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

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SUMMARY

The Viva Naughton Dam is located on the Hams Fork approximately 15 miles north of Kemmerer, Wyoming (Figure 1). The dam and reservoir are owned and operated by PacifiCorp. The reservoir is nearly 3 miles long with an average width of approximately 0.7 miles. It is located in a gently sloping valley with sagebrush, rabbit brush, greasewood and grasses. The public has access to several parking areas, three boat ramps, restrooms and the entire shoreline (except for the face of the dam).

At an elevation over 7,000 feet, the boating season on Viva Naughton Reservoir is typically May through November. The majority of boating activity on the reservoir (84%) occurs during June through August with peak use in July. Boating in May and after Labor Day weekend is light, with less than 10% of boaters launching during each period. The majority of boaters that use the reservoir are anglers. Sixty-two percent of the boaters in 2018 and 2019 were Wyoming residents, 34% were from Utah, and 4% were from other states. Over 700 boats were inspected on their way to Viva Naughton Reservoir during this same time period.

If Viva Naughton Reservoir becomes suspect for dreissenid mussels, the initial response will be to close the ramp on Dempsey Points and close shore launching to consolidate watercraft on the two east side ramps. During this initial six week period the goal will be to minimize the risk of spreading mussels to other waters. Green River Regional personnel will set up and operate one AIS check station between the two east-side boat ramps. They will conduct exit inspections, and decontaminations when necessary, and will educate the public about the issue and prevention methods. Depending on the season, it will take six to 10 employees working 40 hour per week to fully staff the check stations daily from sunrise to one hour after sunset.

An AIS crew lead and inspectors will be hired to operate the check station during the long term response. The check station will be operated daily from May 1 through October 30. The reservoir will be closed to watercraft from November 1 through April 30. Depending on the season, six to 10 inspectors will be needed to staff the check station. Operations of the check station will be overseen by one 8-month contract biologist.

The budget for the first year of a long-term response in Wyoming will be approximately $300 thousand to put equipment, supplies and personnel in place. The more expensive equipment items will include a vehicle, decontamination units, campers and an office trailer. Thousands of gallons of water will need to be hauled and stored at the check station for decontaminating watercraft. Upon reaching positive status, it will be more economical to drill a water well to provide water for decontamination. The first year of Suspect and Positive status will cost $278,000 and $381,000, respectively, and annual operating expenses thereafter will be approximately $175,000. The first year of Infested Status will cost $557,000. Annual operating expenses thereafter will be approximately $245,000.

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 area 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 Viva Naughton 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 DREISSENID 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

The Viva Naughton Dam is located on the Hams Fork in Section 14, Township 23 North, Range 117 West, approximately 15 miles north of Kemmerer, Wyoming (Figure 1). The dam and reservoir are owned and operated by PacifiCorp. The primary purpose of the dam is to store water for supply to the PacifiCorp steam generation plant south of Kemmerer. Water is pumped to the plant by a station located roughly 10 miles downstream from the dam. The reservoir also provides water to meet downstream irrigation rights and to satisfy the municipal water supply of Kemmerer. A list of key contacts can be found in Appendix A.

FIGURE 1. Location of Viva Naughton and Kemmerer City reservoirs north of the City of Kemmerer.

Viva Naughton Reservoir is nearly 3 miles long with an average width of approximately 0.7 miles. When full, the reservoir elevation is 7,241.7 feet, has a surface area of 1,409 acres and stores nearly 44,732 acre-feet of water. At normal full pool, maximum depth is 60 feet and there is just over 10 miles of shoreline. Public parking and restrooms are found at three locations on the east side of the reservoir (Figure 2). There is also a parking area on the northwest side of the reservoir near Dempsey point. Anglers can access the entire shoreline (except for the face of the dam) from the parking areas. Two public boat ramps exist on the east side of the reservoir and an additional boat ramp is located on the west side near Dempsey Point. Given the limited number of access points and slope of the shoreline around the reservoir shore launching is rare.

FIGURE 2. Viva Naughton Reservoir showing the locations of public boat ramps.

Viva Naughton Reservoir is located in a gently sloping valley with sagebrush, rabbit brush, greasewood and grasses. Sparse willow and aspen also occur. The reservoir is re-charged via the Hams Fork entering from the north. Viva Naughton is classified as moderately eutrophic (U.S. EPA 1977) and little thermal stratification occurs because of wind turbulence. The mean water exchange rate in Viva Naughton is 170 days, but during spring runoff, water flushes more rapidly through the reservoir, decreasing water retention to 12 - 15 days (King 1975). Past memos and personal communication (Fowden 1996) have indicated that during flushing events, large amounts of water, fish and zooplankton exit the reservoir. Viva Naughton Reservoir experiences mid to late summer submerged aquatic vegetation blooms that hinder fishing from the shoreline.

