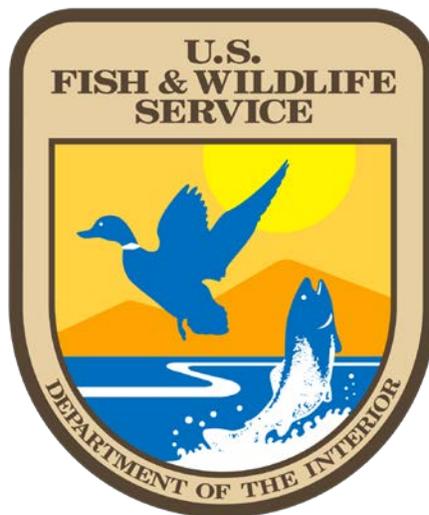

ACTION PLAN

ENDANGERED SPECIES ACT (ESA) COMPLIANCE FOR QUAGGA/ ZEBRA (Q/Z) MUSSEL RESPONSE IN THE COLUMBIA RIVER BASIN STATES



The action plan proposed with USFWS funds and implemented by the PSMFC Aquatic Nuisance Program (ANS) will result in a manual that will inform, expedite and facilitate ESA Section 7 consultations to minimize impacts of dreissenid mussel response actions on listed species and their designated critical habitat. To inform the development of the manual, we will convene federal, state and other agencies and entities to provide input and expertise.

The manual will be developed with the assumption that a “no response action” situation is unacceptable given the likely long-term adverse effects of dreissenids on trust resources. However, the manual will address (1) anticipated effects to listed trust species and their habitats if dreissenid mussels were to establish for the long term due to no response action, and (2) the likelihood that the control measures will protect of trust species and their habitats from the adverse impacts of a dreissenid mussel introduction.



CONTENTS

BACKGROUND AND NEED	3
THE PROCESS	5
OUTLINE FOR THE MANUAL	6
ACTION PLAN TO PRODUCE THE MANUAL BY DECEMBER 31, 2018	10
INITIAL LIST OF POTENTIAL PARTICIPANTS IN MANUAL DISCUSSION AND DEVELOPMENT	12

BACKGROUND AND NEED

The spread of zebra (*Dreissena polymorpha*) and quagga (*Dreissena rostriformis bugensis*) mussels, (also referred to as dreissenid mussels or dreissenids) in the western United States is of great concern to: aquatic resource managers; biologists and ecologists; industrial, municipal and agricultural raw water users and suppliers; and entities associated with recreation and recreational industries. When dreissenid mussels are introduced to aquatic systems under suitable environmental conditions, they reproduce rapidly and clog power plant components, municipal water intake pipes, fish screens, and other underwater infrastructure. They are also capable of causing severe ecological impacts, such as outcompeting or contributing to local displacement, or extinction, of native species, causing dramatic shifts in trophic dynamics and food web structure, altering ecosystem processes, and modifying the provision of ecosystem services.

In addition, dreissenid mussels pose tremendous economic risk. Mussel mitigation systems are estimated to cost \$1.8 million per dam facility, and the cost to remove mussels from dam facilities is estimated at \$48,000 per facility. Removal of mussels from boat launches is estimated to cost \$750 per facility. The State of Washington estimates the total impacts of invasive mussels to be more than \$100 million, with a corresponding loss of 500 jobs and \$27,884,000 in labor income.

Tens of millions of dollars are spent each year to manage quagga/zebra mussel infestations in North America as well as implement prevention efforts associated with trailered watercraft (i.e., watercraft inspections and decontaminations). The 2016 dreissenid veliger detection in Tiber Reservoir and a suspect positive sample from Tiber and Canyon Ferry reservoirs in Montana raised the level of concern in the Columbia River Basin (CRB) because of the proximity of these water bodies to the CRB. The 2016 Montana detections have energized entities in the CRB region to increase actions to prevent the movement and spread of dreissenids into uninfested waterbodies.

Dreissenid mussels were originally introduced to North America via ballast water transfer from oceangoing commercial ships, but the primary vector of intra-continental transport is via recreational watercraft. Dreissenid mussels attach themselves to recreational watercraft and other water-based equipment, hitching rides from one water body to the next. Contaminated watercraft continue to be transported into and through uninfested regions of the West, as evidenced by the hundreds of interceptions annually at inspection stations in western states.

