

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA**

**IN THE MATTER OF THE APPLICATION OF NAVIGATOR HEARTLAND
GREENWAY, LLC FOR A PERMIT UNDER THE SOUTH DAKOTA ENERGY
CONVERSION AND TRANSMISSION FACILITIES ACT TO CONSTRUCT THE
HEARTLAND GREENWAY PIPELINE IN SOUTH DAKOTA**

DOCKET NO. HP22-002

**Direct Testimony of Amy Cottrell
On Behalf of the Staff of the South Dakota Public Utilities Commission
May 25th, 2023**



1 **Q: Please state your name and business address.**
2
3 A: Amy Cottrell, ERM, 1155 Perimeter Center West, Atlanta, Georgia, 30338
4
5 **Q: Describe your educational background.**
6
7 A: B.S., University of Wisconsin-Green Bay; Biology major, Environmental Science
8 minor
9 M.S., Auburn University; Fisheries
10
11 **Q: By whom are you now employed?**
12
13 A: I have been employed by Environmental Resources Management, Inc. since
14 March 2023.
15
16 **Q: What work experience have you had that is relevant to your involvement on
17 this project?**
18
19 A: I have 10 years' experience as a fisheries biologist and aquatic ecologist for
20 academic institutions and federal, state, and tribal governments in the Midwest,
21 southeast, and pacific northwest. I have studied and implemented federal, state,
22 and tribal regulations relating to aquatic and terrestrial natural resources, fisheries
23 and wildlife management, and tribal treaty rights. I have experience working within
24 the Migratory Bird Treaty Act, Endangered Species Act, Clean Water Act, Dingell-
25 Johnson Act, Magnuson-Stevens Act, and state regulations. I have worked with
26 United States Fish and Wildlife Services (USFWS), National Oceanic Atmospheric
27 Administration (NOAA), Federal Energy Regulatory Commission (FERC), United
28 States Army Corps of Engineers (USACE), Bureau of Indian Affairs (BIA), United
29 States Environmental Protection Agency (USEPA), Bureau of Land Management
30 (BLM), United States Forest Service (USFS), Department of Transportation (DOT),
31 and state natural resource agencies.
32
33 **Q: What Professional Credentials do you hold?**
34
35 A: Certified Fisheries Professional, American Fisheries Society
36 Endangered and Threatened species handling permit, USFWS
37
38 **Q: What is the purpose of your testimony?**
39
40 A: To provide an assessment of the completeness and adequacy of the Aquatic
41 Impacts sections of the Navigator Heartland Greenway Pipeline System
42 application, specifically Section 6.6 – Aquatic Wildlife and Ecosystems. To assess
43 that all reasonable ecological measures have been accounted for, and that
44 remediation plans are wholistic and reasonable for aquatic ecosystems in the
45 application. To provide professional recommendations of the proposed activities,

46 mitigation measures and identify potential concerns assessed from review of the
47 application.
48

49 **Q: What methodology did you employ?**

50
51 A: I reviewed the application and associated components (Exhibit A – Project
52 Mapping, Exhibit C – Supplementary Tables, Exhibit E – Environmental
53 Construction Guidance, and applicant direct testimonies) and supplemental
54 materials (applicant’s responses to staff’s first through sixth set of data requests)
55 for completeness and accuracy, and consulted external resources, including:

- 56 • South Dakota Administrative Rules
- 57 • South Dakota Game, Fish and Parks (SDGFP) Fisheries Management Area
58 Strategic Plans
- 59 • USACE Wetlands Delineation Manual
- 60 • U.S. Endangered Species Act species distribution and abundance list
- 61 • USGS National Land Cover Database
- 62 • Government agency rules in the Federal Register
- 63 • USFWS policy and regulations
- 64 • SDGFP Aquatic Invasive Species laws and regulations

65
66 **Q: Did you review section 6.6 of Navigator’s Application?**

67
68 A: Yes. I reviewed Section 6.6 – Aquatic Wildlife and Ecosystems of the Navigator
69 application and cross checked with external resources.
70

71 **Q: Please summarize what information was included in section 6.6 of**
72 **Navigator’s Application.**

73
74 A: Aquatic habitats and wildlife that will be impacted by the Project either by direct
75 crossing or proximity to, including standalone waters and wetlands. Section 6.6
76 further describes the flora and fauna assumed to be impacted, and measures that
77 will be taken to avoid, minimize, and/or mitigate impacts. The methodology of
78 pipeline construction across waterbodies and how the Project will impact aquatic
79 habitats and wildlife is detailed.
80

81 **Q: In your opinion, did Navigator’s Application adequately address ARSD**
82 **20:10:22:17 (Effect on aquatic ecosystems)? Please explain.**

83
84 A: Not to date. Application is missing biological survey data, including a complete
85 wetland delineation and inland waterbody documentation, and federally
86 (Endangered Species Act) listed and state species of concern. These data are
87 needed to properly identify and quantify aquatic flora and fauna that may be
88 affected within the proposed pipeline construction and operation site, to analyze
89 impacts of construction and operation on the entire biotic environment, and thus to
90 fully identify measures to ameliorate negative biological impacts of construction
91 and operation. In the Applicant’s Responses to Staff’s First Set of Data Requests,

92 the Applicant states that they will perform biological surveys before June 2023 to
93 collect aforementioned data. Applicant needs to then perform potential impact
94 analyses and finalize an action plan to avoid, minimize, and/or mitigate negative
95 impacts to aquatic flora, fauna, and habitats. It is my understanding that this will
96 be completed before permit approval.
97

98 **Q: In your opinion, did section 6.6.3 of Navigator’s Application properly**
99 **identify the potential impacts to wetlands and waterbodies? Please explain.**
100

101 A: No. To-date, the Applicant provides the total number of waterbody crossings
102 located within the Project boundary and provides supplemental data for these
103 waterbodies in Exhibit C, Table C-2; however, the application does not list or define
104 potential impacts to these waterbodies. The Applicant defines wetland types and
105 lists their ecological services. Table 6.6-1 (Summary of Wetlands Crossed by the
106 Project by County) lists total miles of each wetlands type impacted within the
107 project area. Table 6.6-2 (Horizontal Directional Drill Locations) lists the Horizontal
108 Directional Drilling (HDD) locations and length (in feet) of waterbodies impacted.
109 Aside from the following sentence in Section 6.6.2 – Wetlands, ‘...permanent
110 conversion of some PFO [palustrine forested] and PSS [palustrine scrub shrub] to
111 PEM [palustrine emergent] will be necessary to conduct the required pipeline
112 inspections and pipeline integrity’, there are no details in the application defining
113 specifics of any other potential impacts. The only mention of potential impacts is
114 that they will be avoided. It is impossible to say impacts will be avoided without first
115 identifying what the potential impacts are. Potential impacts to wetlands and
116 waterbodies need to be defined.
117

118 **Q: Do you agree with the mitigation measures Navigator plans to implement to**
119 **minimize the potential impacts to wetlands and waterbodies? Please**
120 **explain.**
121

