

Rapid Response Plan Following Detection of Dreissenid Mussels in Keyhole Reservoir, Wyoming

Sheridan Regional Fisheries Management Crew, Wyoming Game and Fish Department, 700 Valley View Drive, Sheridan, WY 82801

SUMMARY

Keyhole Reservoir is a 9,411 surface acre (at full pool) reservoir located 12 miles northeast of Moorcroft, Wyoming in Keyhole State Park, and serves as an irrigation supply for 60,000 downstream acres (Belle Fourche Irrigation District 57,183 acres, Crook County Irrigation District 3,000 acres). The reservoir is managed by Reclamation, while the fishery is managed by the Wyoming Game and Fish Department and the adjacent land is managed by Wyoming State Parks and Cultural Resources or private landowners.

The boating season typically begins at ice-off in March to ice-on in November or early December. Approximately 85% of the boating traffic is resident boaters from nearby communities, while the highest nonresident boat traffic comes from nearby South Dakota and Montana. Most watercraft (58%), are simple fishing vessels with one outboard motor. During the hot summer months, boat complexity increases with the arrival of wakeboard and ski boats. Five boat ramps are located within Keyhole State Park with three on the east side of the reservoir near the Park Headquarters and two on the west side near Pine Haven, Wyoming. Shore launching of watercraft occurs, but is generally rare and is limited to non-motorized personal watercraft (e.g., kayaks, canoes, etc.).

Upon an initial detection of dreissenid mussels in Keyhole Reservoir, the goal would be to minimize the risk of spreading mussels to other waters while awaiting follow-up sampling results. During this six-week period, two exit inspection locations (near Park Headquarters and in Pine Haven) will be created to inspect all boats leaving Keyhole Reservoir. Current regional personnel will operate these check stations from ½ hour before sunrise to ½ hour after sunset. Depending on the time of year and anticipated boating traffic, 3 to 14 people will be needed to sufficiently operate the check stations. Nightly boat ramp and shore launching closures are recommended to ensure all watercraft are inspected.

Depending on follow up sampling results, the reservoir could remain Suspect, or be elevated to Positive or Infested status. All three possibilities would entail a longer-term response, which requires hiring of seasonal technicians and a Contract Biologist I to operate and supervise check stations. Check stations will continue to inspect and decontaminate (if necessary) every watercraft leaving Keyhole Reservoir, thus minimizing the risk of spreading mussels to other waters. The implementation of a Local Boater Program at Keyhole Reservoir is recommended to reduce staffing, equipment and maintenance costs.

Start-up costs of exit inspections following initial detection will be assimilated through regional personnel and equipment. As the program progresses, costs increase dramatically with the purchase of signs, camp trailers, office trailers, decontamination units, water tanks, and state motor pool vehicles. The majority of program costs is accrued through technician salaries and groceries. Initial (first year) budgets reflecting equipment purchases range from \$446,000 to

\$765,000, depending on status level. After the initial year, annual budgets to operate AIS exit inspection check stations are approximately \$198,000 to \$286,000 (Appendix B). A designated boating season, a reduction in the boating day length, and a Local Boater Program should strongly be considered to reduce costs if Keyhole Reservoir becomes positive with dreissenid mussels.

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 Keyhole Reservoir 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.

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). Consider hiring a dive team to inspect for physical mussel presence.

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

Keyhole Reservoir is located within the 14,720-acre Keyhole State Park in northeastern Wyoming, approximately 12 miles northeast of Moorcroft, Wyoming and approximately 146 river miles upstream from Belle Fourche Reservoir in South Dakota. The Flood Control Act of 1944 and the provisions negotiated between Wyoming and South Dakota in the Belle Fourche River Compact authorized the construction of Keyhole Reservoir. Construction of Keyhole Reservoir began in 1950 and impoundment began in 1952. Keyhole Reservoir was constructed to provide irrigation water to approximately 60,000 acres downstream (South Dakota 90%, Wyoming 10%).

The Keyhole Reservoir fishery is managed by the Wyoming Game and Fish Department and the water is managed by Reclamation. The lands within and adjacent to the reservoir are managed primarily by Keyhole State Park, with private residences and the town of Pine Haven located in close proximity to the park.

Keyhole Reservoir is the largest waterbody in northeast Wyoming. At full pool (elevation 4,099 ft) the reservoir contains 194,668 acre-feet of water at 9,411 surface acres with an average depth of 20.6 feet, a max depth of 83 feet, and approximately 52 shoreline miles. Historical averages of Keyhole Reservoir on October 1st (the beginning of the new water year) are an elevation of 4,087 or 95,359 acre/ft of water at 5,423 surface acres (57% of reservoir capacity). Throughout history, Keyhole has only reached full pool six times (1978, 1999, 2012, 2015, and twice in 2019).

Primary stakeholders that would be potentially affected by a positive dreissenid sample include Reclamation, Keyhole Marina, NEWWA (Northeast Wyoming Walleye Association), Wyoming Walleye Circuit, Wyoming Walleye Stampede, Rusty Bell (Stick' N Fins, archery fishing for carp), South Dakota Game Fish and Parks, Black Hills National Forest, the Belle Fourche-Wyoming Water Association, and the Belle Fourche Irrigation District.

Boating Season

The boating season at Keyhole generally runs from ice-off in March to ice-on in late November or early December. Anglers make up a majority of the boating traffic during the cooler months, both spring and fall. During the warmer summer months, the boating traffic shifts to mostly water recreationists (jet skis, wake boarders, paddle boards, etc.). From January 1, 2018 through November 11, 2019, a total of 3,180 watercraft were inspected that were bound for Keyhole Reservoir. Of those inspections, 128 were high risk inspections (4%) and 31 decontaminations were conducted.

Access Areas

Access to Keyhole Reservoir is from Highway 14 to Highway 13, then to Pine Haven Road (County Road 210) through the town of Pine Haven, Wyoming or from Interstate 90 (I-90) taking Pine Ridge Road (Exit 165, County Road 205), which becomes McKean Road 5 miles north of I-90 (Figure 1). There are three public entrances into Keyhole State Park that lead to five public boat ramps (Figure 2). Pine Haven Road to Waters Street leads to the west end of the park and the Wind Creek boat ramp. Pine Haven Road to Hays Boulevard leads to the center of the park and the Coulter Bay/Bearclaw boat ramp. Pine Ridge Road to McKean Road to Marina Road leads to the east end of the park and to Pat's Point, Marina, and Tatanka boat ramps. McKean Road leads to several campgrounds and the dam area where some shore launching occurs.

There are numerous private docks in Cottonwood Bay, one private dock on the north side of the narrows, and the docks associated with Keyhole Marina. However, there are no private boat ramps and all boats have to launch and load from a public boat ramp within the park. Public access via a road is nonexistent on the north side of the reservoir.

