

## **Rapid Response Plan Following Detection of Dreissenid Mussels in Big Horn Lake, Wyoming**

Cody Regional Fisheries Management Crew, Wyoming Game and Fish Department, 2820 State Highway 120, Cody, WY 82414

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### **SUMMARY**

Big Horn Lake, also known as Yellowtail Reservoir, is located 10 miles east of Lovell, WY in the northwest corner of the Cody Region. The reservoir extends into south central Montana and is approximately 40 miles south of Billings, MT. The reservoir was impounded in 1965 by the United States Bureau of Reclamation (USBR) for flood control, power generation, irrigation, and recreation. Bighorn Canyon National Recreation Area (BCNRA), administered by the National Park Service, manages recreational use, while the USBR manages water storage. The fishery is managed jointly by the Montana Department of Fish, Wildlife, and Parks and the Wyoming Game and Fish Department (WGFD). The Crow Tribe has adjacent lands and water rights within Big Horn Lake, and Western Area Power Administration manages power generation.

Big Horn Lake is approximately 72 miles long with an average width of 0.10 miles. The reservoir is at an elevation of 3,640 feet and a volume of around 1.2 million acre-feet of water when at full pool.

The boating season is typically from late May (reservoir levels are often too low to launch boats on the Wyoming side prior to this time) through October. There are two established boat ramps in Wyoming; Horseshoe Bend and Kane. Most boaters are residents of Wyoming. The goal of rapid response at all status levels is to minimize the risk of spreading dreissenid mussels to other waters. This will be accomplished by closing the Kane ramp, prohibiting shoreline launching and thus requiring all boats launching in Wyoming to travel past the Crooked Creek inspection and decontamination station prior to launching at the Horseshoe Bend ramp.

A total of two inspectors, one WGFD and one BCNRA, will be present at the Crooked Creek station during week days and three inspectors, two WGFD and one BCNRA, on weekends and holidays. This staffing level will be sufficient for all status levels. Three additional inspectors will be hired for the Long-term Suspect Status. Under the Positive and Infested status levels, an AWEC Biologist 1 will be hired to oversee the Crooked Creek inspection station and staff. The Crooked Creek inspection station will be operated from 10 am to ½ hour after sunset from Memorial Day weekend through November 15.

The cost associated with responding to the detection of dreissenid mussels in Big Horn Lake range from \$2,064 for the six week Short-term Suspect Status period to an initial annual cost of \$119,826 for Infested Status. After the initial year, the annual operating cost for containing dreissenid mussels in an infested Big Horn Lake is approximately \$105,000.

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**INTRODUCTION**

Zebra (*Dreissena polymorpha*) and quagga (*Dreissena bugensis*) mussels are aquatic invasive species (AIS) that have far-reaching negative impacts on natural resources, water infrastructure, recreation, and can be attributed to significant economic loss. Zebra mussels are native to the Black and Caspian seas and were first discovered in the Great Lakes in 1988. Quagga mussels are native to the Dnieper River Drainage in Ukraine and were first found in the Great Lakes in 1989. Since their initial introductions, these species have spread across most of the United States, and have been detected in Wyoming's neighboring states of Nebraska, South Dakota, Montana, Colorado, and Utah. The close proximity of zebra and quagga mussels to Wyoming elevates the threat of introduction and increases the need for plans to contain them if detected.

Currently, Wyoming's AIS program is focused on outreach, watercraft inspection and monitoring, with the overall goal of keeping invasive species such as zebra and quagga mussels out of the state. Wyoming law requires inspection of all watercraft entering the state and the Wyoming Game and Fish Department (WGFD) currently maintains 14 inspection stations (primarily at Department of Transportation Ports of Entry) that intercept incoming watercraft and inspect them for the presence of AIS. The WGFD AIS program also conducts inspections at various waters by roving personnel and at regional offices. Annual monitoring for a variety of AIS, including zebra and quagga mussels, is conducted on priority waters throughout Wyoming and an outreach program is in place to educate the public about the threats of AIS and what they can do to prevent their spread.

If zebra or quagga mussels are detected in a Wyoming water, immediate action will be necessary to prevent their spread to other waters. This rapid response plan is a water-specific plan that outlines the steps needed to quickly mobilize personnel and equipment to provide exit inspections and, if necessary, decontaminations of all boats leaving the affected water. This plan will be initiated when zebra or quagga mussel veligers (larvae) or adults are detected in a sample from Fremont Lake and are verified by independent experts and genetic analysis. At that point, the lake will enter Short-term Suspect Status. This coincides with the period of time necessary to conduct additional sampling and testing necessary to verify whether zebra or quagga mussels are present (up to six weeks). If follow-up sampling does not detect zebra or quagga mussels, the water will enter Long-term Suspect Status and monthly monitoring will be initiated. If zebra or quagga mussels are not detected for three years, the water will once again be considered negative. Conversely, if two sampling events within a 12-month period detect zebra or quagga mussels, the water will enter Positive Status and will not be considered negative again unless mussels are not detected in monthly monitoring for five years. Finally, a water will enter Infested Status when evidence shows a recruiting and reproducing population of zebra or quagga mussels is established. At this point, eradication of mussels is highly unlikely and containment efforts will be necessary for the foreseeable future.