At an elevation over 7,000 feet, the boating season on Viva Naughton Reservoir is typically May through November. Most years' ice melts off the reservoir in middle to late April and ice starts forming in middle to late November. The majority of the boating activity on the reservoir (84%) occurs during June through August with peak use in July. Boating in May and after Labor Day weekend is light, with less than 10% of boaters launching during each period.

The majority of boaters that use Viva Naughton Reservoir are anglers. Sixty-two percent of the boaters in 2018 and 2019 were Wyoming residents, 34% were from Utah, 2% were from Idaho and less than 1% each were from Montana, Nevada or Nebraska. Of the boats that use the reservoir, 79% are motorized and 21% are non-motorized. The vast majority of motorized boats are outboards (62%), with less than 2% (combined) being higher risk boats such as inboards and PWC.

During the 2018 and 2019 boating season, 713 boats were inspected on their way to Viva Naughton Reservoir. Of these boats, only 2% received a high-risk inspection and only one boat was decontaminated. Three of the boats (< 0.4%) were last used on an infested water, likely Lake Powell. A review of the inspection data from 2010 through 2019 suggests the use of high-risk boat such as wakeboard boats on the reservoir is low. During that time period only three wakeboard boats were documented heading to the reservoir.

RAPID RESPONSE – SHORT-TERM SUSPECT STATUS

In the event that a sample from Viva Naughton 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 and motors. All watercraft leaving Viva Naughton 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 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 will be prepared so personnel can be hired and equipment can be purchased as quickly as possible once follow-up results are available.

Communication Plan

Upon the initial detection of dreissenid mussels, WGFD's AIS Coordinator will begin the administrative communication chain outlined in the WGFD AIS Administrative Rapid Response Plan (WGFD 2020). Initial contacts in the administrative communication chain include the AIS Coordinator contacting the Communications Director, the Regional Fisheries Supervisor, and the Fish Division Chief, who contacts the WGFD Director. On the regional level, the Green River Regional Fisheries Supervisor will begin the regional communication chain to disseminate information about the detection to internal and external partners and stakeholders (Figure 3). Internal WGFD contacts include Regional Fish Division personnel, the Regional Wildlife

Supervisor, the Regional Habitat and Access Supervisor and the Regional I&E Specialist. The Regional Wildlife Supervisor will then contact the Kemmerer and Cokeville game wardens as well as local Wildlife and Terrestrial Habitat biologists. The Regional Habitat and Access Supervisor will contact appropriate Habitat and Access biologists.