The threat of dreissenid mussels to uninfested regions of the West has resulted in numerous interjurisdictional prevention efforts, such as the *Building Consensus* initiative, coordination and implementation of watercraft interception and decontamination stations and programs, collaboration and enhanced law enforcement.

During the past decade, the Pacific States Marine Fisheries Commission (PSMFC) has played a

leadership role, working with partners throughout the western states and provinces, to minimize the spread and introduction of aquatic invasive species. These efforts have included initiating conversations with, and convening on a regular basis, US Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) regional staff to compile background information and discuss roles and responsibilities associated with an anticipated response to an introduction of dreissenids in the CRB and associated states. These activities were intended to facilitate an efficient response to an introduction of dreissenids by clarifying roles and responsibilities in interagency or cross-jurisdictional circumstances, designating a lead federal agency, understanding the effects of any potential actions on species and designated critical habitats, and ensuring permits were in place, and policies established. To that end, the [Columbia River Basin Rapid Response Plan](#) was created, followed by a series of Columbia River Basin [rapid response exercises](#), and the creation of a draft working document, [Responding to an introduction of dreissenids in the Columbia River Basin \(2014\)](#).

A key next step in the process is to build on the foundational work that has been developed by delineating a suite of most-likely rapid response eradication actions for a potential dreissenid introduction in the CRB and associated states, and assess the potential for those actions to affect associated Endangered Species Act (ESA)-listed species and critical habitat (e.g., impacts of the biocide potash on the threatened bull trout and its critical habitat). The information will be gathered, compiled, and analyzed in a manual that is intended to:

- Facilitate to the extent possible the “front-loading” of conservation measures to avoid and minimize adverse impacts to ESA-listed species and critical habitats during emergency response actions.
- Facilitate and expedite non-emergency ESA Section 7 consultations on rapid response actions.
- Clarify and better inform the *Columbia River Basin Interagency Invasive Species Response Plan* relative to the scope of federal agency response activities.
- Inform existing state rapid response plans for Oregon, Washington, Idaho, and Montana.
- Improve communication and coordination among jurisdictions and other regional entities.
- Foster comprehensive mitigation approaches to reduce risks that affect multiple jurisdictions.
- Maximize economies of scale by leveraging individual capabilities and sharing resources and information.
- Avoid duplication of efforts by leveraging information developed to date by individual states and entities. Each state will share information and benefit from the completed work and lessons learned of other states as each completes action items in this plan.

Ultimately, the goal of this effort is to facilitate decisions that consider impacts to trust resources in the face of an incipient invasion of dreissenid mussels. This effort requires that all federal management agencies in the CRB, including key federal regulatory agencies, specifically, the USFWS and NMFS, participate collaboratively to produce the manual. The outcomes of the effort

will include the production of a manual as well as improved coordination and collaboration among the many jurisdictions that would be engaged in emergency and non-emergency dreissenid rapid response efforts in the CRB and CRB states.

The target completion date proposed for the manual is December 31, 2018. The schedule for this entire project, which may include additional steps to inform the development of a Biological Opinion and Assessment for purposes of informing ESA section 7 consultation on response activities, is October 1, 2017 – December 31, 2019.

THE PROCESS

This action plan will result in the production of a manual that will meet the needs of federal and state agencies and tribes as well as advance and inform ESA consultation efforts. The production of this manual requires coordination and collaboration among federal and state agencies in each state and among the CRB states. The USFWS, PSMFC, and NMFS serve on a leadership team guiding this overall effort. Representatives from each of the states will identify appropriate individuals to serve on workgroups to advance content addressing species and habitats as well as likely responses in each state.

Because the initiation of any action in a CRB state will trigger that state's rapid response plan and require a coordinated response with federal agencies in the state in which the response occurs, we propose the manual be developed using state-based working groups that coordinate with the Leadership Team (USFWS, PSMFC, and NMFS). We propose working with the states in the following order¹: Washington, Oregon, Montana, and Idaho. The proposed order for work flow is based on the maturation of existing rapid response plans, history of conducting rapid response exercises, and current levels of coordination and collaboration among entities that would likely be involved in a dreissenid response (e.g., Fish and Wildlife agency and sister state agencies, Invasive Species Council, tribes, federal partners). Lessons learned as we move through the process will create efficiencies for each of the states.