This plan provides guidance for the initial response to detection of dreissenid mussels at each of these four status levels and is intended to be implemented quickly and act as the guiding document for initial decision making following detection. It is not intended as a long-term containment plan, but will outline the action necessary to provide short-term containment while a long term containment and monitoring plan is developed.

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**CONFIRMATION OF DREISSENIID MUSSELS**

Sampling of Wyoming waters is conducted annually in accordance with the “Wyoming Game and Fish Department Aquatic Invasive Species Sampling and Monitoring Manual” (WGFD 2019). High priority waters are sampled twice per season (June or July, and September or October), and lower priority waters are sampled once per season in September or October. To determine whether Wyoming waters contain evidence of AIS, specimens of adult or juvenile crayfish, snails, mollusks, plants, etc. are collected during routine sampling and any specimen suspected of being AIS must be positively identified by at least two independent experts. Only samples collected by the WGFD may be used to change the classification of a water. Samples collected by a third party will be used as a notification of a possible detection which must be confirmed by a WGFD sample.

To meet the minimum criteria for detection of dreissenid mussels, an adult or juvenile specimen must be verified by two independent experts and confirmed by DNA, or a veliger (larval form) must be identified and verified using cross-polarized light microscopy by two independent experts and confirmed by DNA analysis (PCR and gene sequencing).

Based on sampling results, waters are given certain classifications related to their dreissenid mussel status:

A water body that has not been sampled for aquatic invasive species is classified as *Unknown/Not Tested*. A water body at which sampling is ongoing and nothing has been detected (or nothing has been detected within the time frames for de-listing) is classified as *Negative*. Currently, all waters in Wyoming are classified as either *Unknown/Not Tested*, or *Negative*.

A water body classified as *Inconclusive* has not met the minimum criteria for detection but evidence of dreissenids has been documented. For example, evidence of a mussel veliger is detected via microscopy but cannot be confirmed by DNA analysis. This is a temporary classification and additional sampling of this water will be conducted to determine whether the water body is classified as negative (no detections in subsequent sample) or suspect (verified detection in subsequent sample).

A water body classified as *Suspect* indicates a water at which one sample has been verified by visual confirmation (visual identification of adult or microscopy identification of veliger) and this sample was confirmed as dreissenid by DNA analysis (PCR and gene sequencing). In this scenario, additional sampling will be conducted to determine whether another sample taken within 12 months detects evidence of dreissenids. If a subsequent sample does detect dreissenids, this water will then be classified as *Positive*.

A water body classified as *Positive* indicates a water at which two or more sampling events within a 12-month period meet the minimum criteria for detection. For example, samples from two different sampling events are verified by both visual identification (including microscopy) and DNA confirmation (PCR and gene sequencing).

In many cases, a water classified as *Positive* will ultimately become *Infested* which is a water body with an established (recruiting and reproducing) population of dreissenid mussels. For example, lakes Mead and Powell are considered infested waters as they have large populations of reproducing dreissenids and mussels are readily evident on the shoreline and submerged materials such as docks, buoys, etc.

In some instances, the classification of a water body can be downgraded over time. The exact reasons why dreissenids are detected at a water once, then not again in subsequent

sampling, or are detected in a water classified as *Positive* but never establish a population, remains largely unknown.

A water body initially classified as *Inconclusive* can be de-listed to *Negative* status after one year of negative testing results including at least one sample taken in the same month of subsequent year as the initial positive sample (to account for seasonal environment variability). The time frame for de-listing a water body extends from there with a water body initially classified as *Suspect* requiring three years of negative testing to re-classify to *Negative*, a *Positive* water body requiring five years of negative testing to re-classify to *Negative*, and an *Infested* water body requiring a successful eradication or extirpation event and a minimum of five years of negative testing results post-eradication event to re-classify to *Negative*.

## WATER DESCRIPTION

Big Horn Lake, also known as Yellowtail Reservoir, is located 10 miles east of Lovell, WY in the northwest corner of the Cody Region (Figure 1). The reservoir extends 72 miles into south central Montana and is approximately 40 miles south of Billings, MT. The reservoir was impounded in 1965 by the United States Bureau of Reclamation (USBR) for flood control, power generation, irrigation, and recreation. The National Park Service (NPS) manages recreational use, while the USBR manages water storage. The fishery is managed jointly by the Montana Department of Fish, Wildlife, and Parks (MFWP) and the Wyoming Game & Fish Department (WGFD). The Crow Tribe has adjacent lands and water rights within Big Horn Lake, and Western Area Power Administration manages power generation.