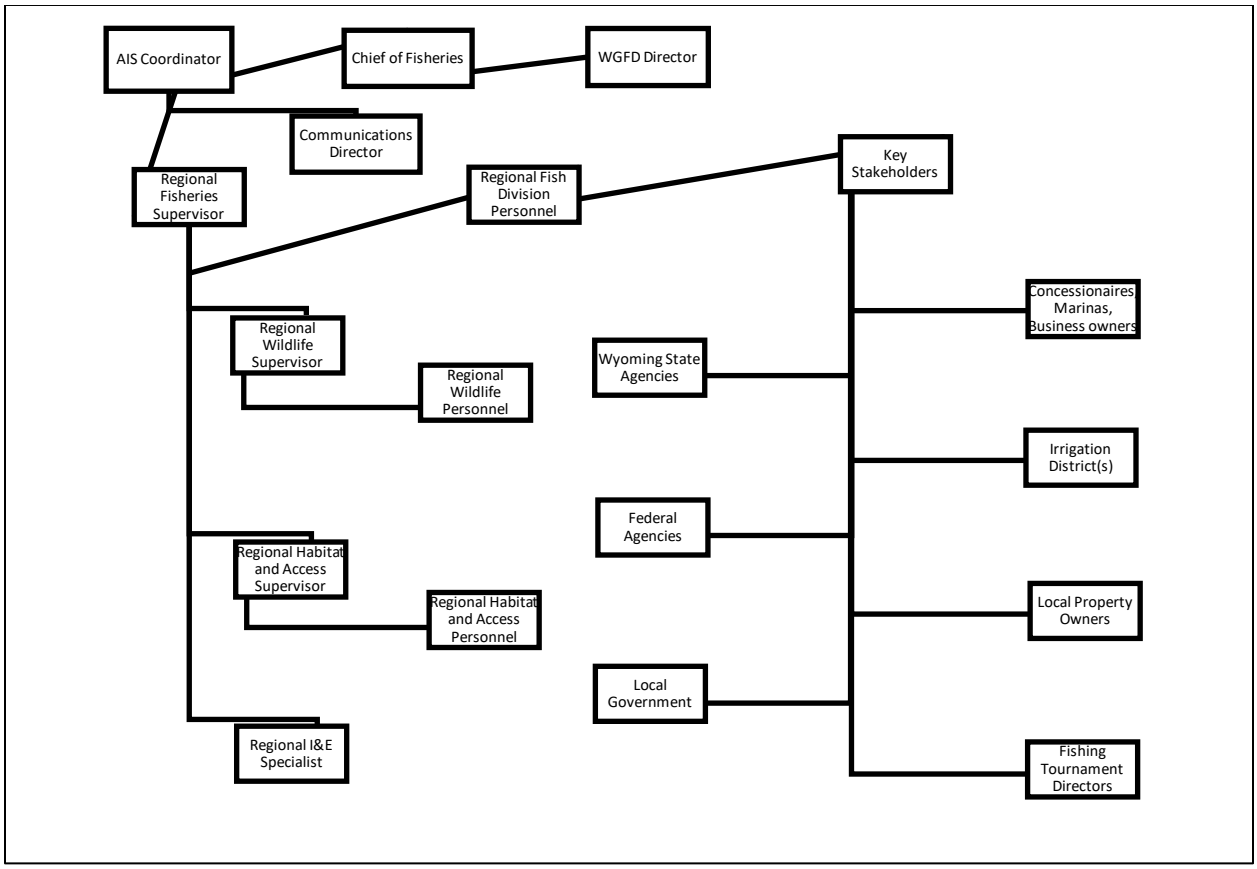

FIGURE 3. Communication chain for dissemination of information on the local and regional level following a dreissenid mussel detection in a Wyoming water.

The Green River Regional Fisheries Supervisor or biologists will also contact key stakeholders, including the PacifiCorp Managing Director of the Naughton Power Plant, Director of the Kemmerer/Diamondville Joint Powers Board, President of the Hams Fork Water Users and the Kemmerer City Administrator responsible for Kemmerer City Reservoir. Boater contacts made through the Wyoming AIS inspection stations will be used as a primary notification and education outlet during this time period. The AIS Coordinator will also contact and coordinate with WGFD communication personnel, including Regional I&E (see Public Outreach, below), and regional stakeholders (Western Regional Panel, federal partners, etc.).

Key information to convey to internal and external partners and stakeholders should include the name of the affected water, which species was collected, who collected the sample, where the sample was collected, which agency/expert analyzed the sample, any relevant information about the sample, who to contact for more information, a brief description of containment protocols that will be put in place, and any critical changes for the public. Every effort should be made to quickly contact all partners and stakeholders prior to beginning public

outreach efforts. The regional fisheries supervisor will attempt to make all contacts within 24 hours of detection and will contact the Communications Director once enough contacts have been made to initiate outreach efforts.

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

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

Launching will be consolidated by 1) prohibiting shore launching for all trailered and motorized watercraft and 2) closing the Dempsey Point boat ramp (Figure 4). Shore launching is limited on Viva Naughton Reservoir, but prohibiting shore launching is essential to the response plan. Closing the reservoir to shore launching and closing Dempsey Point boat ramp would be mutually agreed upon by PacifiCorp and the Wyoming Game and Fish Department. All access roads that lead to potential shore launching sites will be signed to make users aware of the closure (N=5; Figure 4). No seasonal closures are being considered at this time.

Figure 4. Location of roads that lead to potential shore launching sites on Viva Naughton Reservoir.

Check Station

Watercraft departing from Viva Naughton Reservoir will be inspected on the east side at a convenient AIS checkpoint. A single location will be designated for all inspections and will be between the two boating access areas on the east side of the reservoir (Figure 5). Signs will be placed at both ramps (north and south) to notify boaters that stopping at the check station is mandatory. The check station will be open from sunrise to ½ hour after sunset. Specific dates and hours of operation are referenced in Appendix B.

FIGURE 5. Location of Viva Naughton proposed AIS check station between the two boat ramps on the east side of the reservoir.

Staffing Plan

Inspectors will be stationed at the check station from approximately sunrise to ½ hour after sunset. During the summer solstice this will be from approximately 6:00 am to 9:30 pm. Depending on season and time of day, from one to three inspectors will be on duty at any given time. The number of inspectors needed during pre, peak and post-watercraft seasons are identified in Appendix B. These numbers will be adjusted depending on watercraft traffic expected during the Short-term Suspect Status period. The volume of boats departing the reservoir is expected to be greatest most days between 10 am and 3 pm. As such, inspector shifts will be structured so the number of inspectors at each ramp are maximized from mid-morning to mid-afternoon (Appendix B). Inspectors will each work 4 days on; ten hour shift at the boat ramp (excluding travel). Inspectors will stay in campers provided near the check station to reduce travel or commute at their own expense daily.

Check stations during Short-term Suspect Status will be staffed by regional WGFD personnel, including wardens, warden trainees, fish and wildlife management personnel and associated technicians and AIS rover inspectors. A total of six people will be needed per week during the peak season and four people per week during the off season. The 4-6 AIS "roving" personnel will be requested first. After that, requests will go out to other regional and staff level personnel.

