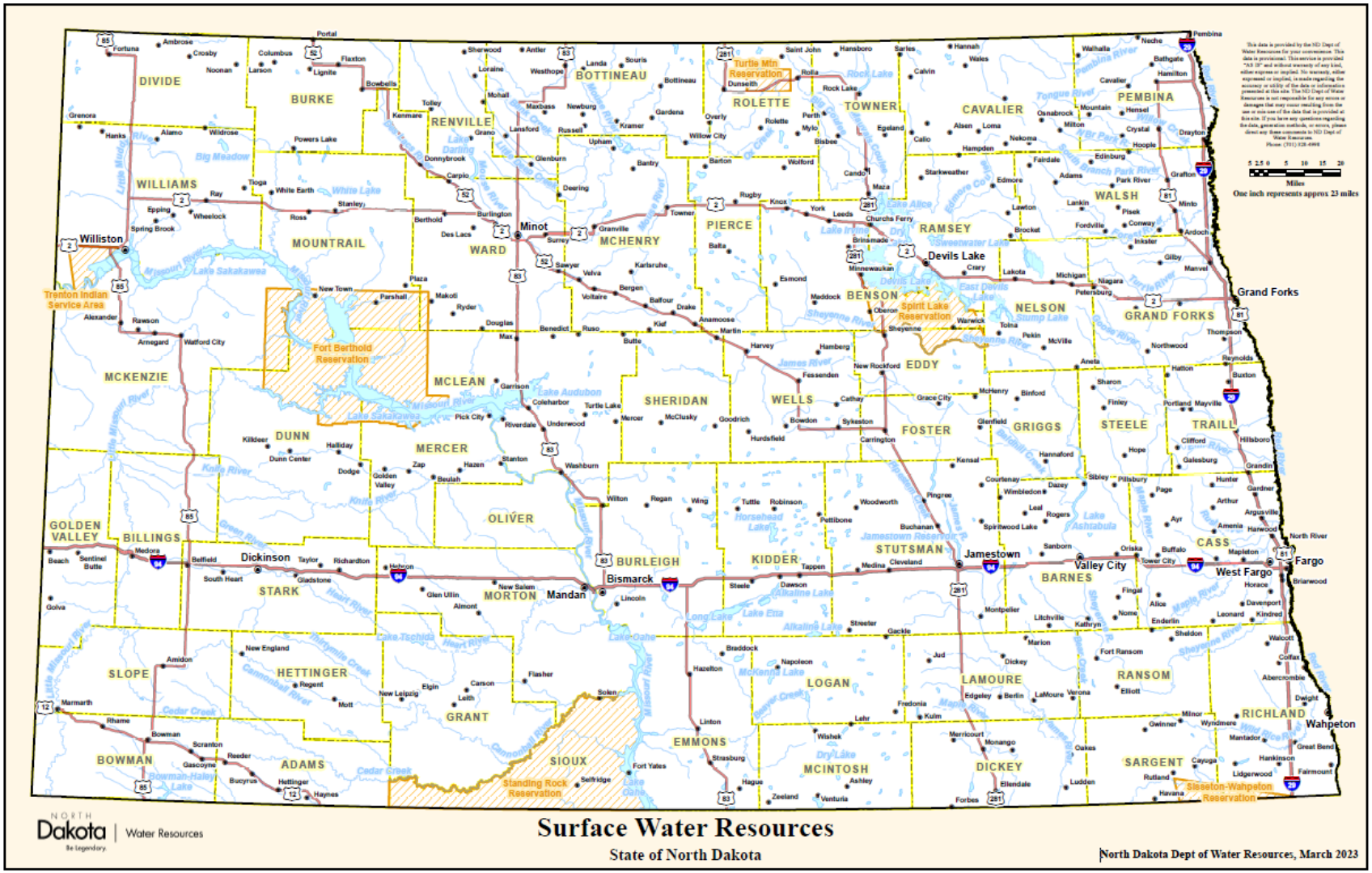



Figure 1. The Surface Water of North Dakota. Map generated by North Dakota Department of Water Resources (2023).

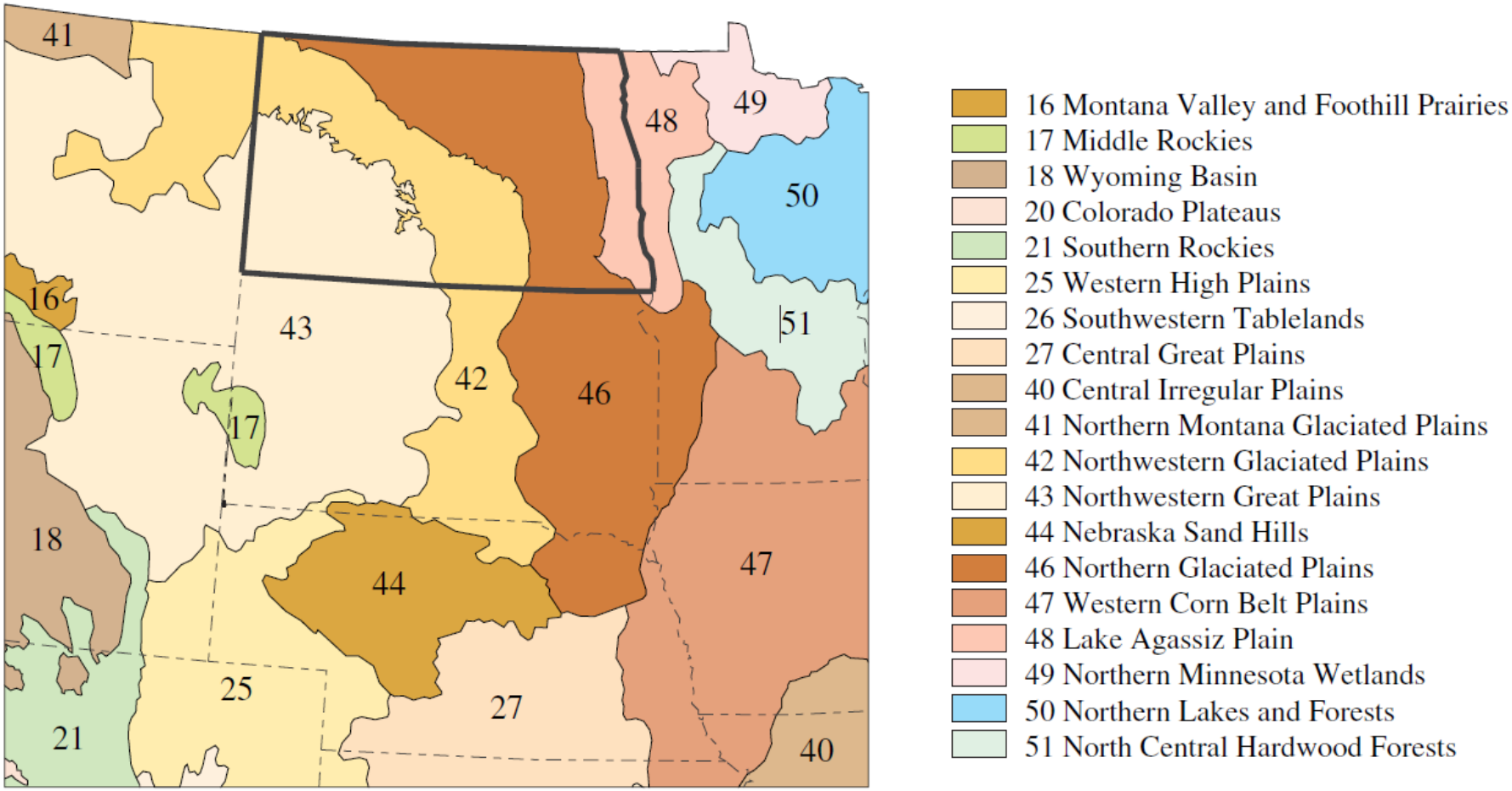



Figure 2. Ecoregions of North Dakota. From "Level III ecoregions of the continental United States" by U.S. Environmental Protection Agency (1996).

## Overlapping Jurisdictions

Since ANS do not adhere to geo-political bounds, managing ANS at a state level can have repercussions across jurisdictional boundaries. Although North Dakota actively participates in regional and national ANS efforts, agency authorities are limited to work within the state. Therefore, collaboration among neighboring states and provinces is necessary to address many ANS issues. Efforts of neighboring states and provinces all influence North Dakota's ANS program. Communication between ANS professionals in North Dakota and neighboring states happens regularly. The interconnectedness of our waters, cultures and economies makes interagency communication and coordination essential to supporting each other's ANS management plans and preventing the spread of ANS in the region.

Waterways in North Dakota have overlapping jurisdictions. The Missouri River basin is part of the Gulf of Mexico drainage and runs through the neighboring states of Montana and South Dakota. The Red River basin is part of the Hudson Bay drainage and is shared by Minnesota, South Dakota, North Dakota, Saskatchewan and Manitoba (NDSWC 2018).

On the Missouri River, the U.S. Army Corps of Engineers (USACE) has significant water management responsibilities. They own and operate six mainstem dams on the river for eight congressionally authorized purposes, including flood control, water supply, irrigation, water quality, recreation, hydropower, fish and wildlife and navigation. USACE and the Bureau of Reclamation also operate dams on the river's tributaries. North Dakota state agencies have management responsibilities on the river as well. The Department of Water Resources (DWR) manages the state's sovereign lands, all land below the ordinary high-water mark of navigable water bodies, including beds and islands. The DWR is also responsible for managing the appropriation of river water, the review of development in National Flood Insurance Program regulatory floodways, and the construction of water infrastructure within the state. The Department of Environmental Quality is responsible for managing the water quality of the river through enforcement of the Clean Water Act. The North Dakota Game and Fish Department manages the fish and wildlife populations of the river and enforces recreational and boating laws. Local organizations are also a part of the river management system. Water resource boards along the river have the broad responsibility of resolving water resource issues in the river basin including those related to water quality, drainage and managing easements. Local organizations, like cities and counties, are responsible for zoning near the river and other floodplain rules.

Jurisdictions on the Red River are similar to the Missouri River, however, there are some differences. USACE does not have a significant water management responsibility on the Red River but does operate Lake Traverse Dam at the headwaters of the Red River. USACE also operates tributary dams including Lake Ashtabula on the Sheyenne River and Homme Dam on the south branch of the Park River. A significant difference between the Missouri and Red rivers is the international aspects of the Red River. The Souris River is a tributary of the Red River that flows south out of Canada to North Dakota and back north again into Canada, joining the Assiniboine River and eventually the Red River in Winnipeg. The Red and Souris rivers flow into Canada and management of these rivers is coordinated between the United States and Canada through the International Joint Commission.

The presence of a continental divide between the two significant drainages is a cause for international concern related to ANS introductions and spread in North Dakota. Of additional importance, North Dakota is recognized as an outdoor recreation destination that draws people from all over the nation. At Devils Lake, one of North Dakota's premier recreational destinations, 40% of

fishing participants are nonresident anglers (Caspers and Gangl 2017), most of whom come from Great Lakes states with a higher prevalence of ANS.

## History and Development of the Plan

North Dakota has long recognized ANS as an issue and began management efforts in the early 2000s, primarily through ANS surveillance during annual fisheries surveys (Ryckman 2013). A statewide, coordinated effort started with the first adoption of the North Dakota Statewide ANS Management Plan and establishment of the AISC through N.D.C.C. § 20.1-17-01 with the acknowledgment that ANS issues span several state and federal authorities (see Appendix A for member list) and involve a variety of public and private interests. This committee and interested parties, chaired by the NDGFD, acts as an advisory group for ANS matters and is comprised of professionals with a wide range of expertise. Members discuss pertinent ANS issues and conduct work under the AISC's guidance when feasible. Given the overlap in member authorities and interests, a comprehensive statewide ANS management plan is needed to guide efforts and prevent redundancy of activities.

The first North Dakota Statewide ANS Management Plan was adopted and approved by the Federal Interagency ANS Task Force (ANSTF) in 2005. Since then, authorities have shifted, and ANS knowledge has advanced significantly. Therefore, a new plan was developed by the NDGFD and the AISC beginning in 2017 and completed in 2018. NDGFD's ANS coordinator was the primary author of the 2018 plan. The first draft was circulated amongst the agencies of the AISC, seeking comment and input. The draft was also distributed to federal, state and private partners outside the AISC. Feedback was received and incorporated from many different partners including Devils Lake Convention and Visitors Bureau, the North Dakota Sport Fishing Congress, Office of the State Engineer (now Department of Water Resources) and the U.S. Fish and Wildlife Service (Appendix B). In 2018, two public AISC meetings were held to discuss edits and incorporate comments received into the ANS Management Plan draft. After multiple drafts and rounds of review, the AISC voted to approve the plan on November 1, 2018. In December of 2018, North Dakota Game and Fish presented the plan to the governor's office. The plan was reviewed and approved by the North Dakota governor.

In 2019, the North Dakota legislature passed Senate Bill 2293 to support ANS prevention, education, monitoring, and enforcement efforts. The bill created a funding source of approximately $1.5 million per biennium to enhance NDGFD's ANS program. Funds are generated through an additional fee applied to motorized watercraft registered in North Dakota, the creation of an annual ANS sticker fee for motorized watercraft registered outside the state and surcharges on non-resident hunting and fishing licenses. Part of the enhancement funds supported the hiring of an NDGFD biologist and warden positions.

To reflect the changes in the NDGFD's ANS program, the regional distribution of ANS, and state priorities, the AISC decided it was appropriate to update the North Dakota Statewide ANS Management Plan in 2022. The update would also allow the state to seek approval of the plan from the Federal Interagency ANS Task Force. If approved, the state would be eligible for a grant opportunity that goes with having an ANSTF approved plan. The ANS Coordinator and AISC undertook updates to the 2018 plan starting in 2023. In 2024, the AISC worked with the ANSTF to meet the criteria of a proposed plan. Final updates were reviewed by the AISC, state, federal and private partners. On ___, the AISC voted to approve updates to the state management plan.