Smaller craft such as float tubes, paddleboards, and smaller boats can launch wherever the user can carry their vessel. Most shore launchings that occur are non-motorized watercraft/toys. When Keyhole Reservoir is low, shore launching of larger watercraft has been common around the dam area, but is generally rare.

The access roads to each entrance of Keyhole State Park provide good pinch points to inspect all boats entering or exiting the reservoir. On the west side of the reservoir, a check station pinch point at Paradise Foods grocery store would capture all boaters exiting from the Coulter/Bearclaw and Wind Creek boat ramps. On the east side of the reservoir, the current check station (gravel pull-through constructed in 2010) would capture all boaters exiting from Pat's Point, Marina, and Tatanka boat ramps (Figure 3). The only watercraft that would not be intercepted by either of these check stations would be shore launched vessels near the dam area.

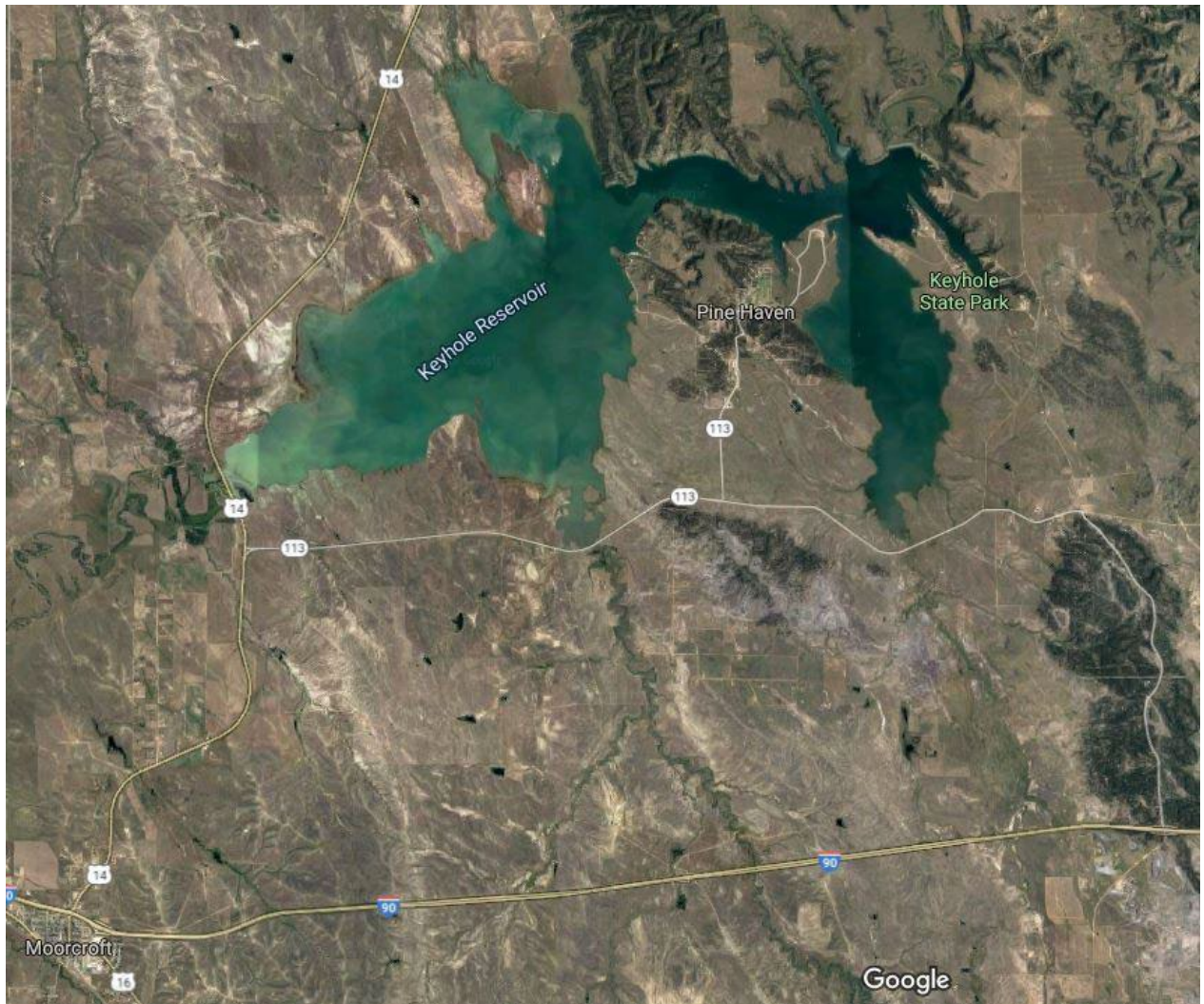


FIGURE 1. Entire view of Keyhole Reservoir.



FIGURE 2. Keyhole Reservoir's five boat ramp locations.

