Preparing for Columbia River Basin Dreissenid Eradication and Control Efforts
A Decadal Journey and Key Next Steps

A report prepared for the Pacific States Marine Fisheries Commission
by Creative Resource Strategies, LLC

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Table of Contents

Executive Summary

Dreissenids were introduced to the Great Lakes in the United States in the 1980s via ballast water transfer and have since established in numerous water bodies in North America. Establishment of dreissenids in North America has been costly, therefore, significant efforts have been made to prevent their westward spread into the Pacific Northwest. These efforts include public outreach, a network of watercraft inspection and decontamination stations, a national *Call Before You Haul* program, an amendment to the Rivers and Harbors Act of 1958 (Section 104 in the Water Resources Reform and Development Act of 2014), rapid response exercises to test preparedness, and water body monitoring. Despite these strategic and costly annual prevention efforts, new detections of dreissenids in previously uninfested water bodies are announced annually, and the western states continue to intercept dreissenid-infested watercraft, particularly from the Great Lakes and Lower Colorado River regions of the United States.

In 2016, Pacific States Marine Fisheries Commission (PSMFC) began exploring options to navigate the complexities associated with implementing a dreissenid eradication or control action in the Columbia River Basin (CRB) given the quantity of federally listed species, and in particular, salmonids. Because responding to a detection of dreissenids in the CRB will require addressing the life history needs of federally listed species and their critical habitats, PSMFC and the U.S. Fish and Wildlife Service (USFWS) led the development of "Dreissenid Mussel Rapid Response in the Columbia River Basin: Recommended Practices to Facilitate Endangered Species Act Section 7 Compliance." The document and the accompanying website serve as a resource to facilitate a response to an introduction of dreissenids in the CRB, highlighting key elements and considerations for an emergency consultation.

Because it is both foreseeable and predictable that dreissenids will eventually be detected in the CRB, the U.S. Army Corps of Engineers (USACE) completed a Federal Natural Resources Law Compliance and Biological Assessment for dreissenid mussel rapid response in 2018. The USACE requested formal programmatic framework consultation with NOAA Fisheries and the USFWS (the Services) on 23 October 2018. Consultation will be complete when the Corps receives biological opinions from the Services, which are then accepted by the Corps for implementation. However, efforts to advance the consultation have not been completed; the USFWS has opted for any potential action to occur under emergency consultation, and NOAA Fisheries remains in consultation. Dreissenid rapid response actions cannot be taken without initiating Section 7 emergency consultations (for locations with a federal nexus) or Section 10 consultations (for entities other than federal agencies or locations without a federal nexus – however, these types of consultations generally take years to process).

If dreissenids are detected and spread within the CRB, a mechanism will likely be needed to address multiple actions simultaneously in numerous locations throughout the CRB. Currently, the only option that exists for one or more dreissenid eradication or control efforts in the CRB is through individual Section 7 emergency consultations with the Services. For example, a Section 7 Emergency Consultation is currently in process for the 2023 eradication effort attempted by the state of Idaho in the Snake River. Private, state, and local landowners can apply for incidental take permits through Section 10 of the ESA; however, a Habitat Conservation Plan must be developed that describes how a project might affect species and how a landowner will minimize or mitigate

harm to protected species. Habitat Conservation Plans require an accompanying Section 10 consultation.

This document reviews and identifies a biological opinion approved by the Services for the use of long-term fire retardant in the United States. The analysis illustrates parallels between the potential use of fire retardant across a significant geographic scope in the United States with the potential use of chemicals to attempt to eradicate or control dreissenids in the CRB. The purpose of this analysis is to demonstrate examples exist in which the Services have issued a biological opinion while unable to determine take based on the lack of information that exists in advance of an action. In the case of the biological opinion relating to fire retardant, surrogates are used to denote take.

This report also reviews the option by which, when a project may jeopardize listed species or adversely affect critical habitat and there are no viable reasonable and prudent alternatives, potential applicants (the federal action agency interested in proceeding with the action) or the Governor of the state where the action occurs, can apply for an exemption for a federal action despite its effects on listed species or their critical habitat.

Lastly, this report documents the actions Columbia River Basin entities have taken to prepare for an introduction of dreissenids and makes two recommendations that should be pursued simultaneously to protect the CRB and its hydropower and irrigation infrastructure, recreation, and natural resources:

Recommendation: Restructure the Biological Assessment for dreissenid mussel rapid response (2018) and model the new version after the approach taken to develop a biological opinion for wildfire retardant. Engage with the Services to negotiate a biological opinion.

Recommendation: Inform PNW state governors that an option exists, at the appropriate time, to apply to the Endangered Species Committee (ESC) for an exemption from ESA requirements to conduct dreissenid eradication actions in the CRB. The request would be based on the evidence that there are no reasonable and prudent actions, the benefits of proceeding with an action outweigh the benefits of alternative courses of action consistent with conserving species and their habitat, that the action is in the public interest and of national or regional significance, and that there was no prohibited irretrievable or irreversible commitment of resources before the exemption.

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Background

Zebra mussels (*Dreissena polymorpha*) are native to Eastern Europe (Higgins and Vander Zanden 2010) and were introduced to the Great Lakes through cargo ship ballast water transfer (Roberts 1990) between 1986 and 1989 (MacIssac 1994; Mills et al. 1996; Roe and MacIssac 1997; Cohen and Weinstein 2001; Whittier et al. 2008). Quagga mussels (*Dreissena bugensis*) originated in the Black Sea, Ukraine, and were first detected in Lake Erie in 1989 (May and Marsden 1992; Rosenberg and Ludyansiky 1994; Mills et al. 1996). Both dreissenids initially spread throughout the Great Lakes and have since established in numerous water bodies in North America (Figures 1 and 2).

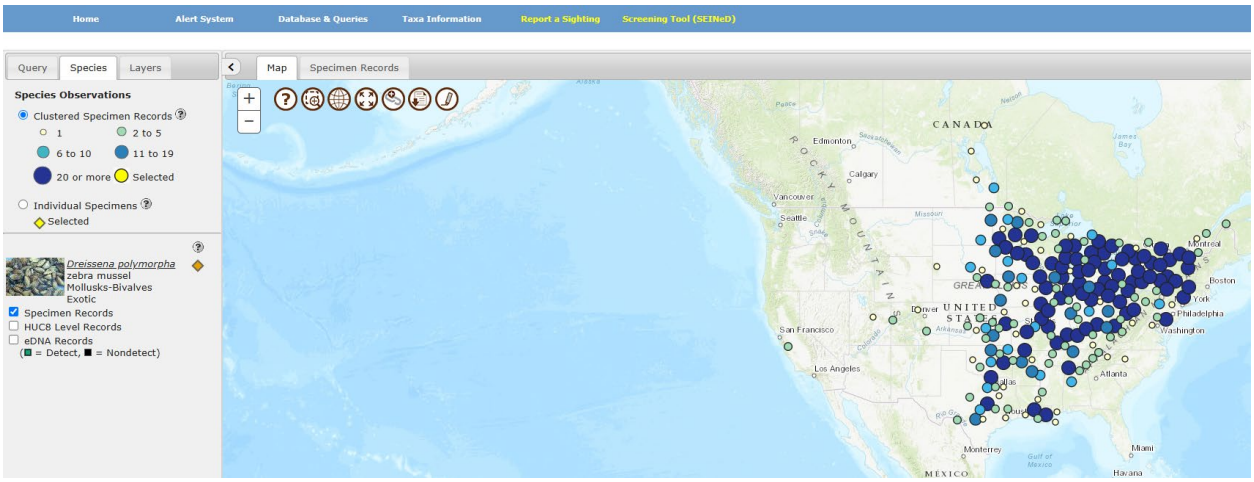


Figure 1. Distribution of zebra mussels as of 25 June 2024.