# Problem Definition and Ranking

Although many waters in North Dakota are believed to be free of ANS, there's been an increase in detections and confirmations. Most nonnative aquatic species documented in North Dakota were identified in the past 30 years, except for common carp, which was first stocked as a food resource starting in the 1890s. In North Dakota, most nonnative species introductions are a result of human activities and water connectivity. Pathways of species introductions are everchanging, so the state takes comprehensive steps to minimize the threat of introductions through regulation, public education and preventative actions.

The original 2005 ANS management plan identified and worked to address major pathways of ANS introductions. Many of the original plan's actions and strategies are still carried out today. The NDGFD and AISC work to identify likely pathways for ANS introductions annually. Primary vectors that could contribute to the spread of ANS in North Dakota include:

- Movement of docks/lifts and water-based equipment;
- Recreational activities;
- Equipment used for industry;
- Water connectivity;
- Organisms in trade;
- Bait; and
- Aquaculture activities.

## Discussion of Key Pathways

### *The Movement of Docks/Lifts and Water-based Equipment*

Many of North Dakota's waterbodies have little to no shoreline development; however, the number of lakes with development is slowly increasing. As more shorelines develop with cabins, campgrounds, parks and beaches, the desire for readily available water access increases. The movement of docks, lifts, and other water-related equipment from one waterbody to another can facilitate the accidental movement of ANS, especially zebra mussels. NDGFD works diligently with partners to educate property owners, marinas, and lake associations about the risk posed by the movement of used water-related equipment. In 2023, NDGFD made an addition to North Dakota Administrative Code (N.D.A.C.) § 30-03-06-01, which requires docks and lifts to dry for three weeks before they are allowed to be moved to a new waterbody. Raising public awareness of the new administrative rule will be a top priority for the state's ANS program.

### *Recreational Activities*

North Dakota has abundant waters that support a wide variety of recreational opportunities. Fishing, hunting, trapping, pleasure boating, watersports, diving, and many other activities occur in North Dakota. Well over a thousand waters likely support some recreational activity, including over 400 waters managed as fisheries by the NDGFD. The waters of North Dakota are a recreational resource for both residents and nonresidents. While water-based recreation can spur economic growth and is a part of the regional culture, it can also facilitate the spread of ANS. Watercraft and gear used for recreation have long been identified as pathways for spreading ANS.

There are more than 70,000 resident watercraft registered in North Dakota, and an additional 7,000 watercraft registered outside of the state recreate in North Dakota on an annual basis. Most of the registered watercraft are open boats (~64%), personal watercraft (~16%), and pontoons (~15%). The state addresses the risk recreational boating poses in spreading ANS principally through N.D.C.C. § 20. 1-17 and N.D.A.C. § 30-03-06. N.D.A.C. § 30-03-06, which prohibits the transportation of ANS and vegetation on recreational watercraft and mandates the draining of watercraft. Other strategies employed by the state include boater education campaigns, enforcement activities, and placement of watercraft inspectors at high-use ramp locations.

Fishing drives most boat launches that happen in North Dakota. About one-fifth, or 146,873 of North Dakota residents and 62,664 nonresidents, bought a fishing license in 2021. Besides boating, bait releases and the movement of fishing gear are other pathways ANS can spread. ANS concerns are always evaluated when drafting and reviewing the North Dakota fishing and hunting proclamations. In 2016, N.D.A.C. § 30-03-06-05 was amended to eliminate the transfer of water, including bait water, away from waters of the state designated as infested with a class 1 prohibited aquatic nuisance species. This regulation was explicitly amended to address the concern about zebra mussel veligers in residual bait water.

### *Equipment Used for Industry*

Water-based commercial and industrial projects can lead to the incidental introduction of nonnative aquatic species. In North Dakota, such projects are usually related to oil activity and developing or maintaining water infrastructure. Most large water-based projects in North Dakota occur on the Missouri River System, which includes the mainstem river, Lake Sakakawea, and Lake Oahe. To carry out these projects, equipment such as barges, tugboats, anchors, and chains are often brought to North Dakota from areas across the country. The NDGFD works closely with the Department of Transportation, Division of Water Resources, and the USACE to inspect commercial equipment before it is allowed to launch on any of the state's waters. N.D.C.C. §. 20.1-17 and N.D.A.C. § 30-03-06 apply to all commercial projects on or near surface water.

### *Water Connectivity*

The connectivity of waterbodies via natural and manmade pathways such as rivers, streams, drainage ditches, and canals allow for the dispersal of species into new areas. A localized ANS introduction may not remain contained to a single waterbody depending on the hydrology of the system and the species in question. North Dakota has approximately 7,000 miles of rivers and streams that can serve as corridors for the movement of species at a local and regional level (NDDWR 2022). Several examples exist of connected waters facilitating the spread of ANS into new areas. The Red River became infested with zebra mussels due to the downstream drift of zebra mussel veligers from the Otter Tail River in Minnesota. The zebra mussel infestation of Lake LaMoure in 2020 facilitated the downstream movement of zebra mussels into the James River. Invasive carp are found in North Dakota because of the upstream movement of fish from the Missouri River into the James River. To mitigate risks associated with water connectivity, the NDGFD monitors existing ANS populations and, in some cases, will deploy physical barriers. To prevent the spread of common carp, especially during years of high spring runoff, the NDGFD has constructed multiple control structures like culvert drops, earthen berms and stock dams to contain existing populations.

### *Organisms in Trade*

Organisms in trade, including those for use as pets, gardening, or landscaping, can threaten North Dakota waters. These organisms are traded at general retail stores, specialty shops, and online

vendors. Incidental escapes and intentional releases of organisms are thought to be one leading cause of nonnative species introductions in the United States. Addressing the organisms in trade pathways and enforcing laws on online retailers has been a significant challenge for regulating agencies. The unlawful introduction of organisms in North Dakota is covered extensively in the North Dakota Fishing Proclamation, N.D.C.C. § 20.1-02-05 and N.D.A.C. § 30-03-06-04. N.D.C.C. §§ 4.1-22-01 through 4.1-22-11 provides the Department of Agriculture the authority to certify and inspect all plant nurseries in North Dakota for viability, certificate of inspection, correct labeling, and pests. The NDGFD worked closely with the Department of Agriculture to ban the importation of moss balls into the state after zebra mussels were found in moss ball shipments across the country. The state maintains a cooperative partnership with pet stores by providing ANS education materials, such as "Don't let it Loose" posters and fish bags. The NDGFD conducts unannounced inspections of retail pet stores to look for species of concern.

### *Bait*

The use of live aquatic bait is a preferred fishing method for anglers in North Dakota. The trade and use of live aquatic bait was a primary concern identified and addressed in the original ANS management plan. Besides leeches, white suckers, and creek chubs, all other live aquatic bait must be trapped and sold locally. NDGFD started its bait wholesale inspection program in the early 2000s. This program has been very successful over the years and significantly reduced the likelihood of non-target organisms being sold at retail vendors. The release of live aquatic bait is prohibited through the same state statutes and rules pertaining to the release of organisms in trade, N.D.C.C. § 20.1-02-05, and N.D.A.C. § 30-03-06-04.

### *Aquaculture Activities*

Although aquaculture activities provide recreational fishing opportunities and are important for recovery efforts related to threatened and endangered species, they can inadvertently lead to the spread of ANS. North Dakota has no state-operated fish hatcheries. Instead, it relies on partnerships with two fish hatcheries managed by the U.S. Fish and Wildlife Service: Garrison Dam NFH and Valley City NFH, to stock the state's waters to support angling opportunities. NDGFD and the United States Fish and Wildlife Service (USFWS) work cooperatively to take measures that limit the likelihood that ANS are spread through aquaculture activities, primarily through routine hatchery inspections and best management practices. NDGFD utilizes resources such as "BMP Recommendations for Aquatic Invasive Species Early Detection and Decontamination in Fish Rearing and Holding Facilities" and "Hazard Analysis and Critical Control Point" (HACCP) to guide hatchery inspection and stocking efforts.

Private fish stockings are a regulated activity in North Dakota. Individuals interested in stocking private water must fill out a "Stocking-Transfer Request" form. Requests are vetted for potential ANS concerns. NDGFD typically requires specific stocking instructions and/or an ANS facility inspection by the Department or other qualified agency, as a condition before requests are approved. NDGFD often coordinates with the states of Montana, Wyoming, South Dakota, and Minnesota to discuss potential ANS concerns of private fish hatcheries in their respective state.

While a formal process exists for stocking public and private waters, illegal fish stockings occur in both. State statutes and rules that cover illegal fish stockings include those similar to the release of bait fish and pets, N.D.C.C. § 20.1-02-05, and N.D.A.C. § 30-03-06-04. Illegal fish stockings are difficult for enforcement staff to interdict because they are infrequent and often intentional. Creative education and enforcement strategies are needed to combat this potential ANS vector.

## Aquatic Nuisance Species in North Dakota

On an annual basis the NDGFD and AISC review the state's ANS list as outlined by N.D.C.C. § 20.1-17-01. As of May 2025, North Dakota has designated 47 species that present an immediate threat to the state's waters. These 47 regulated species make up the state's ANS list. Only 8 of the 47 species have been documented in North Dakota. To determine if a species warrants listing, the AISC reviews previous risk assessments, utilizes USFWS ecological screening tools, and conducts a literature review of impacts and known locations in the region. Once a species is voted on the list, it is placed into three classifications of ANS, depending on the severity of the threat, the potential to invade and its ability to be managed once established. The AISC may reclassify a species if it better meets the criteria of a different class, which is usually a result of change in geographical range, or the development of new management techniques. These three classifications determine how each species is to be handled by the public and the state. Figure 3 is a map depicting the current distribution of ANS in North Dakota. Common carp were not included on the map because they are widespread across the state and are only presumed absent in the Devils Lake Basin.

### Classifications

#### *Class I: Prohibited Aquatic Nuisance Species*

Class I ANS are either not known to be present in North Dakota, or if present, only in a few waters. These species have a high potential to invade, and establishment will cause ecological and/or economic harm. There are no known management strategies to control established populations without harming non-target species. A NDGFD director's permit is required to possess, import, purchase, trade, or propagate these species. Violations constitute a Class B misdemeanor.

#### *Class II: Regulated Aquatic Nuisance Species*

Class II ANS have either become established in North Dakota or have been used in a limited manner in commercial enterprises. These species have a high potential to spread unless preventative actions are taken. There are limited management strategies to control expansion of established populations, and management actions may have a negative impact on non-target species. A NDGFD director's permit is required for possessing a regulated species in special facilities in addition to permits which may already be in place. Penalties may vary for violations but could include a Class B misdemeanor.

#### *Class III: Listed Aquatic Nuisance Species*

Class III ANS are established in North Dakota, are common in many areas, and have a history of use in North Dakota in commercial and permitted activities. Nonetheless, the possibility of negative impacts to native biota exists. Management strategies are available and commonly used. The need to control is based on impacts to recreational fisheries, funding sources and impacts to non-target species. Trade and movement may be covered under existing permits or regulations propagated by the NDGFD. Penalties may vary for violations but could include a Class B misdemeanor.

### *North Dakota ANS List*

The following is North Dakota's ANS list as of May 2025. **Bolded text indicates that a species has been documented in North Dakota**. All other species on the North Dakota ANS list have not been documented in the state but are believed to have significant impacts if they become established.