Big Horn Lake is approximately 72 miles long with an average width of 0.10 miles. The reservoir is at an elevation of 3,640 feet and a volume of around 1.2 million acre-feet of water when at full pool. In general, the Wyoming end of the reservoir is broad and shallow while the Montana end is narrow and deep. Depths in the Wyoming end average approximately 15 feet when the reservoir is at full pool. Maximum depths are found in the canyon section near the Wyoming/Montana state-line and are around 100 feet at full pool.

Land surrounding Big Horn Lake is managed by the National Park Service as the Bighorn Canyon National Recreation Area (BCNRA). The Wyoming Game and Fish Commission owns or has management authority for approximately 19,000 acres of land known as the Yellowtail Wildlife Habitat Management Area located along the southeast portion of the lake. Big Horn Lake is bordered by the Pryor Mountains to the west, the Bighorn Mountains to the east, and the arid Big Horn Basin to the south. Inflows to the reservoir are driven by mountain snowpack in the Wind River Range and Bighorn Mountains. Water levels fluctuate considerably within and among years. The severity of fluctuations depends greatly on snowpack, the timing and magnitude of precipitation, and to a lesser extent water use (power generation).

The boating season is typically from late May (reservoir levels are often too low to launch boats on the Wyoming side prior to this time) through October. There are two established boat ramps in Wyoming; Horseshoe Bend and Kane (Figure 1). A small number of boats launch from the shore immediately upstream of the Highway 14a causeway on the east side of the reservoir/river (hereafter Causeway). In general, the majority of boats that launch in Wyoming use the Horseshoe Bend ramp. The Kane ramp and Causeway site are used infrequently throughout the boating season.



FIGURE 1: Google Earth image with the Crooked Creek inspection station and the three boat launch sites on Big Horn Lake, Wyoming.

Between January 1 and November 11, 2019, a total of 3,619 boats were inspected that were destined for Big Horn Lake. Of these, 33% were resident boats and 67% nonresident. These numbers are likely biased towards nonresident boats since all boats coming in to the state of Wyoming from out of state must be inspected March 1 – November 30. Over 80% of boats inspected at the BCNRA check station at Crooked Creek are owned by residents of Wyoming. Of the nonresident boats, 72% were from Montana, and 1.5% each from Colorado, California, Utah, and South Dakota. The majority of boats (91%) bound for Big Horn Lake were motorized. A small percentage (1.5%) of these boats required high risk inspection and only 0.3% of boats required decontamination.

## RAPID RESPONSE – SHORT-TERM SUSPECT STATUS

This section outlines the Department's actions between the time the first positive detection of dreissenid mussels is received and receipt of follow-up sample results. This time period is estimated to be approximately six weeks in duration. The primary goal during this time period is to minimize the risk of spreading mussels to other waters and to provide capacity to

contact all boaters coming on and off Big Horn Lake. Within one week of the initial detection, resources will need to be in place to perform required clean, drain, dry exit inspections of all boats leaving the reservoir and decontamination of undrainable areas, such as ballast tanks. All watercraft leaving Big Horn Lake will receive a red seal and seal receipt to verify the watercraft received an exit inspection. Red seals will designate use on a suspect, positive or infested water versus the brown seal currently used after a Wyoming AIS inspection.

At Short-term Suspect Status, there will not be time to hire personnel or purchase equipment. Therefore, the initial response will rely on existing personnel and equipment. Immediately after initial detection, job announcements and requisitions should be prepared so personnel can be hired and equipment can be purchased as quickly as possible once follow-up results are available.

### **Communication Plan**

Upon the initial detection of dreissenid mussels, WGFD's AIS Coordinator will begin the administrative communication chain outlined in the WGFD AIS Administrative Rapid Response Plan (WGFD 2020). Initial contacts in the administrative communication chain include the AIS Coordinator contacting the Communications Director, the Regional Fisheries Supervisor, and the Fish Division Chief, who contacts the WGFD Director. On the regional level, the Cody Regional Fisheries Supervisor will begin the regional communication chain to disseminate information about the detection to internal and external partners and stakeholders (Figure 2). Internal WGFD contacts include Regional Fish Division personnel, the Regional Wildlife Supervisor, the Regional Habitat and Access Supervisor and the Regional I&E Specialist. The Regional Wildlife Supervisor will then contact the Lovell Game Warden as well as local Wildlife and Terrestrial Habitat biologists. The Regional Habitat and Access Supervisor will contact appropriate Habitat and Access biologists.

The Cody Regional Fisheries Supervisor or biologists will also contact key stakeholders, including the BCNRA Superintendent, USBR Montana Area Manager and the MFWP Fish Manager and AIS Coordinator. He or she will also contact local business owners, including Horseshoe Bend Marina, the Lovell Country Store, Johnny's Bait and Tackle, and the Horseshoe Bend Motel. Boater contacts made through the Wyoming AIS inspection stations will be used as a primary notification and education outlet during this time period. The AIS Coordinator will also contact and coordinate with WGFD communication personnel, including Regional I&E (see Public Outreach, below).