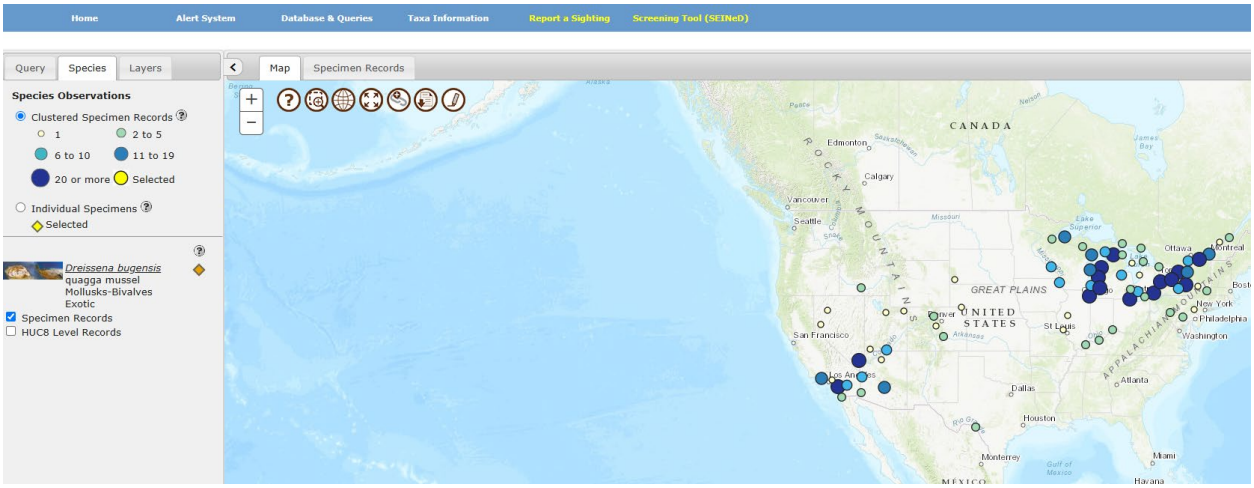


Figure 2. Distribution of quagga mussels as of 25 June 2024.

The economic, environmental, and cultural costs associated with an introduction of dreissenids have been well documented (https://www.crbdirt.com, USACE 2018). The U.S. Army Corps of Engineers (USACE) estimated in 2022 that the potential cost to protect hydropower facilities, salmon fisheries, and privately-owned watercraft in the CRB from a dreissenid infestation could total $185 million annually (GAO 2023).

Agencies throughout the West have been monitoring and tracking the westward expansion of dreissenids, whose movement is facilitated primarily via trailered watercraft. In anticipation of the continued westward expansion of invasive mussels, the Pacific States Marine Fisheries Commission (PSMFC), the western states, and the USACE have worked collaboratively to fund a network of watercraft inspection and decontamination stations (Figures 3 and 4) to intercept watercraft from infested water bodies. The USACE has sponsored a 50–50 cost-share agreement with states to fund the construction, management, and operation of watercraft inspection and decontamination stations in the CRB; this agreement was made possible as a result of an amendment of the Rivers and Harbors Act of 1958, Section 104 in the Water Resources Reform and Development Act of 2014. In addition to the original cost-share agreement with Idaho, Montana, Nevada, Oregon, and Washington, the agreement now includes five additional river basins in the western United States as well as watersheds that span the U.S.–Canadian border. Federal congressionally authorized funding totals $130 million annually (GAO 2023).

Canadian provinces that share waters in the CRB also support and staff watercraft inspection and decontamination stations.

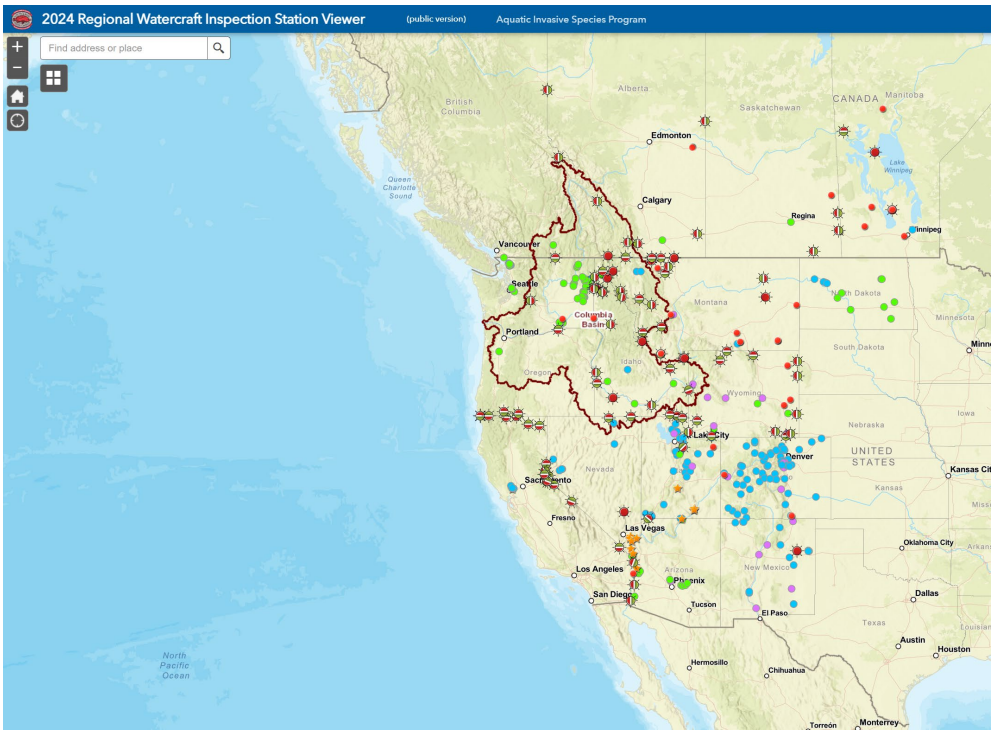


Figure 3. Locations of state and provincial watercraft inspection and decontamination stations.

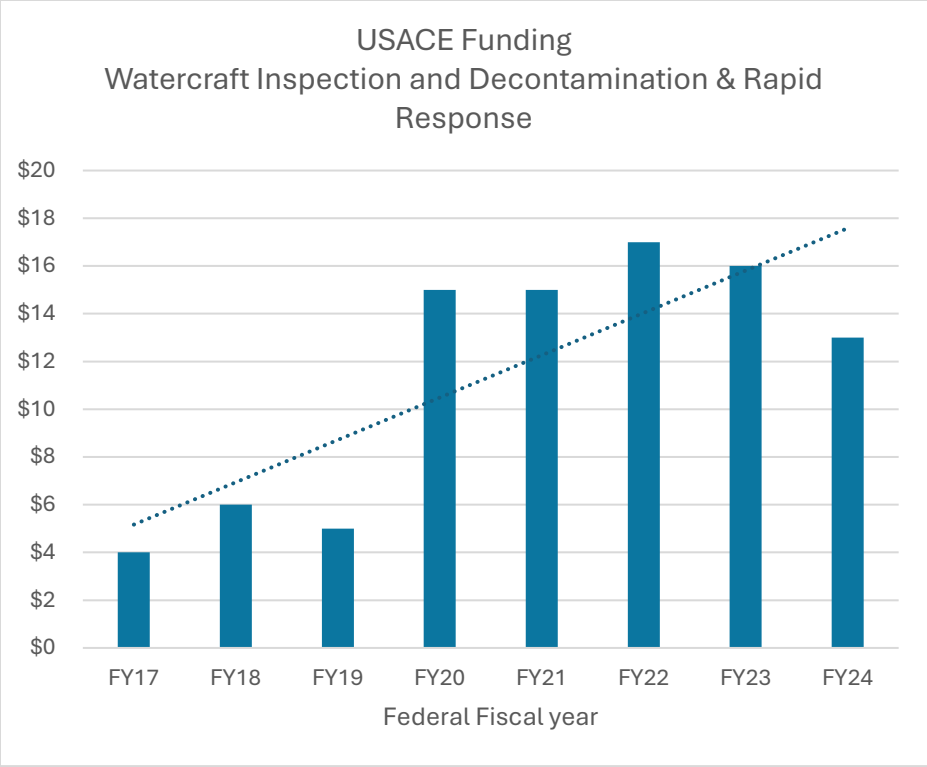


Figure 4. USACE investments in watercraft inspection and decontamination and rapid response preparation, FY17-FY24.