| TYPE | COMMON NAME | SCIENTIFIC NAME | CLASS | Pathways |
|---|---|---|---|---|
| PLANTS | Brazilian elodea | *Egeria densa* | 1 | OT,RBE,WC |
| | Brittle naiad | *Najas minor* | 1 | OT,RBE,WC |
| | **Curlyleaf pondweed** | ***Potamogeton crispus*** | **2** | OT,RBE,WC |
| | **Eurasian watermilfoil** | ***Myriophyllum spicatum*** | **2** | OT,RBE,WC |
| | **Flowering rush** | ***Botumus umbellatus*** | **2** | AQ,OT,RBE,WC |
| | Didymo or rock snot | *Didymosphenia geminata* | 1 | RBE,WC |
| | Starry stonewort | *Nitellopsis obtuse* | 1 | OT,RBE,WC |
| FISH | Prussian carp | Carassius carassius | 3 | OT, IB. IS, WC |
| | Snakehead species | genera *Channa* and *Parachanna* of the Family Channidae, including but not limited to: | 1 | |
| | Northern snakehead | *Channa argus* | 1 | |
| | Blotched snakehead | *Channa maculata* | 1 | |
| | Bullseye snakehead | *Channa marulius* | 1 | |
| | Giant snakehead | *Channa micropeltes* | 1 | OT,IS,WC |
| | **Silver carp** | ***Hypophthalmichthys molitrix*** | **3** | IB,IS,WC |
| | **Bighead carp** | ***Hypophthalmichthys nobilis*** | **3** | IB,IS,WC |
| | Black carp | *Mylopharyngodon piceus* | 1 | IS,WC |
| | **Grass carp** | ***Ctenopharyngodon idella*** | **3** | IS,WC |
| | **Common carp** | ***Cyprinus carpio*** | **3** | IB,IS,WC |
| | European rudd | *Scardinius erythrophthalmus* | 1 | IB,IS,WC |
| | Round goby | *Neogobius melanostomus* | 1 | IB,IS,WC |
| | Tubenose goby | *Proterorhinus semilunaris* | 1 | IB,IS,WC |
| | Eurasian ruffe | *Gymnocephalus cernuus* | 1 | IB,IS,WC |
| INVERTEBRATES | Chinese mystery snail | *Cipangopaludina chinensis* | 1 | OT,RBE,WC |
| | Banded mystery snail | *Viviparus georgianus* | 1 | OT,RBE,WC |
| | Golden clam | *Corbicula fluminea* | 1 | OT,RBE,WC |
| | **Zebra mussel** | ***Dreissena polymorpha*** | **1** | OT,RBE,C,IB,IS,WC |
| | Quagga mussel | *Dreissena bugensis* | 1 | OT,RBE,C,IB,IS,WC |
| | New Zealand mudsnail | *Potamopyrgus antipodarum* | 1 | OT,RBE,C,IB,IS,WC |
| | Faucet snail | *Bithynia tentaculata* | 1 | OT,RBE,C,IB,IS,WC |
| | Red swamp crayfish | *Procambarus clarkia* | 1 | OT,IB,IS |
| | Rusty crayfish | *Orconectes rusticus* | 1 | OT,IB,IS |
| | Scud | *Echinogammarus ischnus* | 1 | RBE,IB,IS,WC |
| | Fishhook waterflea | *Cercopagis pengoi* | 1 | RBE,IB,IS,WC |
| | Spiny waterflea | *Bythotrephes cederstroemi* | 1 | RBE,IB,IS,WC |
| FISH PATHOGENS | IHNV | Infectious Hematopoietic Necrosis Virus | 1 | IB,IS,WC |
| | IPNV | Infectious Pancreatic Necrosis Virus | 1 | IB,IS,WC |
| | ISAV | Infectious Salmon Anemia Virus | 1 | IB,IS,WC |
| | KHV | Koi Herpes Virus | 1 | IB,IS,WC |
| | CCV | Channel Catfish Virus | 1 | IB,IS,WC |
| | LMBV | Largemouth Bass Virus | 1 | IB,IS,WC |
| | VHSV | Viral Hemorrhagic Septicemia Virus | 1 | IB,IS,WC |
| | WSHV-2 | White Sturgeon Herpes Virus – 2 | 1 | IB,IS,WC |
| | PKD | Proliferative Kidney Disease | 1 | IB,IS,WC |
| FISH PARASITES | Bacterium causing enteric septicemia of catfish | *Edwardsiella ictaluri* | 1 | IB,IS,WC |
| | Bacterium causing BKD | *Renibacterium salmoninarum* | 1 | IB,IS,WC |
| | Bacterium causing enteric redmouth disease | *Yersinia ruckeri* | 1 | IB,IS,WC |
| | Parasites | *Heterosporis spp.* | 1 | IB,IS,WC |
| | Asian tapeworm | *Bothriocephalus opsarichthydis.* Syn. *Bothriocephalus acheilognathi* and *Bothriocephalus gowkengensis* | 1 | IB,IS,WC |

Pathways: **AQ**= Aquaculture, **OT**=Organisms in Trade, **RBE**=Recreational Boating & Equipment, **C**=Commercial Equipment & Vessels, **IB**=Illegal Bait, **IS**=Illegal Stocking, **WC**=Water Connectivity

### *Species of Highest Priority Concern*

In North Dakota, 10 species have been deemed as the highest priority for concern and management within the state's ANS list. Species of priority concern are voted on by the AISC based on their realized and perceived impacts to the ecology, recreation, and economy of North Dakota. These species take precedence when allocating resources for ANS management. The AISC periodically reviews the species of highest priority concern to ensure the list is up to date given the current state of knowledge. Species may be replaced as management strategies evolve, a higher priority species is identified, or realized impacts are observed that were less significant to an aquatic resource than their predeceasing perceived impact.

| Common Name | Scientific Name | Class |
|---|---|---|
| Zebra mussels | *Dreissena polymorpha* | 1 |
| Quagga mussels | *Dreissena bugensis* | 1 |
| Silver carp | *Hypophthalmichthys molitrix* | 3 |
| Bighead carp | *Hypophthalmichthys nobilis* | 3 |
| Common carp | *Cyprinus carpio* | 3 |
| Eurasian watermilfoil | *Myriophyllum spicatum* | 2 |
| Curly leaf pondweed | *Potamogeton crispus* | 2 |
| Starry stonewort | *Nitellopsis obtuse* | 1 |
| Golden clam | *Corbicula fluminea* | 1 |
| Rusty crayfish | *Orconectes rusticus* | 1 |

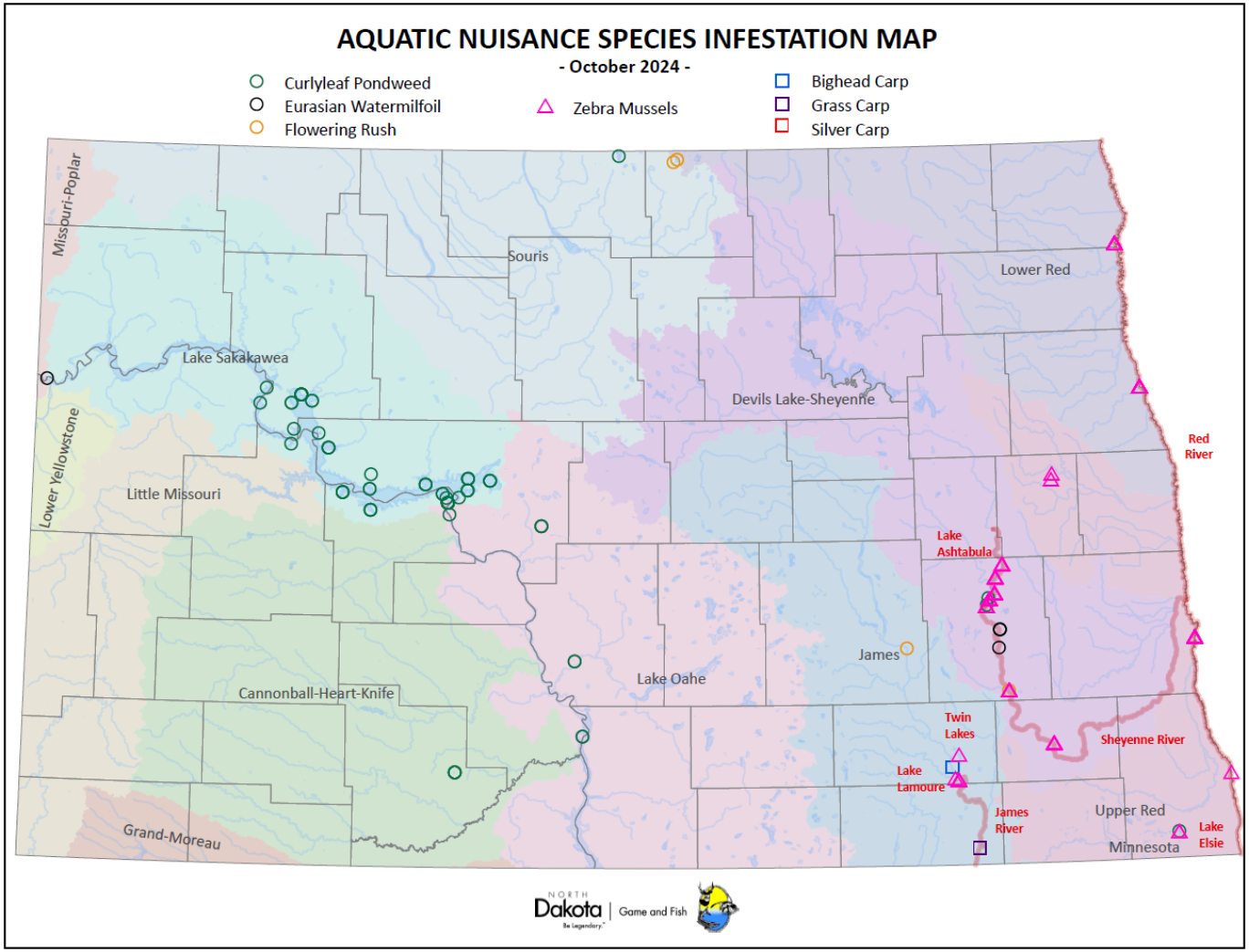



Figure 3. The Distribution of ANS in North Dakota as of May of 2025. Map Generated by the North Dakota Game and Fish (2025).

## Species Overviews

### *Zebra Mussels*

#### Detected in North Dakota

Zebra mussels (*Dreissena polymorpha)* are small, D-shaped or triangular bivalves with alternating light and dark brown striped patterns that can vary drastically among individuals (see picture to the right; Benson et al. 2018). They can look similar to invasive quagga mussels and are distinguished from native mussels by the presence of byssal threads (Mackie and Claudi 2010). Byssal threads are used to attach to stable substrates, which act as the preferred habitat (Benson et al. 2018).

Females produce tens of thousands of eggs per spawn event, totaling up to a million eggs annually (Benson et al. 2018). Zebra mussel larvae, called veligers, are pelagic and freely float with wind and wave action to disperse. These quickly establishing bivalves have several modes of impact. Filter-feeding activities on small plants and animals impact water quality and the ecosystem, primarily through shifting energetic resources from lentic sources to benthic sources (Karatayev et al. 2015). Attachment on hard surfaces can impact recreational activities and through fouling equipment and water pipes in power and water industries, which can have significant economic costs (Benson et al. 2018).

Zebra mussels are native to eastern Europe and western Asia but were introduced to the United States in the 1980s through the discharge of ballast water into the Great Lakes (Benson et al. 2018). Current spread is likely from the movement of water containing veligers and fouled equipment harboring live adults. Zebra mussels are currently found throughout the Great Lakes, Mississippi River Basin, and in several major waterbodies across the United States (Benson et al. 2018).

In North Dakota, the first documented presence of zebra mussels was the confirmation of veligers in water samples taken from the confluence of the Ottertail and Red rivers and at Kidder Dam at Wahpeton in 2010 and 2011. No veligers were detected in 2012 (Ryckman 2013) or again until 2015. In 2015, extremely high densities of veligers were detected in the Red River in North Dakota and Manitoba. Searches in the fall of 2015 revealed the presence of adults. Regulations prohibiting the movement of water away from the Red River went into effect immediately. There are now five lakes (Ashtabula, Elsie, LaMoure, South Golden and Twin) and two additional rivers (the Sheyenne below Baldhill Dam and the James below LaMoure Dam) with established zebra mussel populations. Adult and veliger densities have been monitored at Lake Ashtabula annually since they were discovered in 2019 to monitor the population growth in North Dakota's first zebra mussel infested reservoir. Updated locations are housed on the North Dakota Game and Fish Department website at https://gf.nd.gov/ans/infested-waters (NDGFD 2025).

## *Quagga Mussels*

**Undetected in North Dakota**

Quagga mussels (*Dreissena bugensis*) are small bivalves that display a wide array of color patterns and have an outwardly arched underside. (May and Marsden 1992.) They look similar in appearance to zebra mussels and have byssal threads which distinguish them from native mussels (Mackie and Claudi 2010). Quagga mussels are known to inhabit both hard and soft substrates and have been documented as deep as 130m in the Great Lakes (Benson et al. 2025).

Like zebra mussels, quagga mussels have incredible reproductive potential, so given favorable conditions, quagga mussels can rapidly colonize waterways (Mills et al. 1996) Quagga mussel larvae, called veligers, are pelagic, free floating, and dispersed by wind, wave action and downstream drift in lotic systems. Quagga mussels remove phytoplankton and small particles from the water column by filter feeding, which can lead to benthification and enhanced optical clarity (Claxton et al 1998). Rapid colonization of quagga mussels often leads to biofouling of water delivery systems and infrastructure, leading to significant economic impacts associated with mitigation.

Quagga mussels are native to eastern Europe and were first discovered in the Great Lakes years after the initial documentation of zebra mussels. Where the two species overlap, quagga mussels are known to usurp zebra mussels as the dominant biomass in lentic waters thanks to several differences in life history (Ram et al. 2012). However, zebra mussels are found in more waters in North America, which is partially attributed to their more powerful attachment ability (Mills et al. 1996).

Photo Provided by the Arizona Game and Fish Department.

Quagga mussels have not been documented in the state but are considered a Species of Highest Priority Concern in North Dakota, because of their potential ecological and economic impacts. The bottoms of many waterways in North Dakota are often characterized by soft substrates, so quagga mussels may have a greater potential than zebra mussels to colonize and impact the waters of the state. Updated locations and species profile are housed on the North Dakota Game and Fish Department website at https://gf.nd.gov/ans/species (NDGFD 2025).

### *Silver Carp*

**Detected in North Dakota**

Silver carp (*Hypophthalmichthys molitrix)* is a large-bodied (up to over 4 feet [1 meter] and 77 pounds [35 kilograms]) invasive fish with downward-facing eyes and a relatively large, upturned mouth (USGS 2005). It is very similar in appearance to the invasive bighead carp and young silver carp can be confused with native gizzard shad. It is typically found in the upper water layer in large rivers and is well adapted for large river systems in the United States (Conover et al. 2007).

When disturbed, this species can leap out of the water, potentially harming boaters (Kolar et al. 2007). This fish may compete with native fish, invertebrates and mussels by filter-feeding on microscopic plants and animals from the water (Nico et al. 2018a). Free-floating eggs and larvae are produced during aggregate spawn events (Kolar et al. 2007), which can create large year-classes in successful years.

Silver carp (pictured below) are native to eastern Asia but were introduced to the United States in 1973 for aquaculture use (Nico et al. 2018a). Aside from swimming upstream, bait movements are thought to contribute to new introductions of this species. Silver carp are currently found primarily in the Mississippi River Basin in the United States (Nico et al. 2018a), though much of the United States appears to provide suitable environmental conditions for them to become established (Conover et al. 2007).