Key information to convey to internal and external partners and stakeholders should include the name of the affected water, which species was collected, who collected the sample, where the sample was collected, which agency/expert analyzed the sample, any relevant information about the sample, who to contact for more information, a brief description of containment protocols that will be put in place, and any critical changes for the public. Every effort should be made to quickly contact all partners and stakeholders prior to beginning public outreach efforts. The regional fisheries supervisor will attempt to make all contacts within 24 hours of detection and will contact the Communications Director once enough contacts have been made to initiate outreach efforts.

Contact information for key individuals can be found in Appendix A.

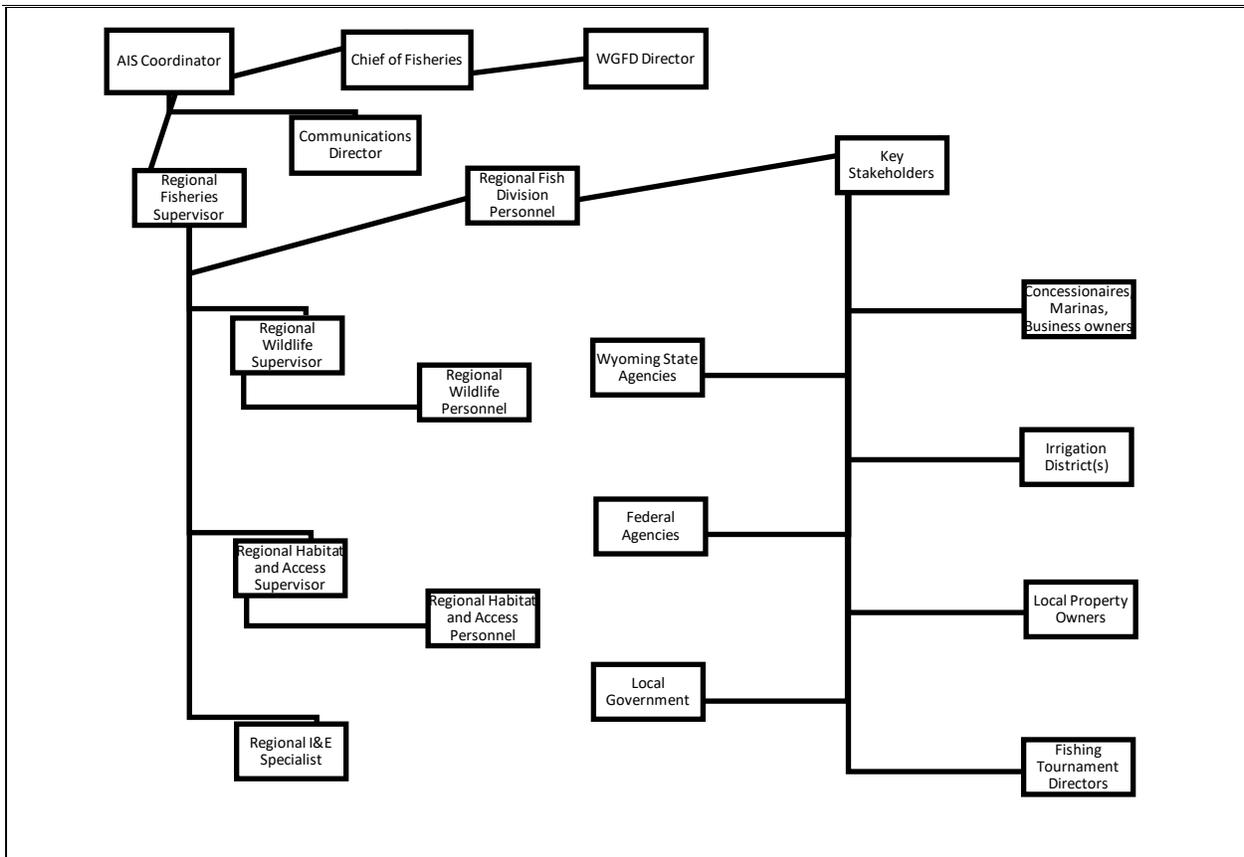


FIGURE 2. Communication chain for dissemination of information on the local and regional level following a dreissenid mussel detection in a Wyoming water.

**Closures and Check Station**

In coordination with the BCNRA, the Kane ramp, Causeway site, and shoreline launching will be closed. With the closure of the Kane ramp and Causeway site, all boats launching on the Wyoming end of Big Horn Lake (and at Barry’s Landing in Montana) will have to travel past the existing BCNRA boat inspection station at Crooked Creek on Highway 37 (Figure 1). The Crooked Creek station will be used as the primary location for inspection and decontamination of all boats coming to (by default because of how the BCNRA operates the station) and off of Big Horn Lake. The station will operate from 10 am to 8 pm daily, or ½ hour after sunset, whichever comes first.