In addition to the stations, PSMFC launched *Call Before You Haul* in 2022, a 24-7 hotline that oversize/overweight watercraft transporters can call to make arrangements for an inspection and, if need be, decontamination of their watercraft. PMSFC worked with every state department of transportation or other agency responsible for issuing oversize/overweight transportation permits to share information about the program with permit applicants. To date, 38 U.S. states are participating in the program, six have pledged to participate, and five have declined (Nebraska, Texas, Mississippi, West Virginia, and New Hampshire).

The western states have been proactively participating in rapid response exercises (https://www.westernais.org/rapid-response) to prepare for an eventual introduction of dreissenids. The purpose of the exercises is to expedite and improve the efficacy and efficiency of a response through coordinated, collaborative efforts.

A significant amount of water body monitoring is occurring throughout the CRB to detect dreissenids upon introduction. Numerous federal, state, tribal, and academic institutions are actively monitoring dreissenids and other nonnative species using a variety of methods. PSMFC compiles the monitoring data from these entities and hosts an online map of entities monitoring for aquatic invasive species, where, and how frequently. This information can help managers and researchers determine if the current level of monitoring is sufficient, and whether efforts should be redirected to better fulfill various needs. In addition, making the information available online enhances coordination among states and provinces. PSMFC has played a lead role in coordinating and sharing information associated with quagga/zebra mussel sampling methods (see "Quagga/Zebra Mussel Sampling Methods") and which laboratories process specific types of

samples (see “Dreissenid Mussel Laboratories”) at: https://www.westernais.org/monitoring. States and provinces with new introductions of dreissenids benefit greatly from having this information available.

Despite all of these outreach, management, and planning efforts to detect dreissenids early and prepare for an eventual response, the western states continue to intercept dreissenid-infested watercraft (Figure 5). Figure 6 illustrates the source and destination of dreissenid-infested watercraft to the Pacific Northwest, the majority of which originated in the Great Lakes and Lower Colorado River regions. One-third of the infested watercraft intercepted from 2017 through 2023 were commercially hauled, and about 50% of the watercraft were recently purchased. These five states have already intercepted a total of 41 dreissenid-infested watercraft from 1 January through 1 June 2024.

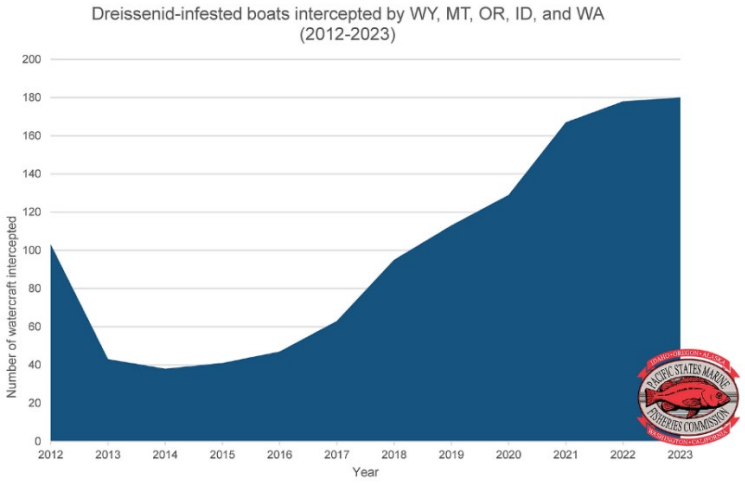


Figure 5. Dreissenid-infested watercraft intercepted by five northwestern states from 2012–2023.

Figure 6. The source (red dots) and destination (blue dots) of dreissenid-infested watercraft intercepted from 2017 through 2023. Source: Montana Fish, Wildlife & Parks.

Responding to Dreissenids in the CRB – Federally Listed Species and Their Habitats

Responding to a detection of dreissenids in the CRB will require addressing the life history needs of federally listed species and their critical habitats (Congressional Research Service 2017). In 2016, PSMFC began exploring options to navigate the complexities associated with implementing an action in the CRB given the quantity of federally listed species, and in particular, salmonids. In addition, the network of hydropower facilities, which provides more than 40% of total U.S. hydroelectric generation (U.S. Energy Information Administration) (Figure 7),[1] must be considered as well as the estimated 141 anadromous fish propagation facilities (PSMFC Columbia Basin Facilities dataset, pers. comm.), which use significant amounts of raw water. Fish passage facilities, such as fish ladders, screens, and bypass infrastructure require consideration.

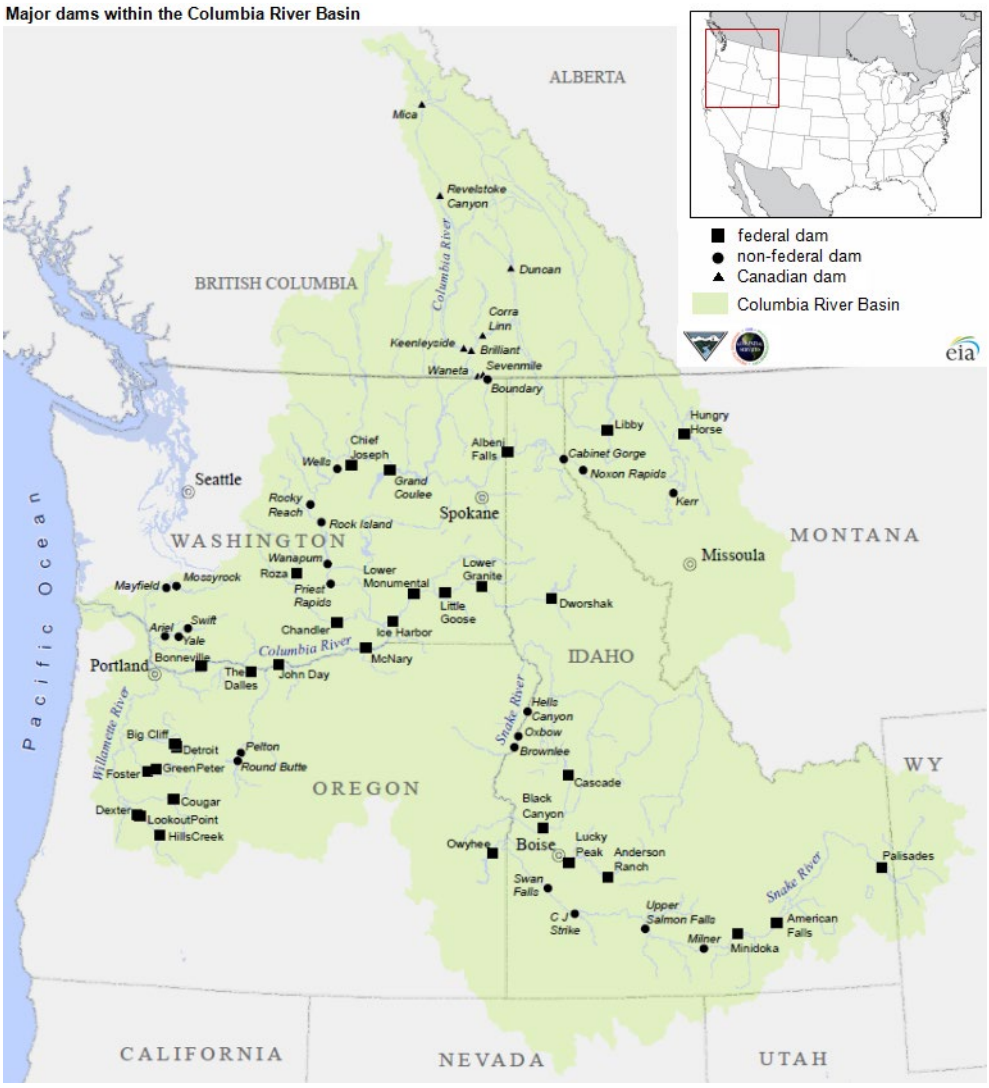


Figure 7. Major hydropower facilities within the Columbia River Basin. Source: Bonneville Power Administration.

