
2019
LAKE ROOSEVELT
INVASIVE MUSSEL
RESPONSE EXERCISE
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2019 Lake Roosevelt Invasive Mussel Rapid Response Exercise

After Action Report

Kettle Falls Marina, Lake Roosevelt National Recreation Area, Kettle Falls, WA

October 22-24, 2019

Divers gearing up, and containment system deployment at Kettle Falls Marina.

Photo courtesy of Washington Department of Fish and Wildlife, Rachel Blomker

This project was made possible by funding provided to the State of Washington Recreation and Conservation Office by the U.S. Department of Interior Bureau of Reclamation via contract # R18AP00055.

This exercise was planned and implemented by the following organizations:

Washington Invasive Species Council

Washington Department of Fish and Wildlife

Spokane Tribe of Indians

Colville Confederated Tribes

US Bureau of Reclamation

U.S. National Park Service

With the support and technical assistance from:

Able Cleanup Tech

Alberta Environment and Natural Resources

The Office of Representative Kathy McMorris Rogers

Pacific States Marine Fisheries Commission

Regional District of Okanagan-Similkameen

Representative Jacqueline Maycumber

TVW – Washington's Public Affairs NetworkUS Army Corps of Engineers

US Coast Guard Auxiliary

Washington House of Representatives

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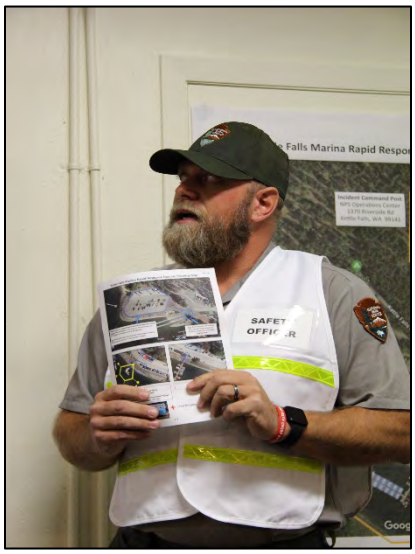
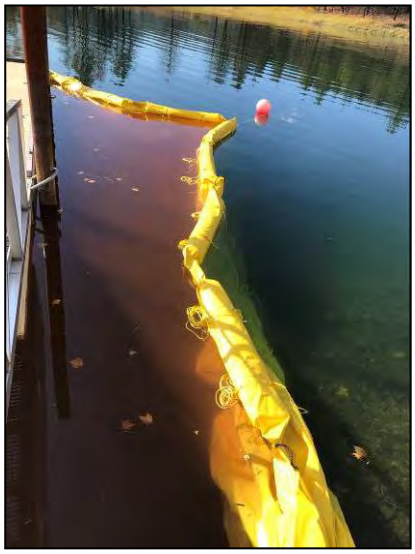
Introduction

On October 22-24, 2019, sixteen tribal, state and federal agencies, other managing organizations, and partners assembled to enact Washington State's first operations-based response exercise to a fictitious discovery of dreissenid veligers in the Kettle Falls Marina located within the Lake Roosevelt National Recreation Area. In total, 59 individuals, representing 16 different organizations participated in the full-day exercise. The exercise utilized the Incident Command System (ICS), which is a command structure typically applied to emergency situations; including the discovery of an invasive species. Prior to the exercise, multiple trainings of the ICS command structure and its various utilities was offered to all participants, and a functional exercise to test response in a discussion-based setting were held as foundational events. The reasoning behind these trainings and preparation was to provide a structure where command lines are clear, and methods to complete goals and objectives are defined for all participants.





The exercise was a hypothetical response scenario that followed a timeline and chronological overview of events that would take place after a sampling and confirmation of presence of dreissenids in the Kettle Falls Marina. The scenario utilized the Lake Roosevelt National Recreation Area as the location of the detection. Lake Roosevelt is a 130 mile long lake formed after the completion of the Grand Coulee Dam in 1941 that resides in northeast Washington 150 miles from the Canadian border. The location was chosen intentionally, as it shares jurisdiction between several state and federal agencies, an international border, local tribes, managing partners, and the recreating public. In the event that invasive freshwater mussels were introduced, the Columbia system would be the most likely place, as well as have the farthest reaching impact on native species.

The exercise concluded on October 24th, with a short in-person debrief of the response—focusing on lessons learned, and what went well during the course of the day's events. Further discussion between stakeholders is currently in the works as to how best to share the success and completion of the drill with partners; as well as make materials and talking points available for those who would like to use them.

Funding for the exercise was provided by the U.S. Department of Interior Bureau of Reclamation through an agreement with the Washington Recreation and Conservation Office. This funding supported the planning, meeting facilities, travel costs, supplies, equipment, and other incidentals.

Methodology

On March 12, 2019, an exercise planning team was assembled to hold an initial planning meeting for the purpose of reviewing prior discussion-based mussel response exercise After Action Reports (AARs), reviewing Washington State and Columbia Basin response plans, setting expectations, and scheduling future events. The exercise team included the following individuals:

- Eric Anderson, Washington Department of Fish and Wildlife
- Justin Bush, Washington Recreation and Conservation Office
- Leah Elwell, Invasive Species Action Network on behalf of Pacific States Marine Fisheries Commission
- Dan Foster, US National Parks Service
- Bryan Horsbugh, US Bureau of Reclamation
- Tamara Knudson, Spokane Tribe of Indians
- Holly McClellan, Confederated Tribes of the Colville Reservation
- Heidi McMaster, US Bureau of Reclamation
- Brent Nichols, Spokane Tribe of Indians
- Allen Pleus, Washington Department of Fish and Wildlife
- Brianna Widner, Washington Recreation and Conservation Office

The exercise planning team hosted a workshop on May 13, 2019 for the purpose of discussing and documenting authorities, notification processes, and overall response framework for the upcoming invasive mussel drill. During the May workshop, the planning team decided on the Kettle Falls Marina, in Kettle Falls, Washington as an ideal location to host the mussel exercise.

In the interim period, exercise participants took Federal Emergency Management Administration Emergency Management Institute Trainings to establish a common baseline of incident command training that included:

1. IS-100: Introduction to the Incident Command System
2. IS-200: Basin Incident Command System for Initial Response
3. IS-700: An Introduction to the National Incident Command System
4. IS-800: National Response Framework, an Introduction

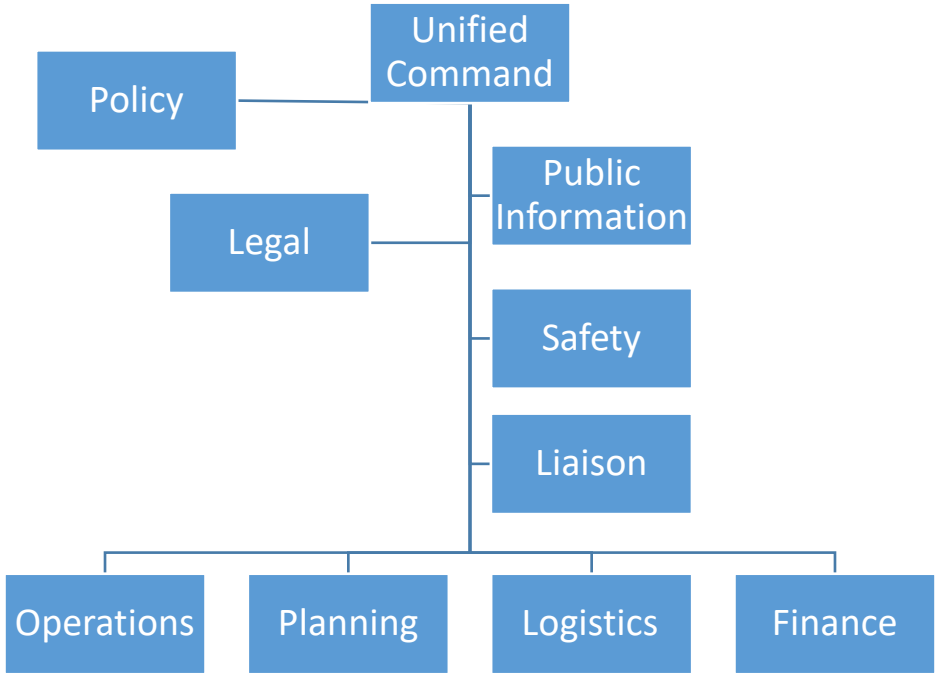
Exercise participants were also invited to take part in Incident Command System 300: Intermediate Incident Command System for Expanding Incidents training held in Olympia, WA from July 24-26, 2019. In total, 23 individuals attended the ICS-300 course and received certificates of completion from the State of Washington Emergency Management Division.

The exercise planning team was then replaced by delegates of each organization having jurisdiction operating as incident commanders. Commanders included:

- Craig Brouwer, US National Park Service
- Heidi McMaster, US Bureau of Reclamation

- Brent Nichols, Spokane Tribe of Indians
- Bret Nine, Colville Confederated Tribes
- Allen Pleus, Washington Department of Fish and Wildlife

The organizations determined that decision making would be shared and that unified command would be used for this exercise. The Unified Commanders, Command and General Staff to the Unit Leader level met on September 4, 2019 to hold a ½ day Mid Term Planning Meeting. At this meeting the planning team engaged with officials to settle logistical and organizational issues.



Building on the successful Midterm Planning Meeting, Unified Command held a Functional Exercise in Spokane, WA on September 5th. The key focus of the exercise was to practice unified commend operations and to make operational decisions in a controlled setting prior to field implementation.

Following the Functional Exercise, the Unified Command, Safety Officer, Planning Section, and all Operations Section personnel met in Kettle Falls, WA to hold an Operations Planning Workshop, to discuss how they would implement the objectives of Unified Command both safely and efficiently. The Planning Workshop culminated in a site-visit to Kettle Falls Marina.

Following stakeholder input, negotiation and formalization of process, objectives, and safe implementation through training and preparation, the exercise team then held an operations-based exercise in Kettle Falls from October 22-24, 2019.

Operations Chief reviewing logistics for the day's exercise.
Photo courtesy of Washington Department of Fish and Wildlife, Rachel Blomker

Goals and Objectives

There were four main goals at the start of the mussel response exercise including:

1. Safety—provide for overall ICS security and safety of all command, general and operational teams
2. Disseminate timely and accurate information –
    a. To local, state, federal, and tribal cooperators
    b. To public through social media, press releases, networks, etc.
3. Identify, coordinate, and move towards containment –
    a. Make plans for physical containment of Dreissenid veliger's in Kettle Falls Marina;
    b. Make plans for physical containment of Dreissenid pathways in and out of Kettle Falls Marina; and
    c. Make plans for assessing Dreissenid presence and distribution at all life stages within a 10-mile radius of Kettle Falls Marina.
4. Develop long-term planning: create plans for ongoing containment, continuous and limited identification and/or eradication.

Alberta conservation canine, Hilo, found traces of mussels along the beach.
Photo courtesy of Washington Department of Fish and Wildlife, Rachel Blomker

Although completing all these goals during the course of a one day exercise was quite ambitious, through the combined effort and dedication of all involved, each goal was completed! Remaining projects will be completed once all the data is collected and compiled in such a way that it can be shared to a broader audience.

Outcomes, Lessons, and Takeaways

All participants completed a demobilization form at the close of the exercise. During this time each individual was interviewed to gather feedback on the strengths and weaknesses of the day's events.