Silver carp were first collected in North Dakota in 2011, when adults were collected at LaMoure Dam and at the Jamestown Dam tailrace on the James River (Ryckman 2013). Adults were collected annually from 2011-2015 and appeared to be from a single age class (likely a 2010 year-class). In 2016 and 2017, adults from the aging year-class were observed during electrofishing, but were able to escape capture. In 2021, two small silver carp were captured during electrofishing and were assumed to be young of the year fish. Several adult fish were also observed but evaded capture. Both individuals were sent to SD to be part of a microchemistry analysis to determine their natal origin. In 2022, two silver carp measuring ~300mm were captured during electrofishing and several larger adults were observed but evaded capture. The Pipestem Reservoir and Jamestown Reservoir dams are considered to be barriers to any natural upstream movement of this species. Dedicated electrofishing is conducted annually to monitor the silver carp population and the locations of silver carp populations are maintained on the North Dakota Game and Fish Department website: https://gf.nd.gov/ans/infested-waters (NDGFD 2025).

### *Bighead Carp*

**Detected in North Dakota**

Bighead carp is a large-bodied (up to over 4 feet [1 meter] and 105 pounds [50kg]) invasive fish with forward-facing eyes and lower jaw that moderately extends past the upper jaw (USGS 2005). Bighead carp are commonly mistaken for silver carp and juvenile fish can easily be confused with gizzard shad. In North America, bighead carp are commonly found in moderate to slow current of large river systems that are turbid and warm (Kolar et al. 2007).

Bighead carp are well adapted to compete with native species for food resources including zooplankton, and detritus (Schrank et al. 2003). Like silver carp, bighead carp are known to spawn in turbulent, high-velocity river areas (Yi et al. 1998). The fish possess tremendous reproductive potential of semi-buoyant, free-floating eggs in large US river systems (Schrank et al. 2002). Bait fish movements are thought to be a potential vector that contribute to new introductions of this species.

A single bighead carp was collected in North Dakota in 2018 at LaMoure Dam on the James River. No fish have been positively observed or collected since; however, a low-density population of bighead carp likely exists within the James River in North Dakota. Rises in the hydrograph of the James River often drive the movement of invasive carp upstream from the lower reaches of the James River and the mainstem Missouri River in South Dakota. Like silver carp, Pipestem Reservoir and Jamestown Reservoir are considered barriers to the upstream movement of this species. Dedicated electrofishing is conducted annually to detect bighead carp. Bighead carp documentations are maintained on the NDGFD website: https://gf.nd.gov/ans/infested-waters (NDGFD 2025).

### *Common Carp*

**Detected in North Dakota**

Common carp (*Cyprinus carpio)* is a large-bodied (over 4 feet [1 meter] and up to 80 pounds [37 kilograms]) invasive fish easily recognized by its large scales and barbels (USGS 2005). Although this species is usually brassy to yellow in color, ornamental varieties (koi) come in a variety of colors and patterns (USGS 2005). One of the most widespread invasive fish worldwide, common carp can be found in a variety of habitats, including lakes, ponds and lower sections of rivers with slower-moving water (Nico et al. 2018c).

Major impacts of common carp introduction include uprooted vegetation and sediment, which decreases water quality and habitat for native species (USGS 2005). Common carp are prolific spawners and given their ability to survive in a wide variety of environments, they can become abundant in a short period of time. Common carp are native to Eurasia, but were introduced to the United States in the early 1800s, where it was intentionally stocked across the nation (Nico et al.

2018c). Common carp (pictured above) are popular ornamental fish and are used as live bait fish in parts of the U.S., so new introductions may be human induced.

In North Dakota, common carp were introduced over a century ago and subsequently stocked in more than 50 waters across the state (Ryckman 2013). Unfortunately, stocked populations established, though only some common carp populations are thought to have significant impacts, which are not well documented (Ryckman 2013). Specific impacts are thought to be highly variable depending upon population numbers and other environmental factors.

Populations of carp and non-infested waters are sampled regularly. Preventing the further expansion of common carp is a top priority for the NDGFD. The NDGFD has constructed numerous barriers to inhibit potential common carp range expansion during high water events. One such example is the contracted building of a permanent earthen berm in 2012 to separate the Pembina River Basin and the Devils Lake Basin.

### *Eurasian Watermilfoil*

#### Detected in North Dakota

Eurasian watermilfoil (*Myriophyllum spicatum)* is a widespread aquatic invasive plant used in aquariums and water gardens, characterized by thin, hollow stems with leaves in whorls of four that contain 14 or more leaflet pairs (see picture to the left; Pfingsten et al. 2018). It is typically found in up to 15 feet (4.5 meters) of water, though it can be found as deep as 30 feet (9 meters) in extremely clear lakes (Gettys et al. 2014). Eurasian watermilfoil can be found in a variety of water conditions.

This aquatic nuisance species can grow quickly, forming dense mats on or near the surface that leads to multiple impacts. Documented impacts in various locations throughout the U.S. include making recreational activities difficult, decreasing native plant diversity and abundance, replacing vegetation that is more nutritional for waterfowl, and clogging water intakes (Pfingsten et al. 2018). Eurasian watermilfoil spread is generally attributed to the movement of plant fragments, which can root and create new plants (Gettys et al. 2014).

Eurasian watermilfoil is native to Europe, Asia and northern Africa but was first introduced to the United States in the 1880s, likely intentionally, as this species is prominent in aquariums and plant nursery trade (Pfingsten et al. 2018). This is the most widespread invasive aquatic plant in the northern half of the Continental U.S. (Gettys et al. 2014) but is found in nearly every state in the country (Pfingsten et al. 2018). In North Dakota, Eurasian watermilfoil was first confirmed in Dead Colt Creek Reservoir in 2005 and was subsequently found in the Sheyenne River downstream of Lake Ashtabula in Barnes County. Eurasian watermilfoil has not been detected in Dead Colt Creek Reservoir since 2009 following a pre-winter water draw-down and is considered extirpated from this water (Ryckman 2013). In 2024, Eurasian watermilfoil was found at the Confluence Ramp, which is located near the confluence of the Missouri and Yellowstone rivers. No real impacts have been observed in the Sheyenne River, likely due to flow rates. Populations are

monitored and non-infested waters are sampled regularly. Updated locations are housed on the North Dakota Game and Fish Department website at https://gf.nd.gov/ans/infested-waters (NDGFD 2025).

### *Curlyleaf Pondweed*

#### Detected in North Dakota

Curlyleaf pondweed (*Potamogeton crispus)* is an invasive submerged aquatic plant that can grow up to 15 feet (4.5 meters) long with alternate, undulate leaves that can be distinguished from native pondweeds by its leaf margin teeth (Thayer et al. 2018). It is typically found fully submerged in 3 to 6 feet (1 to 2 meters) of water in freshwater lakes and ponds, though it has been found in as deep as 20 feet (6 meters) in clear water (Gettys et al. 2014). Curlyleaf pondweed can survive in polluted, low light conditions and extremely cold-water temperatures (Thayer et al. 2018).

This plant, pictured to the right, is considered an aquatic nuisance species because it can grow quickly, forming dense mats on or near the surface, and shade out native aquatic plants (Gettys et al. 2014). Large senescence events in mid-summer can lower water oxygen levels, triggering fish kills (Thayer et al. 2018). Curlyleaf pondweed uses rhizomes and turions as primary reproductive methods, and the seasonality differentiates this species from others in North America (Thayer et al. 2018). Turions can be transported through natural or human-mediated pathways, which allows for quick establishment and wide dissemination through plant fragments carried from one water to another.

Curlyleaf pondweed is native to Eurasia, Africa and Australia but was discovered in the United States in 1841 (Gettys et al. 2014). Now this species is found throughout the United States and surrounding Canadian provinces (Thayer et al. 2018). Curlyleaf pondweed was first found in North Dakota in 2000 in Lake Sakakawea (Ryckman 2013). It is found primarily in the Missouri River System, from the middle reaches of Lake Sakakawea south to the border with South Dakota, including the Missouri River and Lake Oahe. It's also found in the connected waters of Lake Audubon and McClusky Canal. Isolated populations are found in Grass Lake, Lake Ashtabula, Lake Elsie, Lake Metigoshe, McDowell Dam, Raleigh Reservoir and the Sheyenne River in Barnes County. To date, Curlyleaf pondweed has not had any noticeable detrimental effects in North Dakota waters and populations fluctuate greatly across waters and years (Ryckman 2013). Populations are monitored and non-infested waters are sampled regularly. Updated locations are housed on the North Dakota Game and Fish Department website at https://gf.nd.gov/ans/infested-waters (NDGFD 2025).

### *Starry Stonewort*

**Undetected in North Dakota**

Starry Stonewort (*Nitellopsis obtuse*) is an invasive macroalgae similar in appearance to different chara species native to North America. Unlike native chara, Starry stonewort produces white star shaped bulbils at nodes that serve as its primary method of reproduction (National History Museum 2007). It has been observed to grow to heights of 2m and depths of up to 9m in Lake Michigan (Pullman and Crawford 2010). Starry stonewort is known to occupy multiple different habitats, but is often found in slow-moving deeper water (Schloesser et al. 1986).

**Photo Provide by the Minnesota Department of Natural Resources**

This aquatic macroalgae is known to blanket lake bottoms, which can greatly inhibit growth of native plants and impact habitat utilized by spawning centrarchid fish species (Pullman and Crawford 2010). Starry Stonewort is spread through residual water on recreational vessels, fragmentation, and locally by birds and mammals (Pullman and Crawford 2010).

Starry Stonewort is native to much of Europe and Asia and was first discovered in North America in the Great Lakes region (Mills et al. 1993, Soulie-Marsche et al. 2002). This invasive alga has gradually moved its way west and can be found within about 70 miles of the North Dakota border. Due to the impacts observed in Minnesota and other locations, starry stonewort is listed as a Species of Highest Priority Concern in North Dakota. Updated locations and species profile are housed on the North Dakota Game and Fish Department website at https://gf.nd.gov/ans/species (NDGFD 2025).

### *Golden Clam*

**Undetected in North Dakota**

Golden Clams (Corbicula fluminea) are small light brown to golden colored bivalves that can easily be mistaken for native pill claims; however, they have distinct concentric ridges and three cardinal teeth. The species can grow to about two inches and can have various color morphs depending on region (Benson et al. 2025).

Golden clams are broadcast spawners. Female clams can produce 70,000 larvae or more annually (McMahon 2000). Golden clams are known to biofoul pipes and water delivery systems, which have had significant economic impact in the United States (Isom 1986). In addition, they compete with

native bivalves for resources and are efficient filter feeders, removing small particles from the water column.

Golden Clams are native to eastern Asia (Aguirre and Poss 1999). They have likely been spread in the United States through recreational activities, hatchery operations and intentional releases. The species has been documented in nearly all the lower 48 states; however, no occurrences have been documented in North Dakota. Updated locations and species profile are housed on the North Dakota Game and Fish Department website at https://gf.nd.gov/ans/species (NDGFD 2025).

### *Rusty Crayfish*

**Undetected in North Dakota**

Rusty crayfish is a rather large species of crayfish that gets its name from the distinct rust-colored spots on both sides of its carapace (Page 1985). Another distinguishing feature is the black bands on the tips of its chelae (Page 1985). Male rusty crawfish can reach up to about 6 inches in total length (Lodge et al. 1985).

Rusty crayfish are widely known as aggressive and are more well adapted to compete for resources than other crayfish species (Byron and Wilson 2001). They are omnivorous and will consume a wide range of invertebrates, algae and microbes (Lorman 1980). Rusty crayfish are also ecological engineers. They manipulate their environment by cutting down vegetation and in some northern latitude lakes, have shown to be highly successful at controlling aquatic vegetation (Peters et al. 2008). When introduced to new waters, rusty crayfish often displace native crayfish species (Capelli 1982; Bobeldyk and lamberti 2008).

Rusty crayfish are native to the Ohio River drainage (Creaser 1931). It is believed that they spread to new waters through bait releases, hatchery operations, and potentially intentional releases (Hobbs 1989; J. Leonard, Wyoming Game and Fish Department, personal communication; Wilson et al. 2004). Rusty crayfish have not been documented in the state, but they are listed as Species of Highest Priority Concern, because of their ecological impacts and proximity to North Dakota. Updated

locations and species profile are housed on the North Dakota Game and Fish Department website at https://gf.nd.gov/ans/species (NDGFD 2025).

### *Grass Carp*

#### Detected in North Dakota

Grass carp (*Ctenopharyngodon Idella)* is a large-bodied (up to 5 feet [1.5 meters] and 100 pounds [45 kilograms]) invasive fish with large scales that have a dark edging, a short dorsal fin, and a slightly pointed snout (see picture below; USGS 2005). It is very similar in appearance to the invasive black carp and can be distinguished from common carp by the lack of barbels. It can be found in shallow, slow moving or still water of lakes, ponds, pools and backwaters of large rivers, and has a high tolerance range for water temperatures (Conover et al. 2007).

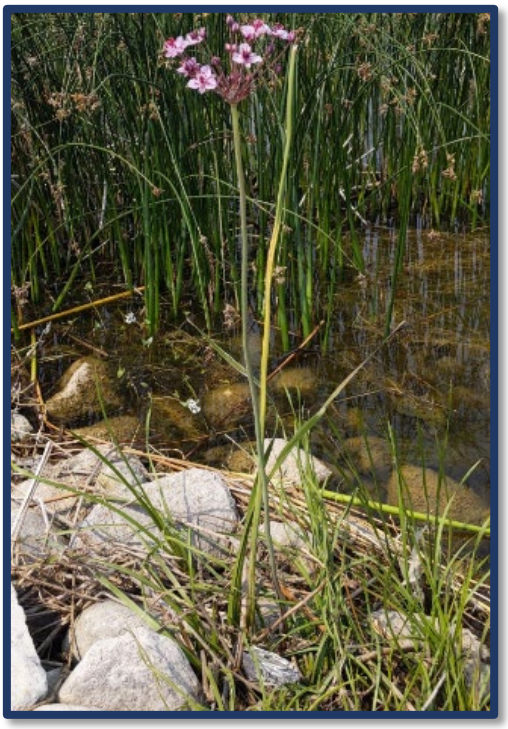
This fish consumes large quantities of aquatic vegetation, which can have negative impacts on water quality and native species (Nico et al. 2018b). Grass carp have a long, somewhat controversial history of being stocked intentionally to control vegetation in numerous waters across the United States (Conover et al. 2007). To reduce the likelihood of feral grass carp populations from establishing, most states either ban grass carp outright or require the use of triploid (infertile) grass carp (Conover et al. 2007).