[1] https://www.eia.gov/todayinenergy/detail.php?id=16891, accessed 14 May 2024.

NOAA Fisheries and U.S. Fish and Wildlife Service Responsibilities for ESA-listed Species

NOAA Fisheries and the U.S. Fish and Wildlife Service (USFWS) (the Services) are responsible for protecting species that are listed as endangered or threatened under the Endangered Species Act (ESA) and for protecting habitats that are critical for their survival. Section 7(a)(1) of the ESA charges federal agencies to aid in the conservation of listed species, and Section 7(a)(2) requires agencies to ensure their activities are not likely to jeopardize the continued existence of federally listed species or destroy or adversely modify designated critical habitat. The ESA requires federal agencies to consult with the Services to determine if an action may jeopardize the continued existence of a species or harm its critical habitat (Congressional Research Office 2017). Consultation may lead to an opinion by the Services that the action will jeopardize listed species or harm their critical habitats unless certain reasonable and prudent alternatives (RPA) are implemented.

Programmatic consultations streamline project implementation because the effects analysis for proposed activities is completed in advance of the action. The programmatic consultation includes the following:

1. Project Design Criteria (PDC), or other standards relative to action effects and stressors, to prevent or limit future adverse effects on listed species and critical habitat;
2. Description of the manner in which projects to be implemented under the programmatic consultation may affect listed species and critical habitat and evaluation of expected level of effects from covered projects;
3. Process for evaluating expected projects and their effects as well as tracking of actual aggregate or additive effects of all projects expected to be implemented under the program. The programmatic consultation document must demonstrate that when the PDC or standards are applied to each project, the aggregate effect of all projects are not likely to adversely affect listed species and their critical habitat;
4. Procedures for streamlined project-specific consultation. If an approved programmatic consultation document is sufficiently detailed, project-specific consultations ideally will consist of findings made by action agency biologists and consulting agency biologists, respectively. An action agency will provide a description of a proposed project, or batched projects, and an assurance that the project(s) will be implemented in accordance with the criteria or standards. The consulting agency reviews the submission and either concurs with the action agency, or identifies adjustments to the project(s) necessary to make it (them) consistent with the programmatic consultation document;
5. Procedures for monitoring projects, reporting requirements, and validating effects predictions; and
6. Comprehensive review of the program, generally conducted annually.

Biological opinions for actions that have restoration as the primary purpose, actions that have a significant restoration component, and “other actions” have been negotiated by the Services (Appendix A). If an action is likely to jeopardize the continued existence of an ESA-listed species or destroy or adversely modify designated critical habitat, then RPAs must be identified, or it must be indicated there are no RPAs. If an action is not likely to jeopardize listed species, destroy critical habitat, or RPAs have been identified and will be implemented by the action agency to avoid

jeopardizing listed species or destroying critical habitat, an Incidental Take Statement is included (identifies life stages affected, the form of take, and establishes RPAs to minimize the impact of the take, if possible; it also identifies the specific terms and conditions to implement each RFP). Discretionary Conservation Recommendations (DCR) that may be implemented by the action agency can further aid in the conservation of the species.

Columbia River Basin Dreissenid Rapid Response Eradication Preparation Efforts

The intent of dreissenid control in the Columbia River Basin is to protect native and ESA-listed fish and wildlife and their habitats from proven deleterious economic and environmental effects from dreissenid establishment. Dreissenid control could arguably be categorized as having a "significant restoration component" because the intent is to prevent habitat loss and degradation, which invariably occurs upon dreissenid establishment. The eradication of any existing populations of dreissenids would invariably prevent habitat loss and degradation critical to the survival of many ESA-listed species that require aquatic habitats for all or part of their life cycles. Therefore, eradication efforts could indeed be considered habitat restoration efforts because these efforts remove the non-native, invasive species contributing to habitat degradation, thus restoring the habitats to pre-invasive conditions.

It is estimated that dreissenid eradication attempts, in concert with comprehensive conservation measures and RPAs, will likely cause short-term, localized, effects to listed species, and potentially critical habitats. Pre-mitigation measures can be taken, depending on the circumstance (i.e., location of detection, extent of infestation, flowing versus still waters, etc.) to translocate listed species prior to action implementation. Such actions would be confined to specific geographic areas (i.e., extent of the scope of infestation) identified by surveys and monitoring. In the long term, the proposed actions will contribute to a lessening of many of the factors limiting the recovery of listed species, including habitat degradation. Small numbers of individual fish or wildlife, estimated to be too few to affect the abundance, productivity, distribution, or genetic diversity of any ESA-listed species, will likely experience adverse effects of any single action permitted under the proposed action. However, at the population scale, the goal is for the survival and recovery of the listed species to be enhanced by the proposed action. Protecting habitats is critical to survival and recovery of listed Columbia River Basin species.

An Example of a Northwest Biological Opinion with Parallels to Potential Dreissenid Actions

Appendix A includes examples of a variety of Northwest biological opinions (BiOp). One BiOp, in particular, is neither a project that has restoration as the primary purpose nor one that has a significant restoration component. It is categorized as an "other" project and has parallels to potential dreissenid actions in the Columbia River Basin.

The BiOp, signed in 2022, is the National Program for the Aerial Application of Long-Term Fire Retardants (OPR-2021-9236). The action agencies are the U.S. Department of Agriculture and the U.S. Forest Service.

The intent of the BiOp is to establish minimum requirements for fire retardant chemicals and safety and to assess the risk of applying those retardants to listed species and designated critical habitat. Key components of the BiOp, and potential parallel components for dreissenid mussel response, are described in Table 1.

Table 1. Comparison of a national program for the aerial application of long-term fire retardants and dreissenid mussel response in the Columbia River Basin.

	National Program for the Aerial Application of Long-Term Fire Retardants	Dreissenid Mussel Rapid Response in the Columbia River Basin
Proposed Action	**Mixed programmatic action** – a federal action that approves actions that will not be subject to further section 7 consultation; approves a framework for the development of future actions – take of listed species would not occur until future actions have section 7 consultation.	**Mixed programmatic action** – a federal action that approves actions that will not be subject to further section 7 consultation; approves a framework for the development of future actions – take of listed species would not occur until future actions have section 7 consultation.
Intent	**To protect individuals and communities** from threats caused by wildfires	**To protect the Columbia River Basin** from the deleterious effects of dreissenids (e.g., infrastructure -hydropower, irrigation, fish hatcheries; recreation; listed species and critical habitats)
Primary Tool	**Long-term fire retardants Qualified Products list** – continually evolving; new products meet specific criteria (2-pronged standard) – amount of active ingredient is limited so as not to exceed amount of chemicals applied per square foot; toxicity of proposed formulation must have a median lethal concentration (LC_{50}) of no less than 200 mg/L to aquatic organisms. List of unacceptable ingredients that increase toxicity not authorized for use and not subject to future consultations.	**Qualified Products List –** continually evolving; Table of anticipated amount of chemicals and calculated LC_{50} in mg/L.
Monitoring and Reporting	**Following each fire, annual coordination meetings, five-year program reviews** Yearly summary of retardant use and reports of retardant intrusions into avoidance areas. Intrusion report no later than 30 days after fire is contained.	**Following each control action, annual coordination meetings, five-year program reviews** Yearly summary of chemical use. Report no later than 30 days after dreissenid action.