¹ *Note:* We propose starting the process with Washington, and while Washington is moving through steps in its process, start the process with Oregon, etc., such that states are concurrently working on actions, but following in the footsteps of the states that have completed earlier actions.

OUTLINE FOR THE MANUAL

I. Introduction

- A. State the purpose of document, e.g., to assess the potential effects of emergency and non-emergency response activities on federally protected resources.
- B. Briefly specify the proposed suite of emergency and non-emergency actions, including all conservation measures (minimization and avoidance measures), on a state-by-state basis, including federal actions and any state actions. Produce one overall manual, but with distinct chapters for each state.

II. Project description (Response Characterization—Suite of Actions)

- A. Incorporate a range of environmental settings and cross-jurisdictional challenges/scenarios², to develop case studies for representative, high-risk water bodies to document a series of project descriptions for each state, including:
 - what the control project or action is (focusing on likely control options, such as potash, and key critical species, such as bull trout (*Salvelinus confluentus*));
 - where the project is located;
 - who is going to implement the control action and under what authority; and
 - how the control action will be accomplished, which may involve an initial emergency response followed by subsequent non-emergency activities. The Manual will identify a suite of potential conservation measures that could be implemented to avoid, reduce, or eliminate adverse effects or that would benefit ESA-protected species or critical habitat in conjunction with emergency and non-emergency response actions.
- B. Create a map delineating the location of each project element.
- C. Identify any conservation measures and best management practices (e.g., timing restrictions that avoid or minimize adverse effects to ESA-listed species and critical habitat that do not compromise the effectiveness of the response action) for incorporation into the project design.

III. Action Area

- A. Delineate the geographic area that is likely to be affected, directly or indirectly, by the response action.

² Generally, one action in a specific location sets the stage for the Project Description. However, this manual is different, in that neither the specific action nor the specific location where the action will occur, has been identified. Therefore, the goal is to review a suite of potential water body types, water body managers, and control actions to understand the challenges and steps associated with each situation to help inform future emergency and non-emergency ESA section 7 consultations.

The ESA regulatory definition of “action area” means “all areas that may be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). The action area encompasses the geographic area subject to physical, chemical and biotic changes as a result of the response action.

- B. Delineate the specific areas and their associated physical and biological attributes that are likely to be affected by each of the project elements. Include a discussion of topography, vegetation, critical habitat and listed species conditions and trends, and maps.
- C. Identify potentially affected cultural/archeological resources via consultation with Tribes, when appropriate.
- D. Identify any ongoing activities that may be affecting ESA-listed species or critical habitat.
- E. Identify and evaluate key uncertainties affecting the results of A-D above, and provide any associated recommendations to address those uncertainties in the future via research projects.

IV. Proposed/Listed Species/Critical Habitat Considered

- A. Identify the species or critical habitat that “may be present.”

This includes listed, proposed and candidate species, and proposed and designated critical habitat. Species that may be present in the general area, *but not necessarily in the action area*, should be included in the assessment. The ESA Section 7(a)(2) Process (Step 1) portion of the USFWS website (insert link) will be used to complete this section of the assessment.

For each species, describe its biology and distribution, status reviews – consider all life stages. Include longevity; age distribution; age to maturity; reproductive strategy (for example, the number of times mature individuals reproduce in a lifetime, or whether mature individuals reproduce sexually or asexually); recruitment; seasonal distribution patterns; biogeography; food habits; niche; life cycle; hosts and symbionts; predators and competitors; and disease factors. The size of a population and its natural variance over time are important characteristics affecting the species’ response to disturbance factors. Describe the reason or reasons for listing as well as current pressures, new threats, and limiting factors. Document the geographical extent of proposed or designated critical habitat, and describe the primary constituent elements and/or the physical and biological features of the proposed or designated critical habitat.

B. Describe ongoing monitoring for species and critical natural resources that may be threatened by dreissenids, or a potential dreissenid response action.