Grass carp are native to eastern Asia but were introduced to the United States in 1963 for aquaculture use and have become widespread across the United States for vegetation control (Nico et al. 2018b). Grass carp have been both legally and illegally stocked in North Dakota, with the most recent stocking in 1986 (Ryckman 2013). The North Dakota Game and Fish Department conducted the initial and only legal stockings of triploid grass carp in 1971 and 1972 into Spiritwood Lake. Grass carp have been infrequently collected at Spiritwood, with the last grass carp shot in 2022 by a bow fisherman.

Grass carp were also illegally stocked in the state. In the 1970s, a pond in Minot was stocked with grass carp by locals. Upon learning of this stocking, the Department eradicated the pond, as well as several miles of the nearby Souris River. The eradication was reported as being a total success. No other specific information is available regarding this stocking (Ryckman 2013). A second illegal stocking was conducted by locals at Briarwood Pond near Fargo for multiple years prior to 1987. Winterkill decimated the grass carp population in 1985-86, but were stocked again in May 1986 illegally. Upon learning of the stocking in 1987, North Dakota Game and Fish drew down the pond prior to freeze, then eradicated in February 1988, which was effective at eliminating the population (Ryckman 2013). In 2021, while electrofishing the James River, two adult diploid grass carp were captured and removed. North Dakota Game and Fish regulations prohibit the import, sale, possession and stocking of this species. Updated locations are housed on the North Dakota Game and Fish Department website at https://gf.nd.gov/ans/infested-waters (NDGFD 2025).

### *Flowering Rush*

**Detected in North Dakota**



Flowering Rush (Butomus umbellatus) is an invasive plant commonly used in water gardens because of its aesthetic pink flowers. It is characterized by its long, smooth stem similar to native bulrushes, triangular leaves that twist near the tip, and its umbrella shaped head that supports 20-50 flowers with three petals, three sepals, and nine stamens per flower (Jacobs et al. 2011).

Flowering rush is usually found along shorelines in North Dakota, but it is capable of growing offshore in other areas to depths of 10 feet (3 meters). It can grow quickly and in high enough densities to outcompete native vegetation, restrict shoreline access and water flow, and impede recreational activity. Flowering rush spreads both sexually via seeds and asexually via rhizome and root fragmentation (Hroudová and Zákravský 1993).

Flowering rush is native to Europe, Asia and Africa but was introduced to the United States in the late 1800s, it is likely spread through the water gardening trade (Lui et al. 2005). Flowering rush was first confirmed in North Dakota in 2020 at Carpenter Lake where it persists and accounts for a large percentage of the emergent vegetation in the lake. Due likely to downstream drift, flowering rush is also found in School Section Lake. In 2021, flowering rush was found in isolated clusters on both the James and Sheyenne rivers. There are likely multiple small pockets of flowering rush on both river systems. Known populations are monitored and non-infested waters are sampled regularly. Updated locations are housed on the North Dakota Game and Fish Department website at https://gf.nd.gov/ans/infested-waters (NDGFD 2025).

## Existing Authorities

In North Dakota, many state agencies have authority and regulatory roles in managing natural resources. While only some agencies have authority to regulate ANS, all public agencies have an ethical responsibility to prevent damage to the state's resources and to act in the best interests of its citizens. Agencies that control water, pests, or invasive species are all critical to managing ANS in North Dakota. Relevant authorities and regulations of various state agencies as set forth in N.D.C.C. and N.D.A.C. are summarized below.

### *North Dakota Game and Fish Department*

The North Dakota Game and Fish Department [N.D.C.C.: §§ 20.1-02-01 through 20.1-02-32] provides the director with the authority to regulate the importation, introduction and transplanting of fish, fish eggs and other aquatic animals into state waters. The act provides that one must have a permit issued by the director before introducing any fish or fish eggs into public waters, and the fish or fish eggs must be inspected for disease.

The Aquatic Nuisance Species Act [N.D.C.C §§ 20.1-17-01 through 20.1-17-09] provides the director with the authority to manage ANS in the state. The director or designee has the power to prepare a statewide ANS management plan, establish and chair the North Dakota Aquatic Invasive Species Committee (AISC), list and restrict movement of ANS, manage infested waters, and establish civil penalties for violations. The AISC shall be comprised of state, local, and private interests and act as an advisory committee for ANS efforts throughout the state. The director also establishes reasonable rules to reduce the likelihood of introducing or spreading ANS and fish diseases into and within North Dakota [N.D.A.C. ch.30-03-06 and N.D.A.C. ch. 30-04-04].

The Fish, Frog, and Turtle Regulation Act [N.D.C.C.: 20.1-06-01 through 20.1-06-17] provides the director with the power to remove and dispose of fish deemed undesirable. The director may adopt rules governing the operation of private fish hatcheries, introduction and release of fish into the state, and the supervision of live bait wholesalers. Department rules further elaborate on permitting and operational guidelines for bait vendors [N.D.A.C. 30-03-01.1], private fish hatcheries [N.D.A.C. ch 30-03-02], and fishing contests [N.D.A.C. ch. 30-03-05].

### *North Dakota Department of Agriculture*

The commissioner of agriculture or the commissioner's authorized representative, with the assistance of the North Dakota State University Extension Service, has jurisdiction over the management, control and eradication of pests, noxious weeds, rodent and insect management and the use and application of pesticides. Their primary function is to provide technical expertise to county weed boards and to provide funding for various weed control activities.

The Plant Pests Act [N.D.C.C. §§ 4.1-23-01 through 4.1-23-12] provides the Department of Agriculture the power to suppress, control, or eradicate the spread of plant pests in the state. The commissioner may temporarily quarantine areas believed necessary to prevent the spread of plant pests for up to 90 days without a public hearing, or longer with a public hearing. The commissioner is empowered to conduct a reasonable inspection of any premises or property within the state with a warrant issued by District Court or consent of the owner and may stop and inspect any means of transport or conveyance within the state if there is probable cause to believe it to contain or carry a plant pest or host.

The North Dakota Noxious Weed Control Act [N.D.C.C. §§ 4.1-47-01 through 4.1-47-33] provides that the agriculture commissioner, working in conjunction with county weed boards and county weed officers, the authority for control, maintenance, and eradication of noxious weeds, invasive species, and pests throughout the state. The commissioner, after consultation with the North Dakota State University Extension Service, shall compile and keep a current list of noxious weeds and provide local authorities with information and a program for the control or eradication of noxious weeds. The act provides the Highway Patrol, sheriffs, and other law enforcement officers the power to stop and inspect vehicles suspected of transporting noxious weeds within the state, to prevent the dissemination of noxious weeds on highways, airways or waterways.

The Plant Nurseries Act [N.D.C.C. §§ 4.1-22-01 through 4.1-22-11] provides that the Department of Agriculture has the authority to certify and inspect all plant nurseries in North Dakota for viability, certificate of inspection, correct labeling, or pests. Any violations may warrant the forfeiture of nursery stock, revocation of certification, or civil penalties.

### *North Dakota Department of Environmental Quality*

The State Water Pollution Control Board, which includes the director of the North Dakota Game and Fish Department, through the Department of Environmental Quality, and with cooperation of the Department of Water Resources [N.D.C.C. §§ 61-28-01 through 61-28-09], maintains and improves water quality of the state, formulates and issues standards of water quality, and provides for a system to classify North Dakota's waters [N.D.A.C. §§ 33-16-02.1-01 through 33-16-02.1-11]. The

agency is to require the proper maintenance and operation of sewage and industrial waste systems to protect present and future use of such waters for, among other reasons, the propagation of fish and aquatic life and wildlife.

### *North Dakota Department of Water Resources and State Water Commission*

N.D.C.C. ch. 61-02 establishes the State Water Commission, which has general authority over all surface and subsurface water within the state and is administered under the Department of Water Resources (N.D.A.C. ch. 89-01-01). This includes authority over water projects, which includes recreational use or wildlife conservation. A permit is required [N.D.C.C. §§ 61-04-02] for all water uses, except in cases when both the amount of water to be impounded, diverted, or withdrawn is less than 12.5 acre-feet, and the contemplated use is domestic, livestock, or fish, wildlife, or other recreational use. Although no permit is required for these uses, the Department must be notified of the location and the acre-feet capacity, stored or utilized, once the facilities are constructed. The Department has the authority to regulate the construction and modification of water control projects, including dams, dikes, and other water control and management devices [N.D.C.C. § 61-16.1-38], as well as drainage [N.D.C.C. §§ 61-32-03], in conjunction with county water resource districts. In addition, the Department has authority over North Dakota's sovereign lands [N.D.C.C. §§ 61-33-02], which are those areas, including beds and islands, lying within the ordinary high watermarks of navigable lakes and streams.

### *North Dakota Water Resource District Act*

North Dakota Water Resource District Boards are the only public entity with the power to order the removal of aquatic weeds and pests [N.D.C.C. §§ 61-1.1-01 through 61-16.1-63]. Water resource boards have the power to manage water resources within their districts and order or initiate legal action to compel a person, user or controller of any bridge, or culvert to remove any weeds, shrubbery or other debris which hinders or decreases the flow of water.

### *North Dakota Highway Patrol and Other Law Enforcement*

Statutes concerning the enforcement of state laws generally require other law enforcement agencies within the state to aide and assist in the enforcement of laws and regulations in these areas. Any peace officer of the state may enforce laws that help prevent the introduction or spread of ANS.

### *Federal*

No single federal agency has clear authority over all aspects of ANS management. Many federal agencies have programs and responsibilities that address aspects of the problem such as importation, interstate transportation, exclusion, control and eradication. Federal activities on ANS management are coordinated through the Aquatic Nuisance Species Task Force (ANSTF) and the National Invasive Species Council (NISC). In addition, Executive Order (EO) 13112 and EO 13751, require all federal agencies to collaborate in developing a national invasive species management plan that will include terrestrial and aquatic species. Federal legislation is handled through Congress, who have express authority to create laws.

### *Federal Actions*

At the highest levels of federal government (secretary or equivalent level), the NISC coordinates department-level actions to address national invasive species issues for both terrestrial and aquatic environments. Established under EO 13112, this council is advised by the Invasive Species Advisory Committee, a federal advisory committee comprised of representatives from state, territorial, tribal and local governments, as well as academic institutions, non-governmental organizations, and the private sector.

The ANSTF provides a framework that allows for the coordination of ANS issues across multi-jurisdictional agencies. The group was established by the Nonindigenous Aquatic Nuisance Prevention and Control Act (NANPCA) in 1990 and reauthorized with the passage of the National Invasive Species Act (NISA) in 1996. ANSTF is currently comprised of 13 federal and 12 non-federal members. Member organizations include a diverse assemblage of federal, state, and tribal partners from across the United States. ANSTF works to develop and implement programs geared toward the research, surveillance, management, and prevention of ANS in U.S. waters. Using the guidance provided within NISA, ANSTF established and coordinates with six ANS regional panels and creates frameworks for states to develop ANS management plans to control the spread of ANS.

In addition to ANSTF's efforts, many federal agencies are responsible for taking actions to prevent the introduction and spread of ANS, though some are more involved than others. Major examples of federal agency actions include, but are not limited to, the following:

- *U.S. Fish and Wildlife Service –co-chair and provide*s administration of the ANSTF, management of the State and Interstate Aquatic Nuisance Species Management Plan Grant Program, national and regional coordination of efforts; Lacey Act enforcement; triploid grass carp certification; and leadership on Asian carp management, monitoring, and research.
- *U.S. Geological Survey* – maintain the Non-indigenous Aquatic Species database and act as leaders in research on invasive carp control strategies and other ANS needs.
- *U.S. Army Corps of Engineers –Builds, maintains and operates water infrastructure for the purposes of navigation, flood control, power and water supply*; Administers the Aquatic Plant Control Research Program and the Aquatic Nuisance Species Research Program; Operates deterrents to prevent invasive carp dispersal from the Mississippi River Basin into the Great Lakes; project permitting that includes ANS prevention requirements.
- *Bureau of Reclamation* – the largest water wholesaler in the United States, operating and maintaining water infrastructure such as reservoirs, canals, and power plants; delivering water for consumptive and non-consumptive uses; administer programs to research, control, and prevent the spread of invasive species at reclamation waters.

### *Executive Order 13112 on Invasive Species*

President Clinton signed Executive Order (EO) 13112 on Invasive Species (64 Fed. Reg. 6183, Feb. 8, 1999), on February 3, 1999. The EO seeks to prevent the introduction of invasive species, provide for their control, and minimize their impacts through better coordination of federal agency efforts under a National Invasive Species Management Plan. The order directs all federal agencies to address invasive species concerns, as well as refrain from actions likely to increase invasive species problems. The National Invasive Species Management Plan is updated every two years by the National Invasive Species Council. EO 13112 was later amended by EO 13751.

### *Executive Order 13751 on Invasive Species*

On December 8, 2016, President Obama signed EO 13751 which amended EO 13122 and directs further cooperation of Federal prevention and control efforts related to invasive species. This order expands membership of the National Invasive Species council, guides its operations and accounts for emerging factors that affect efforts to address invasive species.

### *Lacey Act (Title 16 of U.S.C. 3371-3378 and Title 18 of U.S.C. 42-43)*

Title 16 of the Lacey Act makes it illegal to import, export, transport, sell, receive, acquire, or purchase any fish or wildlife or plant taken, possessed, transported, or sold in violation of any law, treaty, or regulation of the United States, any State, Native American tribe, or foreign nation. This provision of the Lacey Act essentially ensures reciprocity of fish and wildlife and plant laws across jurisdictions. Since many jurisdictions have laws pertaining to invasive species, Title 16 can be used to impose and enact federal penalties for possessing or transporting invasive species.