122 A: No, I do not agree. In Section 6.6.3 – Impacts to Wetlands and Waterbodies and
123 Mitigation Measures, the application states, ‘a majority of wetlands and large
124 waterbodies within the Project area will be crossed via HDD, therefore avoiding
125 impacts to these wetlands. Negative impacts of HDD are addressed in Exhibit E
126 Section 5.4.3 – Inadvertent Releases. However, the mitigation measures should
127 be restructured to include more preventative BMPs when crossing waterbodies
128 instead of reactive measures to a release. In-stream sediment barriers (i.e., silt
129 screens or small coffer dam type structures) are mentioned in the application as a
130 response to a release; however, they should be deployed prior to construction to
131 minimize potential negative impacts. Given the installation time for both types of
132 barriers, deploying mitigation measures after an unexpected release would
133 potentially increase the negative impacts to waterbodies. The application should
134 also include mitigation measures for aquifer breaching, a known risk of HDD.
135

136 Mitigation measures for the Open Cut method, which is being used to cross most
137 waterbodies, are presented in the application and in Exhibit E. Section 6.6.3 of the

138 application lists best management practices (BMPs), which are discussed in
139 Exhibit E; however, these are preventative measures. Neither the application nor
140 Section 5.3.4 – Open Cut Crossing Method in Exhibit E discuss remediation for
141 potential negative impacts.

142
143 **Q: Do you have any recommendations for additional mitigation measures in**
144 **order to minimize impacts to wetlands and waterbodies? Please explain.**

145
146 A: See previous two answers for more detail. Table 6.6-1 needs to include total
147 estimated acreage of impacts, not just linear impacts as wetlands are not strictly
148 linear systems – especially the prairie pothole-type wetlands located within the
149 proposed Project area. Crossing a wetland linearly is going to have radiating
150 effects on the entire wetland and surrounding watershed. Wetland impacts and
151 mitigation are calculated in acres, and any temporary or permanent wetland
152 impacts would need to be confirmed and quantified. This acreage can easily be
153 added to Table 6.6-1 after wetland delineations are completed during field surveys
154 prior to June 2023. Table 6.6-1 should include potential impacts to the water table,
155 local hydrology, and soil compaction within and around wetlands and waterbodies
156 crossed. Lastly, this section should include impacts from access roads, contractor
157 yards, and above ground facilities mentioned in the application, including proximity
158 of roads to wetlands and waterbodies, estimated frequency of use by construction
159 vehicles and other heavy equipment, and how post-construction clean-up will
160 operate to avoid additional negative impacts.

161
162 Applicant needs to better describe wetland crossing methods. While the
163 application lists BMPs for both waterbodies and wetlands, the Open Cut method
164 section focuses almost exclusively on waterbody crossing impacts, while making
165 minor mention of mitigation measures for wetland crossings.

166
167 In the application, construction methods and mitigation measures are described ‘to
168 best ability’ for waterbodies; for example, ‘Pipeline trench will be dug immediately
169 before installation to limit duration of construction within/near waterbody.’ Applicant
170 also lists BMPs here and in Exhibit E that will be employed to prevent or minimize
171 negative impacts. Construction methods and mitigation measures may need to be
172 updated after wetland delineations are performed, as is mentioned in Section 6.7
173 – Threatened and Endangered Species of the application, ‘Pending final results of
174 field surveys and input from resource agencies, appropriate mitigation and
175 protection measures will be implemented to minimize potential impacts.’ Applicant
176 needs to follow the USACE Midwest Regional Supplement (USACE 2010) to
177 complete prairie pothole wetland delineations in the project boundary.

178
179 **Q: In your opinion, did section 6.6.4 of Navigator’s Application properly**
180 **identify the potential impacts to aquatic fauna? Please explain.**

181
182 A: Not completely. As is, the application describes ecosystem types and species
183 potentially present, defines categorical fishery waters present and notes the project

184 will not cross any high-quality fisheries within South Dakota according to the South
185 Dakota Water Quality Standards, crossing only warmwater fish life propagation
186 waters. According to the Fisheries Management Strategic Plan for the East River
187 Fisheries Management Area, the Project would not cross any stocked lakes or
188 ponds. The application does not identify potential impacts to other species that
189 potentially use these waterbodies or wetlands other than fishes. Presence,
190 abundance, and potential impact data for other aquatic species need to be
191 included. It is my understanding that the applicant will complete biological field
192 surveys by June 2023, and an assessment of the survey results will need to be
193 performed to determine completeness and accuracy of potential impacts
194 identification to aquatic fauna.

195
196 **Q: Do you agree with the mitigation measures Navigator plans to implement to**
197 **minimize the potential impacts to aquatic fauna?**

198
199 A: Not completely. I do agree with the Applicant's plan to continue consulting with
200 USFWS and SDGFP to assist with mitigation measures and any necessary permits
201 needed prior to Project approval. However, no species-specific baseline data are
202 provided; these data are necessary to fully identify potential impacts and thus
203 mitigation measures for aquatic fauna.

204
205 It is my understanding that the Applicant will complete biological field surveys by
206 June 2023 to fully identify potential impacts and complete their mitigation plan.
207 Because these surveys have yet to be completed, an assessment of the survey
208 results will need to be performed to determine completeness and accuracy of
209 mitigation measures to potential impacts to aquatic fauna.

210
211 **Q: Do you have any recommendations for additional mitigation measures to**
212 **minimize impacts to aquatic fauna? Please explain.**

213
214 A: Applicant needs to define proximity of the Big Sioux River to neighboring
215 waterbodies in order to properly identify threats of aquatic invasive species,
216 specifically silver carp and bighead carp.

217
218 The invasive species prevention plan needs to extend past general equipment
219 cleaning and needs to include steps that are proven to be preventative. Refer to
220 the SDGFP Aquatic Invasive Species Strategic Management Plan (AIS SMP) 2023
221 and perhaps consult with USFWS and SDGFP for guidance (attached; Exhibit_AC-
222 2).

223
224 Applicant needs to consult with USFWS SD Ecological Services and SD Game,
225 Fish, and Parks for BMPs relating to the endangered Topeka Shiner.

226
227 Since the biological field surveys are yet to be completed, an assessment of the
228 survey results will need to be performed to determine completeness and accuracy
229 of mitigation measures to potential impacts to aquatic fauna.

