

Rapid Response Plan Following Detection of Dreissenid Mussels in Jackson Lake, Wyoming

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SUMMARY

Jackson Lake is a natural, glacial lake formed between the Teton Mountains and the Yellowstone Plateau in Grand Teton National Park (GTNP) that is fed by the Snake River. A dam constructed in the early 1900s as part of the Minidoka Project, provides irrigation storage and flood control while increasing lake elevation by 30 feet. The dam is managed by the U.S. Bureau of Reclamation, while the lake is managed jointly by Wyoming Game and Fish Department and the National Park Service. The lake is 15 miles long, 7 miles wide, and stores 847,000 acre-feet of water with a max depth of 438 feet. Jackson Lake is approximately 32 miles from the town of Jackson, and four developed boat ramps can be accessed by either State Highway 191 or Teton Park Road. Shore launching is limited to mostly near Lizard Creek Campground on the north end of the lake. The boating season typically extends from mid-May through November, but the lake is closed to fishing during the month of October to protect spawning Lake Trout.

Boater use within GTNP is high, with an average of 189 boats per day passing through the NPS-run check stations. Many of these boats are non-motorized (87% based on GTNP boat permit sales), and not all are going to Jackson Lake. However, Jackson Lake has the highest occurrence of high risk inspections in the state (10%), due to a high number of non-resident boaters and large, complex watercraft. Resident use is proportionally low at 28%, with Utah, Idaho, Colorado, Montana, and California making up the majority of non-resident use.

The initial response to a dreissenid mussel detection in Jackson Lake will be to close two boat ramps, prohibit shore launching, and prohibit trailering of boats between one hour after sunset and 8 am. These restrictions will consolidate watercraft to the two remaining ramps for inspections and decontaminations. All Jackson Regional personnel (and personnel from outside the region) will set up and staff the AIS check stations at Signal Mountain and Leek's Marina boat ramps, with the goal of minimizing the risk of spreading mussels to other waters. The check stations will be open daily from 8 am to one hour after sunset for up to six weeks while awaiting follow-up sampling results. Inspectors will contact every boater leaving Jackson Lake to conduct exit inspections, necessary decontaminations, and educate them about the issue and prevention methods.

After the initial response conducted by existing regional personnel, AIS crew leads and inspectors will be hired and tasked with operating check stations during the long-term response. Check stations will be staffed with up to 11 inspectors from May 15 through November 31, but will be closed during the month of October when the lake is closed to fishing. Stations will operate similar to the initial response effort, and boaters will be responsible to seek out exit inspections when check stations are closed.

Costs for the initial year of a long-term dreissenid mussel response are approximately \$450,000 for equipment and supply purchases and personnel costs. Equipment costs include the

rental or purchase of decontamination units and vehicles, as well as the purchase of camper, office, and water hauling trailers. Additional costs of several hundred thousand dollars may also be needed to enlarge existing parking lots to relieve congestion from inspection stations. After the first year, annual operating costs for check stations will be between \$200,000 and \$250,000.

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.

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

Jackson Lake is a natural, glacial lake formed between the Teton Mountains to the west and the Yellowstone Plateau to the north. It is located within Grand Teton National Park (GTNP) and is fed by the Snake River. The lake is in the northern section of the park, approximately 32 miles from the town of Jackson. A dam was constructed in the early 1900s to increase the lake level by 30 feet and provide water storage for the Minidoka Project. The dam is managed by the U.S. Bureau of Reclamation and is used for irrigation storage to provide water to the Snake River basin in Idaho, and also functions for flood control. At full capacity, Jackson Lake stores 847,000 acre-feet of water and has a maximum depth of 438 feet. Jackson Lake is 15 miles long, 7 miles wide, covers 27,500 surface acres with over 55 miles of shoreline, and sits at an elevation of 6,772 feet above sea level at full pool.

Two highways provide access to Grand Teton National Park and Jackson Lake, State Highway 191 and Teton Park Road. There are four public boat ramps, which include Leek's Marina, Colter Bay Marina, Signal Mountain, and Spalding Bay (Figure 1). The boating season extends from mid-May through November depending on weather. The fishery is managed jointly by the Wyoming Game and Fish Department (WGFD) and the National Park Service (NPS). The land adjacent to the lake is managed by the NPS.

Boater use within Grand Teton National Park (GTNP) is high, with an average of 189 boats per day passing through the NPS-run AIS check stations. Many of these are non-motorized (87%) based on boating permit sales for GTNP. However, based on WGFD inspection data from January 1, 2018–November 11, 2019, Jackson Lake has the highest occurrence of High Risk inspections for Wyoming waters (10%) because of high prevalence of complex, large (wakeboard or cabin cruiser) watercraft with prior use on infested waters. Resident use is also comparatively low at 28%, with Utah, Idaho, Colorado, Montana, and California boaters making up the majority of non-resident use.