	National Program for the Aerial Application of Long-Term Fire Retardants	Dreissenid Mussel Rapid Response in the Columbia River Basin
	If take has been exceeded, US Forest Service must again begin consultation with NMFS.	
Mitigation and Conservation Measures	1) mapping and guidance, 2) establishment of buffer zones, 3) provide funding for research on the effects of fire retardants on listed species and critical habitats, and 4) development and maintenance of a spill calculator to estimate the effects of fire-retardant intrusions into streams.	Initial treatments within the ESU boundaries of ESA-listed Endangered fishes Upper Columbia River Spring Chinook and Snake River Basin sockeye would not include EarthTec® QZ or Endothall. Potash, Zequanox®, ozone, and UV-B would be used as appropriate at each site. In the event that follow-up treatment with EarthTec® QZ and/or Endothall is necessary, the Corps will develop site-specific conservation measures and coordinate appropriately with the Services prior to treatment. Also see Section 2.1.6 of PM-EC-2019-0062 (USACE 2018)
Decision Making	Managing wildfires using fire retardants involves decision making at numerous levels/tiers	Implementing a dreissenid action in the Columbia River Basin using chemicals involves decision making at numerous levels/tiers
Legal Authority	Authority to use long-term fire retardants originates from laws intended to protect US Forest Service lands and resources	Federal agencies have authorities and responsibilities associated with protecting and conserving listed species and critical habitats, addressing invasive species, etc.
Jurisdictional Boundaries	Fires do not respect jurisdictional boundaries	Dreissenids do not respect jurisdictional boundaries
Action Area	All locations on and immediately downstream of NFS lands where anadromous fish are located	All locations in and downstream of Columbia River Basin water bodies
Listed Species in the Action Area and Designated Critical Habitat	2 whales, 16 salmon ESU, 12 steelhead trout DPS, 4 sturgeon DPS and 1 additional sturgeon species, Pacific Eulachon Critical habitat for sturgeon, Pacific Eulachon, and salmonids	https://www.crbdirt.com/esa-species-and-critical-habitats
Components of the action with associated stressors and associated mitigation measures	a) **Air bases** - Purchase and storage of chemicals at air bases (Ensure spills are contained by implementing containment and water treatment systems) b) **Mobile air bases** – Fuel and retardant spills, water withdrawals that can cause entrainment or impingement of aquatic species at water intake, and introduction of non-native species (Use municipal water supplies, or a large lake or reservoir – not flowing water, which is anadromous fish habitat; site spill containment plan, secondary containment systems set up 300 feet from waterway, and compliance with 2017 Guide to Preventing Aquatic Invasive Species Transport by Wildland Fire Operations) c) **Aerial application of long-term fire retardants** - can affect fish and their food resources (Use of spill calculator to estimate affected distance downstream from intrusion)	a) **Staging Areas** b) **Application of chemicals** – can affect fish and their food resources c) **Lost food resources** - aquatic invertebrates are a food resource for juvenile salmonids and steelhead and may be affected; salmonids are a primary food resource for southern resident killer whales

	National Program for the Aerial Application of Long-Term Fire Retardants	Dreissenid Mussel Rapid Response in the Columbia River Basin
	d) **Lost food resources** – Aquatic invertebrates are a food resource for juvenile salmonids and may be affected; salmonids are a primary food resource for southern resident killer whales and Cook Inlet beluga whales	
Stressors not likely to adversely affect listed species or critical habitat	• Fuel and fire-retardant spills (because of mitigation measures) • Pumping waters occupied by ESA-listed species (because of mitigation measures) • Runoff of chemicals from rain events • Critical habitats – runoff poses insignificant threats to individuals	
Species and critical habitat not likely to be adversely affected	Gulf sturgeon, central California coast coho, and central California coast steelhead are not within the action area. Unlikely fire retardant will be used in the Siuslaw, Olympic, or Mt. Baker-Snoqualmie National Forests, therefore Puget Sound ESU Chinook Salmon, Puget Sound DPS steelhead, Ozette Lake sockeye salmon, and Hood Canal summer-run chum salmon or their critical habitats will not be affected.	Proposed mitigation and conservation measures will minimize effects on listed species and critical habitats.
Status of species and critical habitat likely to be adversely affected	From Biological Assessment	From Biological Assessment

When a Project May Jeopardize Listed Species or Adversely Affect Critical Habitat and There Are No Viable Reasonable and Prudent Alternatives

If the federal action agency deems that Reasonable and Prudent Alternatives (RPAs) are inconsistent with agency action or the Services determine that no RPAs would allow the project to proceed and prevent jeopardy, then potential applicants can apply for an exemption for a federal action despite the existence of listed species or critical habitats (Congressional Research Office 2017). The action agency may apply to the national Endangered Species Committee (ESC)[2] for an exemption from ESA requirements.[3] The exemption process was incorporated as an amendment to the ESA in 1978 (Congressional Research Office 2017) and allows major economic factors to outweigh ESA's mandate to recover a species. ***Pursuit of this option should be considered as a last resort, and emphasis should be placed on having secured a determination from the Services that no viable RPAs exist.***

The ESC is composed of the Secretary of the Interior (serves as chair), the Secretary of Agriculture, the Secretary of the Army, the Chairman of the Council of Economic Advisors, the Administrator of the Environmental Protection Agency, the Administrator of the National Oceanic and Atmospheric Administration and one individual from each affected state.[4] (If multiple states are involved, each state has an appropriate fraction of a vote).[5]

To receive an exemption, the action agency must have carried out its consultation responsibilities in good faith, made a reasonable effort to develop and consider modifications or RPAs, conducted a BA (if required), and refrained from making any prohibited irreversible or irretrievable commitments of resources.[6] For the exemption to be granted, five out of the seven members of the committee must vote in favor of the exemption. To grant the exemption, the ESC must determine that there are no RPAs, that the benefits of proceeding with the action outweigh the benefits of alternative courses of action consistent with conserving species and their habitat, that the action is in the public interest and of national or regional significance, and that there was no prohibited irretrievable or irreversible commitment of resources before the exemption.[7] There have been three completed applications for an exemption - a dam on the Tellico River (denied), Tennessee, a water project (Grayrocks Dam) on the Platte River in Wyoming and Nebraska, and Bureau of Land Management timber sales in Oregon. In addition, applications were filed for three other projects (Pittston Refinery in Eastport, Maine; Docking Area in Mound City, Illinois; and Dredging Alligator Pass in Suwanee Sound, Florida), however, these applications were withdrawn or abandoned (Congressional Research Office 2017).

The exemption process considers extraordinary economic circumstances in the list of factors used in evaluating federal actions and provides an opportunity for economic factors to override jeopardy

[2] This committee has been referred to as the "God Squad" because of its authority to exempt an agency action from the requirements of section 7(a)(2) of the Endangered Species Act.
[3] 16 U.S.C. §1536(e)-(h). For more information about ESA exemptions, see CRS Report R40787, Endangered Species Act (ESA): The Exemption Process, by Pervaze A. Sheikh.
[4] 16 U.S.C. §1536(e).
[5] 50 C.F.R. §453.05(d).
[6] 16 U.S.C. §1536(g)(3).
[7] 16 U.S.C. §1536(h)(1)(A).

to the species. An exemption is for a federal project, license, or action rather than for a species Congressional Research Service 2017).

Potential applicants that can apply for an exemption for a federal action despite its effects on listed species or their critical habitat include:

- **The federal action agency** interested in proceeding with the action.
- An applicant for a federal license or permit whose application was denied primarily because of the prohibitions of ESA requiring that federal agency actions avoid jeopardy to listed species or harm to their critical habitats.
- **The Governor of the state** where the action occurs.

The ESC reviews applications for exemptions, is responsible for the ultimate decision, and may conduct additional fact-finding.

The applicant must include a statement explaining why the action cannot be altered or modified to conform to the statute – the application is submitted 90 days after completing the consultation, which includes the issuance of a BiOp finding jeopardy to the species or adverse modifications to critical habitat. The applicant needs to explain why an exemption is warranted and must include alternatives to the project. The receipt of application is posted in the Federal Register and each Governor of the affected state is notified. The State Department must be notified of potential conflicts with international treaties or agreements.