230
231 **Q: Are Navigator’s proposed construction techniques for waterbody**
232 **crossings consistent with industry standard practices?**
233
234 A: Yes. Applicant states BMPs will be implemented to minimize wetland and/or
235 waterbody impacts and will be used to facilitate post-construction restoration.
236 BMPs are discussed in detail in Exhibit E.
237
238 **Q: Do you have any concerns with the proposed waterbody crossing**
239 **construction techniques proposed by Navigator? If so, please explain and**
240 **provide any recommendations you have for addressing your concerns.**
241
242 A: Yes; see previous response addressing waterbodies and wetlands. The HDD
243 section in Exhibit E should describe when mitigation or remediation measures
244 would be deployed. The Open Cut Method needs to include potential negative
245 impacts of construction failures and a phase mitigation plan for all potential
246 negative impacts. These sections should provide post-construction remediation
247 plans for temporarily impacted waterbodies, wetlands, and aquatic fauna.
248
249 **Q: Did you review Navigator’s Horizontal Directional Drill (HDD) Contingency**
250 **Plan?**
251
252 A: No. The applicant has not yet provided an HDD Contingency Plan.
253
254 **Q: Did you review Navigator’s Spill Prevention, Control, and Countermeasures**
255 **Plan (SPCC Plan)?**
256
257 A: No. The applicant has not yet provided a SPCC Plan.
258
259 **Q: What is an SPCC Plan and how would it help protect the aquatic**
260 **environment?**
261
262 A: A Spill Prevention, Control, and Countermeasure (SPCC) Plan is utilized to help
263 prevent the discharge of oil into waterbodies and surrounding shorelines. A
264 properly defined SPCC plan defines measures to both help prevent spills, and in
265 the event a spill was to occur, it defines control measures should one occur. A
266 project-specific SPCC plan would identify all potential waterbodies in relation to
267 the Project and proposed project activities. Proper spill plan and control
268 measures would be thoroughly defined by a licensed engineer thus minimizing
269 potential impacts to the aquatic environment.
270
271 **Q: Is Navigator required by law or regulation to maintain an SPCC Plan for**
272 **both construction activities and operation of the pipeline?**
273
274 A: U.S. Pipeline and Hazardous Materials Safety Administration (PHMSA)
275 regulations govern the spill responses for the pipeline during operation. This

276 would typically be covered under an emergency response plan, which the
277 application states will be completed prior to commencing operation. The
278 Applicant should develop a SPCC Plan for construction if it meets the USEPA
279 requirements of (1) storing more than 1,320 gallons total of oil products (e.g.,
280 diesel fuel, gasoline, lube oil, hydraulic oil, etc.) at a location, and (2) if a release
281 occurs, the oil products could reasonably be expected to discharge to navigable
282 waters of the U.S. or adjoining shorelines. Based on the information provided in
283 the application, I could not reasonably determine the applicability of this.
284

285 **Q: Does this conclude your testimony?**

286
287 **A:** Yes.

Amy Cottrell

Consultant II

Amy is an ERM Consultant II based out of Atlanta, Georgia. Her expertise is predominantly in fish & wildlife natural resource management, stakeholder engagement, data analytics and visualization, scientific inquiry, and govt to govt consultation (tribal ↔ USFS, USFWS, NOAA, BIA, state agencies). She has managed and studied riverine & reservoir fish populations and habitats, supervised hatchery operations, investigated compliance reviews for permits submitted by state, federal, and corporate entities under MBTA, ESA, CWA, and CAA regarding wetland and inland water issues, developed collaborative research proposals and projects, and has extensive freshwater and marine field experience. Amy is familiar with indigenous cultures and served as a wetland ecologist and tribal liaison for 11 tribal governments regarding tribal treaty rights and land sovereignty.



Experience: 10 years; aquatic ecology, natural resource management

LinkedIn: <https://www.linkedin.com/in/amy-cottrell/>

Email: amy.cottrell@erm.com

Education

- M.S., Fisheries, Auburn University, USA, 2018
- B.S., Biology, University of Wisconsin-Green Bay, USA, 2015
 - PADI Scuba Dive Certification
 - ACA Swiftwater Rescue & Rope Rescue
 - Wilderness First Responder

Professional Affiliations and Registrations

- American Fisheries Society
- Society for Freshwater Sciences
- American Society of Ichthyologists & Herpetologists
- World Sturgeon Conservation Society
- Riverkeeper Alliance

Languages

- English, native speaker
- Spanish, working proficiency

Fields of Competence

- Biological research project development
- Fish & wildlife management; tribal, state, & federal
- Data analysis, interpretation, visualization
- Report writing, grant proposal development
- ESA species
- Game species
- Population dynamics
- Wetland & aquatic plant permitting processes
- Tribal treaty rights, tribal law, consultation
- Telemetry, sonar, aerial imagery
- Scientific communication

Key Industry Sectors

- Renewable Energy Resources

South Dakota Game, Fish and Parks

2023

Aquatic Invasive Species Strategic Management Plan



Kevin Robling
Department Secretary

Tom Kirschenmann
Wildlife Division Director

Jake Davis
Aquatics Program Administrator

John Lott
Aquatics Section Chief

Tanner Davis
AIS Coordinator

Adopted by GFP Commission January 13, 2023



Agency Mission

We serve and connect people and families to the outdoors through effective management of our state's parks, fisheries, and wildlife resources.

Agency Vision

We will conserve our state's outdoor heritage to enhance the quality of life for current and future generations.

Executive Summary

South Dakota Game, Fish and Parks (SDGFP) is a public land administrator and a steward of the state's natural resources. Aquatic Invasive Species (AIS) have the potential to impact numerous aspects of surface waters within the state, several of which pertain to SDGFP, such as recreation. As such, SDGFP has a vested interest in AIS management within the state. This strategic plan is meant to identify the many challenges associated with AIS management and provide a pathway for slowing the spread within the state. Outreach and education are the primary tools available to change the behavior of every surface water user of the state. One of the primary goals of the AIS program is to provide users with the tools they need to implement Best Practices (BPs) every time they use a surface water of the state. As the status and distribution of AIS across the landscape is constantly evolving, this document is also meant to guide activities by SDGFP in response to both new species within the state and changing distributions of species currently established.

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Introduction

Aquatic Invasive Species (AIS) are aquatic plants and animals that have been introduced into waterways in which they do not live naturally. They can affect the natural resources in these ecosystems and the human uses of these resources. Annually, new species are detected in North America and established species have been documented to expand their range. For example, Zebra Mussel (*Dreissena polymorpha*) were first detected in the mid-1980's, but have since spread to numerous states and provinces (USGS data; Figure 1). Despite efforts to stop the spread of species like Zebra Mussel by state, federal and tribal agencies, along with non-governmental organizations, continued expansion has occurred, with new infestations confirmed annually.