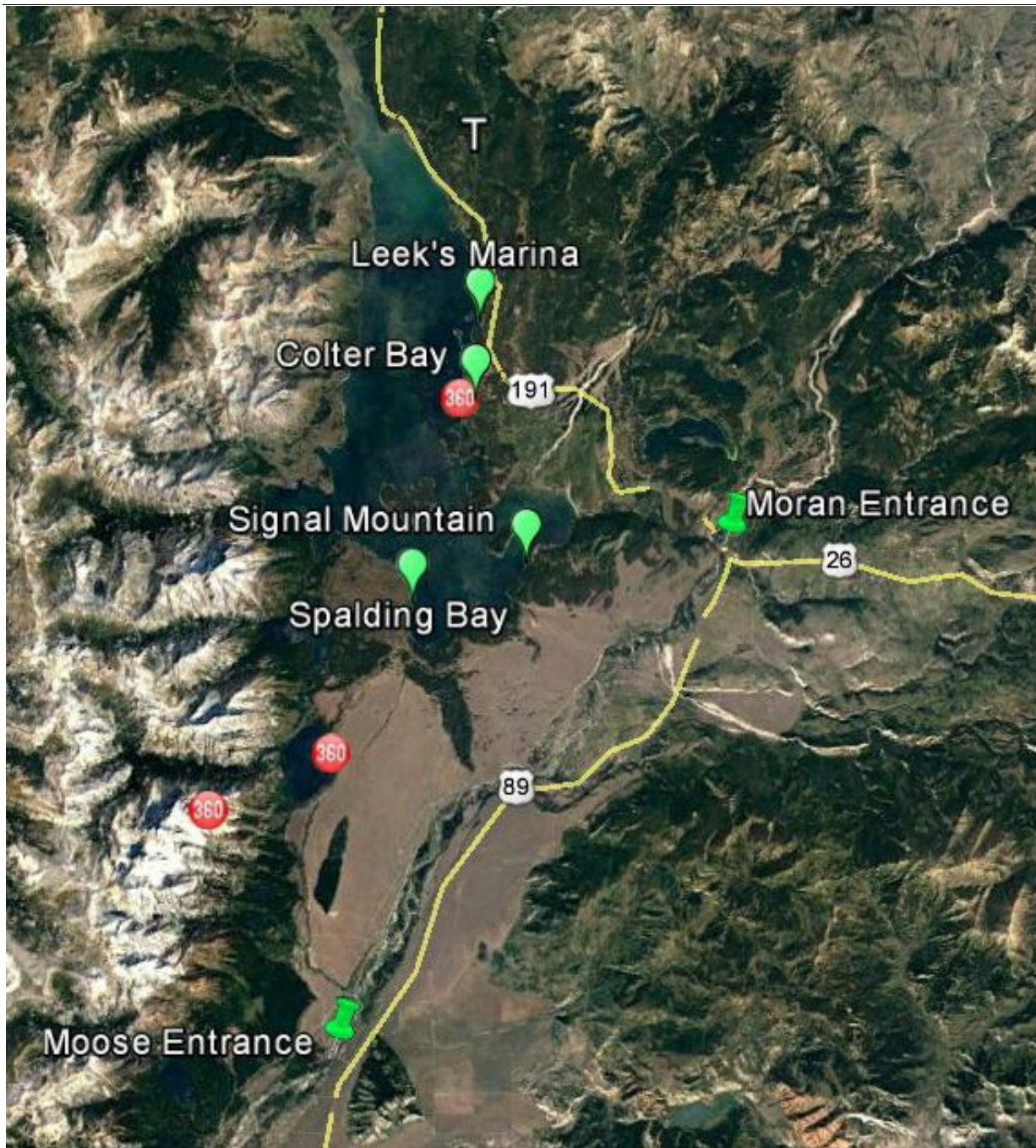


FIGURE 1. Map Depicting existing NPS inspection stations and boat ramps to Jackson Lake.

RAPID RESPONSE – SHORT-TERM SUSPECT STATUS

In the event that a sample from Jackson Lake tests positive for dreissenid mussels, the lake will be considered Short-term Suspect (defined above). After the initial detection, follow-up sampling will occur and results may take up to six weeks to be reported. The goal for rapid response at this status level will be to minimize the risk of spreading mussels to other waters while waiting for follow-up test results. Within one week, we will provide a capacity to contact all boaters coming off the water, conduct clean, drain, dry exit contacts, decontaminate all ballast tanks and other undrainable areas, and flush all motors, if feasible. All watercraft leaving Jackson 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 an 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 Regional Fisheries Supervisor will then follow the local and regional communication chain to disseminate information about the detection to internal and external partners and stakeholders (Figure 2 and Appendix A). In addition, the Regional Fisheries Supervisor or Regional Fish Division personnel will contact personnel from Grand Teton and Yellowstone national parks, the Bureau of Reclamation, Idaho Fish and Game, and Idaho Department of Agriculture, as well as concessionaires and stakeholders listed in Appendix A. The AIS Coordinator and Regional Fisheries Supervisor will coordinate with WGFD communication personnel, including the Regional I&E Specialist (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.