Top Ten Strengths Observed:

1. Established timeline was followed
2. Communication was appropriately shared up and down the chain of command
3. The boom contained the dye successfully
4. The majority of objectives were carried out as planned
5. Public Information Officers were able to take photos and compile videos
6. Everyone, save the Coast Guard Auxiliary team, checked in and checked out
7. Both canine survey teams detected 100% of hidden mussels
8. The standard operating procedures for dive operations was followed and the protocol was determined to be immensely helpful for the exercise
9. Teamwork was excellent—especially considering it was a large (40+) group of people, many of whom had never worked together before
10. Canine teams were able to meet, and scan the exercise area in advance, which ensured shoreline survey teams were working collaboratively

Top Ten Challenges and Lessons Learned:

1. Need to field test equipment before use—problems arose during the exercise with the containment boom, generators, spraying attachments for decontamination unit, etc.
2. Dive team observed that surveying around a metal dock caused malfunctions in their compasses and equipment—something to be mindful of especially in future low visibility situations.
3. For better communication, feedback was received of the need to use radios instead of cell phones. Radios would allow for everyone involved to hear what's going on, in addition to the fact that radios don't depend on a cell phone signal.
4. In a real incident, or future drill, the planning team needs to ensure there is reliable Wi-Fi. For example, the hotspots staff were using on their phones during the drill was not sufficient for all the online needs.
5. More practice is needed with the containment boom to ensure staff are comfortable, and familiar with deployment.
6. Further discussion and follow-up is needed in regards to managing data. For example, state and federal agencies have policies against some document sharing sites (google drive, Box, etc.) however, if documents are shared over email there are issues with size limitations and versioning.
7. When deploying the dye, it would be valuable if there was a plan for how best to disperse the dye when the water is stagnant. During the drill there was a lot of last minute trouble shooting when it was discovered that the dye was not

dispersing in the way that was expected. This led to more time to find a solution, additional equipment requests, and other unplanned miscellaneous needs.

8. If drills similar to these are to become a regular exercise in the future, there could be some benefit to distinguishing between ICS lite and standard ICS
9. Staff realized there was unnecessary duplication in some of the forms, resulting in delay. For example, the forms that the decontamination team and inspectors used today are all electronic. Staff printed them out specifically for the drill, but it added a small amount of work and redundancy.
10. There were several small oversights in equipment needs as the day progressed. For example, the dive team needed containers for specimens, a knife was requested for the boom team, etc. By documenting needs as they arise, this could potentially prevent similar oversights in the future.

Top Takeaways for future events:

1. Need to revise and/or create a state response plan.
2. All information from this drill needs to be compiled and disseminated to all interested parties.
3. There could be a benefit to scheduling a MAC/Unified Command Workshop for staff.
4. All staff should be at least familiar with the ICS structure, could be a benefit to making trainings mandatory for staff members that do this work.

Summary

In summary, the Kettle Falls Marina Rapid Response Exercise was a great success for all involved. Knowing this drill was the first of its kind, laying the foundation for similar drills to follow—all the planning and preparation that went into it's creation was well worth the time and effort.

A video summary of the exercise may be viewed at https://youtu.be/A4GFvLUKOBI.

Divers gearing up, and containment system deployment at Kettle Falls Marina.
Photo courtesy of Washington Department of Fish and Wildlife, Rachel Blomker

Appendix A

Kettle Falls Marina Rapid Response Exercise Participant List

Participant Name	Affiliation
Anderson, Eric	WA State Department of Fish and Wildlife
Bausch, Denise	National Park Service
Bishop, Gerald	U.S. Coast Guard Auxiliary
Blomker, Rachel	WA State Department of Fish and Wildlife
Brouwer, Craig	National Park Service
Bush, Justin	WA State Recreation and Conservation Office
Carter, Kraig	WA State Department of Fish and Wildlife
Chamberlain, Samuel	National Park Service
Couch, Eryn	WA State Recreation and Conservation Office
Davidson, Bryan	WA State Department of Fish and Wildlife
DeHaas, Derek	WA State Department of Fish and Wildlife
Denny, Kelly	WA State Department of Fish and Wildlife
DeForest, Adam	Able Cleanup Technologies
DeWinkler, Jeff	U.S. Bureau of Reclamation
Draheim, Robyn	Pacific States Marine Fisheries Commission
Dunn, David	National Park Service
Edwards, Jon	National Park Service
Engell, Andrew	Representative McMorris Rodgers Office
Estell, Stephanie	WA State Department of Fish and Wildlife
Foster, Dan	National Park Service
Gould, Patsy	Colville Confederated Tribes
Hageman, Alan	National Park Service
Hagemann, Cassie	National Park Service
Haifley, Alexis	WA State Recreation and Conservation Office
Harris, James	U.S. Coast Guard Auxiliary
Johnson, Phillip	WA State Department of Fish and Wildlife
Kimball, Taylor	WA State Department of Fish and Wildlife
Knauss, Nicholas	WA State Department of Fish and Wildlife
Knudson, Tamara	Spokane Tribe of Indians
Koontz, Joshua	WA State Department of Fish and Wildlife
Largin, Derick	WA State Department of Fish and Wildlife
Martinson, Dave	TV Washington
Maycumber, Jacquelin	WA State House of Representatives
Mckay, Ben	National Park Service
McLellan, Holly	Colville Confederated Tribes
McMaster, Heidi	U.S. Bureau of Reclamation
McNamara, Julia	WA State Recreation and Conservation Office
Merg, Kurt	WA State Department of Fish and Wildlife
Monaghan, Brian	Colville Confederated Tribes
Peone, Mitchell	Colville Confederated Tribes
Peters, Michael	TV Washington
Phillips, Allen	Able Cleanup Technologies
Pleus, Allen	WA State Department of Fish and Wildlife
Ramsay, Nicholas	WA State Department of Fish and Wildlife
Sawchuk, Cindy	Government of Alberta
Schultz, Jesse	WA State Department of Fish and Wildlife
Silver, Kipp	Able Cleanup Technologies
Smith, Matt	National Park Service

Steinert, Andy	National Park Service
Taylor, Pam	WA State Department of Fish and Wildlife
Treu-Fowler, Julia	National Park Service
Troyer, Bernard Paul	U.S. Coast Guard Auxiliary
Vaisler, Sean	Regional District of Okanagan-Similkameen
Visser, Richard	WA State Department of Fish and Wildlife
Walter, Damian	US Army Corps of Engineers
Widner, Brianna	WA State Recreation and Conservation Office
Wilkinson, Mike	WA State Department of Fish and Wildlife
Wold, Brendon	WA State House of Representatives
Wolvert, Shay	Colville Confederated Tribes

Appendix B

Kettle Falls Marina Rapid Response Players Handbook

EXERCISE! - - EXERCISE! - - EXERCISE!

This document provides several planning components for the Kettle Falls Marina Rapid Response Exercise (KFMRRE) and is divided into the following sections:

1. Hypothetical response scenario and timeline that provides a chronological overview from original sampling event to the proposed ICS operational and command exercises.
2. ICS exercise tasks and objectives by role including KFMRRE Coordination, Incident Command Facilitation, Multiagency Coordination (MAC) group, Command Staff, General Staff, and Field Unit Leads.
3. ICS Hot Wash objectives for October 24th
4. Post-Operational exercise objectives.

RESPONSE SCENARIO & TIMELINE July 31, 2019:

a) WDFW Aquatic Invasive Species (AIS) Unit early detection monitoring crews collected routine plankton, substrate, shoreline, Ponar benthic, eDNA (environmental DNA), and water quality samples from Kettle Falls Marina.
b) Substrate, shoreline, and Ponar benthic samples were immediately assessed by WDFW staff with no Dreissenids detected.

August 15, 2019:

a) WDFW sent preserved plankton samples to primary Dreissenid (zebra and/or quagga) microscopy contractor as per routine protocols.
b) WDFW sent eDNA samples to primary genetics contractor per routine protocols.

August 22, 2019:

a) WDFW primary Dreissenid microscopy contractor contacted WDFW to report he had verified detection of three (3) Dreissenid veliger's (larval life stage) in the plankton sample.
b) Primary contractor was directed to immediately send samples to WDFW's secondary microscopy contractor.
c) Primary eDNA contractor alerted to expedite analysis.

August 26, 2019:

a) WDFW secondary Dreissenid microscopy contractor contacted AIS Unit and verified detection of three Dreissenid veliger's in the plankton sample.
b) Primary eDNA contractor reported negative result from analysis of sample.
c) WDFW advised the Office of the Governor of Washington State of the detection and designation of Kettle Falls Marina as a **SUSPECT** water body for the presence of invasive Dreissenid mussels.
d) WDFW directed their AIS Unit early detection monitoring team to collect samples

e) WDFW contacted primary jurisdictional leads (National Park Service, Colville Confederated Tribes, Spokane Tribe, and U.S. Bureau of Reclamation) alerting them to the SUSPECT designation.
f) WDFW initiated a Type 5 Incident Command System for addressing risks and additional rapid response management actions recommended for Kettle Falls Marina, Lake Roosevelt, and surrounding areas.
g) Initial meeting is conference call set for September 5, 2019, at 1000hr.

August 27, 2019:

a) WDFW AIS Unit early detection monitoring crews collected additional plankton, substrate, shoreline, Ponar benthic, eDNA (environmental DNA), and water quality samples from four (4) additional sample sites in Kettle Falls Marina and ten (10) additional sample sites in the area upstream to Kettle Falls bay and downstream to Martin Creek. Crews collected duplicate plankton samples.
b) Substrate, shoreline, and Ponar benthic samples were immediately assessed by WDFW staff with no Dreissenids detected.
c) WDFW AIS Unit sent duplicate plankton samples by overnight express to primary and secondary Dreissenid microscopy contractors.
d) WDFW AIS Unit sent eDNA samples by overnight express to primary eDNA contractor.

August 28, 2019:

a) WDFW's primary microscopy contractor verified detection of six (6) Dreissenid veliger's in sample "LR-3" taken within Kettle Falls Marina and secondary microscopy contractor verified detection of two (2) Dreissenid veliger's in same sample "LR-3." Samples taken at 13 other survey sites were negative for Dreissenids.
b) WDFW advised the Office of the Governor of Washington State of the detection and revised designation of Kettle Falls Marina as a **POSITIVE** water body for the presence of invasive Dreissenid mussels.
c) WDFW contacted primary jurisdictional leads (National Park Service, Colville Confederated Tribes, Spokane Tribe, and U.S. Bureau of Reclamation) alerting them to the POSITIVE designation.
d) WDFW initiated a Type 4 Incident Command System request to establish a Unified Command for incident titled "Kettle Falls Marina Rapid Response" (KFMRR) comprised of jurisdictional leads for addressing risks and additional rapid response management actions recommended for Kettle Falls Marina, Lake Roosevelt, and surrounding areas.
e) KFMRR Incident Command Post and first meeting set for September 5, 2019, starting at 1000hr – located at Enduris Training Center in Spokane, Washington.

