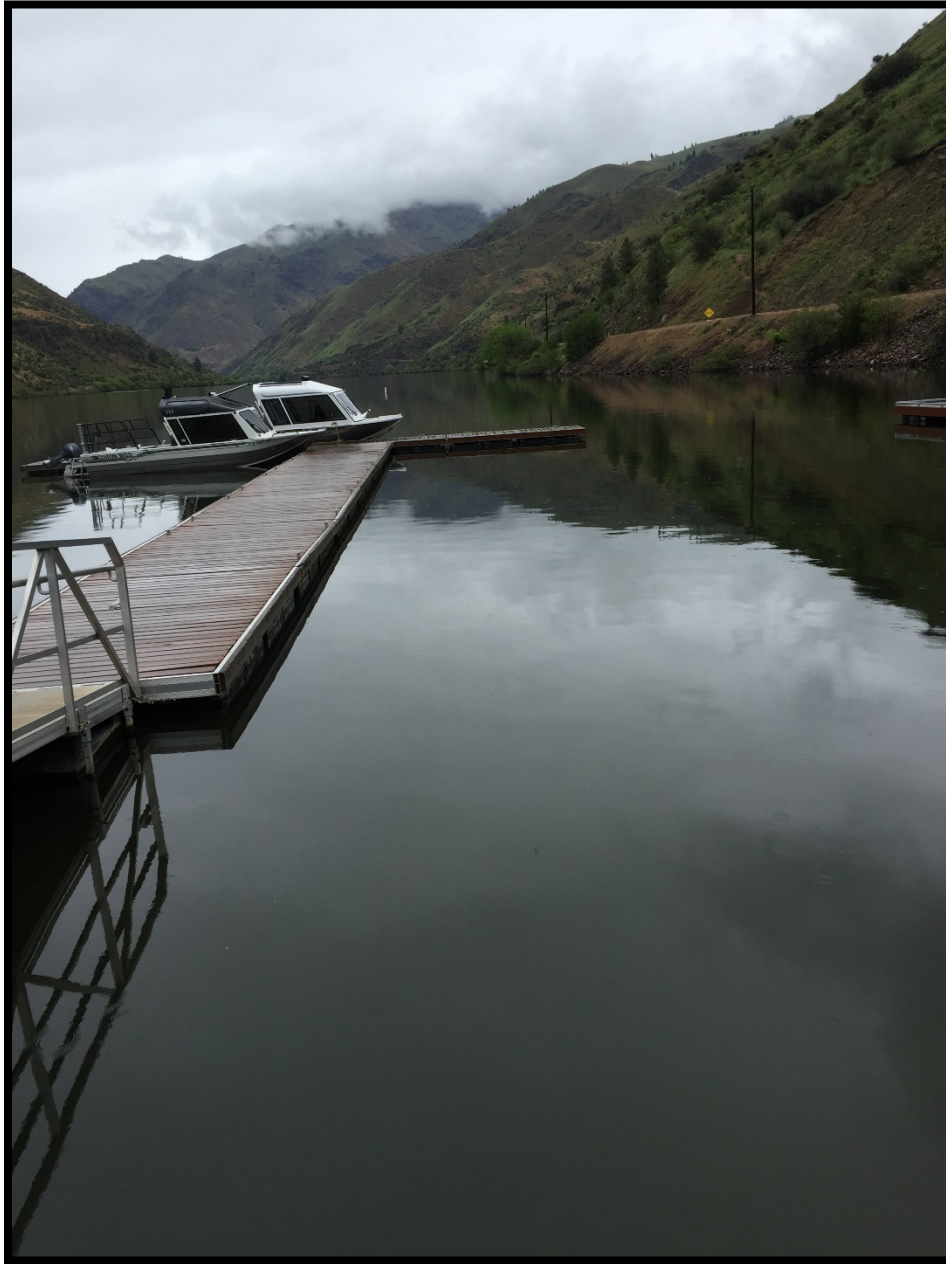

HELLS CANYON DREISSENID RAPID RESPONSE EXERCISE SUMMARY

Copperfield, Idaho
May 20 and 21, 2019



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This exercise was supported by:



The Hells Canyon Dreissenid Rapid Response Exercise was a collaborative event designed to explore actual actions should Idaho Department of Agriculture, Oregon Fish and Game and Idaho Power be faced with a dreissenid discovery. A small group of stakeholders gathered to discuss how best to approach the application of chemicals in an eradication situation. The scenario was guided by the hypothetical discovery of veligers and adult dreissenid mussels at Hells Canyon Park boat launch on the Snake River. The focus of the exercise included actions in a hypothetical timeline that included temporary boat ramp and site closures prior to a busy recreational boating Memorial Day weekend, and discussions on a possible chemical treatment of a 1-acre area surrounding the area of discovery. The following is a summary of discussions and recommendations made during the exercise. The exercise further helps agencies and stakeholders with next steps to be pursued for response preparedness.

Attended by:

- Lloyd Knight – ID Department of Agriculture
- Nic Zurfluh – ID Department of Agriculture
- Stephen Phillips – Pacific States Marine Fisheries Commission
- Glenn Dolphin – Oregon State Marine Board
- Rick Boatner – Oregon Department of Fish and Wildlife
- Grant Jackson - Oregon Department of Agriculture
- Mike Stephenson – Idaho Power
- Dain Bates – Idaho Power
- Theresa Thom – US Fish and Wildlife Service
- Sean Sweeney – US Fish and Wildlife Service
- Brad Defrees - National Marine Fisheries Service
- Leah Elwell – Invasive Species Action Network
- Brad Bolland – Idaho Power (Communications)
- Lon Van Wyke – Idaho Power (Communications)



FIGURE 1 LLOYD KNIGHT, IDAHO DEPARTMENT OF AGRICULTURE DESCRIBING PREVENTION TECHNIQUES TO BE DEPLOYED IN A RESPONSE.

BACKGROUND FOR ID RAPID RESPONSE

Idaho has a rapid response framework for dreissenid mussels that is updated periodically and in 2008 ID partners conducted a rapid response exercise in Boise. ID Department of Agriculture (IDA) implements a prevention and early detection program for mussels and other invasive species. Idaho has focused on implementing a decision tree for notification of an invasive mussel detection. ID statute allows IDA to access up to \$5

million of emergency funding to address invasive mussels.

EXERCISE SCENARIO¹

Scenario Location: Snake River at Hells Canyon Complex which is regulated by multiple dams operated by Idaho Power. The Snake River serves as the state boundary between Oregon and Idaho in this area.

Primary Managing Entities: ID Department of Agriculture (IDA), Oregon Fish and Wildlife, and Idaho Power. Idaho Power manages hydropower infrastructure in the area, including Brownlee and Hells Canyon dams. The USDA Forest Service, Wallowa-Whitman National Forest manages the land in the watershed. The Nez Perce Tribe is a key stakeholder on the Snake River.

Scenario Date: Early May sampling, mid-May sampling results and Memorial Day for response actions.

Scenario Mussel details: Veliger detection with routine sampling using microscopy and molecular methods and adult detection with follow up surveillance.

Recreation and access: This specific area of Hells Canyon is a popular fishing and boating area primarily for motorized boaters. There are multiple public access points on the Oregon and Idaho sides of the river for launching and many private docks.

Several supporting documents informed the scenario and exercise, including:

- Idaho State Department of Agriculture Idaho Waterways Survey: A Standard Operating Procedure for Aquatic Plants and Invasive Species (Varley et al., April 1, 2019) 28 pp.
- Idaho Rapid Response Plan for Early Detection of Dreissenid Mussels (A supplement of the Columbia River Basin Rapid Response Plan) Initially drafted 11/06/2009 and updated 10/21/2015. 5 pp.
- Idaho Administrative Code IDAPA 02.06.09 Idaho Department of Agriculture Rules Governing Invasive Species (IDAPA 02; Title 06; Chapter 09) 20 pp.
- The Idaho Invasive Species Act of 2008: Title 22 – Agriculture and Horticulture Chapter 19, 5 pp.
- Idaho Dreissenid Rapid Response Exercise 2019 Player’s Handbook (March 2019) 7 pp. (See Appendix A).

MONITORING AND INITIAL IDENTIFICATION

Hells Canyon Complex of the Snake River is part of a “critical” priority sampling location for ID, as outlined in the Idaho State Management Plan. During the summer season sampling is done every other week. See sampling regime below and Idaho sampling map (Appendix B).

NAME	Priority	Sample events	Samples to collect	Total Samples	Late June	Early July	Late July	Early Aug	Late Aug	Early Sept	Late Sept	Early Oct
Brownlee Reservoir	Critical	5	4	20	x	x	x				x	x
Hells Canyon Reservoir	Critical	5	4	20	x	x	x				x	x
Oxbow Res	Critical	5	4	20	x	x	x				x	x

IDA has a current contract with Aquaticus, LLC in Chiefland, FL to provide identification with a 2-week turnaround of dreissenid mussels from routine water sampling. Identification confirmation is conducted by Aquaticus. A direct phone call with Steve Wells of Aquaticus clarified the following:

¹ All scenario mussel details were fictitious but were selected to help examine complicated situations for action should managers be faced with this situation.



FIGURE 2. NIC ZURFLUH WITH IDA REMOVING A PLANKTON TOW SAMPLE.

- If samples contain veligers they will be photo documented.
- Live veligers are able to be determined with the use of dye.
- Samples are retained post-processing for the calendar year.
- Mussel spiked samples are frequently used in-house for quality assurance/quality control.
- Should IDA have a need to process excessive samples to better understand possible mussel establishment, Aquaticus will dedicate unlimited time and prioritize as needed.

DELIMITING SURVEY

In the event of a veliger detection during routine sampling, extensive surveillance would be conducted both above and below the initial positive sample site following a veliger detection. The goal would be to attempt to hone in on possible point of introduction.