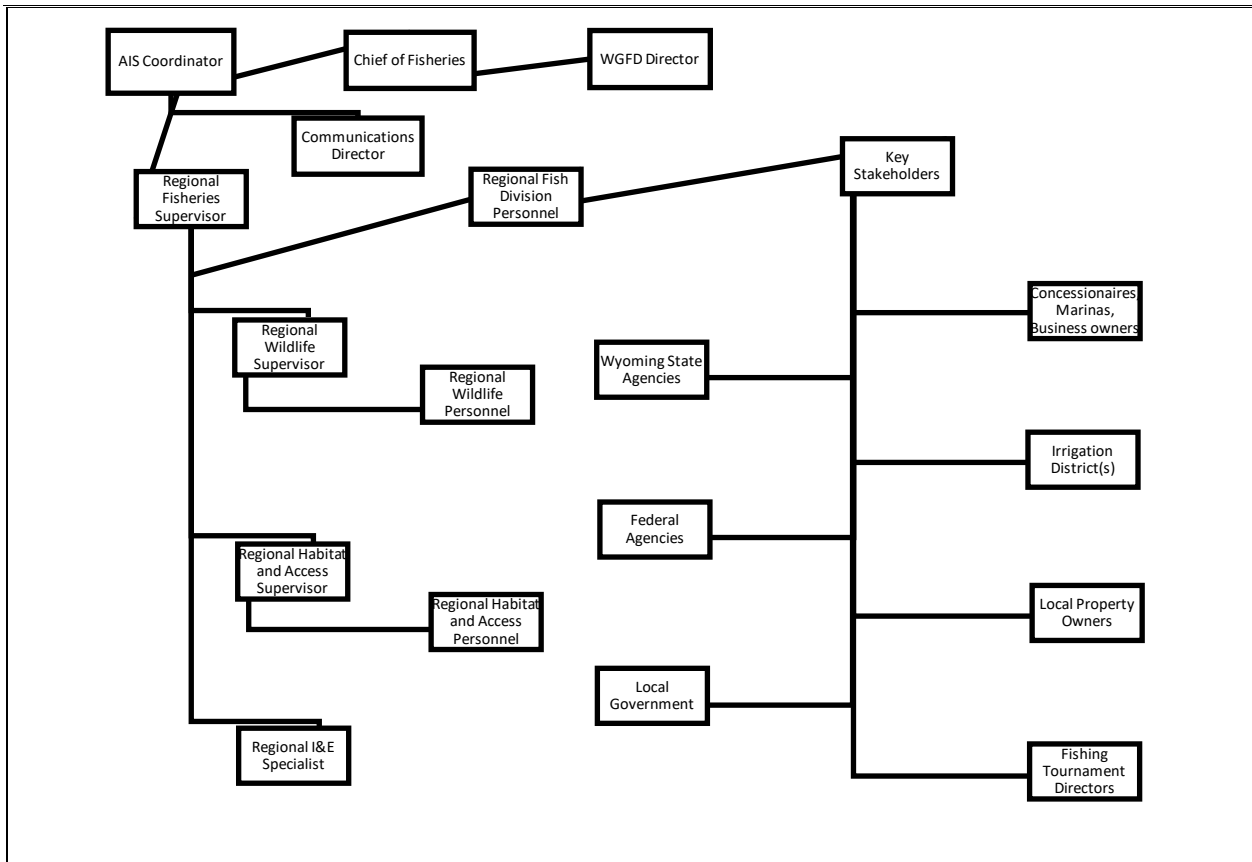


FIGURE 2. Communication chain for dissemination of information on the local and regional level following a dreissenid mussel detection in a Wyoming water.

Closures

To help minimize the resources needed, Colter Bay and Spaulding Bay boat ramps will be closed to all watercraft. The remaining two boat ramps (Leek’s Marina and Signal Mountain) will remain open since they have heavy use, a decontamination water source, and ample space to set up inspection stations (Figures 3-4). Although Colter Bay can be a popular boat ramp, it is not usable at low lake levels (boats can launch, but cannot leave the bay), and is very close in proximity to Leek’s Marina. Mooring and boat rentals at Colter Bay shall continue, and Colter Bay mooring lessees will be allowed to launch at start of season. Launching and trailering of boats at Leek’s Marina and Signal Mountain will be prohibited from one hour after sunset until 8 am and shore launching will also be prohibited.



FIGURE 3. Signal Mountain boat ramp with water source and inspection station locations

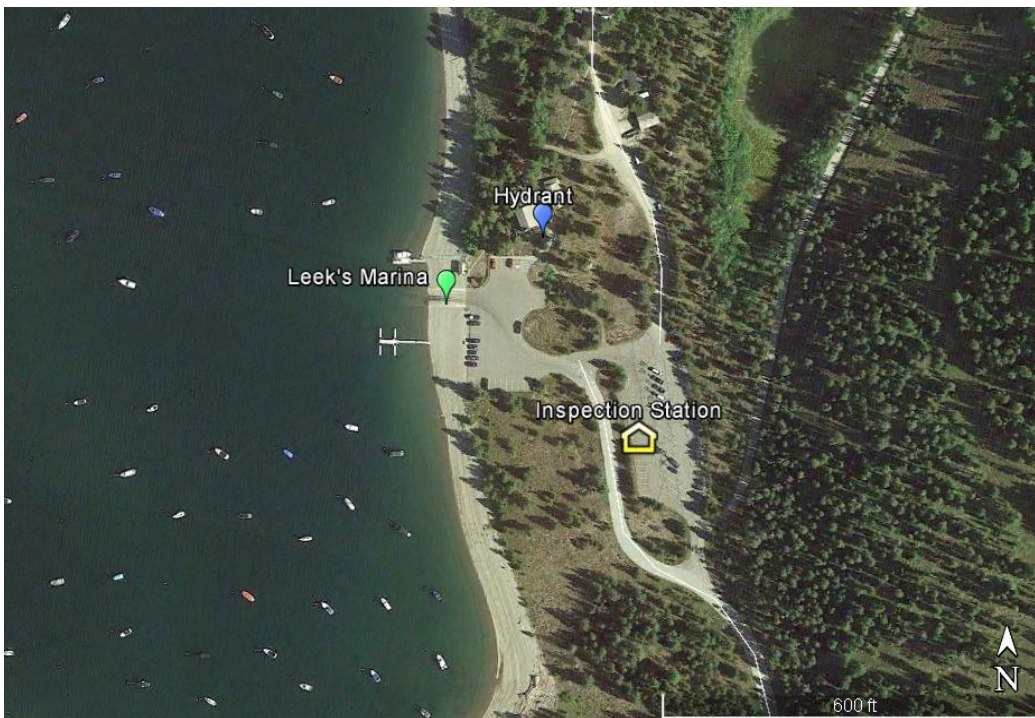


FIGURE 4. Leek's Marina boat ramp with water source and inspection station locations.