September 5, 2019:

1. Briefing
2. ICP established
3. Incident objectives established
    a. Safety – provide for overall ICS security and safety of all command, general and operational teams

b. Disseminate timely and accurate information -
    i. To local, state, federal, and tribal cooperators (Liaison)
    ii. To public through social media, press releases, networks, etc. (PIO)
c. Identify, coordinate and move towards containment -
    i. Make plans for physical containment of Dreissenid veliger's in Kettle Falls Marina;
    ii. Make plans for physical containment of Dreissenid pathways in and out of Kettle Falls Marina; and
    iii. Make plans for assessing Dreissenid presence and distribution at all life stages within a 10-mile radius of Kettle Falls Marina.
d. Develop long-term planning – develop plans for ongoing containment, continuous and limited identification and/or eradication.

4. IAP approved including following operation actions:
    i. Boat-based detection surveys
    ii. Shoreline detection surveys using canines
    iii. Dive detection surveys
    iv. Watercraft inspections
    v. Watercraft decontaminations
    vi. Containment boom
    vii. Water safety zone

October 22, 2019

Time	Location	Action
As needed	Various	Operations personnel and equipment mobilize to KFM
1500	KFM	Safety Officer inspects incident area for risks/hazards (ICS Forms 208 or 208HM and 215A Completion)
1600	KFM	Staging Area Manager checks-in all field operations personnel and equipment (ICS Form 218)
1630	KFM	All ICS exercise personnel briefing in NPS conference room (ICS Form 204)
1700	KFM	End of exercise for day

October 23, 2019

Time	Location	Action
0800	ICP	Operations briefing based on 9/5 IAP (ICS Forms 201 and 202)
		Safety Briefing from 215A
0830	KFM	Operations actions implemented
1200	KFM/ICP	Working lunches provided
1600	KFM	Hard Stop all operational actions
1700	KFM	Check-out/demobilize operations personnel completed (ICS Forms 204 and 218)
1700	ICP	Operations closing briefing
1730	ICP	End of exercise for day

October 24, 2019

Time	Location	Action
0800	ICP	Operations overview
0830	ICP	Exercise objectives evaluation by action
0930	ICP	Exercise “Hot Wash” of good/bad/recommendations
1100	ICP	Exercise completion

*KFM = Kettle Falls Marina; ICP = Incident Command Post at NPS Operations Center.

ICS EXERCISE TASKS & OBJECTIVES BY ROLE

All “Exercise Objectives” times are for October 23, 2019. The General Staff will exercise using an Incident Action Plans (IAP) based on a POSITIVE water body classification. There will be no specific MAC/UC exercise during this period. The following provides an outline of the exercise by response group type, personnel, their roles and responsibilities, and objectives.

2a. KFMRRE Coordination

Personnel

Justin Bush (RC); Allen Pleus, Eric Anderson, and Phil Johnson (WDFW)

Pre-Exercise Tasks

1. Develop operations exercise plan (this document)
2. Notify MAC, UC, and ICS Facilitator of revised exercise plan
3. Notify General Staff that are no longer required for this exercise period
4. Finalize NPS Special Use Permit
5. Coordinate plan with USBR on contract requirements
6. Coordinate exercise logistics (meeting locations, lodging, reimbursements, etc.)
7. Approve exercise joint press release
8. Establish IC Post at NPS Operations Center including Hot Spot Wi-Fi
9. WDFW train RCO on use of story map product
10. ICS Facilitation
    a. Coordination
    b. Inter-agency agreement(s) as necessary
11. Videography
    a. Develop SOW
    b. Contract with TVW

Exercise Objectives

1. Participate in roles as assigned
2. Support successful completion of Operational exercise objectives

Post-Exercise Tasks

1. Oct. 24: Participate in Hot Wash to review objectives
2. Coordinate completion of After Action Report
3. Coordinate completion of Video product
4. Coordinate completion of Revised Washington State Rapid Response Plan
5. Assess need for additional ICS tabletop exercise
6. Finalize USBR contract obligations

2b. Incident Command Facilitation

Personnel

Captain Phil Johnson (WDFW)

Pre-Exercise Tasks

1. Assist RCO/WDFW in developing operations exercise script/plan
2. Complete POSITIVE IAP
    a. ICS 200 (IAP cover)
    b. ICS 201 (Incident Briefing)
    c. ICS 203 (Organization Assignment List)
    d. ICS 204 (Assignment List)
    e. ICS 205 (Incident Radio Communications Plan)
    f. ICS 206 (Medical Plan)
    g. ICS 207 (Organizational Chart)
    h. ICS 208 (Safety Message)
    i. ICS 2015a (Incident Action Plan Safety Analysis)
    j. ICS 221 (Demobilization Plan)
3. All equipment/materials operational and staged for

deployment Exercise Objectives

1. Assist Operation Section Chief/Deputy to ensure field exercise plan adheres to ICS format

Post-Exercise Tasks

1. Oct. 24: Attend Hot Wash to ensure ICS objectives are met
2. Provide input and review of After Action Report from ICS perspective
3. Provide input and review of revised Washington Rapid Response Plan from ICS

perspective

Exercise Observers

Personnel

Robyn Draheim (PSMFC); Joe Maroney (Kalispel Tribe);_

Pre-Exercise Tasks

1. Confirm Observer participation status

Exercise Objectives

1. Coordinate with and follow ICS Branch Director and Safety Officer directives on observation boundaries
2. Observe exercise actions based on own needs

Post-Exercise Tasks

1. Provide feedback to RCO and WDFW on observations
2. Provide review of After Action Report
3. Provide input and review of revised Washington Rapid Response Plan

2c. Multiagency Coordination (MAC) Group

Personnel

Stephen Pozzanghera (WDFW); JT Austin (GOV); Dan Foster (NPS); BJ Kieffer (STI); Randall Friedlander (CCT);

_____ (USBR); LT Luke Woods (USCG); Ray Willard (WISC); Marvin Shutters (USACE); Johnna Roy (USFWS); Stephen Phillips (Columbia Basin Team)

Pre-Exercise Tasks

1. Review Operational objectives (this document)
2. Review Incident Action Plan (IAP)

Exercise Objectives

1. Observe Operational actions as interested

Post-Exercise Tasks

1. Provide review of After Action Report
2. Provide input and review of revised Washington Rapid Response Plan
3. Provide input on development of a future ICS tabletop exercise based on this exercise
4. Participate in a future ICS tabletop exercise (Pending)

2d. Command Staff

Unified Command

Personnel

Allen Pleus (WDFW); Craig Brouwer (NPS); Tamara Knudson (STI); Holly McClellan (CCT);_ (USBR)

Pre-Exercise Tasks

1. Review Operational objectives (this document)
2. Review Incident Action Plan (IAP)

Exercise Objectives

1. Observe Operational actions as interested
2. Provide UC support to meet Operational objectives exercise as necessary

Post-Exercise Tasks

1. Oct. 24: Provide Hot Wash feedback
2. Provide input and review of After Action Report
3. Provide input and review of revised Washington Rapid Response Plan
4. Planning for future ICS tabletop exercise

Public Information Officer (PIO)

Personnel

Rachel Blomker (WDFW); Eryn Couch (RCO); Denise Bausch (NPS);____(STI); (CCT); Edna Rey-Vizgirdas (USBR)

Pre-Exercise Tasks

1. KFMRRE/ZQ bio one-paper handout
2. Exercise official joint press release

3. Exercise photography
4. Contact/coordinate local media for coverage
5. Plan for coordination with TVW as necessary (RCO)
6. All PIO equipment/materials operational and staged for deployment

Exercise Objectives

1. Maintain communications with Unified Command
2. Manage media relations
3. Take photos of exercise activities
4. Coordinate with TVW as necessary

Post-Exercise Tasks

1. Oct. 24: Provide Hot Wash feedback
2. Provide input and review of After Action Report from PIO perspective
3. Provide input and review of revised Washington Rapid Response Plan from PIO perspective

Liaison Officer(s) (LO)

Personnel

Justin Bush (RCO)

Pre-Exercise Tasks

1. All Liaison equipment/materials operational and staged for deployment Exercise Objectives

1. Be available as necessary

Post-Exercise Tasks

1. Oct. 24: Provide Hot Wash feedback
2. Provide input and review of After Action Report from Liaison perspective
3. Provide input and review of revised Washington Rapid Response Plan from Liaison perspective

Safety Officer/Deputy

Personnel

Andy Steiner (NPS); Jim Fry (WDFW); Taylor Kimball (WDFW)

Pre-Exercise Tasks

1. NPS coordinate with WDFW Safety personnel
2. Finalize ICS safety-related forms for IAP
3. All Safety equipment/materials operational and staged for deployment
4. Oct. 22: Report on KFM incident area risk/hazard assessment forecast

Exercise Objectives

1. Report on KFM incident area risk/hazard assessment advisory
2. Establish a Medical/First Aid station
3. Provide safety briefing to all field operational personnel prior to any actions
4. Maintain safe response environment with objective of Zero injuries
5. Ensure safe dive operations
6. Communicate up ICS chain on hourly schedule
7. Provide an "All Clear" communication up ICS chain when all operations completed

Post-Exercise Tasks

1. Oct. 24: Provide Hot Wash feedback
2. Provide input and review of After Action Report from Safety Officer perspective
3. Provide input and review of revised Washington Rapid Response Plan from Safety Officer perspective

Legal Liaison

Position not utilized for this exercise.

2e. General Staff

Operations Section Chief/Deputy

Personnel

Captain Eric Anderson (WDFW); Heidi McMaster (USBR)

Pre-Exercise Tasks

1. Determine if full-scale operational actions are achievable for timeline
2. Overall Operational exercise timeline for October 22-24
3. Communications plan
4. Request for USCG Aux assistance finalize
5. Verify operational unit preparations on track for exercise
6. All Operations Section equipment/materials operational and staged for deployment

Exercise Objectives

1. Meet ICS Incident Safety Objective: Provide for overall safety of operational teams.
2. Meet ICS Incident Containment Exercise Objectives:
    a. Make plans for physical containment of Dreissenid veliger's in KFM;
    b. Make plans for physical containment of Dreissenid pathways in and out of KFM;
    c. Make plans for assessing Dreissenid presence and distribution at all life stages within KFM
3. Ensure operational units meeting timeline expectations
4. Ensure Hard Stop of all operation actions by 1600hr
5. Provide closing briefing on meeting operational objectives by 1700hr

Post-Exercise Tasks

1. October 24: Lead debrief on operations Hot Wash objectives
2. October 24: Ensure all operational staff are demobilized safely
3. Provide input and review of After Action Report from Operations Section Chief perspective
4. Provide input and review of revised Washington Rapid Response Plan from Operations Section Chief perspective

Staging Area Manager

Personnel

Brianna Widner (RCO)

Pre-Exercise Tasks

1. Verify protocols and data collection expectations
2. All Staging equipment/materials operational and staged for deployment
3. Oct. 22: All operational equipment checked in on ICS Form 204 and 211

Exercise Objectives

1. Maintains food/water logistics during operations
2. All operation equipment checked out on ICS Form 221
3. Briefs personnel on overnight lodging and food arrangements

Post-Exercise Tasks

1. Oct. 24: Provide Hot Wash feedback
2. Provide input and review of After Action Report from Staging Area Manager perspective
3. Provide input and review of revised Washington Rapid Response Plan from Staging Area Manager perspective

Water Branch Director

Personnel

Jesse Schultz (WDFW)

Pre-Exercise Tasks

1. Verify protocols and data collection expectations
2. All Water Branch equipment/materials operational and staged for

deployment Exercise Objectives

1. Ensure water-based operational units meeting objectives and timeline expectations
2. Communicate status of water-based operational units to Operations Section Chief/Deputy on an hourly basis (bottom of each hour, i.e., 9:30, 10:30, etc.)
3. Verify and communicate Dreissenid findings immediately to Operations Section Chief/Deputy
4. Ensure Hard Stop of all land-based operation actions by 1600hr

Post-Exercise Tasks

1. Oct. 24: Provide Hot Wash feedback
2. Provide input and review of After Action Report from Water Branch Director perspective
3. Provide input and review of revised Washington Rapid Response Plan from Water Branch Director perspective

Land Branch Director

Personnel

Sgt. Pam Taylor (WDFW)

Pre-Exercise Tasks

1. Verify protocols and data collection expectations
2. All Land Branch equipment/materials operational and staged for deployment

Exercise Objectives

1. Ensure land-based operational units meeting objectives and timeline expectations
2. Communicate status of land-based operational units to Operations Section Chief/Deputy on an hourly basis (top of each hour, i.e., 9:00, 10:00, etc.)
3. Verify and communicate Dreissenid findings immediately to Operations Section Chief/Deputy
4. Ensure Hard Stop of all land-based operation actions by 1600hr

Post-Exercise Tasks

1. Oct. 24: Provide Hot Wash feedback
2. Provide input and review of After Action Report from Land Branch Director perspective
3. Provide input and review of revised Washington Rapid Response Plan from Land Branch Director perspective

Situation Unit Lead

Position not utilized for this exercise.