Supplies and Equipment

The budget for Short-term Suspect can be found in Appendix C. Aluminum signs will be installed on all access roads (Figure 4) letting boaters know that: 1) exit inspection is required, 2) shore launching is prohibited, and 3) the Dempsey ramp is closed to launching. A request will be submitted for the signs to be installed by one or more of the WGFD Habitat and Access crews. We will need to seek permission from PacifiCorp for installation of signs on the land managed by them.

The check station will need equipment and supplies to complete exit inspections and decontaminations of standing water that cannot be drained, including motors and ballast tanks. A single decontamination unit will initially be required at the check station due to relatively low boating volume. In the event the primary unit fails, a secondary unit will be available in Kemmerer that is already in our current inventory.

Water for decontamination units will be hauled by Zueck Transportation and stored in a 21,000 gallon Frac-Tank rented from Rain for Rent. The cost of water hauled from Rock Springs to the check station include: $13 per 1,000 gallons of water and $140 an hour transportation cost. Costs for the Frac-Tank are listed as setup, delivery, weekly rental costs, and pickup (Appendix C). Zueck Transportation can haul 6,000 gallons of water per trip. During the Short-Term Suspect Status period, we estimate a need for 6,000 gallons of water at the Viva Naughton check station. Water from the Frac-Tank will fill the decontamination unit either by head pressure or with existing FMGR water pumps.

Two camper would be placed at or near the check station to provide shelter from inclement weather and housing for personnel during Short-term Suspect Status. The campers will either come from FMGR inventory or will be borrowed either from another crew or division. Camp groceries would be purchased for six employees during this six week period while they are camping (Appendix C).

To close the Dempsey Point boat ramp, a barrier will need to be erected to prohibit launching while allowing the public access to the area around the ramp for other uses. A steel cable and two metal posts will span the width of the ramp to prohibit launching (Appendix C). The cable will be raised 3 feet above the surface of the ramp which will prevent the ability of any watercraft to launch. A “ramp closed” sign will also be hung from the cable to notify boaters. Additionally, signs will need to be placed at Dempsey Point to remind boaters that shore launching is prohibited. A request will be made of the local game wardens to enforce the prohibition on shore launch, especially on Dempsey Point.

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 Green River Regional I&E Specialist to relay information about Short-term Suspect Status at Viva Naughton 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, Viva Naughton 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 this period is still to minimize the risk of spreading mussels to other waters. During the first year (from initial detection through the following boating season), we will need to provide capacity for all boaters coming off the water to efficiently obtain a required clean, drain, dry exit inspection, motor flush, and decontamination of ballast tanks and other undrainable areas. All watercraft leaving Viva Naughton 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 in years two and three to a lower level response, with a goal of contacting a significant number of boaters, but placing more responsibility on boaters to obtain 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 as these motor types are difficult to drain completely. 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 WGFD AIS Administrative Rapid Response Plan; WGFD 2020). In addition, the Green River Region internal communication chain outlined in the Short-term Suspect Status section (above) will continue to be utilized to inform key stakeholders (Appendix A) of follow-up sampling results.

Closures

Closure status will remain the same as outlined for Short Term Suspect Status. From this status moving forward, upon mutual agreement by PacifiCorp and the Wyoming Game and Fish Department Viva Naughton Reservoir would be closed to all watercraft from November 1 through April 30. This seasonal closure will restrict watercraft use to the period during which the AIS check station is operational. Refer to the closure section in the Short-term Suspect Status (above) for further details.

Check Station

Watercraft departing Viva Naughton Reservoir will be inspected at a single AIS check station as described in Short-term Suspect (Figure 5). The check station will be open for the period from May 1 through October 30. Signs will be placed at both ramps (north and south) to notify boaters that stopping at the check station is mandatory. Dates and hours of operation are referenced in Appendix B. Personnel and hours of operation are subject to change based on initial data collected during Short-term Suspect Status. A local boater program will not be necessary given the low volume of watercraft using Viva Naughton Reservoir and a relatively low rate of water fidelity.

Staffing Plan

One contract biologist (crew leads) will be hired April 1 to oversee operations of this check stations. The crew lead will be hired early so they can complete hiring paperwork, receive AIS training, and be prepared to help train the inspectors as they arrive later in the month. The crew leads will ensure equipment and supplies are ready for the check station to open May 1. The Green River AIS Specialist will train and supervise the crew leads. The crew leads' contracts will run from April 1 through November 30 (Appendix C). The inspector's contracts will run from April 15 through October 30.