Inspection Stations

The check stations at the Leek's Marina and Signal Mountain boat ramps will be staffed by WGFD personnel daily from 8 am until one hour after sunset. During that time period, mandatory inspections of all watercraft leaving Jackson Lake will be conducted.

Grand Teton National Park currently intercept all watercraft entering the park at AIS inspection stations near Moose and Moran Junction (Figure 1). All watercraft entering GTNP receive AIS inspections at these stations between the hours of 7:30 am and 4:30 pm. Following a dreissenid mussel detection, inspection station hours will be extended to 6:00 am to 6:00 pm. All watercraft entering or leaving GTNP will be required to stop for an inspection. Those displaying an exit receipt and seal will be allowed through the check station with minimal delay.

Staffing Plan

Staffing needs will be filled by regional WGFD personnel and roving AIS personnel. Jackson Region WGFD employees will be required to assist in staffing check stations for Jackson Lake during the six week time period.

The greatest volume of boats departing Jackson Lake is typically from mid-morning to mid-afternoon (10:00 am to 3:00 pm). Staffing will be structured so the number of inspectors is maximized during that time period. Individual schedules will consist of four 10-hr days at a check station. During that time, inspectors can stay in campers at the check station to minimize travel time and cost. If the six week period falls during high use months (June, July, and August) staffing will consist of three different shifts per check station, one person to open the check station (8:00 am to 6:00 pm), one person to close the check station (12:00 pm to 10:00 pm) and one mid shift person (10:00 am to 8:00 pm). Check stations will be staffed with two inspectors during the slower months of the boating season, and shifts will consist of one person opening the check station (8:00 am to 6:00 pm) and one person closing the check station (12:00 pm to 10:00 pm). To be fully staffed, these two check stations will require a total of 12 people during high use months or eight people during lower use months.

Supplies and Equipment

Additional equipment and costs are outlined in Appendix B. Camper trailers will be provided for inspectors' convenience during the six week time period and camp groceries will be budgeted for personnel staying overnight. Water and electricity for campers is available at each check station. The Jackson Region currently has one extra decontamination unit available, but three additional units will need to be rented or borrowed from other regions. Water for decontaminations will come from fire hydrants near each inspection location. Signs will be posted indicating the water's status, the requirements for exit inspections, and boat ramp closures.

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 Jackson Regional I&E Specialist to relay information about Short-term Suspect Status at Jackson Lake through media outlets (newspapers, radio, etc.). Regional Information and Education personnel will coordinate all communications efforts with the Communications Director.

GTNP check stations will still be in operation during a Short-term Suspect Status and these stations will be most boaters' first point of contact. Information about the detection of dreissenid mussels in Jackson Lake and its potential spread and risks to the area will be explained and distributed.

RAPID RESPONSE – LONG-TERM SUSPECT STATUS

If initial follow-up sampling does not yield a positive result, Jackson 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.

Year 1

When seeking to determine the status of Jackson Lake through additional sampling, the first year will be the most critical and require increased effort. During this time [from initial detection through the following boating season (Year 1)], 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 Jackson 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. There will also be an increase in public information and outreach via pertinent outlets to highlight potential threats at Jackson Lake.

Years 2 and 3

If there is no confirmation of dreissenid mussel presence after the first full boating season, efforts will switch in the subsequent two years (Years 2 and 3) 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.

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 Jackson Region internal communication chain outlined in the Short-term Suspect Status section (above) will continue to be utilized to inform the Jackson Region and key stakeholders of follow-up sampling results.

Closures*Year 1*

During Year 1 of Long-term Suspect Status, the closures outlined in Short-term Suspect Status will remain in effect. These closures include no night launching or trailering of boats, no shore launching, and the closure of Colter Bay and Spaulding Bay boat ramps. Mooring and boat rentals at Colter Bay shall continue, and Colter Bay mooring lessees will be allowed to launch and retrieve vessels at the start and end of the season. Jackson Lake is already closed to angling during the month of October and sees very little boating pressure during that time. Therefore, Jackson Lake will be closed to all boating for the month of October. For the month of November, only Leek's Marina boat ramp will be open, primarily for use by Lake Trout anglers.

Years 2 and 3

In Years 2 and 3 of Long-term Suspect Status, the Colter Bay and Spaulding Bay boat ramps would be reopened, and night launching and trailering, as well as shore launching, would once again be allowed.