Documentation Unit Lead

Personnel

Alexis Haifley and Julia McNamara (RCO);

Pre-Exercise Tasks

1. Verify protocols and data collection expectations
2. All Documentation equipment/materials operational and staged for deployment

Exercise Objectives

1. Validate rapid response objectives as defined in the CRB RRP (2010) and the WA DM RRP (2017)
2. Document any objectives developed during the exercise that are not listed in the aforementioned plans
3. Record any requests for specialized assets that are not present but needed for the response
4. Collect all data developed from shore and water surveys and deliver to WDFW AIS unit for analysis at the end of the exercise
5. Record amount of time to complete exercise objectives for both Shore and Water based operations elements

Post-Exercise Tasks

1. Oct. 24: Provide Hot Wash feedback
2. Provide input and review of After Action Report from Documentation Lead perspective
3. Provide input and review of revised Washington Rapid Response Plan from Documentation Lead perspective

Resources Unit Lead

Position not utilized for this exercise.

2f. Field Unit Leads

Water Safety Zone (WSZ) Unit Lead

Personnel

Gerald Bishop (USCG Aux)

Pre-Exercise Tasks

1. Verify implementation protocols and data collection expectations
2. All Water Safety Zone equipment/materials operational and staged for deployment

Exercise Objectives

1. No unauthorized boats permitted to enter safety zone during operational period
2. Significant actions/findings are reported up ICS chain-of-command

Post-Exercise Tasks

1. Oct. 24: Provide Hot Wash feedback
2. Provide review of After Action Report from WSZ Unit Lead perspective
3. Provide input and review of revised Washington Rapid Response Plan from WSZ Unit Lead perspective

Containment Boom (CB) Unit Lead

Personnel

Richard Visser (WDFW)

Pre-Exercise Tasks

1. Verify implementation protocols and data collection expectations
2. New boom equipment delivered to NPS storage
3. All boom equipment/materials needs verified/obtained
3. All Containment Boom equipment/materials operational and staged for deployment

Exercise Objectives

1. Containment boom is fully deployed around NPS dock
2. Containment boom remains fully functional for hours during treatment actions
3. Containment boom removed, assessed for decontamination, and demobilized
4. Significant actions/findings are reported up ICS chain-of-command

Post-Exercise Tasks

1. Oct. 24: Provide Hot Wash feedback
2. Provide review of After Action Report from Containment Boom Unit Lead perspective
3. Provide input and review of revised Washington Rapid Response Plan from Containment Boom Unit Lead perspective

Boat-Based Dreissenid Survey (BBDS) Unit Lead

Personnel

Michael Wilkinson (WDFW)

Pre-Exercise Tasks

1. Verify survey protocols and data collection expectations
2. Plan for chain-of-command and mailing of plankton and eDNA samples to contractors
3. All Boat-Based Survey equipment/materials operational and staged for deployment

Exercise Objectives

1. Survey team launches boat and begins surveys
2. Completes 4 site surveys for horizontal/vertical plankton tows, ponor grab samples, eDNA, water quality
3. Evaluates Ponar samples for ZQ presence/absence
4. Prepares plankton and eDNA samples for analysis shipment
5. Provides survey data and samples to __
6. Boat is pulled and all equipment is decontaminated and demobilized
7. Significant actions/findings are reported up ICS chain-of-command

Post-Exercise Tasks

1. Oct. 24: Provide Hot Wash feedback
2. Provide review of After Action Report from BBDS Unit Lead perspective
3. Provide input and review of revised Washington Rapid Response Plan from BBDS Unit Lead perspective

Watercraft Inspection (WI) Unit Leads

Personnel

Nicolas Ramsey (WDFW);

(NPS)

Pre-Exercise Tasks

1. Verify inspection protocols and data collection expectations
2. Identify/coordinate minimum number of watercraft to be inspected
3. All Watercraft Inspection equipment/materials operational and staged for deployment
4. Pre-plan for placement and number of ZQ samples for canine detection during inspections
5. Oct 23: Deploy ZQ test samples

Exercise Objectives

1. A minimum of four (4) watercraft are inspected and “ZQ” samples alerted to by canine(s)
2. Significant actions/findings are reported up ICS chain-of-command

Post-Exercise Tasks

1. Oct. 24: Provide Hot Wash feedback
2. Provide review of After Action Report from WI Unit Lead perspective
3. Provide input and review of revised Washington Rapid Response Plan from WI Unit Lead perspective

Watercraft Decontamination (WD) Unit Leads

Personnel

Nicolas Ramsey (WDFW);

(NPS)

Pre-Exercise Tasks

1. Verify decontamination protocols and data collection expectations
2. Identify/coordinate minimum number of watercraft to be decontaminated
3. All Watercraft Decontamination equipment/materials operational and staged for deployment

Exercise Objectives

1. A minimum of four (4) watercraft are decontaminated
2. Significant actions/findings are reported up ICS chain-of-command

Post-Exercise Tasks

1. Oct. 24: Provide Hot Wash feedback
2. Provide review of After Action Report from WD Unit Lead perspective
3. Provide input and review of revised Washington Rapid Response Plan from WD Unit Lead perspective

Diver-Based Dreissenid Survey (DBDS) Unit Lead

Personnel

Taylor Kimball (WDFW)

Pre-Exercise Tasks

1. Verify survey protocols and data collection expectations

2. All Diver-Based Survey equipment/materials operational and staged for deployment
3. Pre-plan for placement and number of “ZQ” samples for detection during surveys
4. Oct 22: Deploy ZQ test samples

Exercise Objectives

1. Divers inspect feet of dock and locate “ZQ” samples
2. Divers inspect square feet of benthic area and locate “ZQ” samples
3. Significant actions/findings are reported up ICS chain-of-command

Post-Exercise Tasks

1. Oct. 24: Provide Hot Wash feedback
2. Provide review of After Action Report from DBDS Unit Lead perspective
3. Provide input and review of revised Washington Rapid Response Plan from DBDS Unit Lead perspective

Shoreline Dreissenid Survey-Canine (SDSC) Unit Lead

Personnel

Sgt. Pam Taylor (WDFW)

Pre-Exercise Tasks

1. Verify survey protocols and data collection expectations
2. All Shoreline Survey equipment/materials operational and staged for deployment including canine first aid supplies
3. Pre-plan for placement and number of ZQ samples for detection during surveys
4. Oct 22: Deploy ZQ test samples

Exercise Objectives

1. Conduct meters of shoreline survey by two independent canine teams according to WDFW protocols
2. Each canine team locates ZQ samples
3. Each canine team completes survey data forms
4. Significant actions/findings are reported up ICS chain-of-command

Post-Exercise Tasks

1. Oct. 24: Provide Hot Wash feedback
2. Provide review of After Action Report from SDSC Unit Lead perspective
3. Provide input and review of revised Washington Rapid Response Plan from SDSC Unit Lead perspective

Treatment Unit Lead

Personnel

Richard Visser (WDFW)

Pre-Exercise Tasks

1. Pre- and post-dye application detection survey design completed
2. All Treatment equipment/materials operational and staged for deployment
3. Ecology Agreed Order signed by WDFW & Ecology

Exercise Objectives

1. Treatment application equipment and dye are prepped and ready for deployment
2. Initial pre-dye application detection surveys conducted
3. Dye treatment is applied within 1 hour of containment boom determined as fully functional
4. Series of post-dye application detection surveys conducted at hour intervals
5. Significant actions/findings are reported up ICS chain-of-command

Post-Exercise Tasks

1. Oct. 24: Provide Hot Wash feedback
2. Provide necessary maintenance and return equipment to original source
3. Meet Ecology Administrative Order requirements for use of dye
4. Provide review of After Action Report from Treatment Unit Lead perspective
5. Provide input and review of revised Washington Rapid Response Plan from Treatment Unit Lead perspective

Land Enforcement (LE) Unit Lead

NPS Personnel

Pre-Exercise Tasks

1. Verify enforcement protocols and data collection expectations
2. All Land Enforcement equipment/materials operational and staged for deployment

Exercise Objectives

1. Unescorted public and media are kept away from exercise actions
2. Significant actions/findings are reported up ICS chain-of-command

Post-Exercise Tasks

1. Oct. 24: Provide Hot Wash feedback
2. Provide review of After Action Report from LE Unit Lead perspective
3. Provide input and review of revised Washington Rapid Response Plan from LE Unit Lead perspective

Communications (COM) Unit Lead

Personnel

Rich Leon (WDFW)

Pre-Exercise Tasks

1. Verify communication protocols and data collection expectations
2. All Communications equipment/materials operational and staged for deployment

Exercise Objectives

1. Operations Section Chief/Deputy have communications capacity with all field units
2. Operations Section Chief/Deputy have communications capacity with Unified Command
3. Significant actions/findings are reported up ICS chain-of-command

Post-Exercise Tasks

1. Oct. 24: Provide Hot Wash feedback
2. Provide review of After Action Report from COM Unit Lead perspective
3. Provide input and review of revised Washington Rapid Response Plan from COM Unit Lead perspective

3. ICS HOT WASH OBJECTIVES (Oct. 24)

1. Brief Operations Section Chief/Deputy assessment of overall exercise success, failures, gaps, etc.
2. Brief ICS Facilitator assessment of overall exercise success, failures, gaps, etc.
3. All Operations objectives are evaluated for success of completion (TBD: yes/no; 1-5 success rating?)
4. Simple survey of participants for exercise success, failures, gaps, etc. (scribe writes down responses)

POST-EXERCISE TASKS/OBJECTIVES (In progress)

A. Documentation:
    1. RCO collects and compiles all IC
    2. RCO posts all documentation at
    3. After Action Report
    4. Videography
    5. MS, notes, and other documents