Title 18 of the Lacey Act is known as the Injurious Species Provision. It authorizes the USFWS to list by regulation certain invasive or otherwise harmful wildlife species, thereby prohibiting their importation into the United States, its territories and possessions, the District of Columbia, or Puerto Rico. It also does not allow for any shipment between the continental United States, District of Columbia, Hawaii, Puerto Rico, or any possession of the United States. Species are added to the injurious species list through the regulatory process, which includes public input, usually based on criteria that address the likelihood of introduction and potential impacts.

### *Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA; Title I of P. No.101-646, 16 U.S.C. 4701 et seq.)*

This Act established the Aquatic Nuisance Species Task Force to prevent the introduction of, and to control the spread of ANS. The Task Force membership includes representatives from various federal agencies, such as the Environmental Protection Agency, U.S. Coast Guard, U.S. Department of Agriculture, National Park Service, Bureau of Land Management, and Bureau of Reclamation, among others as well as non-federal ex-offico members. The Task Forces is charged with prevention monitoring, and control with these activities supported by research and education. Under NANPCA, state governors are authorized to submit comprehensive management plans to the Task Force for approval, which identifies areas or activities for which technical and financial assistance is needed. Grants are authorized to states for implementing approved management plans, with a maximum federal share of 75% of the cost of each comprehensive management plan. The state (or non-federal) contribution is 25% of total program costs.

### *National Invasive Species Act (NISA; No.104-332)*

In 1996, NISA amended NANPCA to mandate regulations to prevent the introduction and spread of ANS into the Great Lakes through ballast water and other vessel operations. The act authorized funding for research on ANS prevention and control in the Chesapeake Bay, Gulf of Mexico, Pacific Coast, Atlantic Coast and San Francisco Bay-Delta Estuary.

In addition, NISA required a ballast water management program to demonstrate technologies and practices to prevent aquatic nonindigenous species from being introduced into and spread through ballast water in U.S. waters. It modified: (1) the composition and research priorities of the Aquatic Nuisance Species Task Force; and (2) zebra mussel demonstration program requirements.

## GAPS IN AUTHORITY

In conjunction with identifying ANS species of concern and potential pathways of introduction, North Dakota state agency authorities have evolved with the intent to address and mitigate ANS problems. In the past, state agencies have worked directly with the legislature to change century code statutes. N.D.C.C. § 20.1-17-01 grants authority to the NDGFD to develop rules to prevent the movement of aquatic nuisance species into or within the state. NDGFD primarily utilizes administrative rules for ANS prevention. To change or establish a recommended rule requires many steps including soliciting public input, attorney general review, and ultimately approval by the Legislature's Administrative Rules Committee. Administrative rule (N.D.A.C. § 30-03-06-05) changes in 2016 required all drain plugs and watering storing devices to be open during any out-of-water transport. In 2023, N.D.A.C. § 30-03-06-01 was amended to give NDGFD the authority to subject all water-based equipment including those used in commercial and construction projects to an inspection by a Department employee. N.D.A.C. § 30-03-06-01 amendment also required a dry period of 21 days before docks, lifts and related equipment may be moved between waterbodies. Minor ANS concerns, especially related to fish, can be addressed in the North Dakota fishing proclamation, which is updated every two years. As identified by internal review, public input and the AISC, state agencies will continue to work within their jurisdictions and collaborate with each other and the North Dakota Legislature to address gaps in authority when possible.

Current gaps in authority that the state is working to address are directly related to gaps in compliance. Two current issues identified by the NDGFD are boat plug violations during the overland transport of vessels and an unknown compliance with dock and lift regulations. Multiple NDGFD surveys have indicated that over 90 percent of boaters are aware of ANS and the state's regulations. However, wardens consistently report a 10-20 percent violation rate of the state's boat plug laws while conducting ANS roadside checks (NDGFD 2023). Seeking authority to raise fines, especially for those who are repeat offenders, may help improve boater compliance. Likewise, establishing additional and widespread roadside checks to encounter boaters more frequently may have a similar effect. There are challenges associated with both hypothetical supplemental efforts that make gaining the authority to implement difficult. Both efforts would require additional authority in N.D.C.C., or N.D.A.C. and need to have widespread legislative, judicial, and public support.

While N.D.A.C. § 30-03-06-01 requires a 21-day dry period for docks and lifts, there still exists no good way to track or interdict the movement of docks and lifts by private owners. The current regulation ultimately relies on the owner's awareness and cooperation with the regulation. Formal registration of docks/lifts on state waters could give NDGFD a way to track and intercept docks and lifts that present a serious risk of spreading ANS. The information collected from the registration would also provide a pathway to supply private dock and lift owners with ANS educational materials. A dock and lift registration could ultimately be enacted in N.D.A.C. with public support and implemented in such a way that would have a minimal impact on stakeholders.

## Goal, Objective, Strategies, and Actions

### Goal

The goal of the North Dakota ANS Management Plan is to prevent the introduction and spread of ANS into and within North Dakota while mitigating ecological, economic, and social impacts of existing populations where feasible.

### Objective 1. Coordination and Communication - Learn the latest science, strategies, and techniques, as well as leverage partnerships and resources to prevent the spread of ANS.

Given the extensive nature of ANS issues, no single entity can address every need. It is critical that state, federal, local and private entities work together to meet the goal of this management plan. Strong communication and coordination are essential to establishing the collaborative relationships needed to address ANS issues.

#### *Strategy 1.A. Maintain Dedicated ANS staff.*

##### *Action 1.A.1. Hire, train and maintain appropriate staff levels for overseeing and implementing a statewide ANS program.*

One full-time coordinator and biologist should be maintained to oversee the implementation of statewide ANS activities. As duties and resources increase, support staff should be hired and trained to allow for the expansion of ANS efforts.

#### *Strategy 1.B. Coordinate North Dakota Efforts*

##### *Action 1.B.1. Implement an adaptive statewide management plan.*

This document serves as a statewide management plan and should be reviewed and updated at least every 5 years to incorporate the most up-to-date knowledge about ANS and management strategies. Full implementation requires collaboration among federal and state agencies, counties, cities, non-profit organizations, industry partners, academia and other entities.

#### *Action 1.B.2. Host regular meetings of the North Dakota Aquatic Invasive Species Committee.*

This committee is tasked with updating the list of North Dakota ANS annually and is responsible for periodically reviewing and updating the North Dakota ANS Management Plan. The frequency of meetings shall be determined by AISC members, but it is recommended to have a planning meeting in spring and a reporting meeting in fall.

#### *Action 1.B.3. Guide research within North Dakota.*

When opportunities arise, research needs should be presented to universities that address knowledge of ANS biology, ecology and impacts, as well as management efforts and educational techniques. A comprehensive overview of research needs should be developed to guide research opportunities in an informed manner.

### *Strategy 1.C. Actively Participate in Large-scale ANS Efforts.*

#### *Action 1.C.1. Actively participate in regional coordination groups.*

The National ANS Task Force hosts six regional panels, of which North Dakota is a member of two: Mississippi River Basin Panel and Western Regional Panel. These regional panels and other groups bring together diverse stakeholders from the region to discuss current and upcoming ANS issues of importance. Active participation keeps North Dakota informed of potential upcoming issues and allows for collaboration that may help prevent the introduction of ANS into the state.

#### *Action 1.C.2. Participate in national and international coordination efforts.*

Although national and international collaboration is less common, groups such as the International Red River Board provide means to coordinate on basin-wide or larger scales. Similar to regional groups, these entities provide opportunities to collaborate on management activities and to learn about potential threats to North Dakota.

#### *Action 1.C.3. Attend meetings and conferences aimed at addressing ANS issues.*

Part of actively participating in coordination efforts includes travel to meetings. Further, scientific conferences are critical to increasing overall knowledge about available information and methods. Effective management requires an awareness of the current state of ANS in neighboring jurisdictions, opportunities to exchange ideas on prevention and management of ANS and being aware of the latest research on ANS and management techniques.

### *Strategy 1.D. Communicate ANS Activities.*

#### *Action 1.D.1. Develop a publicly accessible annual report.*

An annual report should be developed that details ANS activities and results, to be completed by March 15 of the following year. This report should be shared with the AISC and made available to the public on the North Dakota Game and Fish Department website. The report should be shared with stakeholders, legislators and other interested parties as appropriate.

#### *Action 1.D.2. Develop and distribute informational updates.*

Examples of informational updates might include social media posts, press releases, newspaper articles, webcasts and other media. Keeping the public informed about ANS activities is crucial to garnering support. Information about any new ANS populations or expansions should also be distributed in a timely fashion.

#### *Action 1.D.3. Solicit public input on ANS activities as appropriate.*

Good communication requires gaining public input on large-scale or novel efforts. Examples where public input may be warranted include proposing legislation additions or changes, updating the statewide management plan, or proposing new or increased fees.

## Objective 2. Education and Outreach - Effectively inform the public about ANS, their impacts, and how to prevent their spread.

One of the strongest tools available is education about ANS, impacts and prevention methods. However, providing the right information at the right time to the right audience can be challenging. Identifying audiences and delivering consistent, recognizable outreach campaigns such as “Clean, Drain, Dry”, “Don’t Let It Loose”, “Stop Aquatic Hitchhikers” or “Habitattitude”, can translate into increased preventative actions by water users. The right information and delivery can also translate into increased collaboration opportunities, increased funding opportunities and better management. Advertising and educational efforts require periodical evaluation and adjustment to maximize effectiveness.

### *Strategy 2.A. Implement a Statewide ANS Outreach Campaign.*

#### *Action 2.A.1. Develop and implement a statewide ANS communications strategy.*

Develop and implement a statewide approach to reach audiences about ANS issues. Elements include messages for general audiences, delivery methods and delivery extent. Potential information may include ANS biology and ecology, impacts, and prevention methods. This plan should be reviewed and adjusted annually as needed.

#### *Action 2.A.2. Utilize a recognizable outreach campaign for general audiences.*

Well-established outreach campaigns are powerful reminders with short catchphrases such as “Clean, Drain, Dry” that encourage action and are immediately recognizable across jurisdictions. Adopting established campaigns and slogans increases effectiveness and can often register with non-resident audiences.

### *Strategy 2.B. Educate Stakeholders on ANS.*

#### *Action 2.B.1. Provide information to those engaged in high-risk conveyance activities.*

Some pathways are best addressed independently, as these activities may happen irregularly depending on the specificity of the project. Although organizations may exist to represent these activities, attention at the individual level may be needed to reach the target audience. Information may need to be tailored to the target audience to better engage their interest in the inherent desire to protect natural resources. Examples of high-risk conveyance activities include commercial and industrial projects, commercial hauled vessels and the movement of docks and lifts. Personal contacts, digital marketing and direct mailings are examples of targeted ways to reach high-risk individuals.

#### *Action 2.B.2. Focus educational efforts on entities that provide ANS pathways.*

Some pathways can be addressed on the entity level. Having a central location to distribute information and engage entities that provide ANS pathways not only educates the entity but also establishes a relationship that can create collaborative opportunities. Examples where ANS information should be provided on an entity level include bait vendors, schools, pet stores, marinas, plant nurseries, guides and outfitters, private fish hatcheries, fishing and hunting clubs, and fishing tournaments. Information should be targeted towards the needs of the entity and its users. Public speaking events, attending organizational meetings, and personal contacts with owners are examples of ways to engage entities on ANS issues. More traditional ways of reaching these audiences include radio ads, billboards and information provided during licensing or purchases.

#### *Action 2.B.3. Educate decision-makers on ANS issues.*

Although educational efforts are typically aimed at individuals and entities that have the potential to spread ANS, educational efforts should not stop there. Legislation, regulations and

internal policies play a key role in effective ANS management. Thus, it's important to provide legislators and other policy makers with reliable information about ANS, potential and realized impacts, and recommendations for preventing their introduction and spread.

*Action 2.B.4. Include ANS education in public events.*

Large public events such as the North Dakota State Fair can provide opportunities to educate the public about ANS, impacts and ways to prevent their spread. Personal contacts at these and other planned events can allow for in-depth discussions with interested parties.

*Action 2.B.5. Maintain an updated public information platform.*

Current information about the status of ANS in North Dakota, pertinent regulations, prevention methods and frequently asked questions should be included on a stable information platform (e.g., a website). Additional resources that should be included would be brochures, posters, curriculum, news releases and other deliverables. The platform should be a resource for both the public and the media.

### *Strategy 2.C. Provide Training to Key Staff and Partners.*

*Action 2.C.1. Provide ANS staff opportunities to attend trainings.*

Regional organizations and federal agencies occasionally provide relevant trainings on ways to address ANS, from outreach methods to sampling protocols. Having a well-trained ANS staff benefits North Dakota by introducing the latest research and best management practices to the state.

*Action 2.C.2. Develop and employ a North Dakota-specific ANS training program.*

ANS training programs should be developed using current understanding of ANS biology, ecology, and techniques for prevention and management. Training should also be tailored to the needs of North Dakota prevention and management efforts. At a minimum, training components should include information on current and emerging ANS threats in North Dakota, techniques to prevent the spread and current North Dakota regulations. Trainings should be offered at least every three years or more frequently as needed. Target trainees include key agency staff from agencies involved in ANS detection, enforcement, or management efforts. These may be made available to private entities as needed.

### *Strategy 2.D. Identify and Address Educational Gaps.*

*Action 2.D.1. Evaluate and adjust educational efforts.*

Evaluations are needed to establish a baseline of the current state of knowledge and actions, generally through targeted public surveys. Metrics based on number of impressions can be a useful starting point, but separate evaluations are needed to gauge the effectiveness of outreach efforts based on method of delivery, messaging and target audience. Based on the results of these evaluations, educational efforts should be adjusted as needed to improve efficiency and success.