Programmatic Section 7 Consultation – NOAA Fisheries (NMFS) and USFWS

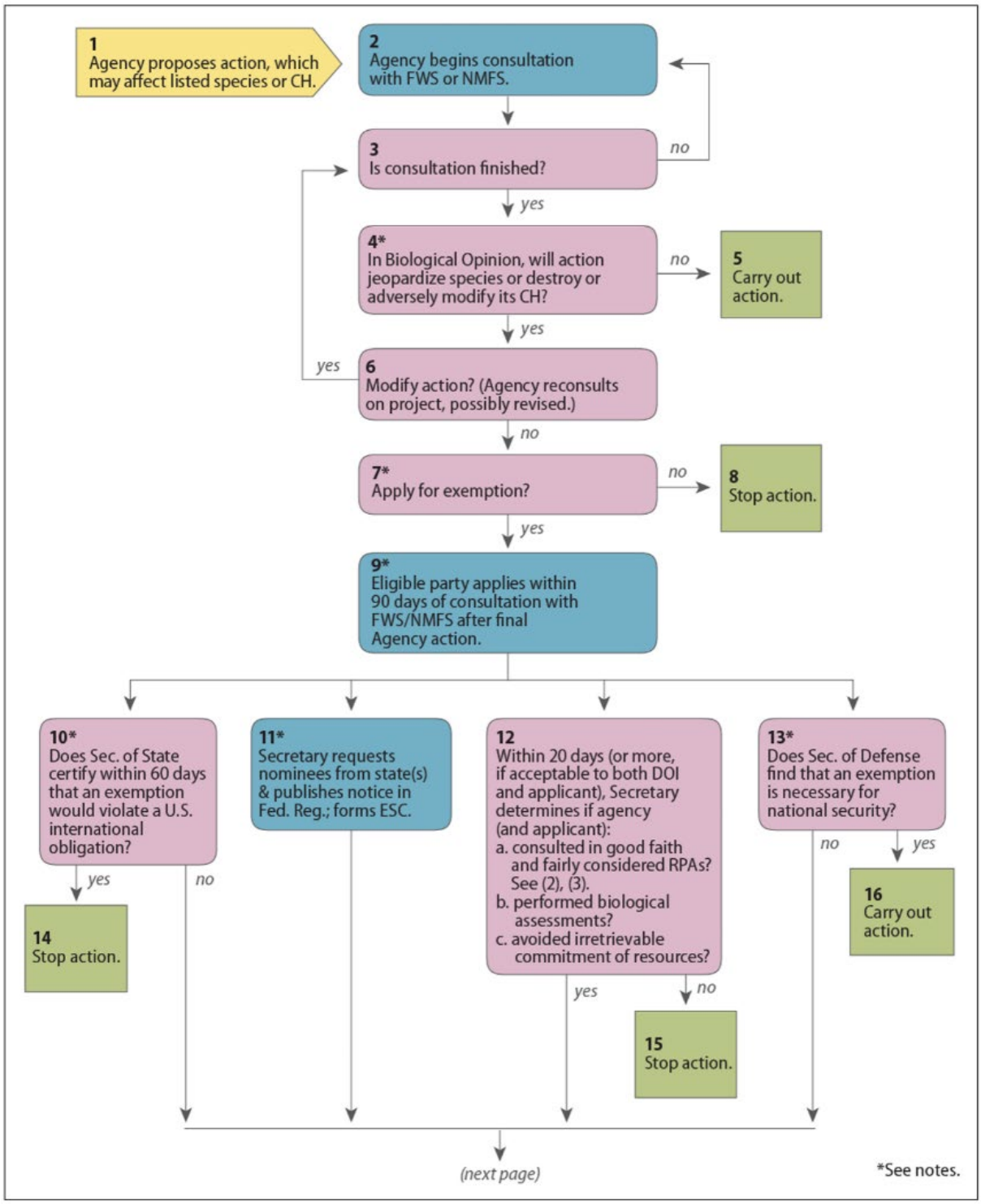
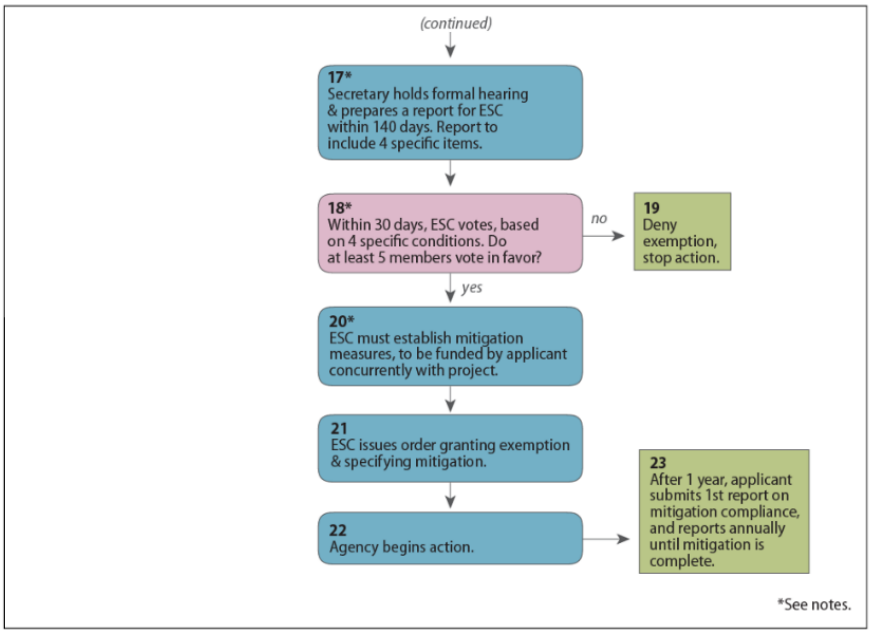


Figure 8. Steps in obtaining an exemption under the ESA.



Source: Congressional Research Service (CRS). See text for further discussion of steps.

Notes: CH = Critical Habitat; ESC = Endangered Species Committee; FWS = Fish and Wildlife Service; NMFS = National Marine Fisheries Service. Collectively, FWS and NMFS = the Services.

Step 4. During the course of consultation, the action agency and the Services may develop reasonable and prudent alternatives (RPAs) to the original action. These RPAs might include modifying the season, size, or extent of the project, or altering some other feature in a manner that will allow the project to proceed and avoid jeopardy or adverse modification of the critical habitat. If the agency is willing or able to make the modification(s)—and agencies usually are—the project proceeds as modified. Almost all projects subject to consultation end at Step 6 and proceed with the action, as modified by any RPAs, if necessary.

Step 7. Only six projects have ever resulted in an exemption application. (See **Appendixes A-D**.)

Step 9. If the applicant is attempting to obtain a permit or license, the applicant must await final agency action (denial of the permit or license) before applying for an exemption. The Pittston case raised the issue of whether a judicial appeal and an exemption could be pursued simultaneously, and Congress clarified the law on this process (16 U.S.C. §1536(g)(2)(A); see **Appendix D**.) There are three categories of eligible applicants: a federal agency, a governor, or a permit or license applicant.

Step 10. This issue could be important in some specific cases, such as certain kinds of harm to migratory birds, because nearly all migratory birds are protected under the Migratory Bird Treaty Act and the U.S.-Mexico and U.S.-Canada Migratory Bird Treaties. Note that in theory the Secretary of State may issue a determination after the DOI Secretary's determination (Step 12), but before the secretarial report on the effects of the action (Step 17).

Step 11. A state nominates representatives, and the President selects one from the state's list. According to regulations, if multiple states are involved, each state gets an appropriate fraction of a vote.

Step 13. This option has never been exercised in controversies affecting Defense Department activities. Technically, for the option to be exercised, the ESC would have to be convened and receive the report described below (Step 17). The ESC would have a formal vote, even though the outcome would not be discretionary: the ESC is directed to approve the exemption if the Defense Secretary makes the finding.

proposed action; (b) evidence on the national or regional significance of the project and the public interest aspects of the agency's action; (c) any mitigation or enhancement measures for the ESC to consider; and (d) whether the agency and the applicant have avoided irretrievable commitment of resources that would foreclose on any of the alternatives to the project.

Step 18. The ESC is to make its determination based on these four issues: (a) Is there a reasonable and prudent alternative to the project that would be consistent with conserving the species? (b) Do the benefits of the agency action clearly outweigh the benefits of the alternatives, and is the proposal in the public interest? (c) Is the agency action regionally or nationally significant? (d) Have the agency and the applicant avoided irretrievable commitments of resources that would foreclose on alternatives consistent with conserving the species?