DELEGATION OF AUTHORITY AND EMERGENCY SITUATION

In the event of a confirmed dreissenid mussel discovery in Idaho waters, the Idaho Governor would likely make a public declaration to direct cooperation to obtain resources, but the language of “emergency” may not be included. The Governor would delegate authority of the response to ID Department of Agriculture (lead agency). However, depending on the partner associated with the detection location (e.g. ID Power) different declarations might be made depending on what might need to be done to initiate resources. The CRB plan already identifies dreissenid discovery as emergency. The Idaho Response Plan for Early Detection of Dreissenid Mussels (a supplement to the Columbia River Basin Rapid Response Plan) outlines clear objectives and activities including notifications to appropriate internal and external agencies and partners.

In the instance where Oregon and Idaho have shared management responses, a co-governor declaration or both governors would likely make separate declarations. Tribal access to local area affected by the response actions would need to be resolved. It is not clear how far downstream restrictions would need to be applied during a response.

IMMEDIATE CONTAINMENT STRATEGIES AND LOGISTICS

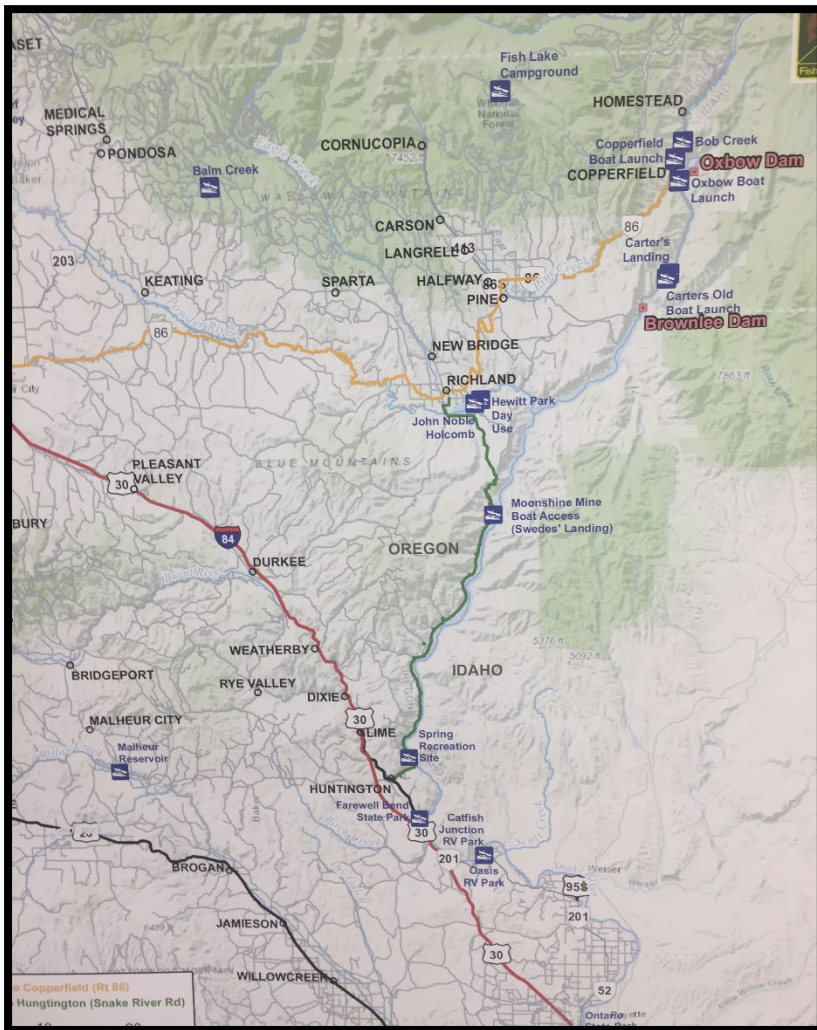


FIGURE 3 AREA OF SCENARIO FOR THE EXERCISE. ACTIVITIES WERE CENTERED AROUND COPPERFIELD AND OXBOW.

A discussion on the impacts to boating Under the scenario of a busy Memorial Day weekend, the impacts to boating were discussed. These potential impacts included appropriate closures, enforcement, and locations of inspection and decontamination stations/equipment.

Inspection and Decontamination

Mobile decontamination would likely be initiated. Several hundred boats would be expected on that weekend.

- In Oregon, there are three pinch points to allow for boat checks and decontaminations. Engine flush would be the primary activity at the inspection station. Daylight hours for operation.
- IDA would do decontamination at all ramps on Idaho side of river. Before IDA would initiate 24-hour operations of inspection, they would close the ramps at night with partners.
- A sheriff is stationed in Copperfield, OR can provide safety and enforcement needs.
- ID Power would yield to recommendations from IDA for any additional actions taken.

Housing additional staff

Oregon can use housing at Baker City to house larger check station. ID might house in Cambridge, ID in hotels, if long-term housing needed could work with ID Power. Roving Crew will often stay in Cambridge or use Forest Service housing if available.

Local Communication

Door to door to shoreline owners and in some cases go dock to dock for specific dialog with private access owners on the situation. Signage could be posted immediately.

PARTNER AGENCY COMMUNICATION AND PERMISSIONS

Federal Energy Regulatory Commission (FERC) would be one of the primary partners to reach out to initially in this particular scenario. A direct phone call with FERC representatives in the national office in Washington DC, Alicia Burtner and Zeena Aljibury, confirmed the following:

- a) For a change in operation with advance notice, the operator would request a variance with appropriate agency concurrence. That request would include the specific time closure and variance need. Public notice with at least 1-week advance. The time it would take to receive the variance from FERC will depend on



FIGURE 4 OXBOW DAM IN OPERATION MAY 22, 2019

specific workloads at the time or other assignments, no exact answer was given.

- b) If there is a short term deviance in operation, FERC would have to be notified within 10 days of making that change. Changes in operations that may be considered would include reservoir levels, or comprehensive impact (e.g. recreation, species impacted, etc.). It will be important to understand what the specific FERC license covers, such as ramping rates, migrating salmon, and resident fish. However, a temporary impact to recreation is less important than a chance to do eradication.
- c) Communication pathway for permitting or variances would be USFWS and NOAA first, and then FERC as long as partners agree to the request. Contact FERC at the Portland regional office. There is a fisheries person at regional office.

Two drawdowns could be needed – one for surveying and one for treatment. Conducting a draw down would help agencies look at possible affected infrastructure that may have attached mussels. A draw down may also be used during chemical treatment to decrease the area to be treated.

FERC would review and approve a response plan once all other agencies have agreed to potential actions. If some entities do not agree, then FERC can help with different decisions to achieve an agreement. ID Power does have a cultural resources plan in place.

Many licensees, including Idaho Power, have an approved approach for general operations that partners have signed off on. A dreissenid approach could be put in place ahead of time and if emergency actions do not deviate from the licensee requirements with FERC, then this approach could be executed. There could be a violation if there is deviation in the operations plan. Communicating with a regional engineer within FERC would be advised.

U.S. Fish and Wildlife Service (USFWS) would be communicated with for the emergency consultation by USFWS. The USFWS Ecological Services handles Section 7 consultation. In general, it is advised to proceed with emergency action and then consult after the emergency action. Prior to taking emergency actions, the lead agency (IDA) will contact the appropriate USFWS Ecological Services office to inform them of the emergency, and to receive recommended minimization measures to protect or reduce the impacts to listed species. Progress of the emergency action and anticipated or realized effects to listed species should be regularly communicated to USFWS, and any

resource protection efforts be arrived at during or shortly following the emergency action. However, at no time will emergency actions be suspended or preempted by these discussions.

After the action has been completed, the lead federal agency will prepare a biological assessment to describe the actions taken and to analyze the effects of those actions to all listed species. There is no set timeline for this process, however this document needs to be prepared and submitted to the USFWS to satisfy consultation requirements. Documenting effects of emergency response helps to adjust understanding of baseline conditions that will inform future decisions and recovery efforts.

National Oceanic and Atmospheric Administration (NOAA) would be contacted similarly for emergency consultation as USFWS stated above.

Because of the threat of litigation, the U.S. Army Corps of Engineers (USACE) does not want to do emergency consultation and would rather do a programmatic consultation. However, programmatic consultation is much more challenging because it is so situation and waterbody specific. Prior to an actual emergency response action occurring, there are too many unknown variables related to expected actions, timing and anticipated impacts to be adequately addressed in a programmatic consultation.

Before proceeding with any treatment or eradication option, the lead agency will need to identify a *federal nexus*, in order to declare an emergency and ultimately emergency consultation. The federal nexus is defined as any federal agency that funds, authorizes, or carries out an action. The lead federal nexus needs to be determined – likely to be USFWS in this scenario. The USFWS would not issue an incidental take permit because action would be after the fact. IDA would communicate to all partners.

Get a better idea of what any in the federal family have for needs, define up front what maybe IDA would want to do, wrap up in a package, the ESA manual will help and be included with that package. Assumed it would be the state would be the appropriate agency and not ID Power; according to FERC contacts, the agency that does the work is not an issue.

TREATMENT OPTIONS DISCUSSION

There are limited options for control/eradication treatment. National Pollutant Discharge Elimination System/Clean Water Act permitting will be required. Also a Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) special local needs permit can also be acquired if a chemical does not have the use/site on it. Some of the permitting or permissions needed will be a) Section 18 of FIFRA that authorizes emergency exemptions for unregistered uses of pesticides to address emergency conditions and b) Section 24c which is a state request to register additional uses of federally registered pesticide formulated for distribution and use in the state to meet special local needs. This is granted at a state level, and in this scenario both OR and ID may need to seek those permissions. The federal timeframe for approvals is generally 90-days. The current existing chemical options include:

- EarthTec QZ (copper sulfate) labeled for use on mussels in open water.
- Muriated potash has Section 18 use/exemption, not labeled for specific use. Quarantine exemption.
- Zequanox is labeled for use with mussel treatment, but has issues (e.g. expensive, dynamics in getting to chemical to site, efficacy, seasonal application considerations). In general, it has less contact time, and side effects.