B. Revised Washington State Rapid Response Plan: 1.

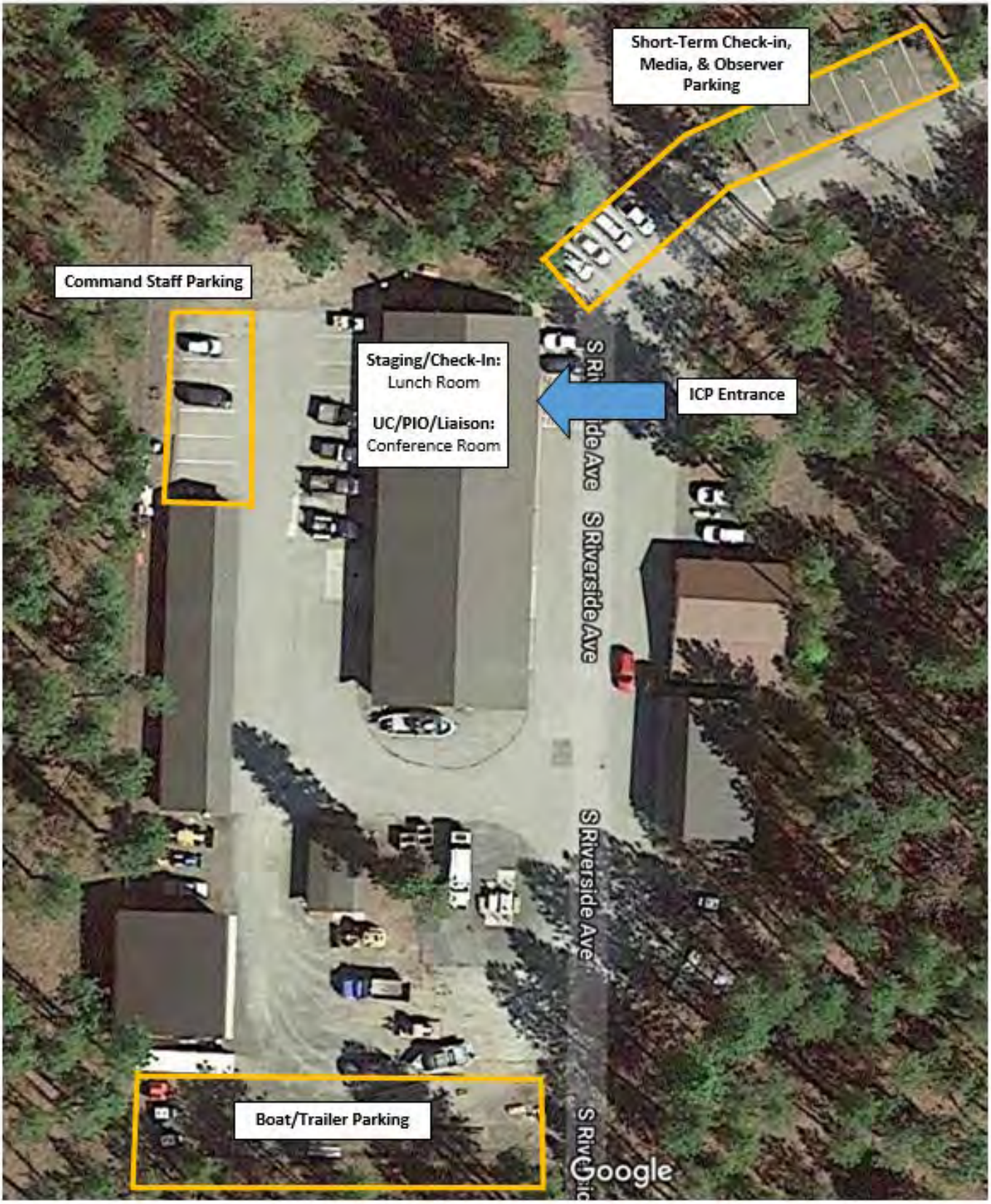
EXERCISE! - - EXERCISE! - - EXERCISE!

Appendix C:

Kettle Falls Marina Rapid Response Exercise Planning Map

● = Exercise Direction/Information Signage

▲ = Rhodamine Dye Permit Signage



Incident Command Post: NPS Operations Center, 1370 Riverside Rd, Kettle Falls, WA 99141

Field Operation Objectives

1. Watercraft Inspections
2. Watercraft Decontaminations
3. Containment (barrier)
4. Treatment (Non-Toxic)
5. Dive-Based Dreissenid Surveys
6. Boat-Based Dreissenid Surveys
7. Shoreline Dreissenid Surveys-Canine
8. USCG Safety Zone

KFM-1 = Boat-based survey sites and site numbers

= First Aid Station

See other side for staging and containment/ treatment location details

Op Area B +
Public Safety Exclusion Area (Blue)
First Aid Station (Red Cross)

Estimated Containment Boom and Anchor points (Yellow)
(Maximum total boom length 350 feet)

Op Area C +
Public Safety Exclusion Area (Blue)

= First Aid Station and Lunch in AIS Trailer

Appendix D

Kettle Falls Marina Rapid Response Action Plan:

Operations Estimated Time Table

	When	What	Who	Where
	7:30	Check-in	All participants and observers	ICP
	7:45	Contractor on-site	Boom Team	ICP
	8:00-8:15	Operations/Safety Briefing	All participants and observers	ICP
	8:15-8:25	Inspection Station/Decon Set-up	Inspection Team/Decon Team	KFM Staging Area A
	8:30-8:35	Water Safety Set-up	Coast Guard Auxiliary	Safety Zone
	8:30-10:00	USBR Boat Decon	Inspection Team/Decon Team	KFM Staging Area A
	8:35-9:35	Boom Deployment	Boom Team	Federal Dock
	8:45-10:00	Water sampling	Sampling Team	KFM sample sites
Dye MUST be in water no later than NOON!	10:00-12:00	Water Sample Team Decon	Inspection Team/Decon Team	KFM Staging Area A
	10:00-1:00	Dock and Shoreline Surveys	Dive and Shoreline Survey Teams	Public Dock/Shoreline
	1:00-3:00	Dive Team Boat Decon	Inspection Team/Decon Team	KFM Staging Area A
	3:30-4:00	Decon Station Demobilization	Inspection Team/Decon Team	KFM Staging Area A
	4:00	Hard Stop	All Operations Staff	KFM
	4:00-5:00	Demobilization of all Ops	All Operations Staff	KFM
	5:00-5:30	Closing Briefing/Check-out	All participants and observers	ICP

Land Operational Teams

Water Operational Teams

Both Water and Land Operational Teams

Potential times for media/observers for decon operations

1. 09Incident Name KFMRRE 2019	2. Operational Period (Date / Time) From: 10/23/19 0730 To: 10/23/19	3. Check-in Location Command Post Staging Area X Other	CHECK-IN LIST (Personnel) ICS 211p-OS

Personnel Check-in Information					8. Initial Incident Check-In?		9. Time	
4. Name		5. Company / Agency	6. ICS Section / Assignment / Quals.	7. Contact Information	(X)	In	Out
Anderson	Eric	WDFW	Ops Sect Chief			0727	1630
Bausch	Denise	NPS	Public Information Officer		X	0804	1440
Bishop	Gerald	USCGA	Safety		X	0715	1324
Blomker	Rachel	WDFW	PIO			0710	1519
BROUWER	Craig	NPS	UIC			710	1335
Bush	Justin	Rec & Cons Office	Liaison Officer			0700	1626
Carter	Kraig	WDFW	Boat Inspection			728	1236
Chamberlain	Samuel	NPS	LEO Inspection			1017	1336
Couch	Eryn	RCO	PIO			709	1519
Davidson	Bryan	WDFW	Dive Team			0733	1451
DeHaas	Derek	WDFW	WID			0630	1237
Denny	Kelly	WDFW	Dive Team			0733	1503
DeForest	Adam	Able Cleanup Tech	Containment		X	0725	1607
DeWinkler	Jeff	BOR	Containment			0730	1554
Draheim	Robyn	PSMFC	Observer			0745	1339
Dunn	David	NPS/LARO	Security		X	0736	1319
Edwards	Jon	NPS	Observer		X	0748	1327

Engell	Andrew	Rep McMorris Rodgers office	Observer		X	1017	11:33
Estell	Stephanie	WDFW	Boat Monitoring			7:26	4:21
Foster	Dan	NPS/LARO	AADM (Agency Administrator)		X	0742	1245
Gould	Patsy	CCT H/A	Observer		X	09:41	11:24
Hageman	Alan	NPS	PIO			0700	1600
Hagemann	Cassie	NPS	Observer		X	0716	1327
Haifley	Alexis	RCO	Scribe			0700	1630
Harris	James	USCGA	Security		X	0715	1327
Johnson	Philip	WDFW	ICS Facilitator			0725	1623
Kimball	Taylor	WDFW	Dive Team Lead			0734	1512
Knauss	Nicholas	WDFW	WID			0630	1240
Knudson	Tamara	STI	Observer			0730	1303
Koontz	Joshua	WDFW	Dive Team			0733	1450
Largin	Derick	DFW	Containment/Treatment		X	0744	1549
Martinson	Dave	TVW	Video			0730	1455
Maycumber	Jacquelin	Legislator	Observer		X	0821	11:32
Mckay	Ben	NPS / LARO	Decon		X	0737	1340
McLellan	Holly	Colville Tribe	Observer		X	0740	1300
McMaster	Heidi	USBR	Deputy Ops Chief			0730	1554
McNamara	Julia	RCO (WISC)	Deputy Documentation Leader			0700	1530
Merg	Kurt	WDFW	Treatment Lead		X	0725	1550
Monaghan	Brian	CCT H/A	Observer		X	09:41	11:24
Peone	Mitchell	History/Arch.	Observer		X	9:41	11:24

Peters	Michael	TVW	Video			0730	1455
Phillips	Allen	Able cleanup tech	containment		X	0725	1608
Pleus	Allen	WDFW	Unified Command			0710	1630
Ramsay	Nicholas	WDFW	Inspection/decontamination lead			0730	1238
Sawchuk	Cindy	Alberta Environment	K9			0737	1526
Schultz	Jesse	WDFW	Water Branch Lead			0719	1624
Silver	Kipp	Able Cleanup Tech	containment		X	0725	1606
Smith	Matt	NPS / LARO	Inspections		X	0732	1400
Steinert	Andy	NPS	Safety Officer			0700	1600
Taylor	Pam	WDFW	Land Branch			0727	1439
Treu-Fowler	Julia	NPS/LARO	Observer		X	0741	12:46
Troyer	Bernard Paul	USCGA	Security		X	0715	1326
Vaisler	Sean	RDOS (Canada)	Observer		X	0731	1335
Visser	Richard	WDFW	Containment			0724	1621
Walter	Damian	Usace	Observer		X	0814	1552
Widner	Brianna	RCO/WISC	Staging Area Manager			0700	1631
Wilkinson	Mike	WDFW	Boat Monitoring			0726	1623
Wold	Brendon	House of Reps, WA	Observer		X	0832	11:32
Wolvert	Shay	CCT	Observer		X	0729	1300

10. Prepared by: Brianna Widner **Date / Time** 10/23/2019, 1631

11. Date / Time Sent to Resources Unit

CHECK-IN LIST (Personnel) June 2000 ICS 211p-OS

ACTIVITY LOG (ICS 214)