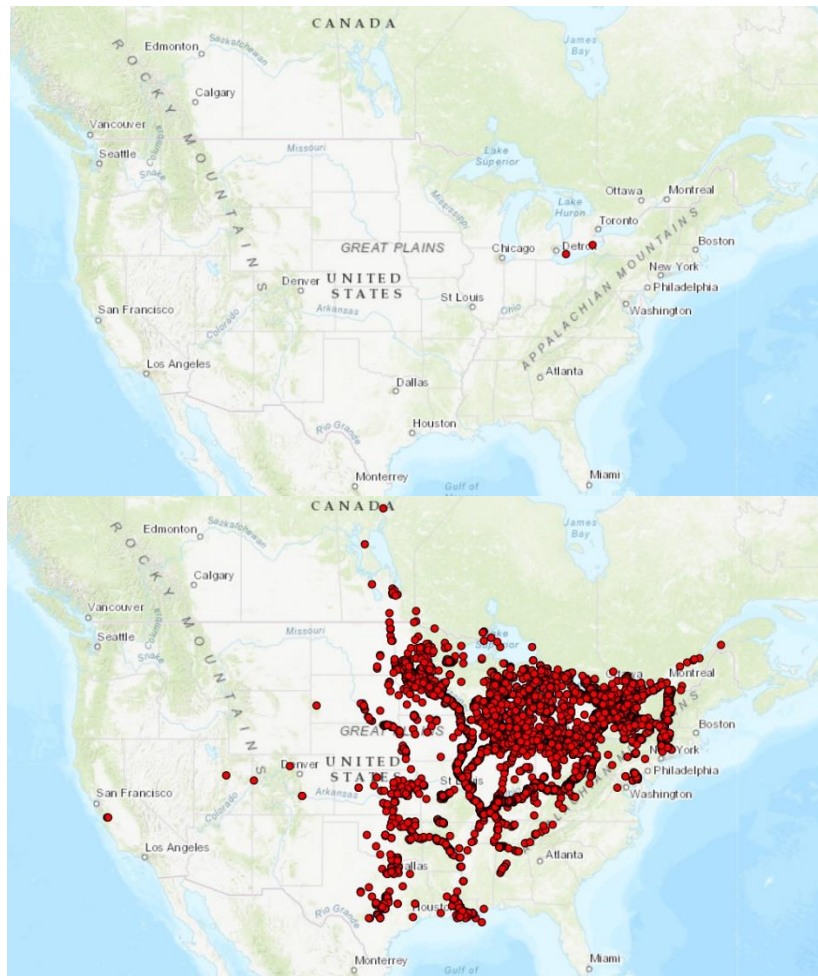


Figure 1. Distribution of Zebra Mussel (*Dreissena polymorpha*) in North American from initial detection in 1986 (top) to known distribution in 2022 (bottom; USGS data).

South Dakota Game, Fish and Parks (SDGFP) works to slow the spread of AIS through outreach and education, regulations, and enforcement. The AIS program within SDGFP has developed over the years as new species have been detected in South Dakota waters and as species have spread within the state. Efforts within the program have and continue to be determined by what is deemed to be most effective and realistic for the State of South Dakota and as such, the primary approach to slowing the spread of AIS focuses on outreach and education. The primary goal is to provide every individual who uses a surface water within the state with the information needed to understand AIS and their impacts, and tools they can put into practice to reduce the risk of spreading any AIS. Additionally, SDGFP has made efforts to evaluate and investigate potential impacts of AIS to the state (Vanderbush et al. 2021), as well as utilizing other published literature (e.g., Lund et al. 2018).

The South Dakota Aquatic Nuisance Species Management Plan (Burgess and Bertrand 2008) was approved by Governor Mike Rounds in 2008. This plan was developed in response to Section 1204 of the Nonindigenous Aquatic Nuisance Prevention and Control Act (NANPCA) of 1990 (U.S. Congress 1990), which provides states an opportunity for federal cost share support for implementation of a plan to address AIS. The Department of Game, Fish and Parks led the effort to draft the 2008 state plan in collaboration with multiple state, federal, tribal, and non-governmental organizations, and is responsible for the administration of the plan; however, this plan was broadly designed for use by all entities that may have AIS management responsibilities. In 2016, a SDGFP Strategic AIS Plan was created and implemented. Starting in 2021, AIS Communication Plans have been generated annually as outreach and education has been the primary tool to inform surface water users of infested waters and practices they can adopt to minimize the likelihood of contributing to the spread of AIS.

In addition to this AIS Strategic Plan, Operational and Communication plans will be generated annually by SDGFP. The AIS Operational Plan outlines the details of the SDGFP AIS program in regard to specific actions for a given year. For example, the number and location of Watercraft Inspection and Decontamination sites, as well as methodologies used during inspections and the educational information provided, will be outlined in this document. Additionally, specific Best Practices (BPs) to be utilized by SDGFP staff during production and stocking of fish and actions taken during fieldwork will be included to ensure that these activities do not contribute to the spread of AIS. The annual AIS Communications Plan will outline specific communication strategies and outlets for information. For example, "Communications Toolkits" will be developed and distributed to interested parties, such as Lake Associations, but the information may vary interannually and this will be captured within the Communications Plan. Additionally, partnerships with outside entities, such as marketing agencies, will allow for additional avenues for information dissemination; however, these will also be determined annually.

Annual development of these plans will allow for flexibility between years and ensure that new information and practices are incorporated into the SDGFP AIS program. These plans will be

created at the start of the calendar year and shared with the SDGFP Commission and public prior to implementation of the field season (i.e., open water period).

SDGFP Role in AIS Management

SDGFP contributes to AIS management by engaging recreational surface water users to help them slow the spread of AIS to new waters, mitigating impacts to recreation where possible, and coordinating with other entities on AIS management activities. In cases where SDGFP may not or does not have authority for surface water use(s), collaboration and cooperation with the necessary entities occurs.

To fully implement the SDGFP AIS Strategic Plan, coordination with other South Dakota state agencies is required. Depending on certain roles, responsibilities and authorities, partnering agencies play a large role in slowing the spread of AIS in South Dakota (Table 1).

Table 1. List of South Dakota state agency partners and examples roles for Aquatic Invasive Species program assistance.

South Dakota state agency	Example role(s)
Department of Transportation	<ul style="list-style-type: none"> • Installation of signage (Rapid Response plan). • Interstate signage during peak boating weekends • Locations for watercraft inspection/decontamination stations
Department of Public Safety	<ul style="list-style-type: none"> • Coordination of road-side watercraft inspection and decontamination locations
Department of Agriculture and Natural Resources	<ul style="list-style-type: none"> • Engagement of non-recreational surface water users.
Department of Revenue	<ul style="list-style-type: none"> • Distribution of information rack cards to County Treasurers for inclusion in watercraft registrations.
Department of Tourism	<ul style="list-style-type: none"> • Dissemination of educational materials • Partnering in marketing campaigns

Inventory

Aquatic Resources of South Dakota

South Dakota lies almost entirely within the Missouri River Basin, although a small portion in the northeast corner of the state flows into the Red River. Lakes and impoundments of various sizes can be found throughout the landscape. Major rivers in South Dakota include the Grand, Moreau, Cheyenne, Bad, White, James, Vermillion, and Big Sioux (Figure 2). The largest waters, by area, in South Dakota are the Missouri River and its associated reservoirs Oahe, Sharpe, Francis Case, and Lewis and Clark.