Inspectors will be stationed at check station from approximately sunrise to ½ hour after sunset. During the summer solstice, this will be from approximately 6:00 AM to 9:30 PM. The number of inspectors needed during pre, peak and post-watercraft seasons are identified in Appendix B. These numbers will be adjusted depending on watercraft traffic encountered during Short-term Suspect Status. The volume of boats departing the reservoir is expected to be greatest most days between 10 AM and 3 PM. As such, inspector shifts will be structured so the number of inspectors at each ramp are maximized from mid-morning to mid-afternoon (Appendix B). Inspectors work station will be this AIS check station at Viva Naughton Reservoir. Inspectors will each work 4 days on; 10-hour shift at the boat ramp (excluding travel). Inspectors will stay in a camper provided near the check station to reduce travel. Year 1 may identify potential cost saving measures that can be implemented in years 2-3.

Supplies and Equipment

The budgets for Long-term Suspect Status year 1, and years 2, and 3 can be found in Appendix C. Aluminum signs installed on all access roads outlined in Short-term Suspect Status will remain in place to let boaters know that: 1) exit inspection is required, 2) shore launching is prohibited, and 3) the Dempsey Point ramp is closed to launching. All exit inspections and decontaminations will be consolidated at the single check station on the east side of Viva Naughton Reservoir as previously discussed.

Two decontamination units will be purchased; one primary and one secondary. In the event the primary and secondary units fail, a third unit will be available in Kemmerer that is already in our current inventory. Immediately upon confirmation of second sample dreissenids from this water, a 6,800 gal cone-bottom tank with a stand will be purchased and placed upslope of the check station so gravity flow can be used to fill the decon units. For details and costs pertaining to water hauling for decontamination units, refer to Short-term Suspect and Appendix C.

An office trailer and two camper will be supplied at the check station for use by AIS inspectors. A half ton motor pool pickup truck set up for towing will be secure for running errands and moving the decon units as necessary. Supplies such as inspection books, seals, and wire for seals were included in the year 1 budget table (Appendix C) to cover all years of Long-term Suspect Status as discounts are offered for purchasing these items in bulk. As mentioned previously, shore launching and the Dempsey Point boat ramp will remain closed during Long-term Suspect Status and the cable barrier outlined in Short-term Suspect Status will remain in place at the Dempsey Point ramp.

Public Outreach

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

RAPID RESPONSE – POSITIVE STATUS

Viva Naughton 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). Viva Naughton Reservoir will remain at Positive Status for five consecutive years of negative sample results, at which time it will be downgraded to Negative Status. Alternatively, if an established population of mussels is detected during that five years, it will be upgraded to Infested Status.

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

Communication Plan

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

Closures

Closures put into effect at Short-term and Long-term Suspect Status will remain in effect. These include prohibiting shore launching for all trailered and motorized watercraft and closure of the Dempsey Point boat ramp.

Check Station

As outlined in the Short and Long-term Suspect Status sections above, a single AIS check station will be located between the two boating access areas on the east side of the reservoir (Figure 5). No additional check stations will be necessary during Positive Status.

Staffing Plan

The staffing plan will be similar to the first year of Long-term Suspect Status outlined above. Refer to Appendix C (Positive Status) for personnel budget information.

Supplies and Equipment

Supplies and equipment will be similar to Long-term Suspect Status. The exceptions during Year 1 Positive Status will be the installation and operation of a water well, and electric service which are included in the supplemental budget. A concrete pad will also be poured at the decontamination location to facilitate decontamination of watercraft leaving the reservoir.

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 Green River Regional I&E Specialist to keep the local boating public aware of the threats and responsibilities associated with a Positive Status on Viva Naughton Reservoir.

RAPID RESPONSE – INFESTED STATUS

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

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

Communication Plan

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

Closures

In the event Viva Naughton is elevated to this status from a lower status, closures enacted during Short-term Suspect Status will remain in effect.

In the event Viva Naughton Reservoir starts at Infested Status, with mutual agreement between PacifiCorp and the Wyoming Game and Fish Department, the reservoir will be closed to all watercraft for a 6 week period to allow the Department personnel time to gather appropriate resources. Following the 6 week closure, the closures described in the Short-term Suspect Status section would be enacted.

Check Station

As outlined in the Long-term Suspect Status section above, a single AIS check station will be located between the two boating access areas on the east side of the reservoir (Figure 5).

In the event Viva Naughton Reservoir is elevated to this status from Positive Status, a water well and concrete pad will already be in place. In the event Viva Naughton Reservoir starts at Infested Status, a water well would need to be drilled and made operational. Water for decontaminations during year one Infested Status will be supplied by a Frac-Tank and water hauling as described in Short-term Suspect Status. A well should be operational by year two Infested Status. In addition a concrete pad for conducting decontamination will need to be poured.