Copper sulfate has a short contact time, is already labeled for use in open water, and could negatively impact native snails and salmonids, including ESA-listed species. Labeled for use in a reservoir. Potash has a longer contact time (means a longer boat ramp closure) and would need to be labeled for off-use. If copper sulfate was used, then would need to understand the possible concentration of copper going down stream that may affect anadromous fish and other native fish such as bull trout. A bubble barrier could be used downstream. Potash is good because it has low impacts on non-targets vertebrates, but can negatively affect invertebrates, especially crayfish, chironomids and daphnia. The USGS 2018 Report² on potash toxicity to salmonids and some vertebrates was discussed. On a side note, during the field site visit to examine the boat ramp and treatment area, substantial numbers of daphnia and other zooplankton were observed.



FIGURE 5 THE SNAKE RIVER IN THE HELLS CANYON COMPLEX

² Densmore et al. 2018. An Evaluation of the toxicity of potassium chloride, active compound in the molluscicide potash, on salmonid fish and their forage base. U.S. Department of the Interior US Geological Survey Open File Report 2018-1080, pp46.

The ecosystem and food web dynamics could be altered with a drawdown and could create larger infestation issues once water levels are brought back up. However, it is unknown the possible impacts that could occur. A better understanding of how both draw downs and chemical use could affect an infestation is needed. What could be moving in with as a result of a treatment? Working in moving water (e.g. Snake River) with treatment chemicals may have unknown implications for effectiveness. Chemical option would likely be pursued regardless of the success of the outcome in an attempt to stop an infestation/introduction in its tracks. Based on USGS stream gage data and Idaho Power flow rate data, streamflow information shall be considered in the context of chemical treatments.

Because of possible impacts to salmonid fisheries and where they are in the system, EarthTec QZ would be preferred for use higher in the basin, and potash lower in the basin.

Other experts could be consulted such as Leonard Willitt (retired USBR) who could speak on the UV technology within dam operations and Renata Claudi (RNT Consulting) who could speak on chemical strategy in open water.

CONSULTATION CONSIDERATIONS

Consultation is on the action that may/would potentially impact a listed species and how this impact would be mitigated. No terms or conditions under emergency consultation. Communication would be issued to the lead federal agency for considerations and guidance. An informal reply would be provided within 48 hours.

Standard Emergency Consultation Manual, chapter 8, is online.³

DISCUSSION WITH DAVID HAMMOND, PHD AT EARTHTEC QZ

Scenario treatment area is roughly 1 acre in size.

The EarthTec QZ product is manufactured in Nebraska by Earth Science Laboratories, Inc., and distributor is in Provo UT. It would take roughly 3 days to get product to location. It would be delivered in a truck and would likely be in a 275-gallon tote/cube that would need a forklift to get off the truck. ID Power does have a forklift to remove from truck). EarthTec is also available in 55 and 30 gallon drums.

EarthTec has been very successful in rapid response treatment area circumstances with the exception of Minnesota. If the water temperature is below 40 °C could take 3-4 weeks for application to affect mortality. If treatment area is not large enough to capture the infestation, then the treatment will not be successful. If logistically possible, treat a larger area than known delineation.

General application concentration

There is limited data on veligers but based on anecdotal evidence the dose that kills the adults can kill the veligers. During the exercise onsite scenario, the temperature of the water is 14-17 °C which is at the appropriate application temperature. At that temperature range, it has been used at low dose for a longer time to minimize effects on non-target. The maximum dose would likely kill fish, and other organisms. The recommended low dose is .2 mg/L for 30 days. However, it could be used at a dose of .4 mg/L for long term. Targeted organisms will start to die after 5 days. If the by-kill and take of non-target is less important, then 1 mg/L or .8 could be used at higher rate. Label allows for repeat dosing as long as you don't exceed that concentration in the treated water. A copper meter will be needed on-site to do readings and test onsite the day after you dose. Clarify if the meter is provided by EarthTec QZ or if IDA will have to procure separately. The background demand in the water for copper will decrease over time (due to algae in the water). Typically, 5 treatments will be done overtime. Duration of the

³ <https://www.fws.gov/endangered/esa-library/pdf/chapter8.pdf>

higher doses will depend on the water quality, and would probably re-apply 5 days later rather than daily at a lower dose. Mortality curves are almost exactly the same at 1 mg/L compared to .5 mg/L. It is more economical to spread out .5mg/L over time or cover a larger area. If there is a fish kill, it is a consequence of dissolved oxygen, but it will also depend on physically how it is applied.

Recommended distribution technique

Application will be performed by a licensed lake applicator and for mussels you will need to apply at the bottom. Customized application boats would likely be needed (IDA has possible contractors for this application). EarthTec QZ partners with applicators. The product is almost water-like, mixed very easily and disperses quite well. Disperses better horizontally rather than vertically. Too early in the season in Idaho right now for any developed thermocline, and this reservoir does not settle into a thermocline very well. A dosing pump may be needed to replenish what is being circulated with fresh water versus treated water.

Estimated Application rate for scenario of one acre/20 feet deep

A configuration of high-medium-low dose is suggested. 7 million gallons in 1 ppm product is 7 gallons. Recommended to budget 1 mg/L copper for the total project. Apply at .5 mg/L day one, .2 mg/L a few days later, .2 mg/L a few days later, .1 mg/L end. Approximately 216 gallons would be needed for project with an estimated cost of \$4K for the chemical. Apply with a contractor littoral line. EarthTec QZ does not have a shelf life, however it will need to be stored indoors or insulated which ID Power could house if need be. If it freezes the copper will separate out. For disposal of unused product, EarthTec QZ might be able to take back if there was a lot of excess, otherwise incineration or hazardous waste collection.

Other technical considerations

- Real-time water quality monitoring would be conducted IDA.
- Copper meter will be needed to monitor application concentration. The applicators might have meter, or contractor could do analysis.
- Barrier will be need to enclose from top to bottom.
- There is a flow station just downstream of the scenario (USGS 13290450 Snake River at Hells Canyon Dam).

Hammond would likely be involved on water chemistry, and site applications if this was a real situation. Oversight for applicators would be an on-site program specialist and another site investigator would be checking the label and application rates and other aspects of a project.

Follow up question for Hammond: Is there a way to neutralize the copper after treatment?

Follow-up assignments for ID Department of Agriculture

- ✓ Get the ID Administration briefed on process and timing of chemical application.
- ✓ Generate a list of applicators.
- ✓ Get an emergency contract in place with applicator.

MINIMIZING IMPACTS TO NON-TARGET SPECIES AND CULTURAL RESOURCES

Salvage species – the guidelines and protocols identified in Reynolds (1996)⁴ and NMFS (2000)⁵ would be appropriate for fish salvage efforts. For other species, such as mollusks and crustaceans, attempts would be made to salvage any listed species and retain them off-site or move them to another portion of the waterbody where they will not be affected by the action.

- Fish shocking for bull trout to remove from the treatment area.
- There are none of the 3 listed snail species of the Snake River in the treatment area (they are above the dam). Bliss rapid snails are one of the listed species in the Snake River. They are abundant in some areas, but not in the potential treatment area. Would likely do survey to understand the number of snails that may be affected, and get a permit for take.
- Surveys should be done for any of the other native species and what might be impacted by treatment. To quantify it would take time, but would be helpful to have a survey of what is present. In an emergency it would be target specific, and rapid survey.

If there is a scientific profile of before and after conditions in treatment area that would be helpful. However, it is not clear if there is ID Fish and Game does native species survey. There could be a nexus here with ID Fish and Game. There is a multi-species baseline study in Northern Idaho⁶ that created catalog of information.

Cultural resources and natural resources would be considered for impacts. A potential list of resources would be compiled prior to any treatment/action.

Anticipate that other areas in the state will have stakeholder voices that may need some discussion and attention. Responding up front helps to manage possible discontent.

⁴ Reynolds, J.B. 1996. Electrofishing. Pages 221–253 in B. R. Murphy and D. W. Willis, eds. Fisheries techniques, 2nd edition. American Fisheries Society, Bethesda, Maryland.

⁵ NMFS (National Marine Fisheries Service). 2000. Guidelines for electrofishing waters containing salmonids listed under the Endangered Species Act. National Marine Fisheries Service, Portland, Oregon, and Santa Rosa, California. https://www.fwspubs.org/doi/suppl/10.3996/112016-JFWM-083/suppl_file/fwma-08-01-30_reference+s02.pdf

⁶ <https://idfg.idaho.gov/baseline>



FIGURE 6 BOAT LAUNCH ON THE SNAKE RIVER ABOVE THE SCENARIO LOCATION

DISCUSSION WITH WESTERN ONTARIO ASI WATER, DAN BUTTS ON POTASH

Potash is a widely available fertilizer. Potassium chloride (KCl) is the active ingredient in potash. Target concentration is 100 ppm. Main target is to affect the gill epithelium. Water chemistry will affect the toxicity of KCl. There are non-target species impacts. There have been studies of lethal acute sensitivity for 96-hours indicating subclinical impacts and acute toxicity to invertebrates. The Virginia Millbrook quarry is a situation where there was mussel eradication success (2006) in 12 acres that was treated. A Manitoba treatment done in harbors did not result in successful eradication, but populations were not well delineated, and applications were done late in October. In another successful application, silt curtains were used to limit the in/outflow, and treated in the spring.

Silt curtains would be needed to extend up to 20 feet deep. Possibly contract out for a specifically made curtain. The open water application trick is proper dispersal; they are using curtains that are applied in fire protection systems. The method is to surgically apply the chemical until it is at the target concentration (100 ppm), it takes about 30 days for mortality to occur.

Depth is important in considering treatment. Contact time needed and is temperature dependent. It is recommended that bioassays should be done during treatment. Bioassay = strategically locate buoy with bioassay (mesh bags with mussels to test efficacy). This may be impossible in the uninfested Idaho to utilize bioassay as suggested. A surrogate such as corbicula possibly could be used for a bioassay.

Local suppliers, such as a farm fertilizer supplier. There is a farm supply in Cambridge, and may have an applicator. Mixing at the farm supply rather than on site would be preferred. It can be bought as a slurry which is what is needed. Tanker truck would bring chemical to site. Diffuser is needed to surgically apply the chemical by section using a Honda generator. Mixing in the water column is very important.