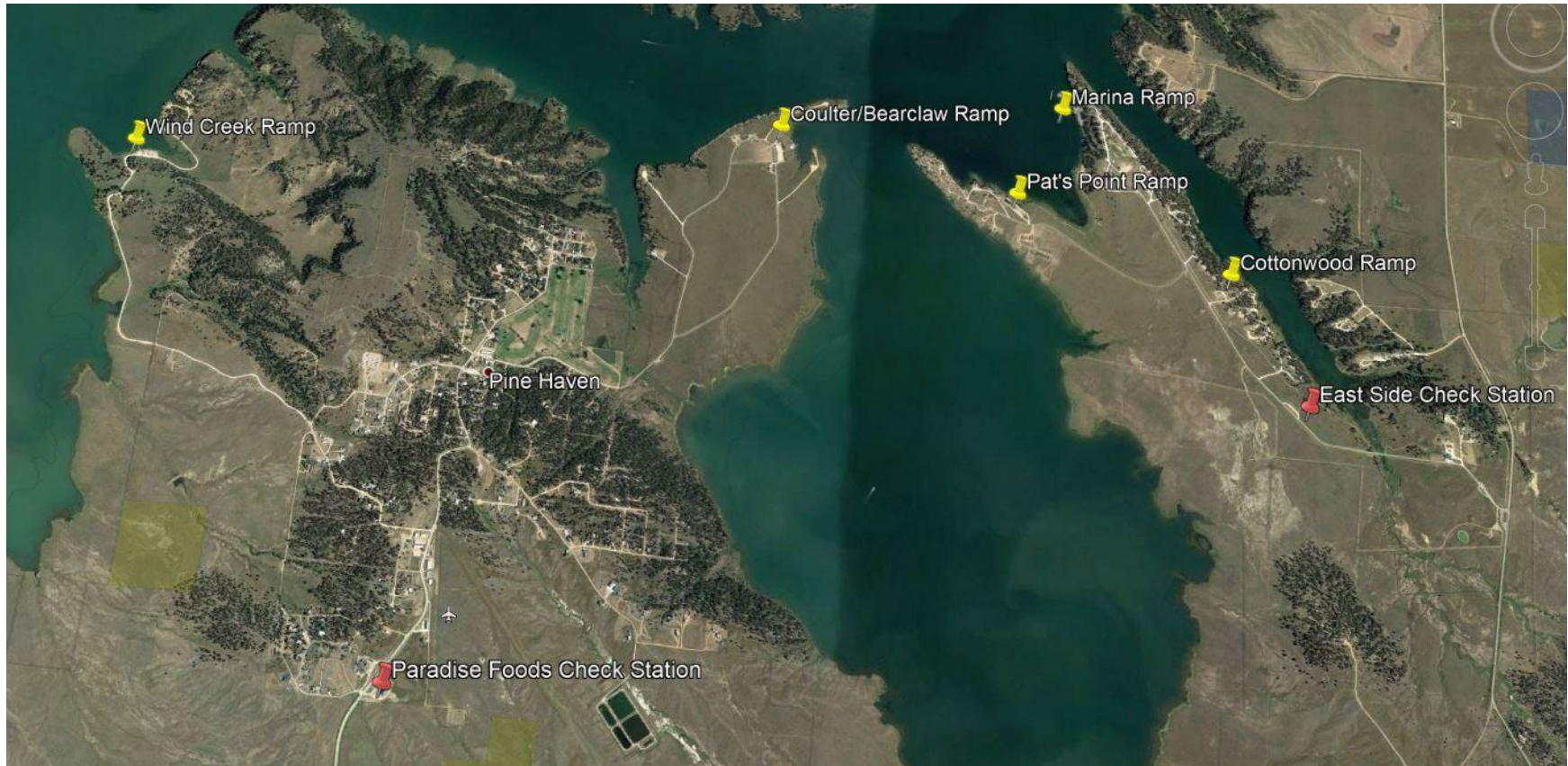


FIGURE 3. Keyhole Reservoir's boat ramp locations with proposed AIS Exit Inspection locations.

Residency and Watercraft Used

Based on January 1, 2018 – November 11, 2019 inspections, the majority of boater use at Keyhole Reservoir consists of resident boaters (85%), with most from nearby Gillette, Moorcroft, Pine Haven, and Sundance. Of the non-resident boaters, most were from South Dakota (60%), with additional boaters traveling from Montana (13%), Colorado (13%), North Dakota (7%), and Nebraska (7%). When fishing is good early in the spring and summer and again in the fall, Wyoming boaters from further distances travel to Keyhole. Throughout recent history, Keyhole Reservoir has hosted up to five fishing tournaments a year during open water. Both resident and nonresident boaters compete in these tournaments. During the hot summer months, anglers become less prevalent while “pleasure” boaters dominate. Most of these recreational boaters are from nearby communities as well.

Most watercraft are simple angling boats, with a typical V-hull, one outboard motor (57% of boaters), and a couple of live-wells. During the hot summer months, the boat style changes with numerous vessels containing ballast tanks for wake-boarding with inboard/outboard motors (22%), inboard motors (6%), personal watercraft (5%), jet motors (2%), or non-motorized (8%).

RAPID RESPONSE – SHORT-TERM SUSPECT STATUS

In the event that a sample from Keyhole Reservoir is confirmed positive for dreissenid mussels, the reservoir will be considered Short-term Suspect (defined above). After the initial detection, follow-up sampling will occur and results will take approximately six weeks to be reported. During that time, it will be necessary to minimize the risk of spreading mussels to other waters. Within one week, 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 Keyhole Reservoir 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. Quick action will be needed to mobilize the necessary personnel and resources to effectively meet these obligations.

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, the AIS Coordinator will begin the administrative communication chain outlined in the 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. The Sheridan Regional Fisheries Supervisor who will begin the regional communication chain (Figure 4), including contacting Regional Fish Division personnel, the Regional Wildlife Supervisor and the Regional Habitat and Access Supervisor. The Regional Wildlife Supervisor will then contact local wardens in

Moorcroft and Gillette, as well as local Wildlife and Terrestrial Habitat biologists. The Regional Habitat and Access Supervisor will also contact appropriate Habitat and Access biologists. Contact information for key individuals can be found in Appendix A.

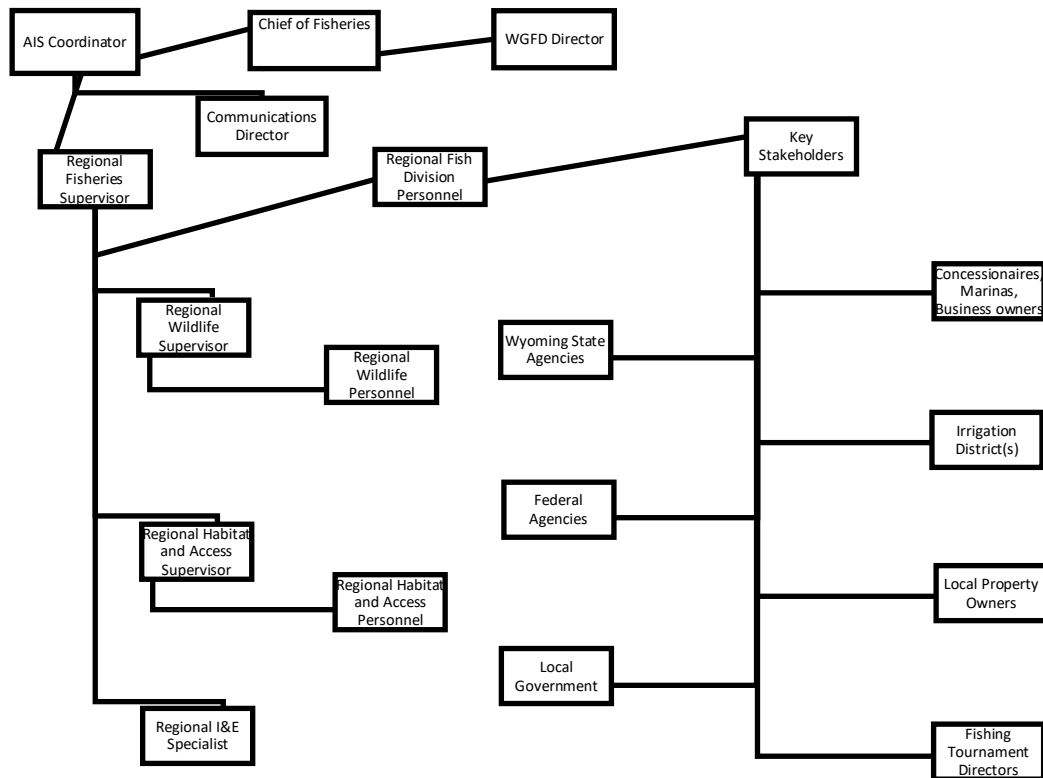


FIGURE 4. Communication chain for dissemination of information on the local and regional level following a dreissenid mussel detection in a Wyoming water.