**Staffing Plan**

The station will be staffed by the Cody Region AIS rover position and one of the North Cody AIS inspector positions. Additionally, the BCNRA AIS inspectors will continue to be present to help with inspections and decontaminations. The station will have two inspectors present each day; one BCNRA inspector and one WGFD inspector. The WGFD inspectors will work 12 hour shifts with one split shift day per week (i.e., 9 am to 1 pm, 1 pm to 5 pm, and 5 pm to 9 pm). One of the 4-hour time blocks on the split shift day will be covered by Regional staff.

The Cody Region Fisheries Biologists, Fisheries Supervisor, and AIS Specialist will be the primary staff used to fill in the split shift slot and as needed.

All WGFD personnel working at the Crooked Creek station will be housed at the Yellowtail Wildlife Habitat Management Unit bunkhouse during their shifts. The bunkhouse is located off Highway 37 approximately three miles south of the Crooked Creek inspection station.

### **Supplies and Equipment**

The BCNRA has three decontamination units and one is located at the Crooked Creek station. It is expected that one decontamination unit will be sufficient, given the realized volume of boat traffic on Big Horn Lake. However, boat traffic tends to be higher during holiday weekends. To account for the increased traffic, the North Cody decontamination unit will be transported to Crooked Creek so that two units are available during holiday weekends. All utilities, including water, are available at the Crooked Creek station.

Camp groceries will be provided to the WGFD inspectors during this 6-week period and will total \$2,100. The cost of camp groceries is the only cost that is above and beyond the normal Cody Region AIS and Fish Management budgets.

### **Public Outreach**

The AIS Administrative Rapid Response Plan outlines the general public outreach plan for suspect, positive or infested determinations for Wyoming waters (WGFD 2020). Following an initial sample testing positive for dreissenid mussels, the AIS Coordinator will contact the Communication Director at WGFD Cheyenne Headquarters. Prior to initiating the public outreach plan, key partners and stakeholders should be contacted according to the Communication Plan (above). The regional fisheries supervisor will attempt to make all contacts within 24 hours of detection and will contact the Communications Director once enough contacts have been made. The Communications Director will then initiate the Communications Plan. A statewide press release will be sent out and information will be posted on the AIS website and any necessary social media. The AIS Coordinator, Regional Fisheries Supervisor and Regional AIS Specialist will collaborate with the Cody Regional I&E Specialist to relay information about Short-term Suspect Status at Big Horn Lake through media outlets (newspapers, radio, etc.). Regional Information and Education personnel will coordinate all communications efforts with the Communications Director.

## **RAPID RESPONSE – LONG-TERM SUSPECT STATUS**

If initial follow-up sampling does not yield a positive result, Big Horn Lake would enter Long-term Suspect Status (defined above) and remain at this level for up to three years if no additional positive samples are found. The goal during this period is still to minimize the risk of spreading mussels to other waters. During the first year (from initial detection through the following boating season), we will need to provide capacity for all boaters coming off the water to efficiently obtain a required clean, drain, dry exit inspection, motor flush, and decontamination of ballast tanks and other undrainable areas. All watercraft leaving Big Horn Lake will receive a red seal and seal receipt to verify the watercraft received an exit inspection.

Red seals will designate use on a suspect, positive or infested water versus the brown seal currently used after a Wyoming AIS inspection.

If there is no confirmation of dreissenid mussel presence after the first full boating season, efforts will switch in years two and three to a lower level response, with a goal of contacting a significant number of boaters, but placing more responsibility on boaters to get an exit inspection. Inspectors will still conduct clean, drain, dry exit inspections on boats leaving the water and decontaminate ballast tanks and other undrainable areas. If feasible, they will continue to flush all motors. If not, they will drain outboards motors and only flush inboard/outboard and inboard motors. Public outreach will increase via multiple outlets to highlight the potential threat at the suspect water.

Given the simplicity of access to Big Horn Lake and the existence of a single check station that intercepts all boater traffic, it is not anticipated that the rapid response in years 2 and 3 of Long-term Suspect Status will be significantly different from year 1. Therefore, this plan for Long-term Suspect Status will apply to all three years at this status level.

### ***Communication Plan***

The administrative communication chain will continue to be utilized to inform all parties on follow-up sampling results and water status (see WGFD AIS Administrative Rapid Response Plan; WGFD 2020). In addition, the Cody Region internal communication chain outlined in the Short-term Suspect Status section (above) will continue to be utilized to inform the Cody Region and key stakeholders of follow-up sampling results. In addition, coordination among agency personnel will occur at the bi-annual Bighorn Issues Group meetings and as needed throughout the 3-year time period.