Not registered as a pesticide, so ID would need a FIFRA exemption and possibly special use permit. No federal oversight on fertilizer composition, it is managed by each state which do analysis for metals and composition break down. Timeline for FIFRA Section 18 exemption could be worked up pretty quickly. This could be done preemptively and have on file. An NPDES permit from Oregon Department of Agriculture would be needed, if at the specific location then it would be Idaho Department of Environmental Quality. Another quarry in MD is being treated later this month with potash and they were able to get a 3-month approval for FIFRA.

5 days would be needed for application/mixing for the scenario. This company does the application of the chemical including providing the boats, and application equipment. At 12 °C water temperature, expect mortality at 7-10 days. Quantity is based on volume of water to treat. Price fluctuates with demand. The costs to treat in past efforts were: \$365K quarry, \$800K Winnipeg. The quote would be for material + labor to treat 7 million gallons. Dan can provide a quote.

OTHER DYNAMICS FOR CHEMICAL TREATMENT

Drawdown could be considered as a way to limit the volume of water being treated, which could decrease the silt curtain area coverage needed. At this time of year, it is not likely to have ability to limit releases due to flood control via US Army Corps of Engineers. Drawdown would likely be utilized for survey only, not for any treatment. Biological Opinion (variance requests) needs would have to be explored if a drawdown was done.

Waiting month to treat would allow for the temperature to come up and water level to decrease. It would likely take another 10 days/two weeks to get all contracting and permitting in place, and materials here. In the meantime, no recreational access would be granted.

There is a dock at the specific site which could affect the chemical process. How best to deal with the dock would be resolved in logistical discussions down the road. There are options for either removal/stay in place.

Follow up for Oregon Department of Agriculture

- ✓ Is it possible to get approvals/exemptions for FIFRA and NPDES at the same time? Grant will explore.

TIMELINE AND IMMEDIATE STEPS

Demonstrating that a plan is in development would be an important part of this situation to show that the state is responding. Some of the time needs would be: 1 week for purchasing process, 1 week with federal partner communications, 1 week for key partners (e.g. ID Power) to get through their internal channels, and 48 hours for emergency recommendations (minimization measures) from USFWS and NMFS. Staff would have to look at the water quality information and the site information which will take a bit of time. Chemical vendor would want updated water analysis.

- Temperature and conductivity are the important variables for both the two treatments. Flow information is available but variable. One tool would be to develop an algorithm with permits, temperature, conductivity and plug in the chemicals to give costs/timeframe.
- Possible hand removal could be done ASAP while waiting for the chemical set up. Net and electroshocking to remove fish. Set up block nets upstream and downstream of the site prior to fish salvage to prevent new species from entering the area. Keep block nets in place during treatment.
- Remove the docks once silt curtains are up, possibly wrap docks similar to tunicate control. Could crane the docks out if needed.

- Pre-purchase curtains with USACE support and then could possibly share regionally. ID Department of Agriculture could pre-buy curtain and material, and store with partners. ID Power has silt curtains here in the area. An online search shows that a 4'x50' costs \$700. Partner sharing and quick purchase would be the likely situation here. ID Fish and Game has a cache in Boise.

PARTICIPANT CONSENSUS ON CHEMICAL CHOICE

OR partners, PSMFC, ID Department of Agriculture, and ID Power are in favor of using EarthTec QZ

USFWS is less supportive of copper and will likely ask for on-site fish removal.

Nez Perce Tribe or other conservation groups (not present at the exercise) could have hesitations about chemical use, and initiate possible litigation. Discussion will be needed with other partners not present.

INITIATING CONSULTATION/COORDINATION WITH USFWS/NOAA

Ben Matibag NOAA provided feedback on consultation dynamics via call in. NOAA was approached by USACE to consider a programmatic consultation for dreissenid rapid response eradication; NOAA is encouraged to do framework consultation without "take" to implement specific actions related to dreissenid mussels for ESA coverage and future. A Biological Assessment is being undertaken. The consultation is for projects within the entire Columbia River Basin. Eric Hein from the regional office is the US FWS contact. Nancy Munn is the NOAA regional contact. Federal nexus is needed.

Programmatic versus emergency

The consultation handbook identifies an emergency. Whereas actions that are repetitive and knowing what the impacts are, would be suitable for a programmatic (e.g. fish culvert replacement). If there is any threat to life or property, then the standard is to stay out of the way of response.

Emergency consultation is recommended. A suite of emergency actions could be proposed and because of that the first couple of incidents NOAA is open to emergency action consultation. After the first couple then they would re-group on whether a programmatic consultation could be put in place. Ultimately this would be a decision from regional NOAA office. Framework consultations traditionally are used for land resource management plans, such as Forest Service or BLM plans from a high level of management. Culverts would be a programmatic consultation. Framework consultation is a large umbrella for future projects (goals, objectives, standards and guides) and there is no take, no terms or conditions.

Federal nexus

Traditionally a federal lead on consultation is determined by associated federal land, federal actions, or federal funding. EPA could be the federal entity. It can difficult to determine who decides if the federal nexus is there, and what occurs if there not a federal nexus. If there is a federal agency who is going to participate or implement an action, then they would be the likely federal nexus. A habitat conservation plan would have to go through NEPA. Section 7 and Section 10 are the areas for federal ESA consultation. The presence of a federally listed species only means that there is an obligation to work with USFWS and/or NOAA. There may be multiple federal entities comprising the federal nexus, but only one lead federal entity will be responsible for consulting with USFWS and/or NOAA. NOAA has a similar 48-hour window for emergency consultation and recommendations will be done via email or phone.

Considerations for scenario federal nexus

- FERC if there is a drawdown or changes in operation outside of the current FERC license.
- Forest Service (FS) has adjacent lands and may be involved in access issues. Further clarification is needed on FS involvement.
- USACE because of flood control and current WRDA funding.
- EPA will be issuing a permit. If you know that you are going to be getting a NPDES permit every time, it might be prudent to get EPA as a partner.
- USFWS may be involved if an ESA species present. It is possible USFWS could be the nexus as a partner who has supported the CRB plan and the funding that was tied to it. Further clarification is needed on USFWS involvement.

ID State Department of Lands has jurisdiction of the water itself. A consulting attorney would be needed to help facilitate all communication. There could be multiple discussions with the Idaho Governor's Office of Species Conservation, Office of Lands that could be needed. The CRB meeting could be a similar place to share information and contacts. Utilizing the CRB Multi-Agency Coordination with individual state actions could be considered. The MAC exists to provide resources and mutual support. This could be streamlined somehow. Some of the other partners (BOR) are asking to be signatory of the CRB plan.

Follow-up assignments for ID Department of Agriculture

- ✓ Does ID have to send a communication to every federal agency with a possible nexus?
- ✓ ID has to update the Tier One contacts to include FERC at a minimum. ID has to flesh out who those contacts need to be.
- ✓ Have regular on-going conversations with key agency partners to keep contacts faces and names fresh.
- ✓ Rapid response will be an agenda item with ID Invasive Species Council bi-annual meetings, list of contacts could be updated and shared regularly.
- ✓ Understand Nez Perce Tribe perspective on chemical options.
- ✓ Determine if there is a statement on chemical options or cultural issues possibly related to a drawdown.
- ✓ Other tribes throughout ID could also be reached out to for future potential actions elsewhere in ID.

Follow-up assignments for Oregon

- ✓ Education on rapid response actions.
- ✓ Better understand various tribal opinions and information sharing.

CONTAINMENT OPTIONS DISCUSSION

The participants traveled on the Snake River by boat to the scenario site to discuss habitat logistics and inspection and decontamination options. The following was discussed as a possible response for containment option responses from Idaho and Oregon.

Closure:

- Immediately close the ramp with ID Power at Hells Canyon Access point with appropriate media outreach and communication about closures to the public and agencies (external and internal). Signage would be used.
- Briefing of the on-site sheriff to get agreement on enforcement needs would be needed. Additional law enforcement will need to be briefed. Sheriff is on-site here with ID Power; Heller Bar or Pittsburg possible enforcement will need to be set up. OR could possibly be re-direct if needed.

- Ramp open and close schedule would be set up by ID Power camp host, physical barrier to minimize the need for a 24 hour WID station. WID stations would be daylight hours.
- ID Fish and Game dialog for fishing tournaments would need to be initiated – either cancel or implement deliberate WID team. Notification and procedures would be put in place.
- Long-term temporary closure of the site at Hells Canyon. Camp host could be stationed to make sure they are not launching. Concrete barriers could be placed at the launch site. An evaluation would be made a year after treatment. A higher level decision would be needed from ID Power to determine if it could be closed for longer.
- Closing access to the entire reservoir would be unlikely and complicated as it is linked with FERC where recreation is a requirement.
- Closing would affect tribal access; coordination with Tribes would be needed.

Inspection and Decontamination:

- ID would do inspection / decontamination closer to Cambridge on ID 71. Downstream another station at the Heller State Park. All boats would be sealed as per norm. An evaluation of practices would be done after a year.
- Oregon would put an inspection station on Hwy 86, possibly right here at Oxbow and create the “Copperfield Inspection Station”. They would pull people from Umatilla and Salem to staff as needed. OR would treat as a mussel boat and seal with red deal. Engine flush and compartments would be decontaminated. An evaluation of practices would be done after a year.



FIGURE 7 IDAHO DEPARTMENT OF AGRICULTURE INSPECTION STAFF DEMONSTRATING DECONTAMINATION OF TYPICAL ON-SITE WATERCRAFT

- Equipment will be brought to the site from Boise. Tender tanks are ready, could get access to water for decontamination units. Typical boat used on waters here is a 20 ft. simple boat without ballast.
- Downstream stations could be temporarily in place until the treatment is done, sample and evaluate after 1 year. Staffing of the downstream is going to be problematic.
- Monitor Brownlee waters for mussels. Potentially set up another station, if Brownlee needs to be contained.
- Signage
 - Boat ramp closure sign – ID Power could print and have them ready instantly.
 - Inspection signage.
 - Information signs are ready and available/ready to print if needed.