C. Describe and map the current population and habitat conditions/features (status and trend, if known) in the action area for each protected resource that “may be present.”

For each species and critical habitat that “may be present,” describe current habitat conditions (inclusive of primary constituent elements or physical and biological features of the critical habitat within the action area), and its current population status and trend, if known. Use information documented in proposed and final listing and critical habitat designation rules that are published in the Federal Register.

D. Identify and evaluate key uncertainties affecting the results of A-C above, and provide any associated recommendations to address those uncertainties in the future via research projects.

V. Effects Analysis

A. For each critical habitat parcel, we will explain how it will or will not be exposed to the project elements.

We will describe how the action (and no response action) may affect each protected resource, including our conclusion and supporting rationale. We will document our analysis of the what, when and how the protected resources will be exposed to and how such individuals or habitat are likely to respond to this exposure, including those responses that may occur later in time. We will document personal communications and conclusions reached when species experts are contacted, and will incorporate literature cited.

B. For each potentially affected candidate, proposed, or listed species describe its exposure and response to response actions (when possible, in terms of its reproduction, population sizes, and distribution).

C. Assess the effects of any future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area that may affect candidate, proposed, or listed species or proposed/designated critical habitat within the action area (when possible, in terms of how they are likely to affect reproduction, population sizes, and distribution of the species, and the recovery function of the critical habitat).

D. Identify and evaluate key uncertainties affecting the results of A-C above, and provide any associated recommendations to address those uncertainties in the future via research projects.

VI. Conclusion and Determination of Effects for each Protected Resource

- A. Based on the findings from parts II – V above, for each species and their designated critical habitat, make one of the following ESA Section 7 effect determinations and include the rationale supporting that finding:
- "No effect" means there will be no impacts, positive or negative, to listed, proposed, or candidate resources. Generally, this means no protected resources will be exposed to the response action(s) and its environmental consequences. Concurrence from the USFWS and NMFS is not required for such determinations.
 - "May affect, but not likely to adversely affect" means that all effects are likely to be beneficial, insignificant, or discountable. Beneficial effects have contemporaneous positive effects without any adverse effects to the species or habitat. Insignificant effects relate to the size of the impact (at the scale of the individual) and include those effects that are undetectable, not measurable, or cannot be evaluated. Discountable effects are those extremely unlikely to occur. These determinations require written concurrence from the USFWS and NMFS.
 - "May affect, and is likely to adversely affect" means that listed, proposed, or candidate resources are likely to be exposed to the response action or its environmental consequences and are likely to respond in a negative manner to the exposure.

The information and analyses used in these case studies can be relied upon, as appropriate, to inform future emergency and non-emergency consultations on site-specific response actions.

VII. Summary and Recommendations for Generalized Standard Operating Guidelines

- A. Generalized standard operating guidelines will be compiled to guide responders if a scenario occurs that does not align with the action/site scenarios described in the aforementioned case studies.

VII. Literature Cited

The best scientific and commercially available data will be used to support the information in the manual. We will include relevant reports, such as results from species or habitat surveys (include survey methodology, specifics, scope, geography, source, implementers, timeline), and supporting documents, such as environmental assessments, grey literature, or other planning documents.