### ***Closures and Check Station***

The same closures outlined in the Short-term Suspect Status section will be continued throughout the 3-year time period pending any changes to status (e.g., second positive sample collected). This includes closure of the Kane ramp and the Causeway site and a prohibition of all shore launching. Signs indicating the ramp closures, prohibition on shoreline launching, and notifying boaters of mandatory exit inspections will be installed where needed. The Crooked Creek check station will be operated daily from the hours of 10 am to ½ hour after sunset.

### ***Staffing Plan***

The station will be staffed by a contract Biologist I and three additional technicians (see budget in Appendix B). The station will have two inspectors present each day; one BCNRA inspector and one WGFD inspector. The check station will run from Memorial Day weekend (earlier if lake elevation is sufficiently high) through November 15. The WGFD inspectors will work 12 hour shifts with one split shift day per week (i.e., 9 am to 1 pm, 1 pm to 5 pm, and 5 pm to 9 pm). There will be two WGFD inspectors at the station on weekends and holidays. Additionally, the BCNRA AIS inspectors will continue to be present to help with inspections and decontaminations. The Cody Region Fisheries Biologists, Fisheries Supervisor, and AIS Specialist will fill in as needed.

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**Supplies and Equipment**

Housing for AIS inspectors will be provided at the Yellowtail WHMA bunkhouse and camp groceries will be provided. Two State Motor Pool-leased vehicles will be necessary for transport of staff and equipment to and from the regional office, Yellowtail bunkhouse, and Crooked Creek check station. One decontamination unit will be purchased should Big Horn Lake enter Long Term Suspect Status. This will allow two decontamination units to be present at Crooked Creek at all times.

**Public Outreach**

At Long-term Suspect Status, statewide public outreach efforts will continue to follow the process outlined in the Administrative Rapid Response Plan (WGFD 2020). The Regional Fisheries Supervisor and Regional AIS Specialist will continue to collaborate with the Cody Regional I&E Specialist to keep the local boating public aware of the threats and responsibilities associated with a Long-term Suspect Status on Big Horn Lake.

**RAPID RESPONSE – POSITIVE STATUS**

Big Horn Lake will be considered positive for dreissenid mussels if two or more sampling events within a 12-month period meet the minimum criteria for detection (defined above). Big Horn Lake will remain at Positive Status for five consecutive years of negative sample results, at which time it will be downgraded to Negative Status. Alternatively, if an established population of mussels is detected during that five years, it will be upgraded to Infested Status.

The goal during Positive Status is still to minimize the risk of spreading mussels to other waters. We will need to provide capacity for all boaters coming off the water to efficiently obtain a required clean, drain, dry inspection, motor flush, and decontamination of ballast tanks and other undrainable areas. If live mussels are found on any boats during exit inspections, they will be fully decontaminated and consideration will be given to upgrading Big Horn Lake's status to Infested. All watercraft leaving Big Horn Lake will receive a red seal and seal receipt to verify the watercraft received an exit inspection. Red seals will designate use on a suspect, positive or infested water versus the brown seal currently used after a Wyoming AIS inspection.

**Communication Plan**

The administrative communication chain will continue to be utilized to inform all parties on follow-up sampling results and water status (see WGFD AIS Administrative Rapid Response Plan; WGFD 2020). In addition, the Cody Region internal communication chain outlined in the Short-term Suspect Status section (above) will be used to inform the Cody Region and key stakeholders of changes in status level.

**Closures and Check Station**

The same closures outlined in the Short-term Suspect Status section will be continued under Positive status. This includes closure of the Kane ramp and the Causeway site and a prohibition of all shore launching. Signs indicating the ramp closures, prohibition on shoreline

launching, and notifying boaters of mandatory exit inspections will be installed where needed. The Crooked Creek check station will continue to operate daily from the hours of 10 am to ½ hour after sunset.

### **Staffing Plan**

The station will be staffed by a contract Biologist I and three additional technicians (see budget in Appendix B) and will follow the scheduling pattern outlined in Long-Term Suspect Status. The Biologist I will oversee check station operations, supervise inspectors and assist with inspections as necessary. The check station will run from Memorial Day weekend (earlier if lake elevation is sufficiently high) through November 15. The station will have two inspectors present each day; one BCNRA inspector and one WGFD inspector. The WGFD inspectors will work 12-hour shifts with one split shift day per week (i.e., 9 am to 1 pm, 1 pm to 5 pm, and 5 pm to 9 pm). There will be two WGFD inspectors at the station on weekends and holidays. Additionally, the BCNRA AIS inspectors will continue to be present to help with inspections and decontaminations. The Cody Region Fisheries Biologists, Fisheries Supervisor, and AIS Specialist will fill in as needed.

### **Supplies and Equipment**

Housing for AIS inspectors will be provided at the Yellowtail WHMA bunkhouse and camp groceries will be provided. Two State Motor Pool-leased vehicles will be necessary for transport of staff and equipment to and from the regional office, Yellowtail bunkhouse, and Crooked Creek check station. One decontamination unit will be purchased should Big Horn Lake go from Short Term Suspect to Positive Status. This will allow two decontamination units to be present at Crooked Creek at all times.