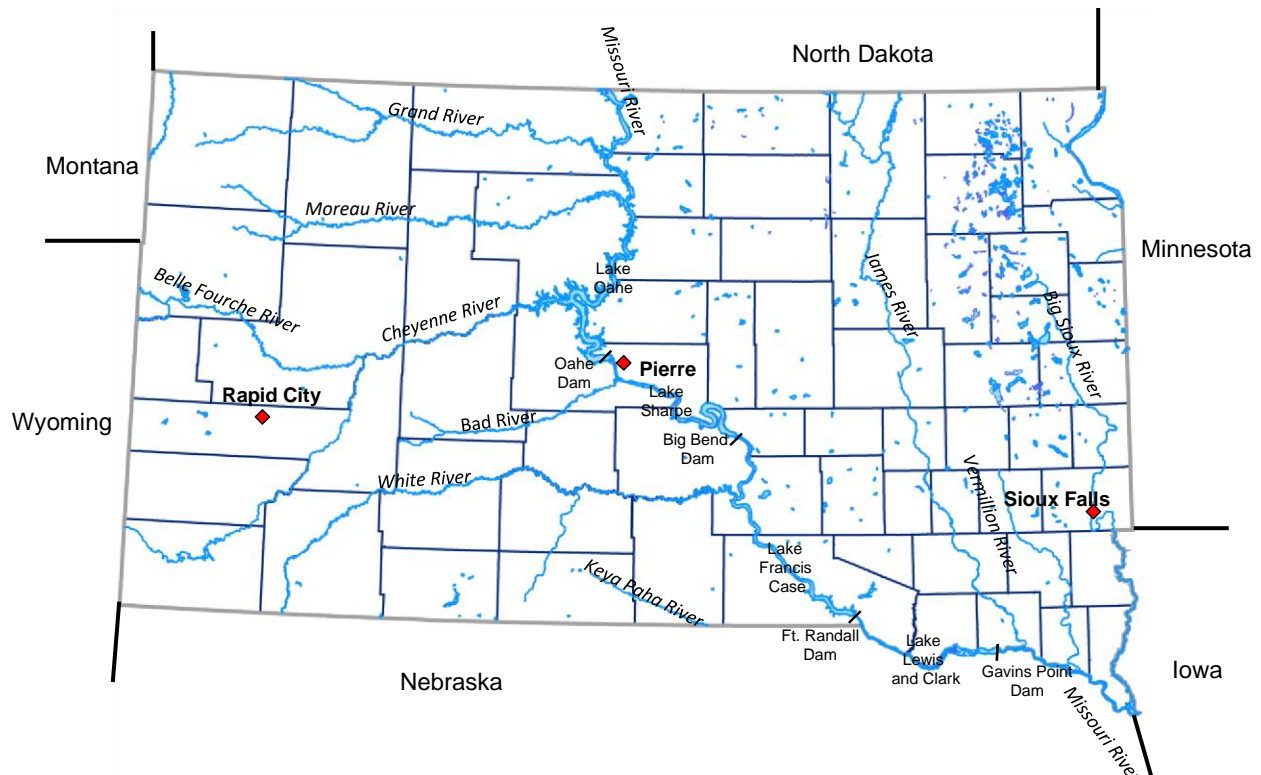


Figure 2. Aquatic resources of South Dakota.

The aquatic resources of South Dakota include a variety of standing and flowing water systems that vary significantly in size, biodiversity, and economic and recreational value. While it may vary depending on precipitation cycles, nearly 10,000 waterbodies over 10 acres are present within the state. Additionally, nearly 500 boat ramps exist across the state that provide access to these numerous waterbodies. In several parts of the state, the connectivity within these systems of waterbodies is high and multiple waterbodies can be connected through flowing waters.

Aquatic Invasive Species Present in South Dakota

Like many other states and provinces, various AIS fish, plant, and invertebrate species have become established in the state (Table 2). The list of species classified as AIS in South Dakota, along with current AIS regulations at the time of plan adoption, can be found in Appendix A. Following detection, the geographic range of these species within South Dakota largely remained localized to single waterbodies; however, many species distributions within the state have increased in subsequent years.

Table 2. Aquatic Invasive Species known to be present in South Dakota, by species and waterbody, as of the date of plan adoption.

		Fish*					Plants*					Invertebrates				
		Bighead Carp	Silver Carp	Grass Carp	European Rudd	Brittle Naisid	Curly Pondweed	Didymo	Eurasian Water-milfoil	Purple Loosestrife	Flowering Rush	New Zealand Mudsnail	Red Swamp Crawfish	Rusty Crawfish	Zebra Mussel	Asian Clam
Waterbody	Missouri River															
	*Lake Oake				x		x		x							
	*Lake Sharpe				x		x		x	x					x	
	*Lake Francis Case				x		x		x	x					x	
	*Lewis & Clark Lake				x	x	x		x	x				x	x	x
	*Below GPD	x	x	x	x								x	x	x	x
	James River	x	x	x												
	Big Sioux River															
	*Below Falls Park	x	x	x												
	Vermillion River				x											
	*Below E. Vermillion SRA	x	x	x												
	Fall River															
	*Inside Hot Springs															x
	Cascade Creek															
	*Cascade Springs															x
	Beaver Creek (Custer)											x				
	Angostura Reservoir						x									x
	Big Stone Lake						x									
	Canyon Lake						x									
	Castle Creek							x								
	Clear Lake (Marshall)														x	
	Dahme Quarry														x	
	Blue Dog Lake														x	
	Enemy Swim Lake														x	
	Herrick Lake						x									
	Interstate Lakes (Brookings)				x											
	Lake Alice				x		x									
	Lake Byron	x	x													
	Lake Cochrane															
	Lake Faulkton										x				x	
	Lake Louise										x					
	Lake Kampecka														x	
	Lake Madison				x											
	Lake Mitchell (Davison)						x								x	
	Lake Roosevelt						x									
	Lake Traverse						x									
	Lake Vermillion				x											
	Lake Yankton						x								x	
	McCook Lake					x	x								x	
	Mina Lake				x											
	Nelson Slough						x									
	Newell Reservoir				x											
	Pactols Reservoir				x										x	
	Pickrel Lake						x								x	
	Rapid Creek						x	x		x						
	Rahn Lake						x									
	Roy Lake						x									
	Sheridan Lake				x		x									
	South Bush Lake														x	
	Stockade Lake						x									
Multiple private ponds			x													
Bar Dealer Pond													x			

*Common Carp and Phragmites are widely distributed and can be found statewide

Management Components

Aquatic Invasive Species management is comprised of four key components: prevention, containment, mitigation and eradication.

1. Prevention

While prevention is an important part of AIS management, it is also challenging because of the evolving movement of AIS across the landscape, both within and outside South Dakota. New AIS are regularly introduced to the United States, and the number and complexity of vectors that have the potential to transport AIS to South Dakota presents a significant challenge. Many aquatic resources in South Dakota have multiple users (recreation, construction, industry, agriculture, municipal water, etc.), which results in many diverse user groups and many vectors for transport.