Staffing Plan

The staffing plan for Infested Status will be similar to Long-Term Suspect Status. The number of inspectors needed during pre, peak and post-watercraft seasons will increase in reflection of the time and effort associated completing full decontaminations of all watercraft leaving the reservoir. Two additional inspectors for pre and post season and four additional inspectors for peak season will be added to the crew at Infested Status. Refer to Appendix C (Infested Status) for personnel budget information and Appendix B (Infested Status) for the inspector staffing plan during pre, peak and post-watercraft seasons.

Supplies and Equipment

In the event Viva Naughton is elevated to Infested Status from a lower status the supplies and equipment necessary to operate the station will already have been acquired (Appendix C).

In the event Viva Naughton Reservoir starts at Infested Status, the supplies and equipment identified in the Short Term Suspect Status, Long Term Suspect Status and the

Positive Status budgets will need to be acquired. Additionally sign #4 will need to be installed to inform boaters that mandatory decontamination is required of all watercraft leaving the reservoir.

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 Green River Regional I&E Specialist to keep the local boating public aware of the threats and responsibilities associated with Infested Status on Viva Naughton Reservoir.

REFERENCES

King, K.W. 1975. Food and Feeding Habits of Rainbow Trout, *Salmo gairdneri*, in Viva Naughton Reservoir, Lincoln County, Wyoming. Master's Thesis, University of South Dakota, Vermillion.

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
Wyoming Game & Fish Department			
Josh Leonard	Aquatic Invasive Species Coordinator	307-721-1374	joshua.leonard@wyo.gov
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John Walrath	Green River Region Fisheries Biologist	307-875-3223	john.walrath@wyo.gov
Cody Schoonover	Cokeville Game Warden	307-679-4067	cody.schoonover@wyo.gov
Chris Baird	Kemmerer Game Warden	307-746-2248	chris.baird@wyo.gov
Miles Anderson	Habitat Access Supervisor - Pinedale	307-367-4353	miles.anderson@wyo.gov
NA	Information & Education Specialist	307-875-3225x224	
PacifiCorp			
Rodger Holt	Managing Director–Naughton Power Plant	307-828-4275	rodger.holt@pacificorp.com
Concessionaires			
NA			
Stakeholders			
Brian Muir	City of Kemmerer Administrators	307-828-4061	bmuir@kemmerer.org
Marcus Rosas	Kemmerer-Diamondville Water and Wastewater Joint Powers Board	307-877-3803	kdwatertp@outlook.com
Don Lamborn	President - Hams Fork Water Users	307-727-8090	hatranch@wildblue.net

APPENDIX B: CHECK STATION SHIFTS: SHORT-TERM THROUGH POSITIVE STATUS

Short-term Suspect, Long-term Suspect and Positive Status. Number of inspectors conducting boat inspections and educating watercraft owners at the exit inspection station during pre-watercraft season (May 1-30), peak-watercraft season (June 1 thru September 15) and post-watercraft season (September 16 to October 30) on Viva Naughton Reservoir. Hours worked each shift are based on the longest day during each season: **pre-watercraft season** opening shift is from 6:30 AM to 4:30 PM, and closing shift is from 11:30 AM to 9:30 PM, **peak-watercraft season** opening shift is from 6:30 AM to 4:30 PM, mid-day shift is from 10:30 AM to 8:30 PM and closing shift is from 11:30 AM to 9:30 PM, **post-watercraft** season opening shift is from 6:30 AM to 4:30 PM, and closing shift is from 11:30 AM to 9:30 PM).

	Monday thru Wednesday, Saturday			**Thursday thru Sunday**			
	Number inspectors per shift per day			**Number inspectors per shift**			**Number**
Viva Naughton check station	**Opening shift**	**Mid-day shift**	**Closing shift**	**Opening shift**	**Mid-shift**	**Closing shift**	**Inspectors Per Week**
Pre-watercraft season	1	0	1	1	0	1	**4**
Peak-watercraft season	1	1	1	1	1	1	**6**
Post-watercraft season	1	0	1	1	0	1	**4**

Infested Status. Number of inspectors conducting boat inspections and educating watercraft owners at the exit inspection station during pre-watercraft season (May 1-30), peak-watercraft season (June 1 thru September 15) and post-watercraft season (September 16 to October 30) on Viva Naughton Reservoir. Hours worked each shift are based on the longest day during each season: **pre-watercraft season** opening shift is from 6:30 AM to 4:30 PM, and closing shift is from 11:30 AM to 9:30 PM, **peak-watercraft season** opening shift is from 6:30 AM to 4:30 PM, mid-day shift is from 10:30 AM to 8:30 PM and closing shift is from 11:30 AM to 9:30 PM, **post-watercraft** season opening shift is from 6:30 AM to 4:30 PM, and closing shift is from 11:30 AM to 9:30 PM).