### **Public Outreach**

At Positive Status, statewide public outreach efforts will continue to follow the process outlined in the Administrative Rapid Response Plan (WGFD 2020). The Regional Fisheries Supervisor and Regional AIS Specialist will continue to collaborate with the Cody Regional I&E Specialist to keep the local boating public aware of the threats and responsibilities associated with a Long-term Suspect Status on Big Horn Lake.

## **RAPID RESPONSE – INFESTED STATUS**

Big Horn Lake will be considered Infested if an established (recruiting or reproducing) population of dreissenid mussels is identified. Big Horn Lake will remain at Infested Status until methods for complete eradication are discovered and implemented. Based on the best available technology and science at the time of this publication it is expected that Big Horn Lake would remain in Infested Status in perpetuity.

The goal during Infested Status is still to minimize the risk of spreading mussels to other waters. We will need to provide the capacity to contact all boaters coming off the water, conduct exit inspections, and ensure all boats leaving have undergone a full decontamination. All watercraft leaving Big Horn Lake will receive a red seal and seal receipt to verify the watercraft

received an exit inspection. Red seals will designate use on a suspect, positive or infested water versus the brown seal currently used after a Wyoming AIS inspection.

### **Communication Plan**

The administrative communication chain will continue to be utilized to inform all parties on follow-up sampling results and water status (see WGFD AIS Administrative Rapid Response Plan; WGFD 2020). In addition, the Cody Region internal communication chain outlined in the Short-term Suspect Status section (above) will continue to be utilized to inform the Cody Region and key stakeholders of changes in status level.

### **Closures and Check Station**

The same closures outlined in the Short-term Suspect Status section will be continued under Infested Status. This includes permanent closure of the Kane ramp and the Causeway site and a prohibition of all shore launching. Signs indicating the ramp closures, prohibition on shoreline launching, and notifying boaters of mandatory exit inspections will be installed where needed. The Crooked Creek check station will continue to be operated daily from the hours of 10 am to ½ hour after sunset.

### **Staffing Plan**

The station will be staffed by a contract or permanent Biologist I and three additional technicians (see budget in Appendix B). The check station will run from Memorial Day weekend (earlier if lake elevation is sufficiently high) through November 15. The station will have 2 inspectors present each day; one BCNRA inspector and one WGFD inspector on week days. The WGFD inspectors will work 12 hour shifts with one split shift day per week (i.e., 9 am to 1 pm, 1 pm to 5 pm, and 5 pm to 9 pm). There will be two WGFD inspectors at the station on weekends and holidays. Additionally, the BCNRA AIS inspectors will continue to be present to help with inspections and decontaminations. The Cody Region Fisheries Biologists, Fisheries Supervisor, and AIS Specialist will fill in as needed.

### **Supplies and Equipment**

Housing for AIS inspectors will be provided at the Yellowtail WHMA bunkhouse and camp groceries will be provided. Two State Motor Pool-leased vehicles will be necessary for transport of staff and equipment to and from the regional office, Yellowtail bunkhouse, and Crooked Creek check station. One decontamination unit will be purchased should Big Horn Lake go from Short Term Suspect to Infested Status. This will allow two decontamination units to be present at Crooked Creek at all times. Additional signs will be purchased and installed that will help inform boaters of the status of the lake and of the decontamination requirements associated with boating on Big Horn Lake.

### **Public Outreach**

At Infested Status, statewide public outreach efforts will continue to follow the process outlined in the Administrative Rapid Response Plan (WGFD 2020). The Regional Fisheries Supervisor and Regional AIS Specialist will continue to collaborate with the Cody Regional I&E

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Specialist to keep the local boating public aware of the threats and responsibilities associated with a Long-term Suspect Status on Big Horn Lake.

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**REFERENCES**

WGFD. 2019. Wyoming Game and Fish Department Aquatic Invasive Species Sampling and Monitoring Manual. Wyoming Game and Fish Department, Cheyenne, WY.

WGFD. 2020. Wyoming Game and Fish Department Administrative Dreissenid Mussel Rapid Response Plan. Wyoming Game and Fish Department, Cheyenne, WY.