Inspection Stations*Year 1*

In Year 1 of Long-term Suspect Status, all boaters leaving Jackson Lake will be contacted at the Leek's Marina and Signal Mountain inspection stations for a required clean, drain, dry inspection; motor drain and flush; and a ballast and undrainable standing water decontamination. Inspection stations will be staffed from May 15 to September 30 and hours of operation will be 8:00 am to one hour after sunset. Outside of this time period, Jackson Lake is closed to fishing in October and typically ice covered by December. Limited boating will be allowed during the month of November via Leek's Marina.

Years 2 and 3

With no second positive sample in the first year of Long-term Suspect Status, a lower level response can be used in Years 2 and 3. Goals will shift from contacting every boater to contacting a significant number of boaters, but still requiring that boaters receive an exit inspection. All boat ramps will be open, and inspection stations will remain at Leek's Marina and Signal Mountain for the same boating season and hours as Year 1. Shore launching will be allowed, and boat ramps will no longer be chained closed after inspection stations have closed. It will be up to boat owners to receive an exit inspection and decontamination (if needed) before

going to a new water. Exit inspections can also be conducted at GTNP, port of entry check stations, and the Jackson Regional Office. Inspections will remain the same, but outboard motors will be drained instead of flushed. Inboard and inboard/outboard motors will still be flushed, and ballast tanks or undrainable areas will still be decontaminated.

Staffing Plan

Year 1

During year one of Long-term Suspect Status, inspectors will be stationed at exit check stations from 8:00 am to one hour after sunset. The staffing plan during Year 1 of Long-term Suspect Status will be the same as that of Short-term Suspect Status (above). Three overlapping shifts will be used during high use months and two overlapping shifts will be used during lower use months. This will require a total of 12 inspectors during high use and nine inspectors during lower use months. One inspector will be a Biologist I, tasked with overseeing operation and staffing of check stations. The remainder of the inspectors will be technicians hired for 3-5 month terms (Appendix B). When check stations are closed, ramps will also be closed. Boats can be left moored overnight, but ramps will be closed with a chain and sign to prevent trailering of boats when check stations are closed. During November, the Biologist I will oversee exit inspections at Leek's Marina.

Years 2 and 3

During Years 2 and 3 of Long-term Suspect Status, inspectors will be stationed at exit check stations from 8:00 am to one hour after sunset. The staffing plan will be similar to Year 1, but there will only be two overlapping shifts per check station (as in the lower use months of Year 1). This will require a total of eight inspectors for the boating season. One inspector will be a Biologist I, tasked with overseeing operation and staffing of the check stations. The remainder of inspectors will be technicians hired for 5 month terms (Appendix B).

Local Boater Program

Several states have had success implementing a "Local Boater Program" that allows individuals who only boat on the suspect, positive, or infested water to bypass or be expedited through check stations. A similar program will be pursued that would be implemented in Year 2 of Long Term Suspect Status.

A local boater program would allow agency personnel to maximize the allocation of available inspection and decontamination resources to high risk watercraft that are departing Jackson Lake and Teton County. Local boater program participants will be identified by a decal that will require annual renewal. Further details on the local boater program and implementation can be found in the Administrative Rapid Response Plan (WGFD 2020).

Supplies and Equipment

The Jackson Region currently has one spare mobile decontamination unit. An additional four units will need to be purchased for use at Signal Mountain and Leeks Marina check stations (Appendix B). Fire hydrants near inspection locations at both boat ramps will provide a water source for decontaminating boats and flushing motors. Two inch hoses will be necessary to fill

decontamination units. An office trailer and a camper trailer will need to be purchased for each inspection station to provide a work space out of the weather and to house inspectors during their shifts. Electricity for offices and trailers will be available at each location and camp groceries will be provided for those staying in trailers overnight. Two State Motor Pool ½ ton pickups will be rented for five months each (May-September). Pickup trucks will be necessary to tow mobile decontamination units. The Leek's Marina check station will require hauling water a short distance. Therefore, a ¾ ton truck and trailer with water tanks will be needed. For inspections after sunset, mobile light tower trailers will also need to be purchased for both inspection locations.

Public outreach

During 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 Jackson Regional I&E Specialist to keep the local boating public aware of the threats and responsibilities associated with a Long-term Suspect Status on Jackson Lake.

Public outreach and involvement will be most important during the first year, and could have great impact on preventing the spread of dreissenid mussels. Significant effort will be put forth in public outreach, information, and education. Results of sampling efforts will be relayed to Key Contacts in Appendix C. Effort will be taken to provide information to educate all WGFD and GTNP employees who can effectively relay verbal and written information to members of the public. An email list-serve will be created to relay information about the AIS status of Jackson Lake to interested parties. The Clean, Drain, Dry message will be emphasized and examples given of how the presence of dreissenid mussels will change the Jackson Lake ecosystem as well as operations in the area.

During Years 2 and 3, continue with the initial message and information, but with the addition of actual data on the increased cost associated with check stations and decontaminations from Year 1. Also provide data on the additional costs and efforts needed if Jackson Lake were to become positive or infested with dreissenid mussels.

RAPID RESPONSE – POSITIVE STATUS

Jackson Lake will reach the Positive Status if samples from two or more sampling events within a 12-month period meet the minimum criteria for detection (defined above). It is possible after reaching Positive Status that mussels will fail to reproduce sufficiently to become established. If monitoring does not identify dreissenid mussels over a period of five consecutive years, Jackson Lake will be downgraded to Negative Status. Alternatively, if an established, reproducing population of mussels is identified, 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 Jackson Lake's status to Infested. All watercraft leaving Jackson 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. There will also be an increase in public information and outreach via pertinent outlets to highlight potential threats and spread from Jackson Lake.

