



**US Army Corps
of Engineers®**

DRAFT INTEGRATED LETTER REPORT AND PROGRAMMATIC ENVIRONMENTAL ASSESSMENT

**Federal Participation in Aquatic Invasive Species Prevention and
Control
Russian River Basin, California**



Prepared in response to Section 104 of the River and Harbor Act of 1958, as amended by Section 1039(d) of the Water Resources Reform and Development Act of 2014, Section 1178 of Water Infrastructure Improvements of the Nation Act of 2016, Section 1170 of the America's Water Infrastructure Act of 2018, and Section 505 of the Water Resources Development Act of 2020.

May 2024

EXECUTIVE SUMMARY

This Integrated Letter Report and Programmatic Environmental Assessment presents the results of economic and environmental impact evaluations performed to determine if the Federal government should participate in an ongoing non-federally managed program to prevent and control the spread of aquatic invasive species (AIS) in the Russian River Basin (RRB). The RRB does not currently have dreissenids, and preventing their introduction by supporting current non-Federally managed inspection and decontamination programs is critical to the protecting the basin.

The RRB is at risk of a dreissenid infestation due to the mobility of watercraft transported overland between and within watersheds. In addition, the high survival rate of dreissenids once established, their ability to be hidden on or inside of boats and other structures, and the high fiscal and environmental costs of infestation present serious problems to those who live, work, or recreate in the RRB.

The existing watercraft inspection program in the RRB is managed by Sonoma County Water Agency, a non-Federal public entity, with input and collaboration from the State of California and other Federal and non-Federal stakeholders. Current inspection station activities include inspecting watercraft at access points (boat ramps) within Lake Mendocino and Lake Sonoma, both of which are USACE-owned and operated water resource projects. Watercraft requiring decontamination are currently directed to Clear Lake and Lake Berryessa, California (outside of the RRB), where decontamination equipment is available. Federal participation would provide an opportunity to further this work and encourage additional activities to prevent the spread of AIS into, out of, and within the ARB. If approved, the program would be cost shared at up to 50 percent with non-Federal sponsors (NFSs), which could include Sonoma County Water Agency, as well as other state, county, or non-Federal public entities.

A wide range of measures to augment and improve the effectiveness and efficiency of the program were considered. These measures include U.S. Army Corps of Engineers (USACE) participating in the regional coordination efforts, expanding the number of locations or hours of operation, adding canine detection capabilities, increasing public awareness, constructing site improvements, as well as augmenting existing monitoring, contingency planning, and rapid response planning efforts. After formulation of alternatives and screening, Alternative 2, Comprehensive Adaptive Improvements, was identified as the Recommended Alternative. The Recommended Alternative would augment the existing watercraft inspection program by incorporating a comprehensive range of measures that function as a suite of tools that would be applied and adjusted annually. Adjustments would be based on need and ability to fund a portion or portions of the program, the results of the coordination efforts, and the availability of Federal funding.

The study is a 50-year period of analysis. While the goal of the watercraft inspections in the basin is to prevent the infestation of dreissenids entirely, there is a possibility that it only prevents an infestation for a few years from the project's inception. To account for

these uncertainties and risks, economic modeling was performed assuming different years of future onset, namely 3, 7, 12, and 50 years. For the final total benefit figure, it was assumed that the watercraft inspections could stave off a dreissenid infestation for at least 7 years from the project's inception. Estimates suggest that approximately \$10.1 million (Fiscal Year 2024 price level) costs are incurred in year 0, with total benefits (costs avoided) over the 50-year period of analysis being \$217 million with a 7-year infestation delay—the timeframe (year) in which total infestation of the RRB is estimated to occur. The estimated average annual cost of the inspection station program is approximately \$632,000, resulting in approximately \$2.41 million average annual net benefits and a benefit-cost ratio (BCR) of 3.8. These economic benefits do not include the ecosystem benefits associated with delaying an infestation.

Because Federal participation would augment an existing non-Federally managed program that is currently operated primarily at reservoir access points, there are only minimal direct effects to the environment. The indirect environmental effects of the proposed action on water quality and recreation are beneficial. Based on limited scope and effects and the proactive coordination performed for this study, no controversy is anticipated. Because Federal support for expansion of non-federally managed AIS prevention and control programs has such a limited initial investment and scope and can be terminated at any time, there is extremely low residual risk.