**APPENDIX A: KEY CONTACTS**

		Phone	Email
<b><u>Wyoming Game &amp; Fish Department</u></b>			
	AIS Coordinator		
	Cody Region Fisheries Supervisor		
	Cody Region Wildlife Supervisor		
	Cody Region AIS Specialist		
	Cody Region Fisheries Biologist		
	Cody Region Fisheries Biologist		
	Lovell Game Warden		
	Information & Education Specialist		
<b><u>Montana Fish Wildlife and Parks</u></b>			
	Region 5 Fisheries Manager		
	AIS Bureau Chief		
<b><u>Bighorn Canyon National Recreation Area</u></b>			
	Superintendent		
<b><u>Bureau of Indian Affairs (Crow Agency)</u></b>			
<b><u>Crow Tribe Natural Resources</u></b>			
<b><u>Western Area Power Administration</u></b>			
	Environmental Protection Specialist		
<b><u>U.S. Bureau of Land Management</u></b>			
	Cody Field Manager		
<b><u>U.S. Bureau of Reclamation</u></b>			
	Montana Area Manager		
<b><u>Concessionaires</u></b>			
Ok-A-Beh Marina			
Horseshoe Bend Marina			
<b><u>Stakeholders</u></b>			
Lovell Chamber of Commerce			
Friends of Bighorn Lake			
Midway Motors			
Johnny's Tackle			
Lovell Country Store			

## APPENDIX B: ANNUAL BUDGETS ASSOCIATED WITH EACH STATUS LEVEL

### SHORT-TERM SUSPECT STATUS

Travel	Description	# of Days	Cost/Day	Total Cost
	Camp Groceries (person days)	86	\$24	\$2,064
	<b>Subtotal</b>			<b>\$2,064</b>
	<b>Total</b>			<b>\$2,064</b>

### LONG-TERM SUSPECT STATUS

Personnel	Description	# of Months	Cost/Month	Total Cost
	Technician 1, 6 months	6	\$2,863	\$17,178
	Technician 2, 6 months	6	\$2,863	\$17,178
	Technician 3, 6 months	6	\$2,864	\$17,184
	<b>Subtotal</b>			<b>\$51,540</b>
Vehicle	Description	# of Months	Cost/Month	Total Cost
	State Motor Pool Sedan 1	6	\$500	\$3,000
	State Motor Pool Sedan 2	6	\$500	\$3,000
	<b>Subtotal</b>			<b>\$6,000</b>
Travel	Description	# of Days	Cost/Day	Total Cost
	Camp Groceries (person days)	477	\$24	\$11,448
	<b>Subtotal</b>			<b>\$11,448</b>
Supplies	Description			Total Cost
	Decontamination Unit	1	\$12,500	\$12,500
	<b>Subtotal</b>			<b>\$12,500</b>
	<b>Total</b>			<b>\$81,488</b>

**POSITIVE STATUS**

<b>Personnel</b>	<b>Description</b>	<b># of Months</b>	<b>Cost/Month</b>	<b>Total Cost</b>
	Biologist I, 8 months	8	\$4,543	\$36,344
	Technician 1, 6 months	6	\$2,863	\$17,178
	Technician 2, 6 months	6	\$2,863	\$17,178
	Technician 3, 6 months	6	\$2,863	\$17,178
	<b>Subtotal</b>			<b>\$87,878</b>
<b>Vehicle</b>	<b>Description</b>	<b># of Months</b>	<b>Cost/Month</b>	<b>Total Cost</b>
	State Motor Pool Sedan 1	6	\$500	\$3,000
	State Motor Pool Sedan 2	6	\$500	\$3,000
	<b>Subtotal</b>			<b>\$6,000</b>
<b>Travel</b>	<b>Description</b>	<b># of Days</b>	<b>Cost/Day</b>	<b>Total Cost</b>
	Camp Groceries (person days)	477	\$24	\$11,448
	<b>Subtotal</b>			<b>\$11,448</b>
<b>Supplies</b>	<b>Description</b>			<b>Total Cost</b>
	Decontamination Unit	1	\$12,500	\$12,500
	<b>Subtotal</b>			<b>\$12,500</b>
	<b>Total</b>			<b>\$117,826</b>

**INFESTED STATUS**

<b>Personnel</b>	<b>Description</b>	<b># of Months</b>	<b>Cost/Month</b>	<b>Total Cost</b>
	Biologist I, 8 months	8	\$4,543	\$36,344
	Technician 1, 6 months	6	\$2,863	\$17,178
	Technician 2, 6 months	6	\$2,863	\$17,178
	Technician 3, 6 months	6	\$2,863	\$17,178
	<b>Subtotal</b>			<b>\$87,878</b>
<b>Vehicle</b>	<b>Description</b>	<b># of Months</b>	<b>Cost/Month</b>	<b>Total Cost</b>
	State Motor Pool Sedan 1	6	\$500	\$3,000
	State Motor Pool Sedan 2	6	\$500	\$3,000
	<b>Subtotal</b>			<b>\$6,000</b>
<b>Travel</b>	<b>Description</b>	<b># of Days</b>	<b>Cost/Day</b>	<b>Total Cost</b>
	Camp Groceries (person days)	477	\$24	\$11,448
	<b>Subtotal</b>			<b>\$11,448</b>
<b>Supplies</b>	<b>Description</b>			<b>Total Cost</b>
	Decontamination Unit	1	\$12,500	\$12,500
	Signs			\$2,000
	<b>Subtotal</b>			<b>\$14,500</b>
	<b>Total</b>			<b>\$119,826</b>