Communication:

- Ownership on downstream access launches would have to be looked at and possibly closed. In-person contact on private property owners about access and situation would be made.
- Communication with inspectors/partners just above Cache Creek and Pittsburg, Heller Bar, Hells Gate would be made and might look to WA to set up a station downstream. Forest Service notifications would be made.
- ID Guides Association would be contacted.
- Communication will ID Power camp hosts, FS hosts, and other river staff will need to be informed. Communicate with all IOGA outfitters to Clean, Drain, Dry.
- Press release to the public

Emergency Declaration

- ID would declare an emergency to draw needed attention to the incident to assist in the release of resources and available deficiency warrant through the ID Invasive Species Act of 2008.
- It is unknown at this time, the response of the Oregon Governor's office in the event of a mussel discovery or if an emergency declaration would be made.

Monitoring and Waterbody Status

- Continued monitoring would be coordinated between ID and OR – the current ID contracted lab analysis can be bombarded with lots of sampling.
- Any use of eDNA in the monitoring – Caren Goldberg in WA could be a resource. Some eDNA sampling could be incorporated.
- Technically ID would refer to the waterbody as “positive” based on sampling. An update to the WID dashboard and USGS NAS would be done and based on the delisting process would utilize WID on-site for 5-years.

PARTICIPANT FEEDBACK

Participants shared impressions of the exercise and commented on positive and negative aspects.

Dane Bain, ID Power: Thorough representation of exercise, the stakeholders from state entities could have been better involved/engaged (i.e. ID Fish and Game). Would have like to spend time determining actual roles and how would insert ourselves in participating in active response.

Sean Sweeney, USFWS: He suggested that the pros and cons on the chemicals could be fleshed out to better support the decisions. He would like to look into what conservation methods USFWS has developed in other regions that may have dealt with copper and fish. He could explore if USFWS or NMFS could be the nexus on this system? Internal communication with OR USFWS (Brendan White) with the shared waterbody would be needed.

Brad Defrees, NOAA: Hearing the needs and the federal nexus of what USFWS and NOAA can do in their power in figuring out the nexus was informative. He suggests developing a list of contacts within the agencies who would be best contacts for an event. Is there an agency that could cover a state-wide action?

Theresa Thom, USFWS: The FERC discussion was really important, and partner participation helped her understand the entire scene. She suggested that fleshing out the 7-day/14-day timeline is important. She felt that the discussion on chemical control methods was very important. It is not clear at what point the shift would be made from a high intensity immediate incident command framework to a more long-term management/containment situation.

Communications and being proactive are important to help drive the conversation with the public. She will continue internal communications and connecting with other divisions within the USFWS to be active participants.

Grant Jackson, OR Department of Ag: He plans to brief his management on the discussions to put on their radar. He plans to explore the dynamics of the NPDES permits.

Rick Boatner, OR Department Fish and Game: He liked that there was no ICS and were able to come up with a simple solution. He is curious what negotiations would look like if ID did not agree about chemicals.

Follow-up

- ✓ Is there an agreement needed among ID and OR that could be drafted in advance; is it a governor to governor dialog?

Mike Stephenson, ID Power: He was pleased that he got more out of it than expected. There are some of the other players that could have been here (missing: USFS, Nez Perce Tribe, EPA, ID Fish and Game, DEQ). EPA has had a very contentious relationship with ID Power, especially with the Hells Canyon re-licensing process and they are typically a hands off. He plans to explore an internal discussion on the boat ramp and park closure, and understand internal support due to a possible public push-back and how long of a time could it be closed.

Glenn Dolphin, OR State Marine Board: He wants to be more engaged with future exercises and discussion, wants to initiate a OR exercise and not go as long between the exercises for OR. He plans to contact OR Governor's office to work on education, and also initiate tribal interactions with those in OR, Legislature is supportive, but governor is not. So how to fund an actual event he would like to explore.

Stephen Phillips, PSMFC: OR exercise could explore the anadromous zone discussion. Tribal interactions could be explored better by PSMFC to make sure there is going to be participation.

Nic Zurfluh, IDA: He was appreciative of all the planning effort. He felt the outside contributions from the experts was tremendously important, and the field trip added to the concept of what actions could be taken. He plans to keep the communication lines open and refresh with other exercises. He will keep an eye open for other treatment options in the future.

Follow-up

- ✓ Understand site specific boat usage.
- ✓ Update the ID rapid response plan.
- ✓ Identify some stock pile supplies.

Lloyd Knight, IDA: He believes that being on-site is the most effective way to do these events. ID Power was a key player in helping to make the event happen. He really wanted to do the discussion without ICS, because if this had been a real event, ID would not have used ICS. There are some updates to the plan, and he would like to do more exercises more often (once or twice a year at some different locations to keep fresh and connected). They could have done more to get some of the absent stakeholders here. He would like to explore the possibility of a "state-family" meeting to get them better briefed. Also better understanding the role of CRB/MAC could be explored more.

MAC BRIEFING

As per Columbia Basin rapid response plan protocols, the MAC was alerted to the exercise and a briefing call was scheduled during the exercise. The CRB MAC call was facilitated by Stephen Phillips, PSMFC and was attended by:

all on-site participants, Doug Cottam, Oregon Department of Fish and Wildlife, Blaine Parker, Columbia River Inter-Tribal Fisheries Commission, Bill Tweit, Washington Department of Fish and Wildlife, and Tom Woolf, Montana Fish, Wildlife & Parks.

The scenario was briefed by Nic Zurfluh. The actions of treatment and containment were presented and discussed.

APPENDIX A – PARTICIPANT PLAYERS HANDBOOK

Idaho Dreissenid Rapid Response Exercise 2019
Player's Handbook



Purpose and Scope

Idaho has taken many preparatory steps in the event of a dreissenid mussel discovery in Idaho waters. By initiating an exercise with a variety of agencies, stakeholders and leadership, this further exploration of responsibilities and reactions will further prepare Idaho should they be faced with an actual detection. The purpose of the rapid response exercise is to improve Idaho dreissenid rapid response guidelines, improve communication guidance, and continue to enhance action familiarity in a response situation.

The exercise is meant to explore the roles of Idaho Department of Agriculture and Idaho Power, Idaho Invasive Species Council and all other responsible parties in the State of Idaho to respond to a simulated dreissenid discovery in Hells Canyon of the Snake River.

Objectives

The objectives that will be focused on in the exercise will help address response issues and assist in better understanding of how a possible eradication of mussels in Idaho might be conducted.

- A. Command and Control: The exercise team will demonstrate the ability to engage, prioritize, coordinate and complete emergency response activities.
- B. Communication: The exercise team will demonstrate an ability to conduct and disseminate information of the detection, response and conclusion of a Dreissenid Emergency.
- C. Resource Management: The exercise team will demonstrate ability to respond to a Dreissenid Emergency and explore the utilization of an emergency resources, as identified during the exercise.

Scenario

The following scenario is plausible and all events occur as they are presented. Since Spring 2010 Idaho has been conducting monitoring in the Hells Canyon complex. To date, no detections have been made of dreissenid mussels.

May 8, 2019: ISDA collects veliger sample following established protocol. Shipped priority overnight to ISDA statewide contractor Aquaticus located in Chiefland Florida.

May 9, 2019: Sample received in good condition by lab technician. Sample is prepared for analysis.

May 13, 2019: Sample is analyzed. Microscopy results are reported to ISDA. Results: 7 quagga veligers (4 umbonal state 3 late pediveliger) identified at one sample location.

May 13, 2019: Sample split (by who) and half is shipped to Pisces Molecular, Boulder Colorado, and half is retained by who.

May 14, 2019: Molecular results are reported to ISDA. Results: positive for quagga mussel (*Dreissena bugensis*).

ISDA dispatches additional survey team to Hells Canyon Reservoir. Samples are shipped priority overnight to Aquaticus for expedited analysis.

ISDA makes initial notifications to Tier 1,2, and 3 contacts.

ISDA notifies Rick Boatner, Oregon Dept. of Fish and Wildlife, of results. Idaho and Oregon will coordinate follow-up surveys.

ISDA activates CRB Rapid Response Plan.

May 15, 2019:

Samples received by Aquaticus in good condition. Samples prepared for analysis.

May 16, 2019:

Samples analyzed microscopically. Results delivered to ISDA; 12 quagga mussel veligers (7 ubonal stage, 5 late pediveliger) all from same sample location.

May 20, 2019:

ISDA dispatches additional survey team to define extent of population in Hells Canyon by performing adult mussel surveys. Several adult mussels were discovered on Hells Canyon Park boat launch dock and mooring equipment.

ISDA provides updated communication to Tier 1,2,3.

ISDA calls together a response team to discuss control and containment options.

Authority is delegated by ID Governor's office. Incident Command is established.

For this particular location, the following assumptions are made:

- ISDA have communicated results to stakeholder for the Hells Canyon Complex (Idaho Power, IDFG, USFS, BLM, IDL, State of Oregon, Washington County).
- ISDA have initiated delimiting surveys to confirm extent of infestation, including adult mussel surveys of structures.
- ISDA have provided updates to our Tier 1, 2, 3 contacts. (Tier 1 including Governor's office, legislative leadership; Tier 2 includes locally affected agencies; Tier 3 is statewide agencies)
- ISDA are coordinating with the Governor's office regarding any items that need to be covered in an Executive Order. These include any closure/containment actions, as well as deficiency warrant or emergency purchase authorization.

May 21, 2019

Response Team assembles in Copperfield, OR.

In Idaho, that initial Tier 1, 2, 3 communications will be the first step in coordinating what ramps or containment measures need to occur. Where statutory authority is unclear, or management authority of resources (ramps, boat launches, etc.), it is anticipated that an Executive Order may be necessary.

The Columbia River Basin Multi Agency Coordination (MAC) Group is notified with basic facts and will include any requests for technical assistance.

As delimiting occurs, evaluation of location specific treatment options occurs. This evaluation will include those private, local, state, or federal agencies that are directly affected in that area first. (IPCO, Oregon, IDFG, EPA, USFWS, Tribes)

May 22, 2019

Development of joint press release as appropriate. MAC briefing as needed as well.