The AIS Coordinator will also contact and coordinate with WGFD communication personnel, including Regional I&E, to prepare internal news and media releases for the public (see Public Outreach, below).

The Sheridan Regional Fisheries Crew will also contact key stakeholders (Figure 4), including Keyhole State Park personnel, Reclamation, South Dakota Game, Fish and Parks, and the Belle Fourche Irrigation District. In addition, they will contact local town officials and businesses including the Empire Guesthouse and RV Park, Paradise Foods grocery store, and Keyhole Marina. A complete list of external contacts are found in Appendix A.

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.

The focus of this plan is on containing invasive mussels through inspection and decontamination of exiting watercraft. Consideration should be given to other potential vectors that could spread invasive mussels (e.g., aircraft used to combat wildfires, commercial water hauling equipment) and communication and coordination should occur with these entities to ensure containment. Current information on preventing the spread of aquatic invasive species in firefighting and water hauling equipment can be found on the WGFD website at <https://wgfd.wyo.gov/Fishing-and-Boating/Aquatic-Invasive-Species-Prevention/AIS-Construction-and-Fire>.

Closures

Temporary, full closure of Keyhole Reservoir boat ramps and long-term closure of individual boat ramps to concentrate boating traffic are not recommended during the Short-term Suspect Status period. Closure of shore launching on the east side of Cottonwood Bay and near the dam is recommended during Short-term Suspect Status since vehicles accessing these areas do not encounter an AIS check station or an AIS exit inspection station (Figure 5). Night closure of boat ramps is also recommended at this status level, to ensure that every vessel leaving Keyhole Reservoir receives an exit inspection. In close coordination with Keyhole State Park, boat ramps will be closed with a cable and sign indicating the reason why. Hours when Keyhole Reservoir boat ramps are open will be ½ hour before sunrise to ½ hour after sunset. If a boat is not off the water by ½ hour after sunset, it will remain in the water until the next day.

Temporary full closure of Keyhole Reservoir boat ramps is recommended if the reservoir immediately goes from Short-term Suspect Status to Infested Status (see Rapid Response – Infested Status below).

Check Stations

Two exit inspection locations will be located at the Paradise Foods Grocery Store in Pine Haven (Paradise Foods Check Station) and the pull-through check station on Marina Road (East Side Check Station; Figure 3). These two locations would intercept boating traffic from all five Keyhole ramps, preventing the need to close individual boat ramps while helping to minimize staffing and equipment needs. Check station hours of operation will progress with day length and hours of operation will coincide with those of boat ramps (½ hour before sunrise until ½ hour after sunset).

Staffing Plan

Check stations will need to be staffed by a minimum of two inspectors per station per day (four total). Staffing levels will depend on the time of year and anticipated boating traffic, but could require 3-14 individuals per week based on a 40 hour work week (see Long-term Suspect Staffing Plan). Personnel staffing the check stations during the Short-term Suspect Status will be regional personnel including wardens, warden trainees, fish management, wildlife management, habitat and access and associated technicians. Additional staffing could be requested from other

regions and statewide AIS “roving” personnel. Keyhole State Park law enforcement personnel may be requested as needed.



FIGURE 5. Keyhole Reservoir with the proposed shore launch closure area on the east side of Cottonwood Bay and the dam area.

Supplies and Equipment

Four trailered decontamination units are already within the Sheridan region with one currently stationed at Keyhole Reservoir. The Lake DeSmet decontamination unit will go to Keyhole Reservoir and one additional decontamination unit will be rented (Appendix B) to serve as a backup during the Short-term Suspect Status period. Water supply to fill the decontamination units can be found at the State Park Headquarters and Paradise Foods. A 10,000 lb capacity flatbed trailer and ¾ ton pickup will need to be borrowed from the Region or elsewhere to haul water from State Park Headquarters to East Side Check Station decontamination units. Two 550 gal capacity water tanks and a 2-inch trash pump will be purchased and mounted on the trailer.

Housing to accommodate personnel during Short-term Suspect Status will consist of four camper trailers. One AIS camp trailer is currently stationed at the State Park Headquarters and there are three additional trailers at the Sheridan Regional Office that could be mobilized if needed. Camper trailer slips would likely be available within the park, park headquarters, or rented at the Empire Guesthouse and RV Park.

Two dynamic messaging signs (DMS) will be rented (one sign for each check station) to direct boaters to the exit inspection locations. Renting DMS signs guarantees that they will always be available for check station purposes. Additional signage will be made to explain boat ramp nightly closures, shore launch closure at the dam area, and that exit inspections required at all boat ramps (Appendix B). Signs will be made locally at Rocky Mountain Sign and Design. Other supplies such as T-posts and cable are already on-hand at the WGFD Sheridan Regional Office or Keyhole State Park Headquarters.

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 Sheridan Regional I&E Specialist to relay information about Short-term Suspect Status at Keyhole Reservoir 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, Keyhole Reservoir 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 the Long-term Suspect Status 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 inspection, motor flush, and decontamination of ballast tanks and other undrainable areas. All watercraft leaving Keyhole Reservoir 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 to a lower level response, with a goal of contacting a significant number of boaters leaving the water, but shifting the onus of getting a required inspection to the boater. 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 outboard 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.

Communication Plan

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

Closures

During Year 1 of Long-term Suspect Status, the Marina, Pat's Point, and Cottonwood Bay (Park Headquarters side of reservoir) boat ramps will be closed in April and November to eliminate the need for the East Side Check Station during this low boater use period. These closures will be lifted and the East Side Check Station would open on May 1. Additional closures of individual boat ramps are not recommended during year 1 of a Long-term Suspect Status period. Closure of shore launching on the east side of Cottonwood Bay and near the dam is recommended during year 1 since access and exit does not encounter an AIS check station or exit inspection station. During years 2 and 3 of Long-term Suspect Status, shore launching will be allowed in this area. Current signage (shore launching prohibited) will be changed to communicate that an exit inspection is required.

Night closure of boat ramps is also recommended during year 1 of a Long-term Suspect Status to ensure that every vessel leaving Keyhole receives an exit inspection. In close coordination with Keyhole State Park, boat ramps will be closed with a cable and sign indicating the reason why. Hours when Keyhole Reservoir boat ramps are open will be ½ hour before sunrise to ½ hour after sunset. If a boat is not off the water by ½ hour after sunset, it will remain in the water until the next day. During year 1 of Long-term Suspect Status, we will be able to assess the number of night boaters (likely all anglers). This will help determine whether to keep night closures or lift them in years 2 and 3 of Long-term Suspect Status.