Step 20. These mitigation measures must be necessary and appropriate. The applicant must pay for these mitigation measures, but may contract with a federal agency to carry them out on its behalf. Because the law makes no distinction among types of applicants, this provision would apply whether the applicant was a federal agency, a governor, or a permit or license applicant.

The Pathway to a Dreissenid Action in the Columbia River Basin

A Programmatic Biological and Conference Opinion for a dreissenid eradication effort in the CRB was defined as the goal when PSMFC and its partners, including the USACE, determined that the most efficient and effective approach to addressing a detection of dreissenids would be a rapid response attempt at eradication. To do so quickly and efficiently would require significant analysis and discussion with the Services prior to initiating an action. Because eradication efforts provide limited windows of opportunity to implement (based on water temperature, in-water timing windows, life history needs of listed species, etc.), it made sense to navigate the complex issues associated with a rapid response in the CRB well in advance of any potential action. These complexities include hydropower facilities, hatchery facilities, irrigation infrastructure, recovery efforts for a significant number of listed fish species, multiple federal, state, and tribal jurisdictions, and numerous other factors.

In anticipation of an eventual detection of dreissenids in the CRB, PSMFC and its partners have been hosting rapid response exercises in locations throughout the basin to "test" how efficiently a rapid response could truly occur, including a June 2024 international exercise with British Columbia and Montana for Lake Koocanusa.

In addition, PSMFC reached out to the USFWS and NOAA Fisheries beginning in 2016 to potentially expedite an emergency consultation. The outcome of that multi-year effort was the PSMFC-led production, in partnership with the USFWS, of "Dreissenid Mussel Rapid Response to the Columbia River Basin: Recommended Practices to Facilitate Endangered Species Act Section 7 Compliance," also known as the "ESA Manual" and the accompanying *Columbia River Basin Dreissenid Incident Response Toolkit*, intended to facilitate a response to an introduction of dreissenids in the CRB. The website states clearly that "the anticipated consequences of taking no action would include long-lasting, significant, and detrimental economic, environmental, and social/cultural effects that would alter ecosystem function and processes throughout the CRB and affect quality of life for people who live in the basin."

The ESA Manual and website include information to help the states, or any other entity taking a dreissenid control action in the CRB, to navigate a Section 7 ESA consultation "if they are planning to seek various federal agency funding".[8] PSMFC documented listed species and critical habitats (for which both the USFWS and NOAA Fisheries have jurisdiction) within each state in the CRB, documented different types of control actions, and estimated effects on listed species and their critical habitats. A suite of best management practices was compiled to minimize detrimental effects to listed species and critical habitats as well as minimize the spread of invasive species. Effects documented included all consequences to listed species or critical habitat caused by a proposed action, including consequences of indirect activities. Incident Command System forms were modified and tailored to a dreissenid response.

Shortly after the ESA Manual was produced and concurrent with the accompanying ESA Manual website being developed, the USACE-NWW completed a Biological Assessment (BA) (2018). Completing the BA was intended to pave the way for a Letter of Concurrence or BiOp from NOAA

[8] Note: States would be subject to Section 10 consultations unless there is a federal nexus. In most cases, there will be a federal nexus associated with a dreissenid response action in the CRB.

Fisheries and the USFWS. However, because of the potential geographic scope of response action, lack of determination of which specific chemicals would be used in any particular location, the specific locations where the action would occur within the CRB, and the potential effects on listed species and critical habitats – which cannot be determined until the extent of the infestation is determined, the USFWS opted for any potential action to occur under emergency consultation; NOAA Fisheries remains in consultation. Efforts to develop a programmatic framework have not advanced. It remains to be seen how the Services would respond to multiple, simultaneous requests for emergency consultations if states or other federal agencies proposed numerous responses in a variety of geographic areas.

A Role for the Governors of Columbia River Basin States

It is clear from the analyses and compilation of information that has occurred to date that any dreissenid control action in the CRB, with the tools that currently exist, may likely adversely affect individuals of listed species in the short term and may adversely affect the ability to recover these species. However, doing nothing and not responding to a detection is certain to have costly, long-term effects on salmon and other listed species recovery, CRB hydropower, irrigation, hatcheries, fish passage systems, and any other infrastructure that moves raw water.

It is both foreseeable and predictable that dreissenids will eventually be detected in the CRB. It is estimated this detection will occur as early as 2024 based on a recent detection of quagga mussels in the middle Snake River in Idaho, and other detections in states and regions adjacent to the CRB. It would not be accurate to characterize a detection of dreissenids in the CRB as an "emergency," a term used to describe "an act of God, casualties, national defense, or security emergencies . . .and response activities that must be taken to prevent imminent loss of human life or property. Predictable events, like those covered in Emergency Use Permits issued by the EPA for pesticide applications, usually do not qualify as emergencies under Section 7 regulations unless there is significant unexpected human health risk."[9]

A Programmatic BiOp could significantly benefit the natural resources of the CRB by expediting the ability to rapidly respond to a dreissenid introduction. Programmatic BiOps save time and money, provide some certainty relative to pre-action mitigation and post-action mitigation measures that would need to be taken, offer clarity regarding the level of acceptable incidental take, and develop a shared understanding of potential actions and effects on listed species and critical habitats. Programmatic agreements pave the way for collaborative, effective, efficient actions in which there is a shared understanding among states and the federal government regarding the purpose of the action, how it would likely be implemented, potential effects on listed species, pre- and post-action mitigation measures, best management practices to be implemented throughout the action, and reporting and monitoring requirements.

PSMFC and the USACE have been unsuccessful navigating the development of a programmatic agreement with the Services since 2016. Knowing that a potential dreissenid eradication effort may jeopardize listed species or adversely modify critical habitat, the Governors of CRB states may apply to the ESC for an exemption from ESA requirements. The Governors of the CRB states can

[9] https://www.fisheries.noaa.gov/insight/section-7-types-endangered-species-act-consultations-greater-atlantic-region#programmatic-consultation

confirm that efforts have been made to carry out consultation responsibilities in good faith, a reasonable effort has been made to develop and consider modifications or RPAs, a BA has been completed, and there have been no irreversible or irretrievable commitments of resources.

Recommendation: Recraft the Biological Assessment for dreissenid mussel rapid response (2018) and model the new version after the approach taken to develop a biological opinion for wildfire retardant. Encourage both Services to negotiate a biological opinion.

Recommendation: Inform PNW state governors that an option exists, at the appropriate time, to apply to the Endangered Species Committee for an exemption from ESA requirements to conduct dreissenid eradication actions in the CRB. The request would be based on the evidence that there are no reasonable and prudent actions, the benefits of proceeding with an action outweigh the benefits of alternative courses of action consistent with conserving species and their habitat, that the action is in the public interest and of national or regional significance, and that there was no prohibited irretrievable or irreversible commitment of resources before the exemption.