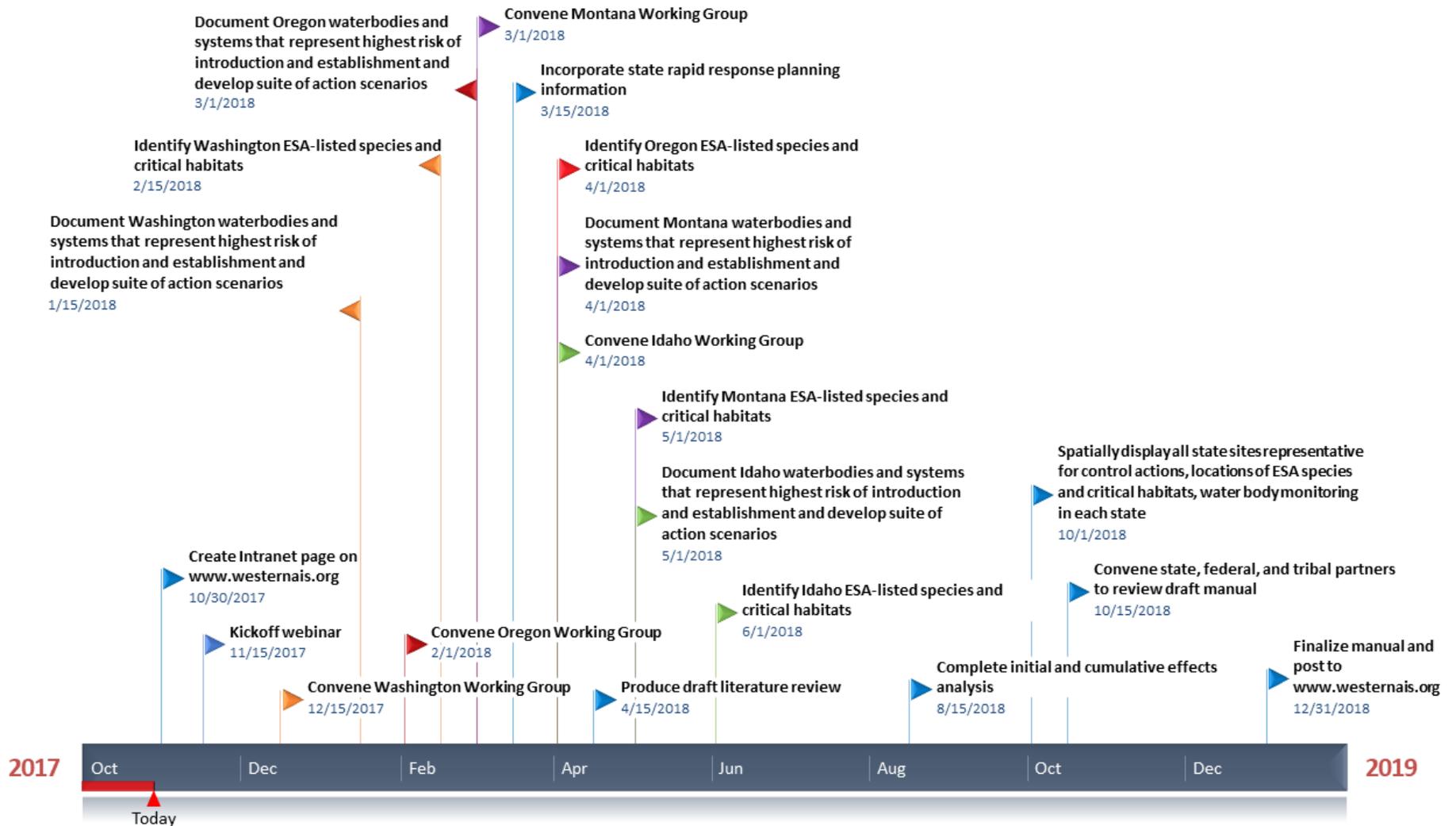
VIII. List of Contacts, Participants, and Preparers