Check Stations

During years 1 through 3 of Long-term Suspect Status, the number and location of the two exit inspection stations will remain the same as for Short-term Suspect Status. The “pinch-points” located at the Paradise Foods grocery store in Pine Haven and the pull-through check station on Marina Road (East Side Check Station) will intercept boating traffic from all five Keyhole Reservoir ramps, preventing the need to close individual boat ramps, while helping to minimize staffing and equipment needs. During year 1 of Long-term Suspect Status, check station hours of operation will coincide with boat ramp hours (½ hour before sunrise until ½ hour after sunset).

The exit inspection location at Paradise Foods will be converted to an AIS entrance inspection station once a local boater program is initiated (see below). The Coulter Bay and Wind Creek boat ramps will only be available to participants in the local boater program. One AIS technician will operate an entrance inspection at Paradise Foods (as currently being done) to ensure that boats and trailers are labeled appropriately as Keyhole Reservoir local boaters. This technician will educate boaters about the program and instruct nonparticipants to launch on the east side of the reservoir.

Local Boater Program

A local boater program (detailed in the Administrative Rapid Response Plan; WGFD 2020) will be very applicable at Keyhole Reservoir. Approximately 85% of boater inspections are resident boats (Beth Bear, personal communication) with a majority of those residents from nearby communities. The local boating public would likely be appreciative of such a program. A local boater program would minimize staffing levels, reduce wear and tear on equipment (fewer decontaminations), and lessen the need for nightly boat ramp closures (presuming that nighttime boaters are mostly residents). We should strongly consider pursuing a local boater program during year 1 of Long-term Suspect Status, realizing that implementation would likely occur by year 2. Given the high cost estimate for year 1 of Long-term Suspect Status, prompt implementation of a local boater program should be strongly considered (Appendix B).

Staffing Plan

Year 1

Staffing levels in year 1 of Long-term Suspect Status will depend on the time of year (day length) and anticipated boating traffic and will range from one to three individuals present at each station at any given time (Table 1). Personnel staffing the check stations will consist of several technicians and one Contract Biologist I to coordinate and supervise operations. To sufficiently run two exit inspection stations, the total number of technicians needed will vary from 2 (November) to 14 (July and August; Table 1). Periodically, additional staffing may be provided by the Sheridan Regional Fisheries Management Crew and other WGFD personnel. Appendix B details the anticipated budget for Year 1 of Long-term Suspect Status level. Assistance from local WGFD Game Wardens and Keyhole State Park law enforcement personnel may be requested as well. Current staffing for Year 1 (Table 1) of Long-term Suspect

Status is figured as if a Local Boater Program is not in place. Total hours and total technicians needed will likely decrease once a Local Boater Program is implemented.

TABLE 1. Month, day length, days per month, technicians needed, total hours and total technicians needed to run AIS exit inspections during Year 1 of Long-term Suspect Status for Keyhole Reservoir. Staffing levels are based on a Local Boater Program not being in place. Total hours and technicians needed will likely decrease once a program is established. Paradise Foods technicians will decrease in number and/or shift to the East Side Check Station.

Month	Day Length ^a (Hours)	Days/Month	Technicians Needed ^b	Total Hours ^c	Total Technicians Needed
April	15	30	1 (PF only)	450	3
May 1-15	15	15	2 (PF-1, ES-1)	450	3
May 16-31	16	16	4 (PF-2, ES-2)	1024	6
June	16	30	4 (PF-2, ES-2)	1920	12
July	16	31	5 (PF-3, ES-2)	2480	14
August	15	31	5 (PF-3, ES-2)	2325	14
Sept 1-15	14	15	4 (PF-2, ES-2)	840	5
Sept 15-31	13	16	2 (PF-1, ES-1)	416	3
October	12	31	2 (PF-1, ES-1)	744	5
November	11	30	1 (PF only)	330	2

^a (Day length) x (Days) x (Technicians) = Total Hours needed to run check stations from ½ hour before sunrise to ½ hour after sunset.

^b PF is the Paradise Foods Check Station and ES is the East Side Check Station.

^c (Total Hours) ÷ (40 hours/week) ÷ (4.33 weeks/month) = Total technicians needed to run check stations from ½ hour before sunrise to ½ hour after sunset per month (technicians can only work 40 hours/week).

Years 2 and 3

During Years 2 and 3 of Long-term Suspect Status at Keyhole Reservoir, it is anticipated that a Local Boater Program will have been initiated. Under this assumption, the Paradise Foods Check Station will be converted to an entrance inspection station ensuring that boats are participants in the Local Boater Program. Night closures of boat ramps and closure of shore launching on the east side of Cottonwood Bay and the dam area will discontinue. Hours of check station operation will decrease to 10 to 12 hours/day and the number of technicians needed to run the exit inspections will decrease as well.

Table 2 details hours of operation for exit inspection check stations, and the number of AIS technicians needed to run the check stations during Years 2 or 3 of Long-term Suspect Status. Appendix B details the anticipated annual budget for Years 2 or 3 of Long-term Suspect Status.

TABLE 2. Month, day length, days per month, technicians needed, and total hours to run AIS exit inspections during Years 2 and 3 of long-term suspect status for Keyhole Reservoir. Staffing levels assume a Local Boater Program is in place. Contract Biologist I will cover the East Side Check Station when needed in April, October, and November.

Month	Day Length ^a (Hours)	Days/Month	Technicians Needed ^b	Total Hours ^c Year 2 or 3	Total Technicians Needed
April	10	30	1 (PF only)	300	2
May 1-15	10	15	2 (PF-1, ES-1)	300	2
May 16-31	12	16	3 (PF-1, ES-2)	576	4
June	12	30	4 (PF-1, ES-3)	1440	8
July	12	31	4 (PF-1, ES-3)	1488	9
August	12	31	4 (PF-1, ES-3)	1488	9
Sept 1-15	12	15	3 (PF-1, ES-2)	540	3
Sept 16-31	12	16	2 (PF-1, ES-1)	384	2
October	10	31	1 (PF-1,)	310	2
November	10	30	1 (PF only)	300	2

^a (Day length) x (Days) x (Technicians) = Total Hours needed to run check stations for 10 to 12 hours a day.

^b PF is the Paradise Foods entrance inspection check station and ES is the East Side Check Station.

^c (Total Hours) ÷ (40 hours/week) ÷ (4.33 weeks/month) = Total technicians needed to run check stations for 10 to 12 hours a day (technicians can only work 40 hours/week).

Supplies and Equipment

Year 1

Three new decontamination units will be purchased. These units plus the existing Keyhole Reservoir unit will allow for two units per inspection station. Water will be hauled from State Park Headquarters to fill the decontamination units. Budget includes a ¾ ton truck and a 10,000 lb capacity trailer to replace truck and trailer borrowed during Short-term Suspect Status. Two 550-gallon water tanks and 2-inch trash pump purchased during Short-term Suspect Status will be mounted on the new trailer.