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 Jackson Region internal communication chain outlined in the Short-term Suspect Status section (above; Figure 2) will continue to be utilized to inform the Jackson Region and key stakeholders (Appendix A) of changes in status level.

Closures

If Positive Status is designated at Jackson Lake, the closures outlined in the Short Term Suspect and Long-term Suspect Year 1 statuses will remain in effect. These closures include no night launching or trailering of boats, no shore launching, and the closure of Colter Bay and Spaulding Bay boat ramps. Mooring and boat rentals at Colter Bay shall continue, and Colter Bay mooring lessees will be allowed to launch and retrieve vessels at start and end of the season. Additionally, Jackson Lake will be closed to all boating during the month of October. For the month of November, only Leek's Marina boat ramp will be open, primarily for use by Lake Trout anglers.

Inspection Stations

As in Short-term Suspect and Long-term Suspect statuses, inspection stations will be located at the Leek's Marina and Signal Mountain boat ramps. Inspection stations will be staffed from May 15 to September 30 and hours of operation will be 8:00 am to one hour after sunset. Outside of this time period, Jackson Lake is closed to fishing in October and typically ice covered by December. Limited boating will be allowed during the month of November via Leek's Marina.

Staffing Plan

The staffing plan for check stations will match that outlined in Year 1 of Long Term Suspect Status. One Biologist I will be hired to oversee operations and supervise 11 technicians who will be hired for three to five month terms.

Local Boater Program

A Local Boater Program would be implemented during Year 2 of Long-term Suspect Status, or Positive Status if it is reached first. Details can be found in the Long-term Suspect Status section and the Administrative Rapid Response Plan (WGFD 2020).

Supplies and Equipment

If Jackson Lake reached Positive Status without entering into a Long-term Suspect Status, it will be necessary to purchase the three decontamination units, two 2-in hoses, two office trailers, two campers, light trailers, and ¾ ton pickup with water trailer listed in the Long-term Suspect Year 1 budget. If these items were already purchased during Long-term Suspect Status, only camp groceries and two additional decontamination units will be necessary (Appendix B). The two additional decontamination units are included to replace any units that failed during three years of Long-term Suspect Status use.

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 Jackson Regional I&E Specialist to keep the local boating public aware of the threats and responsibilities associated with a Positive Status on Jackson Lake.

Public outreach will be imperative if Jackson Lake reaches Positive Status. Results of sampling efforts will be relayed to Key Contacts in Appendix A. Effort will be taken to provide information to educate all WGFD and GTNP employees who can effectively relay verbal and print information to members of the public. An email list-serve will be created to relay information about the AIS status of Jackson Lake to interested parties. The Clean, Drain, Dry message will be emphasized and examples given of how the presence of dreissenid mussels will change the Jackson Lake ecosystem as well as operations in the area.

Public Outreach is something that will need to continue annually for AIS concerns in Jackson Lake and the greater area. Jackson Lake and GTNP receive many non-local visitors throughout the boating season. Continued education and reaching as many people as possible will be beneficial. Seek out avenues for permanent educational signs and materials as well as pursuing new and adaptive avenues to relay the Department's message of Clean, Drain, Dry and the concerns associated with the spread of dreissenid mussels.

RAPID RESPONSE – INFESTED STATUS

Jackson Lake 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 Jackson 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 Infested Status is reached, there is little chance that mussels will be eradicated or Jackson Lake will ever be downgraded in status. Inspection and decontamination stations will become more permanent in efforts to stop the spread of mussels to other waters of the state. Increased public information and outreach via pertinent outlets will be beneficial to increase compliance at check stations and to identify potential threats and spread from Jackson Lake.

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 Jackson Region internal communication chain outlined in the Short-term Suspect Status section (above; Figure 2) will continue to be utilized to inform the Jackson Region and key stakeholders of changes in status level or operations.

Closures

If Infested Status is designated at Jackson Lake, the closures outlined in the Short-term Suspect, Long-term Suspect Year 1, and Positive statuses will remain in effect. These closures include no night launching or trailering of boats, no shore launching, and the closure of Colter Bay and Spaulding Bay boat ramps. Mooring and boat rentals at Colter Bay shall continue, and Colter Bay mooring lessees will be allowed to launch and retrieve vessels at the start and end of the season. Jackson Lake will be closed to boating for the month of October, and Leek's Marina will re-open in November to accommodate boaters (primarily Lake Trout anglers).

Inspection Stations

As in Suspect and Positive statuses, inspection stations will be located at the Leek's Marina and Signal Mountain boat ramps. Inspection stations will be staffed from May 15 to September 30 and the month of November (Leek's Marina only). Hours of operation will be 8:00 am to one hour after sunset. Outside of this time period, Jackson Lake is typically ice covered or closed to fishing (October).

Staffing Plan

The staffing plan for check stations will match that outlined in Year 1 of Long-term Suspect Status. One Biologist will be hired for a 12 month contract to oversee operations and supervise 11 technicians who will be hired for three to five month terms. In November, the inspection station will be staffed by the Biologist I.

Local Boater Program

A Local Boater Program would be implemented during Year 2 of Long-term Suspect, Positive, or Infested Status; whichever is reached first. Details can be found in the Long-term Suspect Status section and the Administrative Rapid Response Plan (WGFD 2020).