	Monday thru Wednesday, Saturday			**Thursday thru Sunday**			
	Number inspectors per shift per day			**Number inspectors per shift**			**Number**
Viva Naughton check station	**Opening shift**	**Mid-day shift**	**Closing shift**	**Opening shift**	**Mid-shift**	**Closing shift**	**Inspectors Per Week**
Pre-watercraft season	1	1	1	1	1	1	**6**
Peak-watercraft season	2	1	2	2	1	2	**10**
Post-watercraft season	1	1	1	1	1	1	**6**

APPENDIX C: ANNUAL BUDGETS ASSOCIATED WITH EACH STATUS LEVEL

SHORT-TERM SUSPECT STATUS

Travel	Description	# of Days	Cost/Day	Total Cost
	Camp Groceries (person days)	252	$24	$6,048
	Subtotal			**$6,048**
Supplies	**Description**	**# of units**	**Cost/unit**	**Total Cost**
	Check station signs #1-3	12	$100	$1,200
	Post and Hardware for signs	11	$18	$198
	Decon Unit rental per week	6	$1,400	$8,400
	Frac-Tank Setup	1	$837	$837
	Frac-Tank Delivery	1	$4,115	$4,115
	Frac-Tank Rental per week	6	$597	$3,582
	Frac-Tank Pick-up	1	$4,115	$4,115
	Water hauling (6,000 gal)	1	$3,488	$3,488
	Gas (generator, etc./month)	6	$150	$900
	propane	1.5	$15	$23
	Traffic cones	5	$20	$100
	Misc supplies and repairs-cost/week	6	$50	$300
	Inspection books	30	$2	$60
	Seals	200	$0.03	$5
	Wire for seals	200	$0.03	$5
	3/4 inch cable (30 ft)	1	$100	$100
	Metal post	2	$60	$120
	Misc supplies 231 - 239 series			$5,000
	Subtotal			**$32,548**
	Total			**$38,596**

LONG-TERM SUSPECT STATUS YEAR 1

Personnel	Description	# of Months	Cost/Month	Total Cost
	Biologist I, 8 months	8	$4,543	$36,344
	Technician, 6.5 months x 4	26	$2,863	$74,438
	Technician, 4 months x 2	8	$2,863	$22,904
	Outside help for busy times	1	$4,553	$4,553
	Subtotal			**$138,239**
Vehicle	**Description**	**# of Months**	**Cost/Month**	**Total Cost**
	State Motor Pool Truck 1	8	$960	$7,680
	Subtotal			**$7,680**
Travel	**Description**	**# of Days**	**Cost/Day**	**Total Cost**
	Camp groceries	544	$24	$13,056
	Per Diem for outside help	30	$157	$4,710
	Subtotal			**$17,766**
Supplies	**Description**	**# of Units**	**Cost/Unit**	**Total Cost**
	Office Trailer	1	$20,000	$20,000
	Generator 2-pack with parallel	2	$1,900	$3,800
	Decon Unit with attachments	2	$12,500	$25,000
	6900 gal cone bottom tank w/ stand	1	$8,200	$8,200
	Water Hauling (6,000 gal)	2.5	$3,488	$8,720
	Water Pump (at least 98 GMP)	2	$700	$1,400
	Camp Trailer	2	$20,000	$40,000
	Fuel (Decon Unit, Generators, ect.)	6	$200	$1,200
	Propane for campers	6	$15	$90
	Inspection books	300	$2	$600
	Seals	500	$0.03	$13
	Wire for seals	500	$0.03	$13
	Misc supplies 231 - 239 series			$5,000
	Subtotal			**$114,036**
	Total			**$277,721**

LONG TERM SUSPECT STATUS YEARS 2-3

Personnel	Description	# of Months	Cost/Month	Total Cost
	Biologist 1, 8 months	8	$4,543	$36,344
	Technician, 6.5 months x 4	26	$2,863	$74,438
	Technician, 4 months x 2	8	$2,863	$22,904
	Outside help for busy times	1	$4,553	$4,553
	Subtotal			**$138,239**
Vehicle	**Description**	**# of Months**	**Cost/Month**	**Total Cost**
	State Motor Pool Truck 1	8	$960	$7,680
	Subtotal			**$7,680**
Travel	**Description**	**# of Days**	**Cost/Day**	**Total Cost**
	Camp Groceries (person days)	544	$24	$13,056
	Per Diem	30	$157	$4,710
	Subtotal			**$17,766**
Supplies	**Description**	**# of units**	**Cost/unit**	**Total Cost**
	Water Hauling (6,000 gal)	2.5	$3,488	$8,720
	Fuel (Decon Unit, Generators, etc.)	6	$200	$1,200
	Propane for camper	6	$15	$90
	misc supplies 231-239			$2,500
	Subtotal			**$12,510**
	TOTAL			**$176,195**