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Appendix A. NW biological opinions for actions in which restoration is the primary purpose.			
Programmatic Name	**Action Agency**	**Action Area**	**Restoration Categories**
19 Aquatic Habitat Restoration Activities Programmatic, Bureau of Land Management, Oregon, Washington, Idaho, California 2007-2012 "ARBO"	USFS, BLM, BIA	Streams and riparian areas on USFS, BLM, Coquille lands or private lands adjacent to Federal lands where Wyden amendment projects may occur in the range of ESA-listed salmon or steelhead, designated critical habitat in Oregon, Washington, Idaho, and California	Large Wood, Boulder, and Gravel Placement; Reconnection of Existing Side Channels and Alcoves; Head-cut Stabilization and Associated Fish Passage; Bank Restoration Fish Passage Culvert and Bridge Projects; Irrigation Screen Installation and Replacement; In-channel Nutrient Enhancement; Floodplain Overburden Removal; Reduction of Recreation Impacts; Estuary Restoration; Riparian Vegetation Treatment (non-commercial, mechanical); Riparian and Upland Juniper Treatment (non-commercial); Riparian Vegetation Treatment (controlled burning); Riparian Area Invasive Plant Treatment; Riparian Exclusion Fencing (with water gaps and stream crossings); Riparian Vegetation Plantings; Road Treatments; Removal of Legacy Structures; Fisheries, Hydrology, Geomorphology Wildlife, Botany, and Cultural Surveys in Support of Aquatic Restoration.
Habitat Improvement Program in Oregon, Washington, and Idaho CY2007 - CY2012 "HIP II "	NOAA Fisheries Restoration Center	Statewide in Oregon, Washington, and Idaho	Fish Passage Restoration; Invasive and Non-native Plant Control; Juniper Tree Removal; Livestock Stream Crossings and Off-Channel; Livestock Watering Facilities; Off- and Side-Channel Habitat Restoration; Piling Removal; Set-back or Removal of Existing Berms, Dikes, Levees; Shellfish Restoration; Streambank Restoration; Water Control Structure Removal; Wetland Restoration; Road and Trail Erosion Control.
Stream Crossing Structure Replacement and Removal Activities CY2006 - CY2011 "USFS, BLM culverts"	USFS, BLM	Idaho, Snake and Clearwater River Basins, HUCs 170601 & 170603	Culvert Removal and Associated Channel Rehabilitation; Culvert, Bridge or Ford Replacement with a Bridge; Culvert or Ford Replacement with a Culvert or Open-Bottomed Arch; Culvert Replacement with Low-Water Trail Ford; Programmatic Project Maintenance
Revised Standard Local Operating Procedures for Endangered Species to Administer Restoration Activities Carried Out by the Department of the Army in the State of Oregon and on the North Shore of the Columbia River CY2008 - CY2013 "SLOPES IV Restoration"	USACE	Oregon State, SW Washington along the Columbia River This includes all upland, riparian and aquatic areas affected by site preparation, construction, and site restoration design criteria at each action site.	Boulder Placement; Fish Passage Restoration; Spawning Gravel Restoration; Large Wood Restoration; Off- and Side-Channel Habitat Restoration; Piling Removal; Set-back Existing Berms, Dikes, and Levees; Streambank Restoration; Water Control Structure Removal.

Partners for Fish and Wildlife Coastal and Recovery Programmatic (NLAA) CY2009 - CY2014 "USFWS Restoration Program"	USFWS	Oregon, excluding the Klamath River basin, and within Pacific, Wahkiakum, Cowlitz, Clark, Skamania, Klickitat, and Benton counties in southern Washington.	Riparian Habitat Restoration (installation of livestock fencing, wildlife habitat structures); Stormwater Management (wetland habitat restoration, installation of livestock fencing, wildlife habitat structures); Instream Habitat Restoration (installation of wood and boulder instream structures); Upland Habitat Restoration (installation of livestock fencing and watering facilities outside the riparian area, installation of bio-engineered stabilization, wildlife habitat structures, planting native upland plant, conversion of altered habitats to historic oak savannahs, short and tall grass prairies, or conifer/hardwood forests, silvicultural treatments, control and removal of invasive/non-native plants, all outside the riparian area, stormwater management); Coastal and Estuarine Habitat Restoration (installation of wood and boulder structures, re-establishment of natural coastal dune processes, installation of wildlife habitat structures); Road and Trail Improvements (improvement, abandonment, closure, decommissioning of roads and trails outside the riparian area, physical data collection).
Partners for Fish and Wildlife Coastal and Recovery Programmatic (LAA) CY2009 - CY2014 "USFWS Restoration Program"	USFWS	43 watersheds surrounding Puget Sound and Hood Canal	Install Instream Structures, Improve Secondary Channel Habitats, Restore Wetland Hydrology, Reduce Livestock Impacts, Improve Road/Trail Conditions, Remove or Reduce Hydraulic Constrictions, Remove/Replace Structural Barriers, Install/Modify Fish Passage Structures.
Washington State Fish Passage and Habitat Enhancement Restoration Programmatic Consultation (2008)	Army Corps of Engineers	All lands in Washington State except USFS and BLM lands	Fish Passage (culvert replacement and relocation, retrofitting culverts, culvert removal, tidegate removal, removal or modification of sediment bars or terraces that block or delay salmonid migrations, temporary placement of sandbags, hay bales, and ecology blocks to improve salmonid passage, construction of structures to provide passage over small dams); Installation of Instream Structures (placement of woody debris, placement of live stakes, placement of engineered log jams, grade control engineered log jams, trapping mobile wood, placement of boulders, boulder weirs and roughened channels, gravel placement associated with structure placement); Levee Removal and Modification; Side Channel/Off-Channel Habitat Restoration

			and Reconnection; Salmonid Spawning Gravel Restoration; Forage Fish Spawning Gravel Restoration; Hardened Fords and Fencing for Livestock Steam Crossings; Irrigation Screen Installation and Replacement; Debris and Structure Removal.
Habitat Restoration Program submitted by the State of Washington, Governor's Salmon Recovery Office, for ESA Section 4(d) Limit 8 (2007, 2009)	National Marine Fisheries Service, State of Washington	Washington	In-Stream Passage, In-Stream Diversion Screening, InStream Habitat (structural work below OHWM), Riparian Habitat Restoration, Upland Habitat Restoration or Protection, Estuarine and Marine Nearshore Habitat Restoration
10(a)(1)(A) Enhancement of Survival Permit, Lower Columbia Fisheries Enhancement Group for Restoration Activities in Southwest Washington State, (Section 10(a)(1)(A) Permit). (2004)	National Marine Fisheries Service, Lower Columbia Fisheries Enhancement Group	Washington State WRIAs 24-28, excluding the Willapa and Naselle river systems	Riparian Enhancement, Fish Passage Restoration, Placement of In-Stream Habitat Forming Structures (Large Woody Debris and Boulders), Reconnecting, Enhancement, and Creation of Off-Channel Rearing Habitat, Enhancement and Creation of Spawning Habitats and Sediment Conditions, Bank Stabilization using Bio-engineering Techniques, Nutrient Enhancement, Placement of Engineered Rock Structures (J-vanes, W-vanes, and Cross Vanes)
USFWS Statewide Restoration Programmatic Biological Opinion – California USFWS-projects must meet the definition of a restoration project and be consistent with USFWS recovery plans or recovery-related documentation for covered species. A restoration project is defined as an eligible project type and relevant protection measures that will result in a net increase in aquatic, riparian, floodplain, wetland, or coastal dune resource functions and/or services through implementation of eligible project types, relevant protection measures, and design guidelines. The goal of each restoration project is "no net loss of waters of the United States and only discountable adverse effects to federally listed species and their critical habitat through implementation of relevant protection measures and/or offsetting habitat restoration or enhancement as part of project design and within the project footprint." **A restoration project covered by this consultation may include multiple benefits**, such as **habitat restoration**, groundwater recharge, recreation, flood management, water quality improvement, and/or adaptation to climate change. In addition, some restoration projects may require creation, modification, or relocation of infrastructure so that travel, recreation, water supply, or other types of infrastructure and operations can continue in the context of the restored habitat (e.g., relocation of			

a bridge or water control structure to allow for habitat restoration). https://acceleratingrestoration.org/permits/usfws-restoration-programmatic-biological-opinion/			

Appendix B. NW biological opinion for "other" action.			
National Program for the Aerial Application of Long-Term Fire Retardants (OPR-2021-9236) Unable to anticipate actual # of individual listed species that would be taken as a result of programmatic action, so the surrogate to monitor is the # of intrusions into waterway. RPAs include monitoring and reporting aerially applied long-term fire-retardant intrusions on each forest and contacting NMFS if the amount or extent of take is exceeded. Conservation recommendations include the USFS phasing out more toxic fire-retardant formulations in favor of less toxic formulations, the USFWS considering wider buffer zones around endangered species habitats, and the USFS notifying NMFS of any conservation recommendations implemented. https://www.fs.usda.gov/sites/default/files/2022-03/NMFS-ESA-Sec7-BO.pdf	US Forest Service	Nationwide	Applying fire retardant as part of wildfire suppression