*Action 2.D.2. Use research to guide educational developments.*

Additional research would assist in identifying other target audiences and developing effective materials. Methods of effectively implementing outreach efforts to increase awareness and preventative actions should also be identified through research efforts.

## Objective 3. Prevention and Control - Deploy strategies through regulation and actions to prevent the spread of ANS and mitigate their impacts to aquatic resources through control activities when possible.

Once established, ANS can be difficult or even impossible to eradicate. Targeted regulation and prevention strategies are often the most cost-effective way to preserve aquatic resources from the impacts of ANS. Although often taxing to resources, in some circumstances, control or eradication attempts may be warranted to prevent the further spread of an ANS.

### *Strategy 3.A. Establish Internal ANS Prevention Policies.*

#### *Action 3.A.1. Establish internal ANS policies and procedures.*

State agencies should develop internal policies to prevent the introduction and spread of ANS during regular agency activities. These should address all work related to the waters of the state (N.D.C.C. §. 61-01-01) to the extent possible and should be periodically reviewed and updated to reflect current best management practices. For high-risk activities, agencies should consider developing HACCP plans to guide routine activities in a consistent manner.

#### *Action 3.A.2. Review agency activities for potential ANS impacts.*

State-sponsored projects should be reviewed for potential ANS impacts and conflicts with other operating procedures. This especially applies to major projects requiring state or federal permits or those that utilize contractors. Most ANS policies will likely directly apply to activities directly involving work in waters of the state, but major projects with indirect activities involving waters of the state should also be included in reviews.

### *Strategy 3.B. Institute and Enforce Comprehensive Regulations.*

#### *Action 3.B.1. Maintain a list of prohibited ANS.*

A list of species considered to be ANS in North Dakota was established in 2005. North Dakota Century Code chapter 20.1-17-01 states that this list should be updated annually. Given new introductions to the U.S. and the upper Midwest, as well as potential changes to federal and state legislation, this list may change considerably through time.

#### *Action 3.B.2. Craft comprehensive statewide regulations.*

Legislation is required to establish the needed authorities within N.D.C.C. to fully implement a comprehensive statewide ANS management plan. In addition, N.D.A.C. and agency policies regulations provide tools that encourage public compliance with taking preventative measures that reduce the likelihood of ANS introductions or spread. Regulation examples may include ANS possession restrictions, bait usage, watercraft inspections, and necessary enforcement tools such as fines or equipment impoundment.

#### *Action 3.B.3. Provide staff to fully enforce regulations.*

Providing dedicated law enforcement staff and time allows for focused ANS efforts, such as compliance checks or investigating violations. Overall compliance often increases with increased enforcement actions, thereby decreasing the likelihood of ANS introductions and spread through illegal pathways.

#### *Action 3.B.4. Facilitate regulation compliance.*

Provide regulation reminders and tools that facilitate regulation compliance. Helping remind the public about ANS regulations and providing tools for compliance will help reduce the likelihood of ANS introduction and spread. Providing strong, consistent enforcement of regulations also acts

as a reminder and increases compliance. Examples include signage at public access sites, roadside checks, watercraft inspection and decontamination stations and fines for violations.

### *Strategy 3.C. Incorporate ANS Preventative Actions into Permitting Processes.*

#### *Action 3.C.1. Include ANS regulatory information in permit language.*

When drafting state-issued permits that require work in waters of the state, information about ANS regulations should be included. If possible, a link or contact for additional information should also be provided to encourage contractors to take actions to prevent the introduction and spread of ANS.

#### *Action 3.C.2. Require preventative actions for high-risk permitted activities.*

Permitted activities that present a high risk, especially those with equipment coming from infested waters, should have additional requirements that decrease the likelihood of introducing and spreading ANS. Equipment inspections should be mandatory for high-risk activities, with decontamination prior to entering the state. All other ANS regulations should also be stressed in the permitting process.

#### *Action 3.C.3. Enforce permit ANS requirements.*

Individuals and entities conducting permitted activities on waters of the state should be made aware of ANS regulations and any special requirements of their permits during the permitting process. Inspections should be carried out on high-risk equipment, and failure to comply with permit requirements should be documented thoroughly. Decontaminations should be ordered as needed. Any violations of ANS regulations or permit requirements should be pursued by the issuing authority in accordance with established penalties.

### *Strategy 3.D. Eradicate or Reduce ANS Populations where Feasible.*

#### *Action 3.D.1. Develop a rapid response plan for new ANS populations.*

Control options are often most effective when an emerging population of ANS is detected prior to establishment. New populations are less stable and may be more susceptible to predation or competition. Thus, developing a plan for how to react to a new finding of ANS is critical to streamline potential management efforts and increase the likelihood that control options would be effective.

#### *Action 3.D.2. Conduct efforts to reduce or eradicate ANS populations as feasible.*

When feasible, management actions should be taken to reduce or eradicate emerging or newly established ANS populations. Population reductions are usually conducted with the intent of delaying population establishment rates or to mitigate harmful impacts of an ANS population. Eradication is generally only undertaken in small, isolated, or emerging populations that are most susceptible to management efforts. Available resources, public support, and likelihood of success are some factors that must be considered when determining feasibility of proposed control or eradication measures.

### *Strategy 3.E. Identify and Incorporate Scientifically Sound Prevention and Control Methods.*

#### *Action 3.E.1. Research new methods of preventing and controlling ANS.*

Scientific research yields an increased understanding of ANS, pathways and management techniques. Whenever feasible, research into new methods of preventing and controlling ANS should be encouraged and pursued.

#### *Action 3.E.2. Develop and integrate best management practices.*

Based on scientific and technological advances, best management practices should be developed to prevent or slow the introduction or spread of ANS. These best management practices should be applied and incorporated into both internal and external uses, policies and educational efforts as appropriate.

### Objective 4. Sampling and Monitoring - Implement plans for the early detection of new ANS and assess the status of existing ANS populations to meet management objectives.

Detecting new and delineating existing ANS populations allows time for planning of impact mitigation or control efforts. By finding pioneer populations, the pathway of introduction may also be more apparent, allowing for an evaluation of that pathway. Monitoring existing populations can provide a baseline for what to expect for new populations as well as potentially providing information about naturally occurring limitations to population establishment. Having a solid understanding of these expansions and limitations can guide management efforts.

#### *Strategy 4.A. Conduct Statewide Early Detection Sampling for ANS.*

##### *Action 4.A.1. Incorporate early detection sampling into existing activities.*

Given the amount of existing time spent conducting biological surveys in North Dakota waters, incorporating ANS sampling into existing sampling activities is the most efficient way to collect data. Biologists across the state already have an understanding of native and nonnative species and are trained to detect differences.

##### *Action 4.A.2. Conduct targeted high-risk early detection sampling.*

Some species are most efficiently sampled using specialized equipment or methods. Gaps in sampling should first be identified based on potential species and existing sampling efforts. High-risk waters should be sampled using specialized methods or equipment for high-impact species. An example would be zebra mussel veliger detection sampling at hatcheries and high-use waters in North Dakota.

#### *Strategy 4.B. Monitor Existing ANS Populations*

##### *Action 4.B.1. Monitor existing ANS populations and document any changes.*

Existing population monitoring provides baseline data for any future population establishment in new areas. It also provides opportunities to identify key elements in any documented population expansions or reductions. Data collected during population monitoring allows for better prediction criteria on pathways of introduction, waters that are at greatest risk of population establishment, and effects of proposed management efforts. Criteria for considering if resources should be allocated to monitor an established population should be, but not limited to, the following:

- There exists permanent or seasonal water connectivity pathways which could facilitate the movement of the ANS to un-infested areas.
- There are specific research questions about the ANS population through which monitoring could help answer and provide knowledge to guide future management efforts.
- It is the first time a new ANS has been documented in the state and the establishment of the species and its impacts warrants recording.

#### *Strategy 4.C. Monitor High-risk Pathways for Signs of ANS.*

##### *Action 4.C.1. Identify and monitor internal high-risk pathways.*

Internal actions such as fish hatchery operations, fish transfers, and routine sampling provide opportunities for the transport of ANS across and into the state. Agency actions that present such risks should be identified and monitored on a routine basis. One example is conducting ANS sampling at fish hatcheries where ANS establishment could impact waters statewide.

*Action 4.C.2. Identify and monitor external high-risk pathways.*

Non-agency activities can also pose serious risks to introducing and spreading ANS given the number of individuals involved. For example, it can be estimated that there are hundreds of thousands of boat launches in North Dakota annually. Although a single boat launch is not always high risk, the volume of boat launches elevates the risk of that pathway. Some pathways require permits, such as the import of live aquatic bait, fishing tournaments, and some construction work. External high-risk pathways should be monitored through permitting processes, inspections, or other methods as necessary. Watercraft inspection and decontamination stations are one example to monitor the high-risk pathway of individual boaters.

## Priorities for Action

Priorities for the management plan's actions are ranked by the AISC. Lead entities for each action are primarily outlined in North Dakota Century Code, but other partners, such as federal, local, and private entities, should be engaged for full implementation. Actions are prioritized E= Essential, H = high, M = medium, L = low. Seven actions were deemed essential priorities and were considered by the North Dakota AISC as pillars of a state ANS program, they include:

- *Action 1.A.1. Hire, train, and maintain appropriate staff levels for overseeing and implementing a statewide ANS program;*
- *Action 1.B.1. Implement an adaptive statewide management plan;*
- *Action 2.A.1. Develop and implement statewide ANS communications strategy;*
- *Action 2.B.3. Educate decision-makers on ANS issues;*
- *Action 3.B.1. Maintain a list of prohibited ANS;*
- *Action 3.B.2. Craft comprehensive statewide regulations; and*
- *Action 3.B.3. Provide staff to fully enforce regulations.*

High, medium, and low actions were assigned priorities by the AISC based on the level of importance the action plays in achieving the overall goal of the ANS management plan. Although important, the ANS program could still function without these actions. Priorities are given a frequency to guide how often they should be executed. Frequencies: 1 = ongoing or annually, 2 = every 2-4 years, 3 = every 5-plus year. Abbreviations: ALL = AISC state agencies and DOT, NDDA = ND Department of Agriculture, DWR = ND Department of Water Resources, DEQ = ND Department of Environmental Quality (formerly State Health Department), and DOT = ND Department of Transportation.

## IMPLEMENTATION TABLE

| GOAL<br>The goal of the North Dakota ANS Management Plan is to prevent the introduction and spread of ANS into and within North Dakota while mitigating ecological, economic, and social impacts of existing populations where feasible. | | | |
|---|---|---|---|
| **OBJECTIVE 1. COORDINATION AND COMMUNICATION**<br>Learn the latest science, strategies, and techniques as well as leverage partnerships and resources to prevent the spread of ANS. | | | |
| **Strategy 1.A. Maintain Dedicated ANS Staff** | **Collaborating entities** | **Priority** | **Frequency** |
| *Action 1.A.1. Hire, train, and maintain appropriate staff levels for overseeing and implementing a statewide ANS program.* | NDGFD | E | 1 |
| **Strategy 1.B. Coordinate North Dakota Efforts** | **Collaborating entities** | **Priority** | **Frequency** |
| *Action 1.B.1. Implement an adaptive statewide management plan.* | ALL | E | 1 |
| *Action 1.B.2. Host regular meetings of the North Dakota Aquatic Invasive Species Committee.* | NDGFD | H | 1 |
| *Action 1.B.3. Guide research within North Dakota.* | ALL | M | 1 |
| **Strategy 1.C. Actively Participate in Large-scale ANS Efforts** | **Collaborating entities** | **Priority** | **Frequency** |
| *Action 1.C.1. Actively participate in regional coordination groups.* | NDGFD | M | 1 |
| *Action 1.C.2. Participate in national and international coordination efforts.* | NDGFD | M | 1 |
| *Action 1.C.3. Attend meetings and conferences aimed at addressing ANS issues.* | ALL | L | 2 |
| **Strategy 1.D. Communicate ANS Activities** | **Collaborating entities** | **Priority** | **Frequency** |
| *Action 1.D.1. Develop a publicly accessible annual report.* | NDGFD | M | 1 |
| *Action 1.D.2. Develop and distribute informational updates.* | ALL | L | 1 |
| *Action 1.D.3. Solicit public input on ANS activities as appropriate.* | ALL | H | 2 |
| **OBJECTIVE 2. EDUCATION AND OUTREACH**<br>Effectively inform the public about ANS, their impacts and how to prevent their spread. | | | |
| **Strategy 2.A. Implement a Statewide ANS Outreach Campaign** | **Collaborating entities** | **Priority** | **Frequency** |