Reducing the likelihood of AIS introductions to new waters by surface water users is largely attempted through outreach and education activities due to the high volume of waters and access points to them. It is the responsibility of every surface water user of the state to make efforts to reduce the likelihood that they are introducing AIS every time they use aquatic resources of the state. As such, providing users with the information needed to implement BPs every time they use a surface water of the state is essential.

Adequate regulations are an important tool in slowing AIS from entering the state and keeping established populations from spreading to new water bodies or new areas of a water body. Compliance by users of these regulations helps ensure that BPs are being utilized. Enforcement of AIS regulations aids in compliance, as well as outreach and education. It is important to ensure the balance between reasonable use of regulations and ecological protection is maintained.

2. Containment

With nearly 10,000 waterbodies and roughly 500 boat ramps statewide, the geographic size and complexity of South Dakota's aquatic resources makes containment efforts challenging. Outreach and education are primary tools for containment efforts. Notifying users of current AIS distributions and vectors of transport are key components to reducing the likelihood of increased spread. Additional control activities include sampling and monitoring water bodies for AIS populations and attempting to eradicate populations where and when feasible.

3. Mitigation

Mitigation in AIS management includes efforts to prevent impacts of AIS, by preventing introductions, or reducing impacts of AIS on the environment or surface water users. Specific impacts and severity vary with species and the environment where they are introduced. In some cases, impacts may be minimal to nonexistent. On the other hand, impacts may be much larger and more complex. In addition to specific actions and costs associated with mitigation efforts,

identifying and coordinating of specific mitigation needs (hydropower, watercraft, irrigation) and disseminating information to user groups, can be challenging.

Outreach and education are important tools of mitigation. This can include educating users on ways to reduce both the risk of spreading AIS while using surface waters of the state or dealing with already established AIS. Research focusing on mitigating AIS impacts is also an important focus, both within and outside South Dakota.

4. Eradication

Eradication of established AIS is often the most difficult aspect of management. Few options exist once a population becomes established and many of these practices are ineffective. Examples of eradication efforts exist and SDGFP, along with aspects specific to South Dakota, consider these when weighing options. In general, attempts to eradicate AIS are extremely costly, largely ineffective, and are likely infeasible in most instances.

Goal, Objectives and Strategies

Goal: Slow the spread of AIS to and within South Dakota.

Objective 1: Educate all surface water users about the importance of CLEAN, DRAIN, DRY in slowing the spread of AIS.

Strategy 1.1: Develop and implement annual SDGFP AIS Communications Plans.

Strategy 1.2: Utilize internal communications staff to disseminate AIS education and outreach material using all available media platforms.

Strategy 1.3: Contract with outside entities for education and outreach efforts that cannot be handled internally.

Strategy 1.4: Provide AIS education and outreach material to external partners (e.g., lake associations, lake service providers, wholesale and retail bait dealers, tourism boards, and other government agencies, etc.) to increase viewership.

Strategy 1.5: Utilize localized education and outreach efforts (e.g., signage, watercraft inspections) to inform users of specific AIS infestations within the state.

Objective 2: Utilize regulations and enforcement as tools to slow the spread of AIS by requiring users to implement specific behaviors for cleaning, draining, and drying watercraft and related equipment.

Strategy 2.1: Annually review AIS regulations to determine their effectiveness at slowing the spread of AIS and recommend necessary changes.

Strategy 2.2: Utilize internal communication staff and external partners to educate users on current AIS regulations.

Strategy 2.3: Utilize internal and engage external law enforcement to enforce AIS regulations.

Strategy 2.4: Use watercraft inspection stations as the primary tool to actively engage watercraft users on complying with regulations and for coordination with law enforcement staff on enforcement activities.

Strategy 2.5: Utilize AIS Workforce Recruitment Plan (Appendix B) to fill advertised AIS positions.

Objective 3: Detect and monitor existing AIS populations.

Strategy 3.1: Utilize SDGFP staff to detect new AIS infestations while conducting fieldwork and monitor existing populations.

Strategy 3.2: Provide avenues for the general public to participate in AIS monitoring (e.g. Citizen Monitoring through SDLEASTWANTED.SD.GOV).

Strategy 3.3: Utilize SDGFP communications staff to notify the public of new infestations and inform them of current AIS distributions in the state.

Strategy 3.4: Execute the Rapid Response Plan (Appendix C) for any new Zebra or Quagga mussel infestation.

Objective 4: Support research on AIS in South Dakota.

Strategy 4.1: Partner with other entities to support research that identifies, predicts, and reduces the likelihood of AIS introductions or provides recommendations on ways to mitigate impacts of AIS present in the state.

Strategy 4.2: SDGFP and partners will support research on potential management alternatives for their effectiveness at reducing impacts of AIS on native species and human users.

Objective 5: Minimize risk of spread of AIS during GFP activities.

Strategy 5.1: Keep staff up to date on current AIS and distributions within the state.

Strategy 5.2: Utilize internally developed Aquatic Invasive Species-Hazard Analysis Critical Control Point (HACCP) plans and published practices (e.g. Schall 2019) to reduce risk of spread during fish management and hatchery production activities.

Strategy 5.3: Utilize any new information to update internal BPs in regard to mitigating the spread of AIS during activities.

Objective 6: Coordinate AIS management efforts with parties interested in surface water use of South Dakota.

Strategy 6.1: Annually engage other state agencies and reference opportunities to partner with GFP on AIS management into GFP's annual communication and field operations work plans.

Strategy 6.2: Engage interested parties on AIS communication and field operations efforts and provide them with information on how to mitigate impacts experienced.

Strategy 6.3: Share annual updates on AIS with other state agencies and surface water uses within the state and use input received in development of annual communications and field operations plans.

Strategy 6.4: Provide Lake Associations with options to partner with GFP on AIS efforts (e.g., outreach, inspections, etc.) at specific waterbodies.

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Appendix A: Aquatic Invasive Species Regulations as of January 1, 2023

South Dakota Codified Laws

41-13A-1. Definitions.

Terms used in this chapter mean:

- (1) “Aquatic invasive species,” an aquatic species that is not native to the state, including the seeds, eggs, spores, or larvae of the species, or other biological material capable of propagation, and whose presence within the state may cause economic or environmental harm;
- (2) “Conveyance,” a motorized or nonmotorized boat and associated equipment that may come in contact with water or that is able to transport water. A conveyance includes any trailer, engine, motor, live well, ballast tank, bilge area, anchor, and any other item that may come in contact with water or is able to transport water that could harbor an aquatic invasive species;
- (3) “Decontamination,” a process used to kill, destroy, or remove aquatic invasive species and other organic material that may be present in or on a conveyance;
- (4) “Inspection,” a visual and tactile examination of a conveyance to determine whether it may harbor any organisms or other organic material that could present a risk of spreading an aquatic invasive species;
- (5) “Waters,” all waters within the jurisdiction of the state used for recreational boating, including rivers, streams, and natural or manmade lakes, ponds, and reservoirs.

41-13A-2. Aquatic invasive species—Prohibitions—Violation as misdemeanor.