1. Incident Name: KFMRRE 2019	2. Operational Period: Date From: 10/23/19 Date To: 10/23/19 Time From: 0730 Time To:	
3. Name: Julia McNamara	4. ICS Position: Deputy Doc. Unit Leader	5. Home Agency (and Unit): RCO

6. Resources Assigned: Radio

Name	ICS Position	Home Agency (and Unit)
~~Decon Station Set~~		

7. Activity Log:

Date/Time	Notable Activities
9:30	Decon Station: Set-up · Parking lot adjacent to ramp set to go in 15 min
9:40	Volunteer boat inspection begins: Dogs look at/sniff where boat has been before entering H2O
9:30	US Coast Guard at safety area in water
9:46	Room equipment filling, set-up
9:20	Boat sampling is deployed
9:20	Water safety deployed
9:50	Ponar grab & sampling of plankton/eDNA sample
9:57	Dive team is preparing to enter water
9:54	Dye deployment being set to go
10:05	BOR boat set-up w/ possible mussels for dogs to search
10:09	Divers ~~end~~ enter water for search
10:13	BOR boat is being searched by Paddlers
10:13	Sampling team out of water · Searching for other team
10:16	Hilo starts Shoreline Search → Not yet
10:16	BOR: Mussels identified
10:16	BOR boat is sent to decontamination
10:20	Dye is being deployed (not quite) (communication)
10:19	Sampling boat team goes back to sampling on water
10:30	Dye is being deployed
10:41	Jesse comes to mix dye w/ kayak paddle
10:47	11/20 of "Mussels" have been found by divers
~~11:09~~ 11:07	Shoreline Survey (actually started) & Briefing
11:14	Hilo found mussel in shoreline search
11:20	Hilo found a mussel

8. Prepared by: Name: _____ Position/Title: _____ Signature: _____

Date/Time: _____

ACTIVITY LOG (ICS 214)

1. Incident Name:	2. Operational Period: Date From: 10/23/19 Date To: 10/23/19 Time From: 0730 Time To: 15:03	
KFMRRE 2019		
3. Name: Julia McNamara	**4. ICS Position:**	**5. Home Agency** (and Unit):

6. Resources Assigned:

Name	ICS Position	Home Agency (and Unit)

7. Activity Log:

Date/Time	Notable Activities
11:23	Sampling boat back on shore & complete
11:23	divers have found 12/20 and going for a 2nd dive
11:23	Dye is still dispersing
11:32	Demobilizing the contamination station
11:35	Puddles does secure on "Sampling boat"
11:41	Test water inside & outside BOOM (1ppm)
12:10	Coast Guard comes to dock
12:30	demobilizing Inspection & Decon
12:30	Boat sampling is done & sample on way to Colville
12:31	Dive team: complete 13/20 tacks found
12:32	~~to~~ Pulling in Coast Guard.
12:33	Boom team wrapping up
12:40	Demobilized Coast Guard
12:45	~~Boom take down intializing~~ → taking samples outside boom
2:01	Boom still in water - landing craft is moving in
2:04	Boom being removed
3:03	Final report on push pins: 14/20 found by divers
4:07	Equiptment is fully checked out
3:45	BOOM fully put away

8. Prepared by: Name: _____ Position/Title: _____ Signature: _____

ICS 214, Page 1 Date/Time: _____

WASHINGTON STATE DEPARTMENT OF FISH AND WILDLIFE
DECONTAMINATION/QUARANTINE ORDER

Date: 10/23/19 **Time:** 1120 **Location:** LAKE ROOSEVELT KETTLE FALLS

Issued to: Name: MICHAEL WILKENSON **Phone #** (360) 789 2160

Address: 519 N MAMER RD SPOKANE VALLEY **DOB:** 5/4/65 **EMAIL:**

Tow Vehicle Plate # C91167M **Description:** 2500 **Origin of vessel:** WA XMT **Destination:**

Location of AIS contamination on conveyance/watercraft (e.g. prop, hull, etc.): CONTAMINATED WATERS

Conveyance/watercraft information:

Manufacturer: LUND Model: SSV-14 Length: 14
Engine type: MERCURY Registration #: WDFW21704
Trailer license plate #: 29632E State: WA XMT

DECONTAMINATION/QUARANTINE PROTOCOL FOR CONVEYANCE/EQUIPMENT FOULED WITH AQUATIC INVASIVE SPECIES

Your conveyance/watercraft and/or equipment are required to undergo decontamination order authorized under RCW 77.135.130 because of one or more of the following reasons:

- [ ] 1) Adult zebra or quagga mussels are present;
- [X] 2) The boat and/or equipment have been to a high risk area in the last 30 days and standing water is present; o
- [ ] 3) It is suspected of being fouled with zebra/quagga mussels or other aquatic invasive species.

Adult Zebra/Quagga Mussels Decontamination Requirements

- [X] **Hot wash & Drying Period required**

Hot Wash Date: 10/23/19 Dry Time required & Release Date:

- [ ] **Other Decontamination procedure/plan** (*Fill in specific details in box below*)

SEAL # 0000221
WDFW

Failure to follow Decontamination Requirements may result in both Criminal & Civil prosecution under Washington State Law.

WDFW-Authorizing Personnel **WDFW - Officer**

Per RCW 77.15.160.4 Invasive Species Management (2017)

SITE SAFETY AND CONTROL PLAN ICS 208 HM	1. Incident Name: Kettle Falls Marina Rapid Response Exercise (KFMRRE)	2. Date Prepared: 10/17/2019	3. Operational Period: Time: 0800 – 10/23/2019 1600

Section I. Site Information

4. Incident Location: Kettle Falls Marina, Kettle Falls, WA

Section II. Organization

5. Incident Commander:	6. HM Group Supervisor:	7. Tech. Specialist - HM Reference:
Allen Pleus	Jesse Schultz	Kurt Merg
8. Safety Officer:	9. Entry Leader:	10. Site Access Control Leader:
Andy Stenert		
11. Asst. Safety Officer - HM:	12. Decontamination Leader:	13. Safe Refuge Area Mgr:
14. Environmental Health:	15.	16.

17. Entry Team: (Buddy System) Name:	PPE Level	18. Decontamination Element: Name:	PPE Level
Entry 1		Decon 1	
Entry 2		Decon 2	
Entry 3		Decon 3	
Entry 4		Decon 4	

Section III. Hazard/Risk Analysis

19. Material:	Container type	Qty.	Phys. State	pH	IDLH	F.P.	I.T.	V.P.	V.D.	S.G.	LEL	UEL
Rhodamine dye												

Comment: Refer to rhodamine dye SDS / gloves eye protection tyvek suits

Section IV. Hazard Monitoring

20. LEL Instrument(s):	21. O_2 Instrument(s):
22. Toxicity/PPM Instrument(s):	23. Radiological Instrument(s):

Comment: fluorometer to measure dye concentration and multiparameter to measure water quality

Section V. Decontamination Procedures

24. Standard Decontamination Procedures: YES: ☐ NO: ☐

Comment:

Section VI. Site Communications

25. Command Frequency:	26. Tactical Frequency:	27. Entry Frequency:

Section VII. Medical Assistance

28. Medical Monitoring: YES: ☐ NO: ☐ 29. Medical Treatment and Transport In-place: YES: ☐ NO: ☐

Comment:

ICS 208 HM Page 1 3/98

Section VIII. Site Map

30. Site Map:

Refer to ICS 201

Weather ☐ Command Post ☐ Zones ☐ Assembly Areas ☐ Escape Routes ☐ Other ☐

Section IX. Entry Objectives

31. Entry Objectives:

Section X. SOP S and Safe Work Practices

32. Modifications to Documented SOP s or Work Practices: YES: ☐ NO: ☒

Comment:

Section XI. Emergency Procedures

33. Emergency Procedures:

Section XII. Safety Briefing

34. Asst. Safety Officer - HM Signature: Safety Briefing Completed (Time):

35. HM Group Supervisor Signature: Jesse Schultz

36. Incident Commander Signature:

INSTRUCTIONS FOR COMPLETING THE SITE SAFETY AND CONTROL PLAN
ICS 208 HM

A Site Safety and Control Plan must be completed by the Hazardous Materials Group Supervisor and reviewed by all within the Hazardous Materials Group prior to operations commencing within the Exclusion Zone.

Item Number	Item Title	Instructions
1.	Incident Name/Number	Print name and/or incident number.
2.	Date and Time	Enter date and time prepared.
3.	Operational Period	Enter the time interval for which the form applies.
4.	Incident Location	Enter the address and or map coordinates of the incident.
5 - 16.	Organization	Enter names of all individuals assigned to ICS positions. (Entries 5 & 8 mandatory). Use Boxes 15 and 16 for other functions: i.e. Medical Monitoring.
17 - 18.	Entry Team/Decon Element	Enter names and level of PPE of Entry & Decon personnel. (Entries 1 - 4 mandatory buddy system and back-up.)
19.	Material	Enter names and pertinent information of all known chemical products. Enter UNK if material is not known. Include any which apply to chemical properties. (Definitions: ph = Potential for Hydrogen (Corrosivity), IDLH = Immediately Dangerous to Life and Health, F.P. = Flash Point, I.T. = Ignition Temperature, V.P. = Vapor Pressure, V.D. = Vapor Density, S.G. = Specific Gravity, LEL = Lower Explosive Limit, UEL = Upper Explosive Limit)
20 - 23.	Hazard Monitoring	List the instruments which will be used to monitor for chemical.
24.	Decontamination Procedures	Check NO if modifications are made to standard decontamination procedures and make appropriate Comments including type of solutions.
25 - 27.	Site Communications	Enter the radio frequency(ies) which apply.
28 - 29.	Medical Assistance	Enter comments if NO is checked.
30.	Site Map	Sketch or attach a site map which defines all locations and layouts of operational zones. (Check boxes are mandatory to be identified.)
31.	Entry Objectives	List all objectives to be performed by the Entry Team in the Exclusion Zone and any parameters which will alter or stop entry operations.
32 - 33.	SOP s, Safe Work Practices, and Emergency Procedures	List in Comments if any modifications to SOP s and any emergency procedures which will be affected if an emergency occurs while personnel are within the Exclusion Zone.
34 - 36.	Safety Briefing	Have the appropriate individual place their signature in the box once the Site Safety and Control Plan is reviewed. Note the time in box 34 when the safety briefing has been completed.