During the Long-term Suspect Status period, personnel will continue to be housed in WGFD camper trailers. At most, ten technicians will be working and housed at any one time and will require four camper trailers. These will consist of two new camper trailers, the AIS camper trailer, and one Sheridan Regional camper trailer. Trailer slips would likely be available within the park, park headquarters, or rented at the Empire Guesthouse and RV Park. Two office trailers and generators to power them are also included in the budget.

During Long-term Suspect Status, DMS signs will be exchanged for permanent signs. Additional signage will be made to explain boat ramp nightly closures, shore launch closure at the dam area, and exit inspection required at all boat ramps. Signs will be made locally at Rocky Mountain Sign and Design. Other supplies such as T-posts and cable are already on-hand between the WGFD Sheridan Regional Office and Keyhole State Park Headquarters.

Years 2 and 3

Budgets in Years 2 and 3 of Long Term Suspect Status reflect vehicle leasing and camper trailer slip rental amounts similar to Year 1, Local Boater Program, and a reduced camp grocery budget which reflects reduced staffing levels (Appendix B). It is expected that large equipment expenditures in Year 1 (e.g., decontamination units) will continue to be in good condition in Years 2 and 3.

RAPID RESPONSE – POSITIVE STATUS

Keyhole Reservoir 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). The goal during the Positive Status period 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 Keyhole Reservoir's status to Infested. All watercraft leaving Keyhole Reservoir 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 Positive Status, it is anticipated that AIS exit inspections will change. The East Side Check Station on the Headquarters side will remain the same as previous status levels. The Paradise Foods Check Station on the Pine Haven side will close in favor of a Local Boater Program (described above in Long-term Suspect Status).

Communication Plan

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

Closures

Permanent closure of shore launching on the east side of Cottonwood Bay and near the dam is recommended during Positive Status since access and exit does not encounter an AIS check station or exit inspection station.

Night closure of boat ramps is also recommended during Positive Status to ensure that every vessel leaving Keyhole Reservoir receives an exit inspection. In close coordination with Keyhole State Park, boat ramps will be closed with a cable and sign indicating the reason why. Hours when Keyhole Reservoir boat ramps are open will be ½ hour before sunrise to ½ hour after sunset. If a boat is not off the water by ½ hour after sunset, it will remain in the water until the next day.

Check Stations

During Positive Status, the number and location of exit inspection stations will have to change. The Paradise Foods Check Station in Pine Haven will be converted to an AIS entrance inspection station. The Wind Creek and Coulter Bay boat ramps will only be used by Local Boater Program participants (refer to Local Boater Program description under Long-term Suspect Status heading). One AIS technician will operate the entrance inspection at Paradise Foods to ensure that boats and trailers are labeled appropriately as Keyhole Reservoir local boaters. This technician will educate boaters about the program and instruct nonparticipants to launch on the east side of the reservoir.

The East Side Check Station on the Headquarters side will continue to intercept boating traffic from the three east side boat ramps and boaters not enrolled in the Local Boater Program. Local Boater Program participants that anticipate boating elsewhere can also use the East Side Check Station for inspections and decontaminations. Local Boater Program participants will still need to stop at any check stations they encounter, but will be expedited through the line with proper credentials. Utilizing the Wind Creek and Coulter Bay boat ramps exclusively for a Local Boater Program will prevent the need to close individual boat ramps during Positive Status, while helping to minimize staffing and equipment needs. During Positive Status, check station hours of operation will coincide with boat ramps hours ($\frac{1}{2}$ hour before sunrise until $\frac{1}{2}$ hour after sunset).

Staffing Plan

Staffing levels for Positive Status will depend on the time of year (day length) and anticipated boating traffic and will range from one to five individuals present at any given time (Table 3). Personnel staffing the check stations will consist of several technicians and one Contract Biologist I to coordinate and supervise operations. To sufficiently run one exit inspection station, the total number of technicians needed will vary from 2 (November) to 14 (July and August; Table 3). One to two technicians will be needed to run the Paradise Foods entrance inspection (ensuring that the boating traffic is participating in the Local Boater Program). Periodically, additional staffing may be provided by the Sheridan Regional Fisheries Management Crew and other WGFD personnel. Assistance from local WGFD Game Wardens and Keyhole State Park law enforcement personnel may be requested as well.

TABLE 3. Month, day length, days per month, technicians needed, total hours, and total technicians needed to run AIS exit inspections during Positive Status for Keyhole Reservoir. The Contract Biologist I will cover the East Side Check Station when needed in April, October, and November

Month	Day Length (Hours)	Days/Month	Technicians Needed	Total Hours	Total Technicians Needed
April	15	30	1 (PF only)	450	3
May 1-15	15	15	2 (PF-1, ES-1)	450	3
May 16-31	16	16	3 (PF-1, ES-2)	768	5
June	16	30	4 (PF-1, ES-3)	1920	11
July	16	31	5 (PF-1, ES-4)	2480	14
August	15	31	5 (PF-1, ES-4)	2325	14
Sept 1-15	14	15	4 (PF-1, ES-3)	840	5
Sept 16-31	13	16	2 (PF-1, ES-1)	416	3
October	12	31	1 (PF only)	372	2
November	11	30	1 (PF only)	330	2

^a (Day length) x (Days) x (Technicians) = Total Hours needed to run check stations from ½ hour before sunrise to ½ hour after sunset.

^b PF is the Paradise Foods entrance inspection check station and ES is the East Side Check Station.

^c (Total Hours) ÷ (40 hours/week) ÷ (4.33 weeks/month) = Total technicians needed to run check stations from ½ hour before sunrise to ½ hour after sunset per month (technicians can only work 40 hours/week).

Refer to Appendix B for anticipated budgetary needs for Positive Status. Budgetary needs will likely be refined and more accurate following the learning curve from Short-term and Long-term Suspect Status periods (e.g., do we need three motor pool vehicles, do we need 14 technicians, etc.). Personnel costs in Appendix B reflect staffing levels if a Local Boater Program is in place. If Keyhole Reservoir progresses directly from Short-term Suspect Status to Positive Status, use staffing levels outlined in Year 1 Long-term Suspect Status until a Local Boater Program can be instituted. Otherwise, all budget items in Appendix B reflect progression from Short-term Suspect Status to Positive Status. Items are noted that would not be required if the reservoir transitioned through Long-term Suspect Status.

RAPID RESPONSE – INFESTED STATUS

Keyhole Reservoir will be considered Infested if an established (recruiting and reproducing) population of adult dreissenid mussels is found. 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 Keyhole Reservoir 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 Infested Status, it is anticipated that AIS exit inspections will operate similarly to previous status levels, with a Local Boat Program entrance inspections at the Paradise Foods Check Station in Pine Haven and exit inspections at the East Side Check Station. Refer to Positive Status for particulars on the communication plan, closures, and public outreach. Refer to Appendix A for a list of internal and external contacts. Refer to Appendix B for anticipated budgetary needs for Infested Status.