Description of scenario location

Hells Canyon is a 10-mile-wide canyon located along the border of eastern Oregon, eastern Washington and western Idaho in the United States. It is part of the Hells Canyon National Recreation Area and is North America's deepest river gorge at 7,993 feet. The Snake River is designated Wild and Scenic as it winds through the National Recreation Area. Although uncommon on most wild and scenic rivers, powerboats have been used on the Snake River in Hells Canyon National Recreation Area for many years and Congress included specific language in the Hells Canyon National Recreation Area Act which allows their continued use.

After completion of large hydropower dams on the Columbia River in the 1930s through the 1950s, several entities sought approval from the Federal Power Commission to build dams on the Snake River, including a high dam in Hells Canyon. In 1955, the Commission issued a license to the Idaho Power Company to build a three-dam complex in the canyon:

- Brownlee Dam, at river mile (RM) 285, was finished in 1958.
- Oxbow Dam, 12 miles downstream, was finished in 1961.
- Hells Canyon Dam, 26 miles (42 km) below Oxbow, was completed in 1967.

The three dams have a combined generating capacity of 1,167 megawatts (MW) of electricity. The complex, which provides about 70 percent of Idaho's hydroelectricity, blocks migration of salmon and other anadromous fish upstream of Hells Canyon Dam.

Activities in Hells Canyon include fishing, jet boat tours, hunting, hiking, camping and whitewater sports (mainly rafting and kayaking). Much of these activities rely on the mighty Snake River, which is the main factor in the creation of Hells Canyon. The Snake River is home to numerous fish species, an abundance of class I-IV rapids (some of largest in the Pacific Northwest), diverse wildlife and miles of trail systems.

Access points

Hells Canyon Campground is in the immediate vicinity of the sampling location.

<https://www.idahopower.com/recreation/parks-and-campgrounds/hells-canyon-complex/hells-canyon-park/>

Numerous access point below stream of this area can be reached from Ballard Creek Road (Oregon side of river) and Hells Canyon Road (Idaho side of river) until it reaches the Hells Canyon Dam.

The mussels were theoretically discovered just below Hells Canyon Park which is an Idaho Power recreational area about 6 miles below Oxbow Dam and above Hells Canyon Dam on the Idaho side.
45.047147 -116.812797



Participant Exercise Roles, Guidelines and Assumptions

This is an exercise. If you make contact outside of the exercise players you should preface all communication with “This is an exercise, not an actual incident”. This ensures that individuals not participating in the exercise understand that the events are not occurring.

Players in the exercise will respond to the situation as presented utilizing their expert knowledge, current response plans, and familiarity from relevant training.

Problem-solving will be the primary focus of the exercise. Decisions made during the exercise should be viewed as an opportunity to discuss and explore multiple options and possible solutions.

Idaho Department of Agriculture utilizes the following guidelines in their sampling regime to help guide management decisions from monitoring results. This terminology will be utilized throughout this response which is specific to dreissenid monitoring.

Waterbody definitions¹:

- Status Unknown – Waters that have not been monitored.
- Undetected/Negative - sampling/testing is ongoing and nothing has been detected, or nothing has been detected within the time frames for de-listing.
- Inconclusive (temporary status) - Water body has not met the minimum criteria for detection.
- Suspect – Waterbody that has met the minimum criteria for detection.
- Positive – Multiple (2 or more) subsequent sampling events that meet the minimum criteria for detection.
- Infested – A waterbody that has an established (recruiting or reproducing) population of AIS.

Exercise Agenda

May 21, 2019		
	Activity	Lead
8:00 am	Welcome and Introductions	Lloyd Knight and Stephen Phillips; ID Power Area Leader
8:10- 9:10 am	Review scenario and discuss actions to date; discuss containment/closure	Lloyd Knight, Rick Boatner and Glenn Dolphin
9:10 – 9:45 am	Roundtable discussion on actions to date	All
9:45 – 11:00 am	Field trip to site (20 minutes each way); containment and WID briefing on-site	Nic Zurfluh and Mike Stephenson
11:00– 12 pm	Evaluation of Treatment Option 1	All
12:00 pm	Lunch On-site at Cook Shack	
12:45 – 3:00 pm	Evaluation of Treatment Options 1 and 2	All
3:00 – 4:00 pm	Communicate with chemical considerations	Calls to experts
4:00 – 4:30 pm	Briefings to leadership (tentative)	Lloyd Knight
4:30- 5:00 pm	Recap on all decision, recommendations and next steps	All
5:00 pm	Adjourn	
6:00 pm	BBQ dinner hosted by IDA	

¹ Definitions were developed by the Western Regional Panel in ANS, Building Consensus in the West Committee

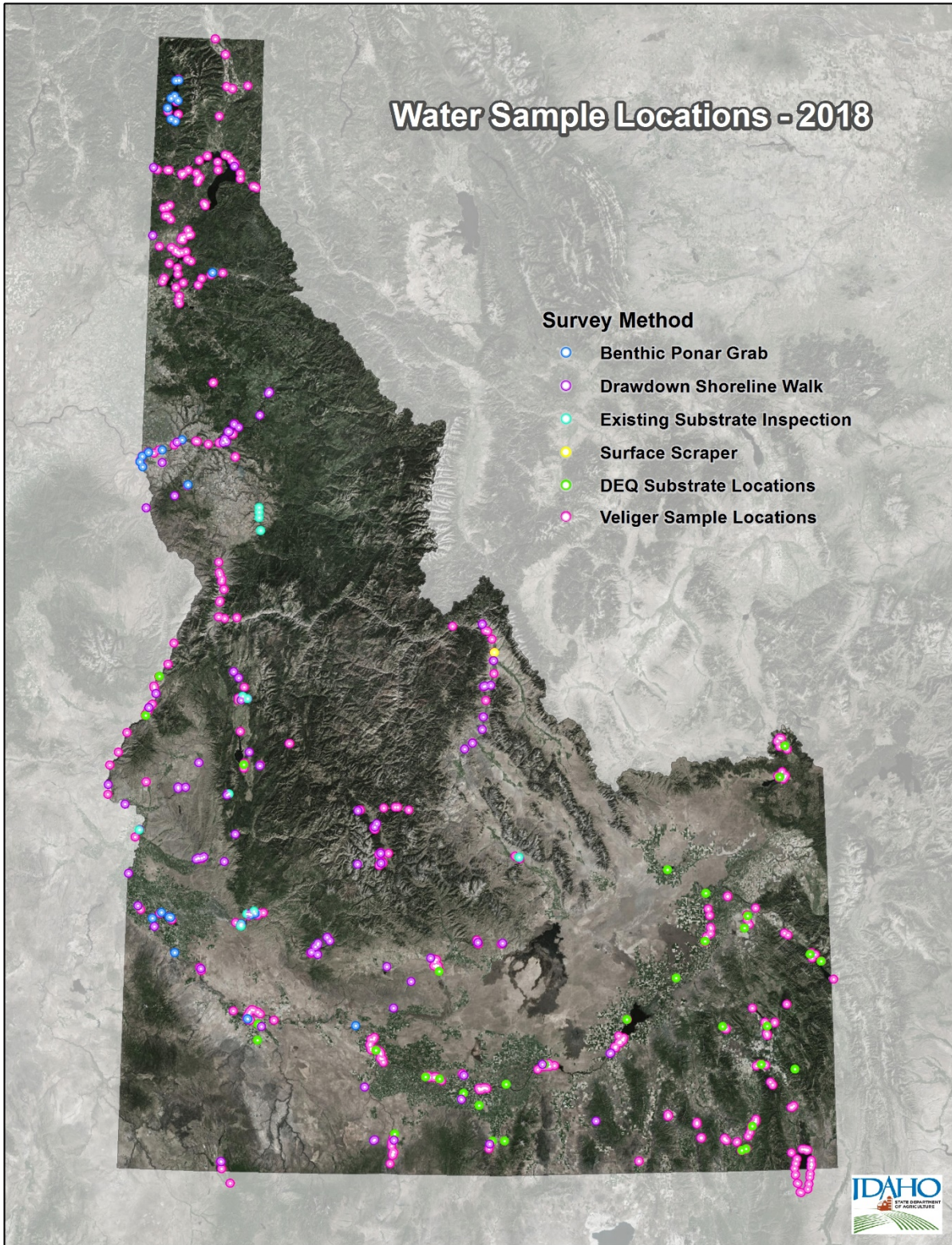
May 22, 2019		
	Activity	Lead
8:00 -10:00 am	Continued Discussion Treatment Options, possible final recommendations	All
10:00 – 12:00 pm	Containment Discussion with final recommendations	All
12:00 – 12:45 pm	Lunch On-site at Cook Shack	
12:45 – 2:00 pm	Review all final recommendations/actions	All
2:00 – 2:30 pm	MAC Briefing	Stephen Phillips
2:30 – 3:30 pm	Participant evaluation of exercise, debrief, next steps	All
4:00 pm	Adjourn	

Resources for Exercise Participants

- Idaho Dreissenid rapid response guidelines
- Active real-time weather
- [Streamflow information](#)
 - https://waterdata.usgs.gov/id/nwis/uv/?site_no=13290450&PARAMeter_cd=00065,00060,00010
 - <https://idastream.idahopower.com/Data/Dashboard/18>
- Database of sampling
- [ICS Online forms: https://training.fema.gov/icsresource/icsforms.aspx](https://training.fema.gov/icsresource/icsforms.aspx)
- Dreissenid background information: <https://nas.er.usgs.gov/queries/FactSheet.aspx?speciesID=5>
- [FEMA ICS trainings: https://training.fema.gov/emiweb/is/icsresource/trainingmaterials.htm](https://training.fema.gov/emiweb/is/icsresource/trainingmaterials.htm)

This training exercise is part of the 100th Meridian Columbia Basin effort to prepare partners across the west for potential discoveries of dreissenids. This exercise is supported by the US Fish and Wildlife Service.

APPENDIX B – IDAHO SAMPLING LOCATIONS



APPENDIX C – PRODUCT LABEL EARTHTEC QZ

EARTHTEC QZ™

Molluscicide For Control of Quagga and Zebra Mussels in Impounded Waters; Lakes; Ponds; Lagoons; Wastewater Lagoons; Reservoirs; Potable Water Supplies*; Canals; Ditches; Aqueducts; and Equipment/Structures that deliver water directly to publicly owned water treatment facilities to include pipes, intake structures, gatehouses, screens, pumping stations, weirs, and penstocks.