No person may possess, import, ship, or transport within this state any aquatic invasive species unless authorized by the commission in rules promulgated under § 41-2-18.

A violation of this section is a Class 2 misdemeanor. A second or subsequent violation of this section within one year is a Class 1 misdemeanor.

41-13A-3. Conveyance placement—Requirements—Violation as misdemeanor.

No person may place a conveyance, or cause a conveyance to be placed, into waters within this state without first meeting the requirements in § 41-13A-4 unless authorized by the commission in rules promulgated under § 41-2-18.

A violation of this section is a Class 2 misdemeanor. A second or subsequent violation of this section within one year is a Class 1 misdemeanor.

41-13A-4. Conveyance removal—Requirements—Violation as misdemeanor.

Any person removing a conveyance from waters shall, to the extent possible, do the following:

- (1) Clean the conveyance by removing all visible organic material, including plants, animals, and mud;
- (2) Drain the conveyance by removing any plug or other barrier that prevents water drainage and running any pumps on board to expunge water; and
- (3) Comply with any other requirements and protocols for the cleaning, draining, and drying of a conveyance established by the commission in rules promulgated under § 41-2-18.

41-13A-5. Inspection stations—Required inspections—Violation as misdemeanor.

To prevent the introduction, importation, infestation, and spread of aquatic invasive species, the department may establish aquatic invasive species inspection stations at any location within the state including interstate borders, highways or other roads, locations adjacent to or near public waters, and at department offices. Any person with a conveyance is required to stop at an inspection station. The department shall receive approval from the Department of Transportation before establishing an inspection station along any road that is part of the state trunk system. Failure to comply with the provisions of this section is a Class 2 misdemeanor. A second or subsequent violation of this section within one year is a Class 1 misdemeanor.

41-13A-6. Inspection stations—Inspections—Decontamination.

At inspection stations established under § 41-13A-5, authorized department personnel may inspect the exterior of any conveyance for the presence of organisms or organic material that may harbor aquatic invasive species. Authorized personnel may examine any interior portion of a conveyance that may carry or transport water or organic material, including an engine, motor, live well, ballast tank, or bilge area. A law enforcement officer may stop a person with a conveyance at a location other than an inspection station if the person fails to stop at an inspection station or fails to comply with required inspection and decontamination procedures. During the inspection, personnel may also check for compliance with the requirements established in §§ 41-13A-2 to 41-13A-4, inclusive.

If any organisms or organic material that may harbor aquatic invasive species are found or suspected to be present as a result of the inspection, the department may decontaminate the conveyance or order the decontamination of the conveyance.

41-13A-7. Law enforcement authority—Inspections—Decontamination.

A law enforcement officer may only stop a conveyance at a location other than an inspection station established under this chapter, and may only inspect the conveyance for the presence of organisms, or organic material that may harbor aquatic invasive species if the conveyance is visibly transporting organisms or organic material, including animals, plants, or mud, or the law enforcement officer otherwise reasonably believes, based on articulable facts, that the conveyance is in violation of any of the provisions of §§ 41-13A-2 through 41-13A-4. If a law enforcement officer conducts an inspection of a conveyance and finds the presence of organisms, organic material, or water, that may harbor aquatic invasive species, a law enforcement officer may do the following:

- (1) Escort the conveyance to the nearest inspection station for immediate decontamination;
- (2) Issue an order requiring the decontamination of the conveyance; or
- (3) Detain the conveyance until the decontamination is complete.

South Dakota Administrative Rules

41:10:04:01. List of aquatic invasive species. Species classified as aquatic invasive species in the state are as follows;

(1) Fish:

- (a) Black carp, **Mylopharyngodon piceus**;
- (b) Common carp, **Cyprinus carpio**;
- (c) Grass carp, **Ctenopharyngodon idella**;
- (d) Bighead carp, **Hypophthalmichthys nobilis**;
- (e) Silver carp, **Hypophthalmichthys molitrix**;
- (f) European rudd, **Scardinius erythrophthalmus**;
- (g) Giant snakehead, **Channa micropeltes**;
- (h) Northern snakehead, **Channa argus**;
- (i) Bullseye snakehead, **Channa marulius**;
- (j) Blotched snakehead, **Channa maculata**;
- (k) Western mosquitofish, **Gambusia affinis**;
- (l) Round goby, **Neogobius melanostomus**; and
- (m) White perch, **Morone americana**;

(2) Plants:

- (a) Brittle naiad, **Najas minor**;
- (b) Curly pondweed, **Potamogeton crispus**;
- (c) Didymo, **Didymosphenia geminata**;
- (d) Eurasian water-milfoil, **Myriophyllum spicatum**;
- (e) Purple loosestrife, **Lythrum salicaria**;
- (f) Flowering rush, **Butomus umbellatus**;
- (g) Common reed, **Phragmites australis**; and
- (h) Starry stonewort, **Nitellopsis obtusa**;

(3) Invertebrates:

- (a) New Zealand mudsnail, **Potamopyrgus antipodarum**;
- (b) Rusty crayfish, **Orconectes rusticus**;
- (c) Zebra mussel, **Dreissena polymorpha**;
- (d) Quagga mussel, **Dreissena rostriformis bugensis**;
- (e) Asian clam, **Corbicula fluminea**;
- (f) Red rimmed melania, **Melanoides tuberculata**;
- (g) Red swap crayfish, **Procambarus clarkii**; and
- (h) Spiny waterflea, **Bythotrephes longimanus**.

41:10:04:02. Aquatic invasive species exemptions. The following are exempt from SDCL 41-13A-2:

- (1) A person possessing a scientific collectors permit issued by the department;
- (2) A person authorized by the department to stock triploid grass carp for pond management purposes;

- (3) A person contracted by the department to conduct commercial fishing operations as authorized in SDCL 41-13-7;
 - (4) A person in the process of removing an aquatic invasive species from a conveyance;
 - (5) An owner or agent of the owner of a conveyance in the process of transporting the conveyance for decontamination using a department approved procedure;
 - (6) An employee of a business approved by the department to transport and possess conveyances for the purpose of decontamination;
 - (7) A commercial plant harvester operating within the requirements of a department approved work plan or a lakeshore property owner operating within the requirements of a department approved permit; and
 - (8) A lakeshore property owner in the process of transporting aquatic invasive species, for disposal, in a manner that minimizes possible introduction to new waters.
- In the case of fish and crayfish species, only dead specimens may be transported or possessed.

41:10:04:02.01. Aquatic species conveyance launching and removal exceptions. The following are exempt from SDCL 41-13A-3 and 41-13A-4:

- (1) An owner and agent of the owner of a conveyance with dressinid mussels attached that is subsequently launched directly into the infested water from which it was removed, if the conveyance was stored on the riparian property of the owner or at a marina business property on the infested water, prior to launch; and
- (2) An owner and agent of the owner of a conveyance with a shooting or observational blind constructed of aquatic macrophytes cut above the water line, attached to or in the conveyance.