POSITIVE STATUS

Personnel	Description	# of Months	Cost/Month	Total Cost
	Biologist 1, 8 months	8	$4,543	$36,344
	Technician, 6.5 months x 4	26	$2,863	$74,438
	Technician, 4 months x 2	8	$2,863	$22,904
	Outside help for busy times	1	$4,553	$4,553
	Subtotal			**$138,239**
Vehicle	**Description**	**# of Months**	**Cost/Month**	**Total Cost**
	Purhcase 3/4 ton pickup	1	$33,000	$33,000
	State Motor Pool Truck 1[b]	8	$960	$7,680
	Subtotal			**$40,680**
Travel	**Description**	**# of Days**	**Cost/Day**	**Total Cost**
	Camp Groceries	544	$24	$13,056
	Per Diem for outside help	30	$157	$4,710
	Subtotal			**$17,766**
Supplies	**Description**	**# of Units**	**Cost/Unit**	**Total Cost**
	Well at Viva Naughton check station	1	$15,000	$15,000
	Well pump/installation	1	$5,000	$5,000
	Electic service to Check station	1	$25,000	$25,000
	Concrete pad (per yard)	40	$350	$14,000
	Office Trailer[a]	1	$20,000	$20,000
	Generator 2-pack with parallel[a]	2	$1,900	$3,800
	Decon Unit with attachments[a]	2	$12,500	$25,000
	6900 gal cone bottom tank/ stand[a]	1	$8,200	$8,200
	Water Hauling[b]	4	$3,488	$13,952
	Water Pump (at least 98 GMP)[a]	2	$700	$1,400
	Camp Trailer[a]	2	$20,000	$40,000
	Fuel (Decon Unit, Generators, ect.)	6	$200	$1,200
	Inspection books[a]	300	$2	$600
	Seals[a]	500	$0.03	$13
	Wire for seals[a]	500	$0.03	$13
	Misc supplies 231 - 239 series			$5,000
	Subtotal			**$178,178**
Utilities	**Description**	**# of Units**	**Cost/Unit**	**Total Cost**
	Power Hookup	1	$4,000	$4,000
	Monthly electric bill	8	$250	$2,000
	Subtotal			**$6,000**
	Total			**$380,863**

[a] These items will not need to be purchased if transitioning from Long-term Suspect Status.
[b] These items will be needed until replacement items can be acquired, likely at the start of Year 2 Positive.

INFESTED STATUS

Personnel	Description	# of Months	Cost/Month	Total Cost
	Biologist I, 8 months	8	$4,543	$36,344
	Technician, 6.5 months x 6	39	$2,863	$111,657
	Technician, 4 months x 4	16	$2,863	$45,808
	Outside help for busy times	2	$4,553	$9,106
	Subtotal			**$202,915**
Vehicle	**Description**	**# of Months**	**Cost/Month**	**Total Cost**
	Purchase 3/4 ton pickup[a]	1	$33,000	$33,000
	State Motor Pool Truck 1[b]	8	$960	$7,680
	Subtotal			**$40,680**
Travel	**Description**	**# of Days**	**Cost/Day**	**Total Cost**
	Camp Groceries	880	$24	$21,120
	Per Diem for outside help	30	$157	$4,710
	Subtotal			**$25,830**
Supplies	**Description**	**# of Units**	**Cost/Unit**	**Total Cost**
	Well at Viva Naughton check station[a]	1	$15,000	$15,000
	Well pump/installation[a]	1	$5,000	$5,000
	Electric service to check station[a]	1	$25,000	$25,000
	Concrete pad (per yard)[a]	40	$350	$14,000
	Office Trailer[a]	1	$20,000	$20,000
	Generator 2-pack with parallel[a]	2	$1,900	$3,800
	Decon Unit with attachments[a]	2	$12,500	$25,000
	6900 gal cone bottom tank w/ stand[a]	1	$8,200	$8,200
	Water Hauling (6000 gal)[b]	3.5	$3,488	$12,208
	Water Pump (at least 98 GMP)[a]	2	$700	$1,400
	Camp Trailer[a]	2	$20,000	$40,000
	Fuel (Decon Unit, Generators, ect.)	6	$200	$1,200
	Inspection books[a]	300	$2	$600
	Seals[a]	500	$0.03	$13
	Wire for seals[a]	500	$0.03	$13
	Check Station signs #1-3[a]	9	$100	$900
	Check Station sign #4	3	$100	$300
	Water Well	2	$50,000	$100,000
	Misc supplies 231 - 239 series			$5,000
	Subtotal			**$277,634**
Utilities	**Description**	**# of Units**	**Cost/Unit**	**Total Cost**
	Power Hookup[a]	2	$4,000	$8,000
	Monthly electric bill	8	$250	$2,000
	Subtotal			**$10,000**
	Total			**$557,059**

[a] Will not need to be purchased if transitioning from Suspect or Positive status.

[b] These items will be needed until replacement items can be acquired, likely at the start of Year 2 Infested.