Check Stations

While the check station location will continue to be in place at the Headquarters, a “permanent” location may need to be developed. During Infested Status, check station hours of operation will coincide with boat ramps hours (½ hour before sunrise until ½ hour after sunset). Boat ramp hours should be strongly reconsidered for closing earlier to ensure that decontaminations do not occur during darkness (e.g. ramps close 2 hours prior to sunset; would depend on time of year).

Staffing Plan

Staffing levels for Infested Status will depend on the time of year (day length) and anticipated boating traffic but will mirror that of Positive Status (refer to Positive Status Staffing Plan and Table 3). Staffing levels may have to be increased during Infested Status if levels prove inadequate during any previous status level.

Personnel costs in Appendix B reflect staffing levels if a Local Boater Program is in place. If Keyhole Reservoir progresses directly from Short-term Suspect Status to Positive Status, use staffing levels outlined in Year 1 Long-term Suspect Status until a Local Boater Program can be instituted.

Supplies and Equipment

During Infested Status, it is anticipated that a permanent decontamination site will have to be in place on the Headquarters side of Keyhole Reservoir. It is currently unclear if the current location (pull-thru check station on Marina Road) can be modified to house and support a permanent decontamination site, or if a better location is needed (currently, the Keyhole State Park Superintendent position is vacant and initial talks on such logistics have not happened). Partially paving the station, a recirculating decontamination system, a well, and power to the site were preliminarily budgeted for.

All budget items in Appendix B reflect progression from Short-term Suspect Status to Positive Status. If this were to occur, the ¾ ton pickup and 10,000 lb capacity trailer borrowed to haul water would be used until a well and power are operational at the East Side Check Station. Items are noted that would not be required if the reservoir transitioned through Long-term Suspect or Positive status. Assuming previous equipment and budget requests have been met from prior status levels, it is not anticipated that large quantities of additional equipment and supplies are going to be needed (particularly if a Local Boater Program is in place and less equipment and personnel are needed on the Pine Haven side). Additional signage describing

Infestation, Local Boater Program watercraft only, Decontamination Required, etc. will be made in Sheridan at Rocky Mountain Sign and Design.

Alternatives

As suggested above, a Local Boater Program would negate the need for the Paradise Foods exit inspection check station on the Pine Haven side of Keyhole Reservoir. A Local Boater Program could be initiated at any of the status levels and would reduce overall staffing, equipment and maintenance needs.

During all status levels, we are suggesting that we decontaminate all vessels coming off the water. At certain times, it is likely that our check stations could be under staffed, overwhelmed, and unable to perform decontaminations in a timely and thorough manner. An alternate method for identifying boats that could not be decontaminated should be strongly considered (such as an alternative seal).

An official boating season should be strongly considered during Positive and Infested status (e.g., April 15 to November 15) with associated boating and ramp closures. All status levels will require all watercraft to be inspected and decontaminated (if necessary). November 16 thru April 14 sees very low boating traffic and/or the reservoir is ice covered. An official boating season will reduce costs for technicians that would otherwise have to remain until ice-on, or start after ice-off. Ice-on and ice-off dates for Keyhole Reservoir can be highly variable depending on weather. An official boating season will ensure that WGFD will have staffing in place to operate exit inspection check stations. Boat ramp hours should also be strongly reconsidered for closing earlier to ensure that decontaminations do not occur after dark (e.g., ramps close 2 hours prior to sunset; would depend on time of year).

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
<u>Wyoming Game & Fish Department</u>			
Brian Nesvik	WGFD Director	307-777-4501	brian.nesvik@wyo.gov
Alan Osterland	Chief of Fisheries	307-777-4559	alan.osterland@wyo.gov
Kevin Gelwicks	Assistant Fish Mgmt Coordinator	307-721-1382	kevin.gelwicks@wyo.gov
Josh Leonard	AIS Coordinator	307-721-1374	Joshua.leonard@wyo.gov
Paul Mavrakis	Regional Fisheries Supervisor	307-672-7418	paul.mavrakis@wyo.gov
Andrew Nikirk	Regional Fisheries Biologist	307-672-7418	andrew.nikirk@wyo.gov
Reed Moore	Sheridan AIS Crew Leader	307-672-7418	reed.moore@wyo.gov
Craig Smith	Regional Wildlife Supervisor	307-672-7418	craig.smith1@wyo.gov
Moorcroft Warden	Game Warden	307-756-3357	
Levi Wood	Game Warden	307-730-2800	levi.wood@wyo.gov
Chris Teter	Game Warden	307-283-1276	chris.teter@wyo.gov
Becca Lutz	Game Warden	307-680-3571	kristen.davanon@wyo.gov
Christina Schmidt	Regional Information & Education	307-672-7418	christina.schmidt@wyo.gov
<u>Keyhole State Park</u>			
Wade Henderson	State Park Superintendent	307-756-3596	
<u>U.S. Bureau of Reclamation</u>			
Chris Langstaff	Rapid City, SD	605-219-5729	clangstaff@usbr.gov
Cindy Larom	Rapid City, SD	605-430-8469	clarom@usbr.gov
Laura Hertz	Bismark, ND	701-471-4675	lhertz@usbr.gov
Jacob Bradford	Billings, MT	406-247-7720	jbradford@usbr.gov
<u>Concessionaires</u>			
Keyhole Marina	Phil Jordan	307-756-9529	
R Place Bar and Grill		307-756-9707	
<u>Stakeholders</u>			
Empire Guesthouse	Mike Smith	307-756-3454	
Paradise Foods	Jay Bowman	307-756-9888	
Pine Haven Mayor	Bill Cunningham	307-217-0359	pinehav@collinscom.net
Belle Fourche Irrigation Dist.		605-456-2541	
Steve Hirtzel	USFS Fisheries Biologist	605-456-9214	
WY WAE Stampede	Brian Woodward	307-258-8898	
WY WAE Circuit	Steve Schauss	307-577-7276	
NEWWA	Dave Corns	307-680-7372	
<u>SD Game Fish & Parks</u>			
Jake Davis	Regional Supervisor	605-394-1759	jake.davis@state.sd.us
Mike Greiner	AIS Coordinator	605-223-7706	mike.greiner@state.sd.us

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)	168	\$24	\$4,032
	Subtotal			\$4,032
Supplies	Description			Total Cost
	2 DMS signs rental (months)	4	\$1,080	\$4,320
	DMS sign shipping	1	\$1,200	\$1,200
	Signs (13 total)	13	\$100	\$1,300
	Trailer slip rental (nights)	42	\$45	\$1,890
	Decontamination Unit Rental (weeks)	6	\$1,400	\$8,400
	550 gal ag water tanks	2	\$500	\$1,000
	2-inch trash pump	1	\$300	\$300
	Subtotal			\$18,410
	Total			\$22,442

*During this six-week period, personnel will consist of existing WGFD employees. Vehicles and other equipment will be borrowed from the Sheridan Region or elsewhere in WGFD.