| | | | |
|---|---|---|---|
| *Action 2.A.1. Develop and implement statewide ANS communications strategy.* | NDGFD | E | 1 |
| *Action 2.A.2. Utilize a recognizable outreach campaign for general audiences.* | ALL | M | 1 |
| **Strategy 2.B. Educate Stakeholders on ANS** | **Collaborating entities** | **Priority** | **Frequency** |
| *Action 2.B.1. Provide information to high-risk individuals.* | NDGFD | H | 1 |
| *Action 2.B.2. Focus educational efforts on entities that provide ANS pathways.* | NDGFD | H | 1 |
| *Action 2.B.3. Educate decision-makers on ANS issues.* | ALL | E | 2 |
| *Action 2.B.4. Include ANS education in public events.* | ALL | M | 1 |
| *Action 2.B.5. Maintain an updated public information platform.* | NDGFD | H | 1 |
| **Strategy 2.C. Provide Training to Key Staff and Partners** | **Collaborating entities** | **Priority** | **Frequency** |
| *Action 2.C.1. Provide ANS staff opportunities to attend trainings.* | ALL | L | 2 |
| *Action 2.C.2. Develop and employ a North Dakota-specific ANS training program.* | NDGFD | M | 2 |
| **Strategy 2.D. Identify and Address Educational Gaps** | **Collaborating entities** | **Priority** | **Frequency** |
| *Action 2.D.1. Evaluate and adjust educational efforts.* | ALL | H | 3 |
| *Action 2.D.2. Use research to guide educational developments.* | ALL | M | 3 |
| **Objective 3. Prevention and Control**<br>**Deploy strategies through regulation and actions to prevent the spread of ANS and mitigate their impacts to aquatic resources through control activities when possible.** | | | |
| **Strategy 3.A. Establish Internal ANS Prevention Policies** | **Collaborating entities** | **Priority** | **Frequency** |
| *Action 3.A.1. Establish internal ANS policies and procedures.* | ALL | H | 2 |
| *Action 3.A.2. Review agency activities for potential ANS impacts.* | ALL | H | 1 |
| **Strategy 3.B. Institute and Enforce Comprehensive Regulations** | **Collaborating entities** | **Priority** | **Frequency** |
| *Action 3.B.1. Maintain a list of prohibited ANS.* | NDGFD | E | 1 |
| *Action 3.B.2. Craft comprehensive statewide regulations.* | NDGFD, NDDA, DWR, DEQ, DOT | E | 2 |
| *Action 3.B.3. Provide staff to fully enforce regulations.* | NDGFD | E | 1 |
| *Action 3.B.4. Facilitate regulation compliance.* | ALL | H | 1 |
| **Strategy 3.C. Incorporate ANS Preventative Actions into Permitting Processes** | **Collaborating entities** | **Priority** | **Frequency** |

| | | | |
|---|---|---|---|
| *Action 3.C.1. Include ANS regulatory information in permit language.* | NDGFD, NDDA, DWR, DEQ, DOT | M | 1 |
| *Action 3.C.2. Require preventative actions for high-risk permitted activities.* | NDGFD, NDDA, DWR, DEQ, DOT | H | 1 |
| *Action 3.C.3. Enforce permit ANS requirements.* | ALL | H | 1 |
| **Strategy 3.D. Eradicate or Reduce ANS Populations where Feasible** | **Collaborating entities** | **Priority** | **Frequency** |
| *Action 3.D.1. Develop a rapid response plan for new ANS populations.* | NDGFD | M | 3 |
| *Action 3.D.2. Conduct efforts to reduce or eradicate ANS populations as feasible.* | ALL | H | 1 |
| **Strategy 3.E. Identify and Incorporate Scientifically Sound Prevention and Control Methods** | **Collaborating entities** | **Priority** | **Frequency** |
| *Action 3.E.1. Research new methods of preventing and controlling ANS.* | ALL | L | 3 |
| *Action 3.E.2. Develop and integrate best management practices.* | ALL | M | 3 |
| **Objective 4. *Sampling and Monitoring***<br>**Implement plans for the early detection of new ANS and assess the status of existing ANS populations to meet management objectives.** | | | |
| **Strategy 4.A. Conduct Statewide Early Detection Sampling for ANS** | **Collaborating entities** | **Priority** | **Frequency** |
| *Action 4.A.1. Incorporate early detection sampling into existing activities.* | NDGFD, NDDA, DWR, DEQ | H | 1 |
| *Action 4.A.2. Conduct targeted high-risk early detection sampling.* | NDGFD | H | 1 |
| **Strategy 4.B. Monitor Existing ANS Populations** | **Collaborating entities** | **Priority** | **Frequency** |
| *Action 4.B.1. Monitor existing ANS populations and document any changes.* | NDGFD | M | 1 |
| **Strategy 4.C. Monitor High-risk Pathways for Signs of ANS** | **Collaborating entities** | **Priority** | **Frequency** |
| *Action 4.C.1. Identify and monitor internal high-risk pathways.* | NDGFD | H | 1 |
| *Action 4.C.2. Identify and monitor external high-risk pathways.* | NDGFD, NDDA | H | 1 |

## Program Monitoring and Evaluation

North Dakota's ANS management plan should be reviewed every 5 years by the AISC to determine if the contents of the plan are still appropriate for guiding North Dakota's ANS efforts. Major changes to state statues, program funding, species range and distribution, and changes in the understanding of ANS management are factors that will affect the extensiveness of the revision. The group should systematically review actions to determine if the current priority rankings are still appropriate and identify the need for new strategies and actions. The AISC and interested parties will guide the direction of the plan using the latest science and input from its members, collaborating agencies and the public.

The evaluation of North Dakota's ANS program should not be limited to the 5-year review process of the ANS management plan. Performance of the program's actions, which are guided by the plan, should be reviewed on an annual basis. During the biannual meetings of AISC and interested parties, the totality of North Dakota's program should be analyzed to assess the effectiveness or shortcomings of actions. The committee should document accomplishments and challenges, which may provide insight into future management strategies. While measuring the performance of a program is often difficult, the group should look at the following factors to gauge effectiveness:

- Whether or not objectives are achieved;
- Allocation of finite resources;
- Rate of spread of a specific species;
- Change in abundance or impact of an invader; and
- Adaptability of priorities to account for the latest science or newly identified pathways of ANS introductions.

North Dakota's ANS program is bound to face unforeseen factors that will impact the state's ability to reach the objectives outlined in the management plan. Through the review and evaluation of the state's program, stressors can quickly be identified by the AISC. Problems that cannot be addressed by the committee may need the support of outside entities including federal agencies, regional partners and the North Dakota legislative body. Dedicated program monitoring and evaluation is crucial to maximizing the prevention and management of ANS in North Dakota.

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# Acronyms Directory

| | |
|---|---|
| **AIS** | Aquatic Invasive Species |
| **ANS** | Aquatic Nuisance Species |
| **ANSTF** | Aquatic Nuisance Species Task Force |
| **DEQ** | North Dakota Department of Environmental Quality |
| **DOT** | North Dakota Department of Transportation |
| **DWR** | North Dakota Division of Water Resources |
| **NANPCA** | Nonindigenous Aquatic Nuisance Prevention and Control Act (NANPCA |
| **NDDA** | North Dakota Department of Agriculture |
| **NDGFD** | North Dakota Game and Fish Department |
| **NISC** | National Invasive Species Council |
| **USACE** | United States Army Corps of Engineers |
| **USFWS** | United States Fish and Wildlife Service |

## Glossary Terms

**Aridness:** Lack of moisture, especially related to the climate of an area.

**Aquatic Nuisance Species (ANS)/Invasive species:** Any nonindigenous, obligate aquatic species of plant or animal which is injurious to native and desirable aquatic species, or which has a negative effect on aquatic habitats, environment, or the economy of the state.

**Barbell:** Whisker like appendage used as a sensory tool.

**Ballast water:** Lake or river water taken in by boats that is used for stability, or in some circumstances to create a larger wake.

**Benthification:** The movement of trophic energy from the upper water column to the bottom.

**Biofouling:** The accumulation of biological matter, typically associated with a nuisance species like zebra mussels that damages water infrastructure.

**Bivalve:** A member of the mollusk phylum that has a hinged shell.

**Diploid:** Refers to a species that can successfully reproduce.

**Detritus:** Decomposing organic material.

**Eradicate:** Completely kill or remove a given species from the environment it inhabits.

**Established:** A self-sustaining, reproducing population.

**Infested:** A waterbody with an established population of ANS.

**Nonindigenous/Nonnative Species:** An organism that was not historically found in an area or region but was brought there typically through anthropogenic means.

**Littoral:** Refers to the shallow light penetrating regions of waters typically near shorelines.

**Mitigation:** Actions reducing the negative effects of an ANS.

**Native Species:** An organism occupying its historical range.

**Outreach:** The process of raising awareness and knowledge of ANS issues by public engagement.

**Obligate:** Requires a particular ecosystem to persist.

**Pathogen:** A disease-causing agent such as a virus, bacteria, or prion.

**Pathway:** The potential means of ANS introduction.

**Pelagic:** Open water, offshore habitat.

**Profundal:** Deep area of lake or river that has little to no light penetration.

**Rhizome:** Reproductive root-like structure in plants that allows an organism to asexually reproduce.

**Senescence event:** Die-off of a certain organism that is usually related to its life history and/or environmental conditions.

**Geo-political boundaries:** Border lines on a map between two political entities.

**Stocked:** Intentionally released by humans, typically to provide recreational opportunities.

**Substrate:** Refers to the bottom composition of a waterbody.

**Triploid:** Refers to an aquatic organism that has been genetically modified to have three sets of chromosomes that make it unable to reproduce.

**Trophic:** Having to do with the state of energy disposition of aquatic environments.

**Turion:** Refers to the acorn like reproductive structure of aquatic plants. Commonly associated with curly leaf pondweed in North Dakota.

**Veliger:** Free-floating, larval stage of a broadcast spawning mussel or clam. In North American freshwater environments veligers are typically associated with dreissennid mussels or corbicula.

# Appendix A. 2025 North Dakota AISC Members and Interested Parties

**Appointed Members**

Ben Holen- North Dakota Game and Fish Department

Michael Jensen- North Dakota Tourism Department

Duane Pool- North Dakota Department of Water Resources

Richard Weisz- North Dakota State Agricultural Department

Joseph Nett- North Dakota Department of Environmental Quality

Nick Simonson- North Dakota Wildlife Federation

Jeff Frith- Devils Lake Joint Water Management Board

Blair Ihmels- Friends of Lake Sakakawea

Scott Hopfauf- Minnkota Power

Rich Brueckner- North Dakota Sport Fishing Congress

Ted Preister- Red River Basin Commission

Antoine Smith- Three Affiliated Tribe

Michael DeVille- Three Affiliated Tribes

**Interested Parties**

Tina Harding- North Dakota Department of Water Resources

Gerald Heiser- North Dakota Department of Water Resources

Scott Sterling- United States Army Corps of Engineers

Wyatt Mack- North Dakota Department of Transportation

Michelle Cox- United States Forest Service

Rodney O'Clair- North Dakota Wildlife Federation

Gregory Schonert- United States Forest Service

Ashley Persinger- North Dakota Department of Water Resources-

Suzie Kenner- Devils Lake Tourism

Wendy Velman- Bureau of Land Management

Josh Wert- North Dakota Department of Environmental Quality

Sarah Bickerdyke- United States Forest Service

Kody Green- United States Army Corps of Engineers

Laura Hertz- Bureau of Reclamation

Joan Koob- United States Army Corps of Engineers

Steve Krentz- United States Fish and Wildlife Service

Gerard Tishmack- United States Fish and Wildlife Service

Daniel McDonald- North Dakota Department of Water Resources-

Shannon Wangsvick- Lake Tschida Recreational Manager

Morgan Berquist- MHA Nation's Department of Science, Technology, and Research-

Lisa Lonefight- MHA Nation's Department of Science, Technology, and Research

Clay Carufel- North Dakota Department of Water Resources

# Appendix B. Comments and Revisions

1. **Reviewer:** Devils Lake Convention and Visitors Bureau

   **Comment:** The ANS plan should be critically reviewed at the end of 3-yrs and problem area identified solutions be implemented at that time re-evaluated at the end of the fifth year of the plan or future plans need to be on a 5-yr redone cycle, but with a critical review and evaluation period in the third year.

2. **Reviewer:** Devils Lake Convention and Visitors Bureau

   **Comment:** The ND proposed plan seldom lists time when efforts are to be accomplished/reviewed (monthly, annually, in 3-yrs or 5-yrs)

3. **Reviewer:** Devils Lake Convention and Visitors Bureau

   **Comment:** *Objective 1: Action 1.B.2:* refers to the AISC, but not how or why it was established where did the authority for the AISC come from. What is its purpose?

4. **Reviewer:** Duane Pool, DWR

   **Comment**: There must be some more broad yet attributable vernacular for "Action 2.B.1. Provide information to those engaged in high-risk conveyance activities". This is not about the individual, but the equipment and activity.

5. **Reviewer:** Duane Pool, DWR

   **Comment:** Your map shows 6 ecoregions and it looks like an Omernik derivative. It is a hodgepodge of Level 3 and Level 4, use Level 3 and be consistent. If you say 4 the map should say 4.

6. **Reviewer:** Duane Pool, DWR

   **Comment**: Cite Bailey's Ecoregions or Omernik's Ecoregions for attached map.

7. **Reviewer:** DWR

   **Comment:** We believe there may be a more recent Executive Order on invasive species since 13112

8. **Reviewer:** Tina Harding, DWR

   **Comments**: In the implementation, the budget should not be laid out in a 5-year plan if money changes every biennium. Incorporating all agency's ANS budgets would be difficult to keep updated and accurate.

9. **Reviewer:** Rich Brueckner, Sportfishing Congress

   **Comment:** Educating decision makers needs to be elevated from high priority to essential.

# APPENDIX C. GOVERNOR'S MEMO

State of
North Dakota
*Office of the Governor*

Doug Burgum
*Governor*

Greetings,

North Dakota's water resources are vital for all North Dakotans, whether for drinking, bathing, irrigation or recreation such as fishing and boating. Aquatic nuisance species (ANS) pose a direct threat to our quality of life by endangering water quality and ecological stability. ANS endanger our municipal and rural water supplies by clogging intake pipes and threaten to disrupt the security of our agriculture and recreation industries.

Investment in preventing the spread of ANS is less disruptive and more cost effective than responding to infestations. Therefore, I directed the North Dakota Game and Fish Department to update the North Dakota Aquatic Nuisance Species Management Plan to reflect contemporary management strategies. This updated plan maximizes the value of capital investment by taking an innovative and collaborative approach rather than adding a regulatory burden.

It is the responsibility of all North Dakotans to take action to prevent ANS movement into or within our State. By working together, we can preserve the quality of our water resources for current and future generations.

Regards,

Doug Burgum
Governor

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