41:10:04:03. Boat restrictions. Except for emergency response boats or as authorized by the secretary, all trailered boats must have all drain plugs, bailers, valves, and other devices used to control the drainage of water opened or removed, except while in a boat ramp parking area or while being launched or loaded.

41:10:04:05. Fish and bait transportation restrictions. Except as authorized by the Secretary, a person may not transport fish or aquatic bait in water obtained from a lake, river, or stream except when in a boat ramp parking area.

41:10:04:06. Infested water -- Definition. For purposes of this chapter, "infested water" means a body of water that has an established zebra or quagga mussel population, a water body downstream of an infested water with a likelihood of becoming infested, or waters that are located outside this state and designated by a legal jurisdiction as infested by zebra or quagga mussels.

41:10:04:10. Decontamination procedure. The department approved decontamination procedures are protocols described in "Uniform Minimum Protocols and Standards for Watercraft Inspection and Decontamination Programs for Dreissenid Mussels in the Western United States" (UMPS), 3rd edition, published by the Pacific States Marine Fisheries Commission.

Appendix B: Aquatic Invasive Species Workforce Recruitment Plan

Goal: Recruit qualified applicants for all positions posted for the AIS program to help slow the spread of AIS within South Dakota.

The South Dakota Game, Fish and Parks (SDGFP) Aquatic Invasive Species (AIS) program is staffed using a combination of full-time, temporary and contract employees. As such, multiple approaches and timelines are associated with the hiring process to fill positions each year.

For SDGFP internships, the timeline will follow what is established by the South Dakota Bureau of Human Resources (SDBHR) in association with the Executive Internship Program (EIP). Specific dates may vary interannually and the pay level will be determined by the South Dakota Bureau of Human Resources (SDBHR) based on the duties listed on the requisition request. Applicants must be full-time students at a college or university and have sophomore standing or above by the end of the fall semester or must currently be enrolled at a vocational-technical school and have completed one year (nine months) by the start of the internship.

For SDGFP seasonal positions, the SDBHR timelines and requirements for applications are more flexible. Additionally, the education enrollment status requirement does not apply. Applicants need to be 18 years of age.

Employees hired by organizations under contract with SDGFP (e.g., County Conservation Districts) are hired through methods specific to a given entity.

This document is meant to provide a pathway for both positions to be posted and disseminated in efforts to reach as many qualified candidates as possible. As a common goal exists to hire all advertised positions, SDGFP will assist any partner organization with development of positions descriptions and postings.

Checklist:

Date completed	Action
	Create position description
	Post position (e.g., BHR website/partner location)
	Send to list of institutions (Table 1)
	Post on GFP social media
	Attend job fairs at educational institutions
	Send GFP emails with job announcements
	Send announcements to NGO partners (e.g., lake associations)

Table 1. List of institutions to send position posting information.

Institution	Location
South Dakota State University	Brookings, SD

University of South Dakota	Vermillion, SD
South Dakota School of Mines and Technology	Rapid City, SD
Black Hills State University	Spearfish, SD
Northern State University	Aberdeen, SD
Dakota State University	Madison, SD
Lake Area Technical College	Watertown, SD
Western Dakota Technical College	Rapid City, SD
Southeast Technical College	Sioux Falls, SD
Mitchell Technical College	Mitchell, SD
Dakota Wesleyan University	Mitchell, SD
Augustana University	Sioux Falls, SD
University of Sioux Falls	Sioux Falls, SD
Chadron State University	Chadron, NE
Southwest Minnesota State University	Marshall, MN
Mount Marty University	Yankton, SD
Presentation College	Aberdeen, SD
Oglala Lakota College	Kyle, SD
Sisseton Wahpeton College	Sisseton, SD
Sinte Gleska University	Mission, SD

Appendix C: South Dakota Zebra and Quagga Mussel Rapid Response Plan

Upon confirmation of a new water being infested with Zebra or Quagga Mussel, the below response plan will be implemented.

Immediately upon confirmation of a new infestation, South Dakota Game, Fish and Parks (GFP) Rapid Response Team members will notify the GFP Cabinet Secretary and Wildlife Division Director, the South Dakota Governor's Office, GFP Commissioners, other GFP staff, and other affected governmental agencies of the infestation.

Rapid Response Team members may include:

- **Game, Fish and Parks** – the AIS Coordinator, Fisheries Management Program Administrator, Aquatic Section Chief, Area Fisheries Supervisor, Regional Conservation Officer Supervisor, and the Communications Director
- **Other Governmental Entities** – other – state, federal, tribal, and municipal agency representatives who may have regulatory authority or the ability to contribute to response efforts.

The AIS Coordinator and Program Administrator will assemble the response team for a specific water.

Immediate Response

1. The GFP Communications Director will coordinate dissemination of information on the new infestation to include:
 - Press releases regarding the new infestation will be developed in collaboration with other management authorities and shared with media contacts within 24 hours of confirmation of the infestation.
 - Targeted emails being shared with anglers/boaters and/or park users.
 - Social media post regarding new infestation on GFP social media platforms.
 - Addition of the infested waterbody to AIS map and Public Fishing Access map.
 - Addition of the infested waterbody to SDLeastWanted.sd.gov.
 - Addition of the infested waterbody to geofencing efforts of the AIS marketing campaign.
2. GFP Aquatics Section Staff will organize a meeting of the Rapid Response Team to determine immediate actions to take in response to the infestation, with additional meetings scheduled, as needed.
 - Immediate actions will include:

- Coordinate with other entities with management authority for the infested water and distribute a joint press release within 1 day of confirmation of the infestation.
- Place high-profile signs, 18” x 24”, on GFP access areas where no other approval is required within 2 days. Placement on water bodies outside GFP authority may take longer until approval is received from the managing agency or entity.
- Position the large (4’ x 8’) notification signs at high profile locations at the water body entrances within 5 days. DOT assists with permanent placement of these signs using their equipment and trucks; however, temporary placement will occur if permanent cannot be accomplished within the timeline (e.g., frozen ground).
- Determining the best locations for actively engaging boaters using the infested water and sharing information on decontamination requirements and how to Clean, Drain, and Dry equipment.
- Identifying groups of people and entities that will be potentially affected by the infestation, including marina operators and slip holders, water service providers (weed harvesters, boat dock and lift businesses), lake association members, municipalities, irrigators, and sportsman and conservation groups.
- Sharing information on decontamination requirements and mitigation techniques with all publics.

Continued Response

3. After the conclusion of the initial boating season of infestation, Rapid Response Team members will meet to develop an action plan for slowing the spread of zebra mussels to other waters.

•Actions will include:

- Working with marinas, slip holders, and lakeshore property owners to reduce colonization of mussels on watercraft and related equipment.
- Identifying parties interested in providing decontaminations for watercraft, and boat docks and lifts, instructing them in proper decontamination procedures, and sharing the availability of services with affected parties.
- Working with other managing government entities on future coordinated AIS efforts.