LONG-TERM SUSPECT STATUS (Year 1)

Personnel	Description	# of Months	Cost/Month	Total Cost
	Contract Biologist	8	\$4,543	\$36,344
	Technicians; 2 @ 8 months	16	\$2,863	\$45,808
	Technicians; 5 @ 6 months	30	\$2,863	\$85,890
	Technicians; 7 @ 4 months	28	\$2,863	\$80,164
	Subtotal			\$248,206
Vehicle	Description	# of Months	Cost/Month	Total Cost
	Purchase 3/4 ton Pickup	1	\$33,000	\$33,000
	State Motor Pool Sedan 1	8	\$500	\$4,000
	State Motor Pool Sedan 2	6	\$500	\$3,000
	Subtotal			\$40,000
Travel	Description	# of Days	Cost/Day	Total Cost
	Camp Groceries (person days)	1,544	\$24	\$37,056
	Subtotal			\$37,056
Supplies	Description			Total Cost
	Camp Trailers	2	\$20,000	\$40,000
	Office Trailers	2	\$20,000	\$40,000
	2-pack 2000W generators (2 pairs)	2	\$1,900	\$3,800
	16 ft 10,000 lb capacity trailer	1	\$4,000	\$4,000
	Signs (one-time expense)	2	\$500	\$1,000
	Decontamination Units	3	\$12,500	\$37,500
	Trailer slip rental (nights)	92	\$45	\$4,140
	Subtotal			\$130,440
	Total			\$455,702

*Table 1 above describes how the number of technicians needed were generated for Year 1 of Long-term Suspect Status.

^a Not necessary if already purchased during Short-term Suspect

LONG-TERM SUSPECT STATUS (Years 2 or 3)

Personnel	Description	# of Months	Cost/Month	Total Cost
	Contract Biologist	8	\$4,543	\$36,344
	Technicians; 2 @ 8 months	16	\$2,863	\$45,808
	Technicians; 4 @ 5 months	20	\$2,863	\$57,260
	Technicians; 3 @ 3 months	9	\$2,863	\$25,767
	Subtotal			\$165,179
Vehicle	Description	# of Months	Cost/Month	Total Cost
	State Motor Pool Sedan 1	8	\$500	\$4,000
	State Motor Pool Sedan 2	8	\$500	\$4,000
	Subtotal			\$8,000
Travel	Description	# of Days	Cost/Day	Total Cost
	Camp Groceries (person days)	834	\$24	\$20,016
	Subtotal			\$20,016
Supplies	Description			Total Cost
	Trailer slip rental (nights)	92	\$45	\$4,140
	Subtotal			\$4,140
	Total			\$197,335

*Table 2 above describes how the number of technicians needed were generated for Years 2 and 3 of Long-term Suspect Status.

POSITIVE STATUS

Personnel	Description	# of Months	Cost/Month	Total Cost
	Contract Biologist	8	\$4,543	\$36,344
	Technician; 2 @ 8 months	16	\$2,863	\$45,808
	Technicians; 6 @ 6 months	36	\$2,863	\$103,068
	Technicians; 6 @ 3 months	18	\$2,863	\$51,534
	Subtotal			\$236,754
Vehicle	Description	# of Months	Cost/Month	Total Cost
	Purchase 3/4 ton pickup ^a	1	\$33,000	\$33,000
	State Motor Pool Sedan 1	8	\$500	\$4,000
	State Motor Pool Sedan 2	8	\$500	\$4,000
	Subtotal			\$41,000
Travel	Description	# of Days	Cost/Day	Total Cost
	Camp Groceries (person days)	1558	\$24	\$37,392
	Subtotal			\$37,392
Supplies	Description			Total Cost
	Camp Trailers ^a	2	\$20,000	\$40,000
	Office Trailers ^a	2	\$20,000	\$40,000
	2-pack 2000W generators (2 pairs) ^a	2	\$1,900	\$3,800
	16' trailer (haul water) ^a	1	\$4,000	\$4,000
	Signs (one-time expense) ^a	2	\$500	\$1,000
	Decontamination Units ^b	3	\$12,500	\$37,500
	Trailer slip rental (nights)	92	\$45	\$4,140
	Subtotal			\$130,440
	Total			\$445,586

*Table 3 above describes how the number of technicians needed were generated for Positive status. An additional decontamination unit was budgeted in anticipation of breakdowns during Long-term Suspect Status.

^a These items will not need to be purchased if transitioning from Long-term Suspect Status.

^b Anticipate only needing to purchase one decontamination unit if transitioning from Long-term Suspect Status.

INFESTED STATUS

Personnel	Description	# of Months	Cost/Month	Total Cost
	Contract Biologist	8	\$4,543	\$36,344
	Technician; 2 @ 8 months	16	\$2,863	\$45,808
	Technicians; 6 @ 6 months	36	\$2,863	\$103,068
	Technicians; 6 @ 3 months	18	\$2,863	\$51,534
	Subtotal			\$236,754
Vehicle	Description	# of Months	Cost/Month	Total Cost
	State Motor Pool Sedan 1	8	\$500	\$4,000
	State Motor Pool Sedan 2	8	\$500	\$4,000
	Subtotal			\$8,000
Travel	Description	# of Days	Cost/Day	Total Cost
	Camp Groceries (person days)	1558	\$24	\$37,392
	Subtotal			\$37,392
Supplies	Description			Total Cost
	Camp Trailers ^a	2	\$20,000	\$40,000
	Office Trailers ^a	2	\$20,000	\$40,000
	Signs (one-time expense) ^a	2	\$500	\$1,000
	Signs (local boat, infestation, decon)		\$2,000	\$2,000
	Recirculating Decontamination Unit	1	\$300,000	\$300,000
	Well drilling-East Side Check Station ^b	1	\$20,000	\$20,000
	Asphalt-East Side Check Station	1	\$50,000	\$50,000
	Electrical to East Side Check Station	1	\$25,000	\$25,000
	Trailer slip rental (nights)	92	\$45	\$4,140
	Subtotal			\$482,140
	Total			\$764,286

*Table 3 above describes how the number of technicians needed were generated for Positive Status. Infested Status mirrors that of Positive Status.

^a These items will not need to be purchased if transitioning from Long-term Suspect or Positive Status.

^b If transitioning from Short-term Suspect Status to Infested Status, continue to use 2 550 gallon water tanks and trash pump purchased during Short-term Suspect Status and borrowed ¾ ton pickup and trailer until well and power are installed at the East Side Check Station.