Supplies and Equipment

If Infested Status is reached without entering into a Long-term Suspect Status or Positive Status, it will be necessary to purchase the four decontamination units, two 2-in hoses, two water tanks, two office trailers, two campers, light trailers, a flatbed trailer for hauling water and a $\frac{3}{4}$ ton pickup listed in the Long-term Suspect Year 1 budget. If these items were already purchased during previous status levels, only camp groceries and two additional decontamination units will be necessary (Appendix B). The two additional decontamination units are included to replace

any units that failed during three to eight years of Long-term Suspect and/or Positive status use. Periodically, decontamination units will need to be replaced during Infested Status.

If Jackson Lake reaches Infested Status, there will be a low probability of Jackson Lake being downgraded in status and the check stations will become permanent, requiring additional investment in infrastructure. The parking lot areas where check stations were located during Long-term Suspect or Positive status will need to be enlarged to decrease congestion and space limitations that likely occurred during the other statuses. The costs associated with paving a new area are included in Appendix B.

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 Jackson Regional I&E Specialist and GTNP personnel to keep the local boating public aware of the threats and responsibilities associated with an Infested Status on Jackson Lake.

Public outreach will need to continue in perpetuity for AIS concerns in Jackson Lake and the greater area. Jackson Lake and GTNP see visitation from many non-local visitors throughout the season, and continued education that reaches as many people as possible will be important. Permanent signs as well as educational products will need to reach people in an effective manner to relay the Department's message of Clean, Drain, Dry and the concerns associated with the spread of dreissenid mussels.

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>			
	AIS Coordinator		
	Jackson Region Fisheries Supervisor		
	Jackson Region Wildlife Supervisor		
	Jackson Region AIS Specialist		
	Jackson Region Fisheries Biologist		
	Jackson Region Fisheries Biologist		
	Jackson Region Aquatic Habitat Bio.		
	South Jackson Game Warden		
	North Jackson Game Warden		
	Information & Education Specialist		
<u>Idaho Fish and Game</u>			
	Upper Snake Region Fisheries Manager		
<u>Grand Teton National Park</u>			
	Fisheries Biologist and AIS Coordinator		
	Supervisory Wildlife Biologist		
	Chief of Science and Resource Management		
	Deputy Superintendent		
	Chief Ranger		
	Colter Bay District Ranger		
	Public Affairs Officer		
<u>Yellowstone National Park</u>			
	Yellowstone Fisheries Chief		
	Chief, Wildlife and Aquatic Resources		
	Chief, Yellowstone Center for Resources		
<u>U.S. Bureau of Reclamation</u>			
	Snake River Area Manager		
<u>Concessionaires</u>			
	Signal Mountain Lodge		
	Leek's Marina		
	Colter Bay Village		
<u>Stakeholders</u>			
	Teton County Conservation District		
	WYDOT	Jackson Office	
	Wyoming Highway Patrol	Jackson Office	
	Teton County Sheriff		
	Jackson Hole Police Department		

APPENDIX B: BUDGETS ASSOCIATED WITH EACH STATUS LEVEL

SHORT-TERM SUSPECT STATUS

Travel	Description	# of Days	Cost/Day	Total Cost
	Camp Groceries (person days)	250	\$24	\$6,000
	Subtotal			\$6,000
Supplies	Description	Number	Cost	Total Cost
	Decon Unit Rental	3	\$8,400	\$25,200
	News releases, outreach materials	1	\$10,000	\$10,000
	Check station and boat ramp signage	1	\$2,500	\$2,500
	Subtotal			\$37,700
	Total			\$43,700

LONG-TERM SUSPECT STATUS

Budget Table Year 1 (High Level Response):

Personnel	Description	# of Months	Cost/Month	Total Cost
	Biologist I	8	\$4,543	\$36,344
	Technician 1	5	\$2,863	\$14,315
	Technician 2	5	\$2,863	\$14,315
	Technician 3	5	\$2,863	\$14,315
	Technician 4	5	\$2,863	\$14,315
	Technician 5	5	\$2,863	\$14,315
	Technician 6	5	\$2,863	\$14,315
	Technician 7	5	\$2,863	\$14,315
	Technician 8	5	\$2,863	\$14,315
	Technician 9	3	\$2,863	\$8,589
	Technician 10	3	\$2,863	\$8,589
	Technician 11	3	\$2,863	\$8,589
	Subtotal			\$176,631
Vehicle	Description	# of Months	Cost/Month	Total Cost
	State Motor Pool 1/2 ton pickup truck	5	\$960	\$4,800
	State Motor Pool 1/2 ton pickup truck	5	\$960	\$4,800
	Purchase 3/4 ton pickup	1	\$33,000	\$33,000
	Subtotal			\$42,600
Travel	Description	# of Days	Cost/Day	Total Cost
	Camp Groceries (person days)	1782	\$24	\$42,768
	Subtotal			\$42,768
Supplies	Description	Number	Cost	Total Cost
	Decontamination Unit (mobile)	4	\$12,500	\$50,000
	2"x100ft hose (filling decon unit)	2	\$150	\$300
	10k lb capacity 16' utility trailer	1	\$4,500	\$4,500
	550 gal plastic ag tank	2	\$450	\$900
	2" Trash Pump	1	\$300	\$300
	Mobile light tower trailer	2	\$6,500	\$13,000
	Camper Trailers	2	\$20,000	\$40,000
	Office Trailers	2	\$20,000	\$40,000
	Subtotal			\$149,000
	Total			\$410,999