Appendix E

Kettle Falls Marina Rapid Response: Survey Results

Diver-Based Dreissenid Survey (DBDS) Unit

Personnel
Taylor Kimball (WDFW)

Pre-Exercise Tasks
1. Verify survey protocols and data collection expectations
2. Verify all Personal Protection Equipment requirements
3. All Diver-Based Survey equipment/materials operational and staged for deployment
4. Pre-plan for placement and number of "ZQ" samples for detection during surveys
5. Oct 22: Deploy ZQ test samples

Exercise Objectives
1. Oct. 22: Check-in
2. Divers inspect 750 feet of dock and locate 13 "ZQ" samples
3. Divers inspect 850 square feet of benthic area and locate 1 "ZQ" samples
4. Significant actions/findings are reported up ICS chain-of-command
5. Check-out/demobilize

11/20 TACKS found

Post-Exercise Tasks
1. Oct. 24: Provide Hot Wash feedback
2. Provide review of After Action Report from DBDS Unit Lead perspective
3. Provide input and review of revised Washington Rapid Response Plan from DBDS Unit Lead perspective

CANINE SHORELINE SURVEY DATA SHEET

HANDLER: Taylor CANINE: Puddles DATE: 10/23/19

LOCATION/INCIDENT: ICF marina

PHOTOS OF SEARCH AREA: YES: ✓ NO: ____

START TIME: 12:00 GPS LOCATION 117N 49E 11 2

END TIME: 1400 GPS LOCATION 117N 49E 11 2

WEATHER: 50°'s WIND DIRECTION: SW - 05

SEARCH AREA DATA

SHORELINE TYPE: Rocky w some veg

INFRASTRUCTURE TYPE: NO Docks

NOTES: Shoreline checked 2 detections Found

K9 CONFIRMATION: NO: ___ YES: ✓ (GPS): (1) 117N 49E 11A MARKED: YES: ✓ NO: ___
(2) 117N 49E 11E

TYPE OF FIND: Adult mussels

SAMPLES COLLECTED: YES: ✓ NO: ____

ADDITIONAL NOTES: 100%. Success on Finds on Known Location.

CANINE SHORELINE SURVEY DATA SHEET

SEC 1

HANDLER: SAwchuck CANINE: Rilo DATE: 10/23/19

LOCATION/INCIDENT: ICFRT

PHOTOS OF SEARCH AREA: YES: ✓ NO: ____

START TIME: 1105 GPS LOCATION 11 UTM 0417302 / 5383327

END TIME: 1330 GPS LOCATION 0417266 / 5383326

WEATHER: Sunny Low 50's WIND DIRECTION: SW 0-5

SEARCH AREA DATA

SHORELINE TYPE: Rocky w Some Veg

INFRASTRUCTURE TYPE: metal Docks

NOTES: Dock Area 1 Checked - All Concrete Substructers checked.

K9 CONFIRMATION: NO: ___ YES: ✓ (GPS): (1) 0417266/5383326 MARKED: YES: ✓ NO: ___

TYPE OF FIND: ADULT mussel S (2) 417220 / 5383330

SAMPLES COLLECTED: YES: ✓ NO: ____

ADDITIONAL NOTES: Survey Area 1 - Dog Alerted to TWO Locations as noted Above.

KFM RRE Zebra/Quagga Mussels Water Quality October 23, 2019

Samplers Kurt Merg, Derick Largin, Richard Visser

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Time (military)	Site #	After Dye Discharge	Measurement (6 inches)	Depth (ft)	Dye Concentration	Temp ©	pH	Salinity (ppt)	Secchi Disk (ft)	Comments
08:43	1	Yes (No)	(Surface) Bottom	1	3.882	11.32	7.81	0.12	11.48	predye pre boom
08:47	1	Yes (No)	Surface (Bottom)	11	~~0.000~~ 2.432	10.33	8.03	0.12	11.48	predye pre boom
08:51	2	Yes (No)	(Surface) Bottom	1	3.114	10.33	8.05	0.12	11.48	"
08:54	2	Yes (No)	Surface (Bottom)	13	3.893	10.33	8.18	0.12	11.48	"
08:56	3	Yes (No)	(Surface) Bottom	1	2.707	10.34	8.19	0.12	12.30	"
08:58	3	Yes (No)	Surface (Bottom)	14	2.662	10.31	8.20	0.12	12.30	"
11:21	1	(Yes) No	(Surface) Bottom	1	16.52	10.5	8.27	0.12	9.84"	Post dye No polarized glasses
11:23	1	(Yes) No	Surface (Bottom)	11	6.510	10.38	8.21	0.12	"	
11:27	2	(Yes) No	(Surface) Bottom	1	11.07	10.48	8.22	0.12	10.66"	Post dye No Polarized
11:29	2	(Yes) No	Surface (Bottom)	14	5.471	10.38	8.22	0.12	"	
11:31	3	(Yes) No	(Surface) Bottom	1	7.20	10.44	8.21	0.12	10.66"	Post dye No polarized
11:35	3	(Yes) No	Surface (Bottom)	14	5.117	10.38	8.21	0.12	"	
11:37	6	(Yes) No	(Surface) Bottom	1	7.632	10.6	8.21	0.12	11.48	
11:39	6	(Yes) No	Surface (Bottom)	13	7.508	10.47	8.28	0.12	"	

start 1015 dye in

Time (military)	Site #	After Dye Discharge	Measurement (6 inches)	Depth (ft)	Dye Concentration	Temp ©	pH	Salinity (ppt)	Secchi Disk (ft)	Comments
1146	5	(Yes) No	(Surface) Bottom	1	1.522	10.59	8.22	0.12	10.33	
1149	5	(Yes) No	Surface (Bottom)	14	1.823	10.38	8.22	0.12	"	
1152	4	(Yes) No	(Surface) Bottom	1	1.516	10.59	8.21	0.12	10.33	
1153	4	(Yes) No	Surface (Bottom)	11	2.052	10.39	8.22	0.12	"	
1227	1	(Yes) No	(Surface) Bottom	1	20.22	10.57	8.21	0.12	9.84	
1230	1	(Yes) No	Surface (Bottom)	10	13.73	10.4	8.22	0.12	"	
1233	2	(Yes) No	(Surface) Bottom	1	20.6	10.53	8.22	0.12	9.84	
1235	2	(Yes) No	Surface (Bottom)	12	5.392	10.41	8.25	0.12	"	
1237	3	(Yes) No	(Surface) Bottom	1	13.42	10.51	8.22	0.12	10.33	
1238	3	(Yes) No	Surface (Bottom)	13	7.739	10.40	8.23	0.12	"	
1245	4	(Yes) No	(Surface) Bottom	1	4.888	10.77	8.22	0.12	11.48	
1246	4	(Yes) No	Surface (Bottom)	10	4.87	10.56	8.22	0.12	"	
1248	5	(Yes) No	(Surface) Bottom	1	3.007	10.68	8.21	0.12	12.30	
1249	5	(Yes) No	Surface (Bottom)	12	1.996	10.43	8.27	0.12	"	
1251	6	(Yes) No	(Surface) Bottom	1	2.847	10.71	8.23	0.12	10.66	

KFM RRE Zebra/Quagga Mussels Water Quality October 23, 2019

Samplers Kurt Merg, Derick Largin, Richard Visser

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Time (military)	Site #	After Dye Discharge	Measurement (6 inches)	Depth (ft)	Dye Concentration	Temp ©	pH	Salinity (ppt)	Secchi Disk (ft)	Comments
1253	6	Yes / No	Surface / Bottom	12	9.072	10.43	8.25	0.12	10.66	
13 20	1	Yes / No	Surface / Bottom	1	10.87	10.62	8.23	0.12	12.30	
1321	1	Yes / No	Surface / Bottom	9	11.36	10.44	8.22	0.12	"	
13 22	2	Yes / No	Surface / Bottom	1	26.33	10.65	8.21	0.12	9.84	
1323	2	Yes / No	Surface / Bottom	12	5.834	10.42	8.26	0.12	"	
1324	3	Yes / No	Surface / Bottom	1	15.77	10.62	8.04	0.12	10.66	
1326	3	Yes / No	Surface / Bottom	12	6.553	10.43	8.15	0.12	"	
1330	6	Yes / No	Surface / Bottom	1	5.477	10.90	8.22	0.12	9.84	
1331	6	Yes / No	Surface / Bottom	12	8.473	10.52	8.32	0.12	"	
13 34	5	Yes / No	Surface / Bottom	1	1.403	10.99	8.24	0.12	9.84	
1335	5	Yes / No	Surface / Bottom	12	1.668	10.46	8.28	0.12	"	
1337	4	Yes / No	Surface / Bottom	1	1.49	11.06	8.22	0.12	9.84	
1338	4	Yes / No	Surface / Bottom	10	1.866	10.48	8.29	0.12	"	
		Yes / No	Surface / Bottom							

Zebra and Quagga Mussel Monitoring Datasheet

Date(M/D/Y): 10/23/2019 Site#: 2 WaterBody: Columbia River Reservoir: Lake Roosevelt

Site Name: FM #2 N: 48.59883 W: -118.12343 Samplers: MW SE

Artificial Substrate X

1)Substrate Attached To: _____ 2)Total Water Depth(m): _____ 3)Substrate Depth(m) _____

4)Substrate: Present Absent 5) Intact Damaged Out of the water 6)Redeployed: Yes No 1st Deployment

7)Zebra/Quagga Mussels: Present Absent If present, contact WDFW IMMEDIATLEY

8)Organisms Present: Algae Algae Blue Green Algae Brown Algae Green Algae Red Bryozoans Chironomids Limpets Periphytons Physid Snails Sponges Unknown Snails Unknown Eggs

Other: _____ 9)Sample Taken: Yes (No)

Horizontal and Vertical Plankton Tow

1)Vertical Depth(m): 4.5

Shoreline X

1)Surveyed: Boat Ramp Boulders Buoys Concrete Structures Docks LWD Mooring Lines Shoreline

Other: _____

2) Zebra/Quagga Mussels: Present Absent If present, contact WDFW IMMEDIATLEY

3) AIS Present: Asian Clams Chinses Mystery Snail New Zealand Mudsnails Crayfish Nonnative

Other: _____ 4)Sample Taken: Yes (No)

Ponar Grab Sampler

1)Vertical Depth(m): 4.5 2)Zebra/Quagga Mussels: Present Absent If present, contact WDFW IMMEDIATLE

3) AIS Present: Asian Clams Chinses Mystery Snail New Zealand Mudsnails Crayfish Nonnative

Other: _____ 4)Sample Taken: (Yes) No

eDNA

1)Sample Method: Smith Root Backpack Pump @ Lab Electric Pump Hand Pump Filtered in field, 5µm

Other: _____

2)Sample Water Filtered(L): 5.11 3)Negative Water Filtered(L): 0.86

Water Quality

Calcium: (Yes) No Salinity: 0.14 pH: 8.01 Temp©: 10.45 D.O.: _____ Secchi Depth(m): 4.5+

Zebra and Quagga Mussel Monitoring Datasheet

Date(M/D/Y): 10/23/2019 Site#: 1 WaterBody: Columbia River Reservoir: Lake Roosevelt

Site Name: KFM #1 N: 48.59895 W: -118.12436 Samplers: MW SE

Artificial Substrate X

1)Substrate Attached To:_____ 2)Total Water Depth(m):_____ 3)Substrate Depth(m)_____

4)Substrate: Present Absent 5) Intact Damaged Out of the water 6)Redeployed: Yes No 1st Deployment

7)Zebra/Quagga Mussels: Present Absent If present, contact WDFW IMMEDIATLEY

8)Organisms Present: Algae Algae Blue Green Algae Brown Algae Green Algae Red Bryozoans Chironomids Limpets Periphytons Physid Snails Sponges Unknown Snails Unknown Eggs

Other:_____ 9)Sample Taken: Yes (No)

Horizontal and Vertical Plankton Tow

1)Vertical Depth(m): ~~8.5~~ 8.0

Shoreline X

1)Surveyed: Boat Ramp Boulders Buoys Concrete Structures Docks LWD Mooring Lines Shoreline

Other:_____

2) Zebra/Quagga Mussels: Present Absent If present, contact WDFW IMMEDIATLEY

3) AIS Present: Asian Clams Chinses Mystery Snail New Zealand Mudsnails Crayfish Nonnative