ACTION PLAN TO PRODUCE THE MANUAL BY DECEMBER 31, 2018

Description	Lead	Partners	Deadline	Status
1. Project-wide tasks to be completed				
1A. Conduct a recorded webinar with entities in each state (and federal partners) to share project goals and desired outcome, review the manual outline, review the draft action plan, and identify/confirm individuals in each state-based working group.	L. DeBruyckere, Leadership Team	Webinar attendees: State representatives (include Nevada and Wyoming in initial outreach); tribes, federal agencies, technical ZQ experts, AIS Coordinators	11/15/2017	
1B. Create and maintain an Intranet page on westernais.org that allows working groups to track progress on development of components of the manual – develop and maintain one overall page for analyses that span all four states and individual pages for each state.	L. DeBruyckere	All entities assisting in the production of content for the ESA Manual	10/30/2017	
1C. Produce a current literature review (focusing on compiling and updating previous reviews) and expert survey analysis of chemical and other control options for dreissenids and their associated conservation measures, including pros and cons associated with each, considering CRB-specific listed species and critical habitats. Share draft literature review and analysis with experts, then convene a webinar with experts to obtain additional review and input before finalizing.	L. DeBruyckere	Control experts	Draft literature review: 4/15/2018 Webinar: 6/15/2018	
1D. Complete initial and cumulative effects analyses based on the two most likely dreissenid control options to be implemented in the CRB and by CRB states, then convene USFWS and NOAA staff for review.	L. DeBruyckere	Control experts; include Laura Sprague from USFWS Idaho Fish Health Lab (biosecurity/chemical treatment)	Complete analysis: 8/15/2018 Review with feds: 9/15/2018	
1E. Convene a meeting with state, federal, and tribal partners to discuss the draft manual and receive their input and guidance.	L. DeBruyckere, Leadership Team		10/15/2018	
1F. Incorporate final edits into manual, distribute to states and partners, and post on http://www.westernais.org .	L. DeBruyckere		12/31/2018	
2. Tasks specific to individual states				
2A. Convene a meeting with the proposed working groups to identify information-gathering tasks in the manual, suite of potential actions,	L. DeBruyckere	Leadership Team, state representatives	WA: 12/15/2017 OR: 2/1/2018 MT: 3/1/2018 ID: 4/1/2018	

share details on Intranet page content and access.				
2B. Document the suite of state-based waterbodies and systems that represent highest risk of dreissenid introduction and establishment (based on water body use and water chemistry characteristics) and develop a suite of action scenarios for each of these systems.	AIS Coordinators	Land management agencies in respective states	WA:1/15/2018 OR:3/1/2018 MT: 4/1/2018 ID: 5/1/2018	
2C. For each state, spatially display, using data layers, as many components of the analysis as feasible, including, at a minimum, the sites representative for control actions, locations of ESA species and critical habitats, water body monitoring in each state, etc.	L. DeBruyckere	PSMFC GIS Staff, AIS Coordinators, entities collecting waterbody monitoring data in the CRB	10/1/2018	
2D. Identify the ESA-listed species and critical habitat within the geographic scope of the action scenarios for each state.	USFWS regional staff; state fish and wildlife staff		WA:2/15/2018 OR:4/1/2018 MT: 5/1/2018 ID: 6/1/2018	
2E. Incorporate state rapid response planning information (e.g., state-specific permits) into manual.	L. DeBruyckere		3/15/2018	

The figure on the next page depicts the process each state will participate in to complete the manual as well as overall products and actions of the Leadership Team (yellow dates).



INITIAL LIST OF POTENTIAL PARTICIPANTS IN MANUAL DISCUSSION AND DEVELOPMENT³

FEDERAL

USFWS Fish & Aquatic Conservation, Region 1 (*Johnna Roy, Linda Beck, Laura Sprague, Larry Salata*)
USFWS Ecological Services, Region 1 (*Bob Kibler, Chris Allen, Brendan White*)
USFWS Region 6 (*Lindy Garner, Joanne Grady*)
National Marine Fisheries Service (*Nancy Munn*)
US Army Corp of Engineers (*Damian Walter, Michael Francis, John Hook, Brad Trumbo*)
Bureau of Reclamation (*Bryan Horsburgh, Scott Hoefler*)
Bonneville Power Administration (*Kim Johnson*)
Environmental Protection Agency (*Dirk Helder*)
US Forest Service (*Rebecca Flitcroft, Jim Capurso, someone from Region 1 FS in Missoula, MT*)
National Park Service (*John Wullschleger, Bryan Moore, Steve Bekedam*)
Bureau of Indian Affairs (*Keith Hatch*)
US Geological Survey (*Tim Counihan, Christine Densmore*)

TRIBES

Columbia River Inter-Tribal Fish Commission (*Blaine Parker*)
Upper Columbia United Tribes (*John Sirois*)

Oregon

Burns Paiute of Harney County
Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians
Confederated Tribes of Grand Ronde
Confederated Tribes of Siletz
Confederated Tribes of Umatilla Reservation
Confederated Tribes of Warm Springs
Cow Creek Bank of Umpqua Indians
Coquille Indian Tribe
Klamath Tribes

Washington

Chehalis
Colville
Cowlitz
Hoh
Jamestown S'Klallam
Kalispel

³ Leadership Team noted in bold.