Bactericide* - Nonpublic Health Bacteria

Potable Water Supplies+ - Water Destined to Be Used as Drinking Water (this water must receive additional and separate potable water treatment)

ACTIVE INGREDIENT

Copper Sulfate Pentahydrate*(CAS No. 7758-99-8) 19.8%

OTHER INGREDIENTS 80.2%

Total 100.0%

*Metallic Copper 5%

THIS PRODUCT WEIGHS 9.91 LB PER GALLON (1.188 kg/L)
AND CONTAINS 0.493 LBS ELEMENTAL COPPER PER GALLON.

EPA REGISTRATION NO. 64962-1

EPA ESTABLISHMENT NO. 64962-NE-001

NET CONTENTS:

TWO AND ONE-HALF (2.5) U.S. GALLONS (Commercial Use Only)

THIRTY (30) U.S. GALLONS

FIFTY-FIVE (55) U.S. GALLONS

TWO HUNDRED SEVENTY-FIVE (275) U.S. GALLONS

BATCH NO.

Manufactured by: Earth Science Laboratories, Inc. 113 SE 22nd Street, Suite 1, Bentonville, AR 72712 Phone: (800) 257-9283

KEEP OUT OF REACH OF CHILDREN

WARNING • AVISO

If you do not understand this label, find someone to explain it to you in detail.
(Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle.)

FIRST AID

IF IN EYES: Hold eye open and rinse slowly and gently with water for 20 minutes. Remove contact lenses, if present, after first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for advice.

IF SWALLOWED: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by a poison control center or doctor. Do not give anything to an unconscious person.

IF ON SKIN OR CLOTHING: Take off contaminated clothing. Rinse skin immediately with plenty of soap and water for 15 to 20 minutes. Call a poison control center or doctor for treatment.

NOTE TO PHYSICIAN: Probable mucosal damage may contraindicate the use of gastric lavage.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment.

You may also contact INFOTRAC 1-800-535-5053 for emergency medical treatment.

SEE ADDITIONAL PRECAUTIONARY STATEMENTS ON THE SIDE OR BACK PANEL.

PRECAUTIONARY STATEMENTS Hazards to Humans and Domestic Animals WARNING

Causes substantial but temporary eye injury. Harmful if swallowed. Harmful if absorbed through skin. Do not get in eyes or on clothing. Avoid contact with skin. Wear protective eyewear (goggles, face shield or safety glasses), long sleeved shirt, long pants, shoes, socks and chemical-resistant gloves made of any waterproof material. Some materials that are chemical-resistant to this product are polyvinyl chloride, polyethylene and viton. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash clothing before reuse.

ENVIRONMENTAL HAZARDS

This pesticide is toxic to fish and aquatic invertebrates. Waters treated with this product may be hazardous to aquatic organisms. Treatment of aquatic weeds and algae can result in oxygen loss from decomposition of dead algae and weeds. This oxygen loss can cause fish and invertebrate suffocation. To minimize this hazard, do not treat more than 1/2 of the water body to avoid depletion of oxygen due to decaying vegetation. Wait at least 14 days between treatments. Begin treatment along the shore and proceed outward in bands to allow fish to move into untreated areas. Consult with the state or local agency with primary responsibility for regulating pesticides before applying to public waters to determine if a permit is required. Certain water conditions including low pH (≤ 6.5), low dissolved organic carbon (DOC) levels (3.0

mg/L or lower) and "soft" waters (i.e. alkalinity less than 50 mg/L) increases the potential acute toxicity to non-target aquatic organisms. The application rates on this label are appropriate for water with alkalinity greater than 50 mg/L. Do not use these application rates for water with less than 50 ppm alkalinity (e.g., soft or acid waters) because trout and other species of fish may be killed under such conditions.

Consult your local state fish and game agency before applying this product to public waters. Permits may be required before treating such waters. For applications in waters destined for use as drinking water, those waters must receive additional and separate potable water treatment. Do not apply more than 1.0 ppm as metallic copper in these waters (background + applied copper).

**PERSONAL PROTECTIVE EQUIPMENT
USER SAFETY REQUIREMENTS**

Mixers, loaders, applicators and other handlers must wear the following:

- Long-sleeved shirt
- Long pants
- Shoes plus socks
- Chemical-resistant gloves made of any waterproof material (Chemical Resistance Category A)
- Protective eyewear

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry. Discard clothing and other absorbent material that have been drenched or heavily contaminated with the product's concentrate. Do not reuse them.

USER SAFETY RECOMMENDATIONS

- Users should wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.
- Users should remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Users should remove PPE immediately after handling this product. As soon as possible, wash thoroughly and change into clean clothing.
- Wash the outside of gloves before removing.

DIRECTIONS FOR USE

It is a violation of federal law to use this product in a manner inconsistent with its labeling. Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirement specific to your state and tribe, consult the agency responsible for pesticide regulation.

USE INFORMATION

EarthTec QZ™ is used to control quagga and zebra mussels in impounded waters; lakes; ponds; lagoons; wastewater lagoons; reservoirs; potable water supplies; canals; ditches; aqueducts; and equipment/structures that deliver water directly to publicly owned water treatment facilities to include pipes, intake structures, gatehouses, screens, pumping stations, weirs, and penstocks.

EarthTec QZ™ is an algaeicide/bactericide/molluscicide consisting of a soluble formulation of copper. EarthTec QZ™'s proprietary formulation ensures that the active ingredient – metallic copper – is delivered in the form of the biologically available cupric ion, Cu²⁺. Before treating bodies of water, consult NPDES permitting authorities. Do not exceed a free metallic copper concentration (background + applied copper) in treated water of 1.0 ppm (mg/L), equivalent to 16.7 mg/L of EarthTec QZ™.

This product has diffusional properties that move the ions through the water according to physical conditions. The product will stay soluble in the water until the ions are taken up by the algae/bacteria (non-public health) or affected by physical properties. When treating flowing waters use a metering pump or similar means to apply a continuous dose so as to achieve a final dilution within the recommended range. See Specific Directions for Use.

**SPECIFIC DIRECTIONS FOR USE
MOLLUSCICIDE**

OPEN WATERS: To Control Quagga and Zebra Mussels in Lakes, Ponds, Lagoons, Reservoirs, and Potable Water Supplies: In open or slow-moving, quiescent waters use as a curative measure, i.e., when mussels (veliger, juvenile or adult) have been detected. EarthTec QZ™ is miscible in water and has ionic diffusion properties that cause it to readily disperse throughout the water column. Apply near the water surface and allow to disperse, or where means exist, deliver via hose and pump to the depths, sites, and surfaces of worst infestation. When applying to large areas, disperse along a route with gaps no greater than 200 feet. When fish are present, do not treat more than one-half of the body of water at a time, starting near one shore and moving outward in bands so as to allow fish to move away. When treating half of a body of water, the second half must not be treated within 14 days from the last treatment. For effective control of adult and juvenile mussels, apply at the recommended rate of 2 to 16 parts per million EarthTec QZ™ (i.e., 2 to 16 gallons of EarthTec QZ™ per million gallons of water) to yield a rate of 0.120 to 0.960 mg/L (ppm) metallic copper. Do not exceed 1.0 mg/L (equivalent to 16.7 ppm EarthTec QZ™) metallic copper in any single application or in the treated water (background + applied). Allow at least 4 days for mortality to occur. Colder water temperatures may require longer exposures and doses closer to the high end of the allowable range. Within the half of the water body being treated repeat applications are permissible if needed to maintain lethal concentrations of copper for sufficient time period. When re-applying, do not exceed a resulting concentration of 1.0 mg/L of metallic copper (background + applied copper) in the treated water. Do not treat the second half of the body of water within 14 days of the last treatment of the first half. Effective control can also be achieved by longer exposures (e.g., 5-30 days) at lower doses (1 to 5 parts per million EarthTec QZ™, to yield a rate of 0.06 to 0.30 mg/L (ppm) metallic copper). Repeat doses are permissible and may be required for severe infestations. When reapplying, do not exceed a resulting concentration of 1.0 mg/L (ppm) metallic copper in the treated water (background + applied).

Dose Rate for Molluscicide EarthTec QZ™ in Open Waters (LOW DOSES)

Acres	Depth (ft)	Acre-Ft to Treat	Million Gallons to Treat	Desired ppm, EarthTec	Desired ppm, as copper	EarthTec Dose Rate (gals)	Desired ppm, EarthTec	Desired ppm, as copper	EarthTec Dose Rate (gals)
0.1	3	0.3	0.1	1.0	0.06	0.10	2.0	0.12	0.20
0.5	3	1.5	0.5	1.0	0.06	0.50	2.0	0.12	1
1	3	3.0	1.0	1.0	0.06	1	2.0	0.12	2
1	6	6.0	2.0	1.0	0.06	2	2.0	0.12	4
10	3	30	10	1.0	0.06	10	2.0	0.12	20
10	4.5	45	15	1.0	0.06	15	2.0	0.12	30
10	6	60	20	1.0	0.06	20	2.0	0.12	40
20	3	60	20	1.0	0.06	20	2.0	0.12	40
100	3	300	100	1.0	0.06	100	2.0	0.12	200
1000	3	3,000	1,000	1.0	0.06	1,000	2.0	0.12	2,000

Dose Rate for Molluscicide EarthTec QZ™ in Open Waters (MEDIUM DOSES)

Acres	Depth (ft)	Acre-Ft to Treat	Million Gallons to Treat	Desired ppm, EarthTec	Desired ppm, as copper	EarthTec Dose Rate (gals)	Desired ppm, EarthTec	Desired ppm, as copper	EarthTec Dose Rate (gals)
0.1	3	0.3	0.1	4.0	0.240	0.40	10.0	0.600	1.00
0.5	3	1.5	0.5	4.0	0.240	2.00	10.0	0.600	5
1	3	3.0	1.0	4.0	0.240	4	10.0	0.600	10
1	6	6.0	2.0	4.0	0.240	8	10.0	0.600	20
10	3	30	10	4.0	0.240	40	10.0	0.600	100
10	4.5	45	15	4.0	0.240	60	10.0	0.600	150
10	6	60	20	4.0	0.240	80	10.0	0.600	200
20	3	60	20	4.0	0.240	80	10.0	0.600	200
100	3	300	100	4.0	0.240	400	10.0	0.600	1,000
1000	3	3,000	1,000	4.0	0.240	4,000	10.0	0.600	10,000