Other:_____ 4)Sample Taken: Yes (No)

Ponar Grab Sampler

1)Vertical Depth(m): 8.5 2)Zebra/Quagga Mussels: Present (Absent) If present, contact WDFW IMMEDIATLE

3) AIS Present: Asian Clams Chinses Mystery Snail New Zealand Mudsnails Crayfish Nonnative

Other:_____ 4)Sample Taken: (Yes) No

eDNA

1)Sample Method: (Smith Root Backpack) Pump @ Lab Electric Pump Hand Pump Filtered in field, 5um

Other:_____

2)Sample Water Filtered(L): 5.13 3)Negative Water Filtered(L): 0.87

Water Quality

Calcium: Yes No Salinity: 0.14 pH: 8.07 Temp©: 10.54 D.O.:_____ Secchi Depth(m): 4.5

Zebra (*Dreissena polymorpha*), and Quagga (*Dreissena rostriformis*)) mussels Rapid Response eDNA Monitoring

10/24/2019

Laboratory work: Sarah Brown
Analysis: Sarah Brown

eDNA Laboratory Methods:

In eDNA analysis of aquatic organisms, water is typically collected and filtered. DNA is then extracted from the filter, and amplified using species-specific primers to determine if the species of interest is present or absent. We used Quantitative Polymerase Chain Reaction (qPCR) to detect minute levels of DNA, using species-specific primers, and a fluorescently labeled reporter molecule (probe), which yields increased fluorescence with an increasing amount of product DNA (Figure 1). A sample is determined "positive" or "negative," based on whether or not the sample crossed the threshold (dashed line in Figure 1). When a sample crosses the threshold, this is referred to as the C_T, "Cycling Threshold." Samples with higher concentration of DNA typically cross the threshold earlier in the cycling (~cycle 20-30) than samples with lower concentration (~ cycle 31-40) (Figure 1).

All laboratory work was performed in AirClean 600 Work Stations (ISC Bioexpress, Utah, USA), which are equipped with HEPA air filters and UV lights. All work surfaces were decontaminated with 50% bleach, and exposed to UV light for at least one hour before work began. DNA extraction was performed on half of the filter sample, using the Qiagen DNeasy Blood & Tissue and Qiashredder kits (Qiagen, Inc.), as per Pilliod et al. (2013). The other half of the filter was stored for potential future use. Post extraction, each filter sample was processed in triplicate.

We tested samples for the presence of Zebra (*Dreissena polymorpha*) and Quagga (*Dreissena rostriformis*) mussels eDNA, using genus level primers developed by Gingera et al. (2017; Table 1). qPCR products were obtained by amplifying DNA in 10µl reaction volumes, containing 5 µl of Taqman gene expression master mix, 0.5 µl of 20X primer/probe mixture, 0.28 µl of molecular grade water, 1 µl EXO-IPC (Internal Positive Control) Master Mix, 0.22 µl EXO-IPC DNA, and 3 µl of DNA. We included an internal positive control (IPC) to detect potential PCR inhibition. Cycling conditions consisted of 2 minutes at 50°C, then 95 °C for 10 minutes, followed by 40 cycles of 95 °C for 1 minute, and 60 °C for 1 minute.

For quantification of Zebra/Quagga mussel eDNA, a 477 bp gBlock gene fragment was synthesized based on the Zebra Mussel complete mitochondrial DNA sequence (GenBank accession; KY091877.1), from base 5,215 to 5,353 (Table 2). All gBlocks were synthesized by IDT. Copy numbers for gBlock fragments were estimated by multiplying Avogadro's number by the number of moles. We made a serial dilution of gBlock fragments from 10^7 to 10^0, to determine the copy number present in each eDNA sample.

To assess the amplification success of each qPCR, we developed a standard curve from 1:10 serial dilutions of these synthetic fragments 10^7 to 10^0. The Limit of Quantification (LOQ, the lowest concentration at which at least 90% of the replicates amplified), and the Limit of

Detection (LOD, the lowest concentration that was 10-fold below the LOQ) were determined for each assay by running the standard curve dilution with 3 replicates.

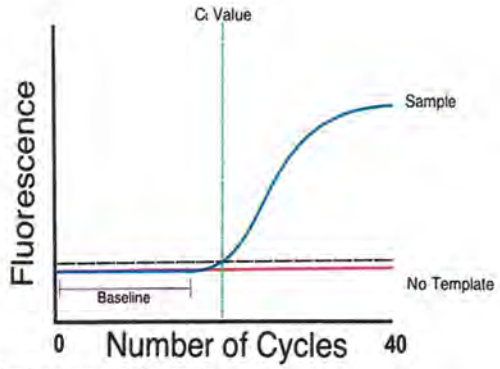
Filter samples were considered positive for detection if two out of three triplicate qPCRs per filter resulted in a positive amplification (e.g. C_T of 40 or below). If qPCR samples were positive for only one of three replicate, the samples were re-amplified, in triplicate.

Results/Discussion:

The LOQ of the Zebra/Quagga assay was 10^5 (2,091 copies/µl), and the LOD was 10^5 (2,091 copies/µl), indicating roughly insensitive detection abilities which can be improved (typical detection is at 20.9 copies (10^1)). Despite this low sensitivity, the Zebra/Quagga mussel assay performed reasonably well, suggesting a strong correlation between Ct and log copy number ($R^2 = 0.92$). None of the associated laboratory negative controls amplified, suggesting no detectable contamination from the field and laboratory. The internal positive control (IPC) amplified in every sample, except KFM 1 (+), indicating that inhibition was not present.

Of the 4 samples collected in Washington (Table 1), Zebra and Quagga mussel eDNA was not detected at any of the sites. In order to determine if KFM 1 (+) has Zebra/Quagga eDNA present, we will purify this sample to remove inhibitors, and re-amplify. Additionally, we will develop another serial dilution standard and re-amplify all samples, to assure that our sensitivity is as low as it typically has been in the past.

Figure 1. Diagram of qPCR real-time output. A sample replicate is deemed Detection, if the sample (blue line) crosses the threshold (dashed line), before the termination of thermal cycling. The point at which the sample crosses the threshold is referred to as C_T.



https://bitesizebio.com/24581/what-is-a-ct-value/

Table 1. Primer and probe sequences used to amplify Zebra/Quagga mussels.

Species	Forward (5'-3')	Reverse (5'-3')	Probe (5'-3')
Zebra/Quagga Mussel (dreissenid assay)	TGGGGCAGTAAGAAGAAAAAAATAA	CATCGAGGTCGCAAACCG	6FAM-CCGTAGGGATAACAGC-MGBNFQ

Table 2. IDT gBlock sequences used to quantify qPCR reactions.

Species	IDT gBlock (5'-3')
Zebra/Quagga Mussel (Genus level assay)	TGGGGCAGTAAGAAGAAAAAAATAATTCTTCCTTGAAAAAAAGATCCCTTATTAAGGA CAAAAGAAAAAGTTACCGTAGGGATAACAGCGTTATCGTTTTTAAGAGAACTAATCGA AGAAACGGTTTGCGACCTCGATG

Table 3. Samples collected from Lake Roosevelt National Recreation Area during the Emergency Response exercise.

Date	Sample #	Extraction #	Sampler	Site	Site #	Type	eDNA Detected?	Inhibited
10/23/2019	KFM-1	1	SE and MW WDFW	Entrance	450	Sample	Not Detected	Yes
10/23/2019	KFM-2	2	SE and MW WDFW	Between houseboat and dock-ramp	451	Sample	Not Detected	No
10/23/2019	KFM-3	3	SE and MW WDFW	Between houseboat dock and covered dock	452	Sample	Not Detected	No
10/23/2019	KFM-4	4	SE and MW WDFW	Between covered dock east end	453	Sample	Not Detected	No
10/23/2019	KFM-1	5	SE and MW WDFW	Entrance	450	Negative	Not Detected	No
10/23/2019	KFM-2	6	SE and MW WDFW	Between houseboat and dock-ramp	451	Negative	Not Detected	No
10/23/2019	KFM-3	7	SE and MW WDFW	Between houseboat dock and covered dock	452	Negative	Not Detected	No
10/23/2019	KFM-4	8	SE and MW WDFW	Between covered dock east end	453	Negative	Not Detected	No

Literature Cited:

Balasingham, K. D., Walter, R. P., & Heath, D. D. (2017). Residual eDNA detection sensitivity assessed by quantitative real-time PCR in a river ecosystem. *Molecular ecology resources*, *17*(3), 523-532.

Coble, A. A., Flinders, C. A., Homyack, J. A., Penaluna, B., Cronn, R. C., & Weitemier, K. (2018). eDNA as a tool for identifying freshwater species in sustainable forestry: A critical review and potential future applications. *Science of The Total Environment*.

Gingera, T. D., Bajno, R., Docker, M. F., & Reist, J. D. (2017). Environmental DNA as a detection tool for zebra mussels Dreissena polymorpha (Pallas, 1771) at the forefront of an invasion event in Lake Winnipeg, Manitoba, Canada. *MANAGEMENT OF BIOLOGICAL INVASIONS*, *8*(3), 287-300.

Goldberg, C. S., Sepulveda, A., Ray, A., Baumgardt, J., & Waits, L. P. (2013). Environmental DNA as a new method for early detection of New Zealand mudsnails (Potamopyrgus antipodarum). *Freshwater Science*, *32*(3), 792-800.

Goldberg, C. S., Turner, C. R., Deiner, K., Klymus, K. E., Thomsen, P. F., Murphy, M. A., ... & Laramie, M. B. (2016). Critical considerations for the application of environmental DNA methods to detect aquatic species. *Methods in Ecology and Evolution*, *7*(11), 1299-1307.

Pilliod, D.S., Goldberg, C.S., Arkle, R.S. and Waits, L.P., 2013. Estimating occupancy and abundance of stream amphibians using environmental DNA from filtered water samples. Canadian Journal of Fisheries and Aquatic Sciences, 70(8), pp.1123-1130.

Sample #	Sample Date	Water Body	Reservoir	Site	Site #	Rec'd Date	Date analysis	Due Date	Aquatube ID	Volume (mL)
KFM-1	10/23/19	KFM-1	N/A	Rapid Response Training	KFM-1	10/23/2019	10/24/2019	10/24/2019	102319_8376	5.5
KFM-2	10/23/19	KFM-2	N/A	Rapid Response Training	KFM-2	10/23/2019	10/24/2019	10/24/2019	102319_8377	4
KFM-3	10/23/19	KFM-3	N/A	Rapid Response Training	KFM-3	10/23/2019	10/24/2019	10/24/2019	102319_8378	4
KFM-4	10/23/19	KFM-4	N/A	Rapid Response Training	KFM-4	10/23/2019	10/24/2019	10/24/2019	102319_8379	7

Percent Analyzed	Dreissenid	Corbicula	ostracods	Other	Photos Taken	AnalysisNotes	mL SR	mL petri	TotalmL	SR cell	DF	#slides
100	0	0	3		0		3	2.5	5.5	3	0.111111	9
100	0	0	5		0		3	1	4	3	0.111111	9
100	0	0	2		0		3	1	4	3	0.111111	9
100	0	0	3		0		3	4	7	3	0.111111	9