Lower Elwha Klallam
Lummi
Makah
Muckleshoot
Nisqually
Nooksack
Puyallup
Quileute
Quinault
Samish
Sauk-Suiattle
Shoalwater Bay
Skokomish
Snoqualmie
Spokane
Squaxin Island
Stillaguamish
Suquamish
Swinomish
Tulalip
Upper Skagit
Yakama

Idaho

Coeur d'Alene Tribe of Indians
Kootenai Tribe of Idaho
Nez Perce Tribe of Idaho
Shoshone-Bannock Tribe

Montana

Blackfeet Tribe of the Blackfeet Reservation
Chippewa Cree Tribe of the Rocky Boy's Reservation
Confederated Salish & Kootenai Tribes of the Flathead Reservation
Crow Tribe of the Crow Reservation
Fort Belknap Tribes of the Fort Belknap Reservation
Fort Peck Tribes of the Fort Peck Reservation
Northern Cheyenne Tribe of the Northern Cheyenne Reservation
Little Shell Band of Chippewa

REGIONAL

NW Power and Conservation Council (*Leslie Bach*)
Pacific Northwest Economic Region (*Matt Morrison*)
Chelan Public Utility District (*Marcie Clement*)

STATE

Pacific States Marine Fisheries Commission (*Stephen Phillips, Lisa DeBruyckere*)

Washington

Washington Department of Fish and Wildlife AIS Coordinator (*Allen Pleus*) (allen.pleus@dfw.wa.gov)
Washington Department of Fish and Wildlife Habitat Program Staff Washington Invasive Species Council
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Oregon

Oregon Department of Fish and Wildlife AIS Coordinator (*Rick Boatner, Martyne Reesman*)
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Oregon State Marine Board (*Glenn Dolphin*)
Oregon Department of Environmental Quality (*Rian Hooff*)
Oregon Department of Agriculture (*Rose Kachadoorian*)
Oregon Invasive Species Council Coordinator (*Jalene Littlejohn*)
Oregon State University – Oregon Sea Grant (*Sam Chan*)

Montana

Montana Fish, Wildlife and Parks (*Tom Woolf, Stacie Schmidt*)
Montana Invasive Species Council Chair (*Bryce Christiaens*)
Montana Department of Environmental Quality (*Jordan Tollefson*)
Montana Department of Agriculture (*Dave Burch*)
Montana Department of Natural Resources and Conservation (*Amy Gannon*)
Montana Invasive Species Action Network (*Bob Wiltshire, Leah Elwell*)
Montana State University Extension (*Jane Mangold*)

Idaho

Idaho Department of Agriculture Aquatic Plants Program Manager (*Vacant*)
Idaho Department of Agriculture (*Lloyd Knight*)
Idaho Department of Agriculture (*Nic Zurfluh*)
Idaho Department of Agriculture (*Jeremy Varley*)

DATABASE EXPERTS/PROGRAMS

Oregon—Institute for Natural Resources (*Eleanor Gaines*)

Washington—Department of Natural Resources Natural Heritage Program (*Andrea Thorpe*)

Idaho—Idaho Department of Fish and Game Natural Heritage Program (*Angie Schmidt*)

Montana—Montana Natural Heritage Program (*Karen Coleman*)

QZ TECHNICAL/BIOLOGICAL EXPERTS

Universities

Portland State University (*Mark Sytsma*)

University of Idaho (*Christine Moffitt - retired*)

Washington State University (*Steve Bollens*)

University of Nevada-Reno (*Chris Jerde*)

McGill University (*Lisa Jones*)

State University of New York (*Dan Molloy*)

Washington State University (*Gretchen Rollwagen-Bollens*)

Portland State University (*Angela Strecker*)

Federal

US Geological Survey (*Tim Counihan*)

National Park Service (*Ben Smith*)

National Park Service (*Theresa Thom*)

Bureau of Reclamation (*Leonard Willett*)

State

Massachusetts Department of Environmental Protection (*David Wong*)

Industry

University California at Davis (*Jackson Gross*)

KASF Consulting (*Kelly Stockton*)

GIS Experts

Idaho State Department of Agriculture (*Stephen Cox*)

Pacific States Marine Fisheries Commission (*Van Hare*)