Dose Rate for Molluscicide EarthTec QZ in Open Waters (MAXIMUM DOSE)

Acres	Depth (ft)	Acre-Ft to Treat	Million Gallons to Treat	Desired ppm, EarthTec	Desired ppm, as copper	EarthTec Dose Rate (gals)
0.1	3	0.3	0.1	16.7	1.0	1.7
0.5	3	1.5	0.5	16.7	1.0	8.4
1	3	3.0	1.0	16.7	1.0	16.7
1	6	6.0	2.0	16.7	1.0	33.5
10	3	30	10	16.7	1.0	167
10	4.5	45	15	16.7	1.0	251
10	6	60	20	16.7	1.0	335
20	3	60	20	16.7	1.0	335
100	3	300	100	16.7	1.0	1,673
1000	3	3,000	1,000	16.7	1.0	16,733

When calculating dose rates for a given volume of water, achieve a desired concentration of metallic copper in the water to be treated by using the following general formula:

$$\frac{\text{Gallons of EarthTec QZ™ Applied:}}{\text{Million Gallons to be Treated}} \times 0.06 = \text{parts per million Copper in the Treated Water}$$

For example, treating 3 million gallons with 4.5 gallons of EarthTec QZ™ (a rate of 1.5 ppm as EarthTec QZ™) will yield a final copper dose of: (4.5 gals / 3 million gallons) x 0.06 = 0.09 mg/L as copper = 90 ppb as copper.

Always use volumetric measurement devices that are calibrated in accordance with manufacturer specifications.

FLOWING WATERS: To Control the Mollusk Pests Quagga and Zebra Mussels in flowing potable water supplies+; canals; ditches; aqueducts; and equipment/structures that deliver the treated water directly to publicly owned water treatment facilities to include pipes, intake structures, gatehouses, screens, pumping stations, weirs, penstocks: In flowing waters, use when mollusks (veliger, juvenile, or adult) have been detected. May be used as a curative measure when adult or juvenile mollusks are present, or as a preventative measure (to inhibit colonization) when adults and/or planktonic larval mollusks have been detected.

EarthTec QZ™ may be used continuously on flowing waters as a means of preventing further spread and colonization of mollusks. Start the continuous application when mollusks are present and end application when mollusks are no longer present. Use a metering pump to apply a continuous dose so as to achieve a final dilution of 1 to 16 ppm EarthTec QZ™ (0.06 to 0.96 ppm metallic copper, or mg/L). Do not exceed 1.0 ppm free metallic copper (background + applied) in the flowing water, equivalent to 16.7 ppm as EarthTec QZ™. If adult mollusks are already present, allow at least 4 days for mortality to occur, or longer for very well-established populations where adults appear in clumps. For most situations satisfactory control will be obtained at a continuous dose of 1 to 5 ppm EarthTec QZ™ (i.e., 0.06 to 0.30 mg/L (ppm) metallic copper). Colder water temperatures may require longer exposure and a dose rate closer to the high end of the allowable range.

Once the initial infestation has been cleared from surfaces, a continuous maintenance dose of 0.6 to 2.0 ppm EarthTec QZ™ (yielding a metallic copper concentration of 36 to 120 ppb) can be used to prevent further colonization.

Example Dose Rates for EarthTec QZ™ in Flowing Waters (LOW DOSE)

cfs	gal/min	MGD	Desired ppm, EarthTec	Desired ppm, as copper	EarthTec Feed Rate (fluid oz/ min)	EarthTec Feed Rate (ml/min)	Desired ppm, EarthTec	Desired ppm, as copper	EarthTec Feed Rate (fluid oz/ min)	EarthTec Feed Rate (ml/min)
1	449	0.65	1.0	0.06	0.06	1.70	2.0	0.12	0.11	3.40
1.55	696	1.0	1.0	0.06	0.09	2.63	2.0	0.12	0.18	5.27
3	1,346	1.9	1.0	0.06	0.17	5.10	2.0	0.12	0.34	10.2
4	1,795	2.6	1.0	0.06	0.23	6.80	2.0	0.12	0.46	13.6
5	2,244	3.2	1.0	0.06	0.29	8.49	2.0	0.12	0.57	17.0
10	4,488	6.5	1.0	0.06	0.57	17.0	2.0	0.12	1.15	34.0
15.47	6,943	10	1.0	0.06	0.89	26.3	2.0	0.12	1.78	52.6
50	22,442	32	1.0	0.06	2.87	84.9	2.0	0.12	5.74	170
100	44,883	65	1.0	0.06	5.74	169.9	2.0	0.12	11.5	340
155	69,429	100	1.0	0.06	8.89	262.8	2.0	0.12	17.8	526
1,000	448,830	646	1.0	0.06	57	1,699	2.0	0.12	115	3,398

Example Dose Rates for EarthTec QZ™ in Flowing Waters (MEDIUM AND HIGH DOSES)

cfs	gal/min	MGD	Desired ppm, EarthTec	Desired ppm, as copper	EarthTec Feed Rate (fluid oz/ min)	EarthTec Feed Rate (ml/min)	Desired ppm, EarthTec	Desired ppm, as copper	EarthTec Feed Rate (fluid oz/ min)	EarthTec Feed Rate (ml/min)
1	449	0.65	5.0	0.30	0.29	8.49	16.0	0.96	0.92	27.2
1.55	696	1.0	5.0	0.30	0.45	13.2	16.0	0.96	1.42	42.1
3	1,346	1.9	5.0	0.30	0.86	25.5	16.0	0.96	2.76	81.5
4	1,795	2.6	5.0	0.30	1.15	34.0	16.0	0.96	3.68	109
5	2,244	3.2	5.0	0.30	1.44	42.5	16.0	0.96	4.60	136
10	4,488	6.5	5.0	0.30	2.87	84.9	16.0	0.96	9.19	272
15.47	6,943	10	5.0	0.30	4.44	131	16.0	0.96	14.2	420
50	22,442	32	5.0	0.30	14.4	425	16.0	0.96	46.0	1,359
100	44,883	65	5.0	0.30	28.7	849	16.0	0.96	91.9	2,718
155	69,429	100	5.0	0.30	44.4	1,314	16.0	0.96	142	4,205
1,000	448,830	646	5.0	0.30	287	8,494	16.0	0.96	919	27,180

MGD = Million Gallons per Day, cfs = Cubic Feet per Second

APPLICATION AND HANDLING EQUIPMENT

Application, handling or storage equipment MUST consist of fiberglass, PVC, polypropylene, viton, corrosion resistant plastics or stainless steel. Never use mild steel, nylon, brass or copper around EarthTec®. Always rinse and clean equipment thoroughly each night with plenty of fresh, clean water.

PESTICIDE STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal. **PESTICIDE STORAGE:** Store in a safe place away from pets and keep out of the reach of children. Store away from excessive heat. EarthTec QZ™ will freeze. Always store EarthTec QZ™ above 32 degrees F (Do Not Freeze). Freezing may cause product separation.



DO NOT FREEZE

Always keep container closed. Keep away from galvanized pipe, and any nylon storage or handling equipment.

DISPOSAL

PESTICIDE DISPOSAL: Pesticide wastes are acutely hazardous. Improper disposal of excess EarthTec QZ™ mixture or rinsate is a violation of federal law. If these wastes cannot be disposed of by use according to label instructions, contact your state pesticide or environmental control agency, or the hazardous waste representative at the nearest EPA regional office for guidance. In the event of spill, neutralize with limestone or baking soda before disposal. May deteriorate concrete.

CONTAINER HANDLING:

Containers with capacities less than 5 gallons: Nonrefillable container. Do not reuse or refill this container. Triple rinse container (or equivalent) promptly after emptying. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use and disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure 2 more times. Offer for recycling if available. If recycling is not available, puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

Containers with capacities greater than 5 gallons: Nonrefillable container. Do not reuse or refill this container. Offer for recycling, if available. Triple rinse container (or equivalent) promptly after emptying. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least 1 complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use and disposal. Repeat this procedure 2 more times. Offer for recycling if available. If recycling is not available, puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

Containers too large to shake: Refillable container. Refill this container with pesticide only. Do not reuse this container for any other purpose. Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or mix tank. Fill the container about 10% full with water. Agitate vigorously or recirculate water with the pump for 2 minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure 2 more times. Offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

**IMPORTANT
READ BEFORE USING
LIMITED WARRANTY AND LIMITATION OF REMEDIES**

Read the entire Directions for Use, Limited Warranty and Limitation of Remedies (including limitations on liability) before using this product. If terms are not acceptable, return the unopened product container at once. By using this product, user or buyer accepts the following conditions, disclaimer of warranties and limitations of liability.

The Directions for Use of this product are believed to be adequate and must be followed carefully. However, it is impossible to eliminate all risks associated with the use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials, or the manner of use application, all of which are beyond the control of Earth Science Laboratories, Inc. To the extent consistent with applicable law, all such risks shall be assumed by the user or buyer.

To the extent consistent with applicable law, seller warrants that the product conforms to the chemical description and is reasonably fit for the purpose stated on the label for use under normal conditions, but makes no other warranties of FITNESS OR MERCHANTABILITY expressed or implied, or any other warranty if the product is used contrary to the label instructions, or under conditions not foreseeable to the seller. To the extent consistent with applicable law, the seller shall not be liable for more than the cost of this product to the buyer and will in no event be liable for any consequential, special or indirect damages connected with the use or handling of this product. This product is offered and the buyer or user accepts it subject to the foregoing terms which may not be varied. Seller makes no warranty for product which has been frozen.



Certified to NSF/ANSI 60