Budget Table Years 2 or 3 (Lower Level Response):

Personnel	Description	# of Months	Cost/Month	Total Cost
	Biologist I	8	\$4,543	\$36,344
	Technician 1	5	\$2,863	\$14,315
	Technician 2	5	\$2,863	\$14,315
	Technician 3	5	\$2,863	\$14,315
	Technician 4	5	\$2,863	\$14,315
	Technician 5	5	\$2,863	\$14,315
	Technician 6	5	\$2,863	\$14,315
	Technician 7	5	\$2,863	\$14,315
	Subtotal			\$107,919
Vehicle	Description	# of Months	Cost/Month	Total Cost
	State Motor Pool 1/2 ton pickup truck	5	\$960	\$4,800
	State Motor Pool 1/2 ton pickup truck	5	\$960	\$4,800
	Subtotal			\$9,600
Travel	Description	# of Days	Cost/Day	Total Cost
	Camp Groceries	1,224	\$24	\$29,376
	Subtotal			\$29,376
	Total			\$146,895

POSITIVE STATUS

Personnel	Description	# of Months	Cost/Month	Total Cost
	Biologist I	8	\$4,543	\$36,344
	Technician 1	5	\$2,863	\$14,315
	Technician 2	5	\$2,863	\$14,315
	Technician 3	5	\$2,863	\$14,315
	Technician 4	5	\$2,863	\$14,315
	Technician 5	5	\$2,863	\$14,315
	Technician 6	5	\$2,863	\$14,315
	Technician 7	5	\$2,863	\$14,315
	Technician 8	5	\$2,863	\$14,315
	Technician 9	3	\$2,863	\$8,589
	Technician 10	3	\$2,863	\$8,589
	Technician 11	3	\$2,863	\$8,589
	Subtotal			\$176,631
Vehicle	Description	# of Months	Cost/Month	Total Cost
	State Motor Pool 1/2 ton pickup truck	5	\$960	\$4,800
	State Motor Pool 1/2 ton pickup truck	5	\$960	\$4,800
	Purchase 3/4 ton pickup ^a	1	\$33,000	\$33,000
	Subtotal			\$42,600
Travel	Description	# of Days	Cost/Day	Total Cost
	Camp Groceries (person days)	1,782	\$24	\$42,768
	Subtotal			\$42,768
Supplies	Description	Number	Cost	Total Cost
	Decontamination Unit (mobile) ^b	6	\$12,500	\$75,000
	2"x100ft hose (for filling decon unit) ^a	2	\$150	\$300
	10k lb capacity 16' utility trailer ^a	1	\$4,500	\$4,500
	550 gal plastic ag tank ^a	2	\$450	\$900
	2" Trash Pump ^a	1	\$300	\$300
	Mobile light tower trailer ^a	2	\$6,500	\$13,000
	Camper Trailers ^a	2	\$20,000	\$40,000
	Office Trailers ^a	2	\$20,000	\$40,000
	Subtotal			\$174,000
	Total			\$435,999

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

^b Will only need to purchase two units if transitioning from Long-term Suspect Status.

INFESTED STATUS

Personnel	Description	# of Months	Cost/Month	Total Cost
	Biologist I	8	\$4,543	\$36,344
	Technician 1	5	\$2,863	\$14,315
	Technician 2	5	\$2,863	\$14,315
	Technician 3	5	\$2,863	\$14,315
	Technician 4	5	\$2,863	\$14,315
	Technician 5	5	\$2,863	\$14,315
	Technician 6	5	\$2,863	\$14,315
	Technician 7	5	\$2,863	\$14,315
	Technician 8	5	\$2,863	\$14,315
	Technician 9	3	\$2,863	\$8,589
	Technician 10	3	\$2,863	\$8,589
	Technician 11	3	\$2,863	\$8,589
	Subtotal			\$176,631
Vehicle	Description	# of Months	Cost/Month	Total Cost
	State Motor Pool 1/2 ton pickup truck	5	\$960	\$4,800
	State Motor Pool 1/2 ton pickup truck	5	\$960	\$4,800
	Purchase 3/4 ton pickup ^a	1	\$33,000	\$33,000
	Subtotal			\$42,600
Travel	Description	# of Days	Cost/Day	Total Cost
	Camp Groceries (person days)	1782	\$24	\$42,768
	Subtotal			\$42,768
Supplies	Description	Number	Cost	Total Cost
	Decontamination Unit (mobile) ^b	6	\$12,500	\$75,000
	2"x100ft hose (filling decon unit) ^a	2	\$150	\$300
	10k lb capacity 16' utility trailer ^a	1	\$4,500	\$4,500
	550 gal plastic ag tank ^a	2	\$450	\$900
	2" Trash Pump ^a	1	\$300	\$300
	Mobile light tower trailer ^a	2	\$6,500	\$13,000
	Camper Trailers ^a	2	\$20,000	\$40,000
	Office Trailers ^a	2	\$20,000	\$40,000
	Subtotal			\$174,000
Other	Description		Cost	Total Cost
	Parking lot enlargement/paving			?
	Subtotal			?
	Total			\$435,999

^a Will not need to be purchased if transitioning from Long-term Suspect or Positive status.

^b Will only need to purchase two units if transitioning from Long-term Suspect or Positive status.