**DRAFT INTEGRATED LETTER REPORT AND
PROGRAMMATIC ENVIRONMENTAL ASSESSMENT
FEDERAL PARTICIPATION IN AQUATIC INVASIVE SPECIES
PREVENTION AND CONTROL
RUSSIAN RIVER BASIN, CALIFORNIA**

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ACRONYMS AND ABBREVIATIONS

AIS	aquatic invasive species
AINN	Aquatic Invasive Species Network
ANSTF	Aquatic Nuisance Species Task Force
APE	Area of Potential Effect
AWIA	America's Water Infrastructure Act (of 2018)
BCR	benefit-cost ratio
BGEPA	Bald and Golden Eagle Protection Act
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
CCR	California Code of Regulations
CDFA	California Department of Food and Agriculture
CDFW	California Department of Fish and Wildlife
CEJST	Climate and Economic Justice Screening Tool
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO ₂	carbon dioxide
CPW	Colorado Parks and Wildlife
DOI	Department of the Interior
eDNA	environmental deoxyribonucleic acid
EIS	Environmental Impact Statement
EOP	Environmental Operating Principle
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
FY	fiscal year
HQ	Headquarters (USACE)
IPCC	Intergovernmental Panel on Climate Change
LAFCo	Local Agency Formation Commission
LR/Programmatic EA	Letter Report/Programmatic Environmental Assessment
MBTA	Migratory Bird Treaty Act
mgd	million gallons per day
mm/yr	millimeters per year
MOU	Memorandum of Understanding
MTCO ₂	metric tons of carbon dioxide
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NFS	non-Federal sponsor
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Commission
NOAA	National Oceanic and Atmospheric
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRA	National Recreation Area
NRHP	National Register of Historic Places
NWD	Northwestern Division (USACE)

*Integrated Letter Report and Programmatic Environmental Assessment
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NWW	Walla Walla District (USACE)
O&M	operations and maintenance
PNWER	Pacific Northwest Economic Region
PPA	Project Partnership Agreement
PSMFC	Pacific State Marine Fisheries Commission
QA/QC	quality assurance and quality control
QR	quick response (code)
QZAP	Quagga Zebra Mussel Action Plan
Reclamation	U.S. Bureau of Reclamation
RHA	River and Harbor Act
RRB	Russian River Basin
SPN	San Francisco District (USACE)
SWRCB	State Water Resources Control Board
UMPS IV	Uniform Minimum Protocols and Standards
USACE	U.S. Army Corps of Engineers
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WID	watercraft inspection and decontamination
WIIN	Water Infrastructure Improvements for the Nation (Act of 2016)
WRDA	Water Resources Development Act
WRP	Western Regional Panel on Aquatic Invasive Species
WRRDA	Water Resources Reform and Development Act

SECTION 1 - INTRODUCTION

This Integrated Letter Report and Programmatic Environmental Assessment (LR/Programmatic EA) was developed by the U.S. Army Corps of Engineers (USACE), Walla Walla District. It presents the results of evaluations of potential and anticipated consequences of a proposed Federal action to participate in a cost-shared aquatic invasive species program to help reduce the risks associated with infestations of aquatic invasive species (AIS) spreading into, out of, or within the Russian River Basin (RRB). This program would include coordinating the establishment of new or bolstering existing watercraft inspection stations in California, maintained and operated by state, county, and other non-Federal public entities (non-Federal sponsors), such as Sonoma County Water Agency, who currently manages watercraft inspection stations in the RRB. The program could also include invasive species monitoring, contingency planning, and rapid response planning and preparation (training exercises and drills) conducted by these entities.

This LR/Programmatic EA documents the environmental, planning, and economic considerations used to develop and support the concluding recommendations. It also documents the coordination and evaluations performed for the proposed Federal action to comply with Title 33 Code of Federal Regulations (CFR) Part 230, Procedures for Implementing the National Environmental Policy Act (NEPA) (USACE 1988), and the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA, Title 40 CFR Part 1500-1508, updated May 20, 2022.

NEPA is a full disclosure law that provides opportunity for public involvement in the Federal decision-making process. All persons and organizations that have a potential interest in this proposed action—including the public, other Federal agencies, state and local agencies, Native American Tribes, and interested stakeholders—are encouraged to participate in the NEPA process. The programmatic scope of this LR/Programmatic EA allows necessary minor changes in the proposed action to be implemented in response to changing physical and environmental conditions and changes in state and Federal laws over time, including changes to program authorities.

This LR/Programmatic EA includes an evaluation of potential environmental effects of the proposed establishment of watercraft inspection stations throughout the RRB at locations with the highest likelihood of preventing the spread of AIS into, out of, or within the basin. If such effects are insignificant, or can be mitigated to insignificant, USACE will issue a Finding of No Significant Impact (FONSI) and proceed with the proposed Federal program. If the environmental effects are determined to be significant, an Environmental Impact Statement (EIS) will be prepared before a decision is reached on whether to implement the program.

1.1 AUTHORITY AND GUIDANCE

This report was prepared pursuant to Section 104 of the River and Harbor Act (RHA) of 1958 (33 United States Code [USC] § 610), as amended by Section 1039(d) of the

Water Resources Reform and Development Act (WRRDA) of 2014 (Public Law 113-121), Section 1178b of the Water Infrastructure Improvements for the Nation Act (WIIN Act) of 2016 (Public Law 114-322), Section 1170 of the America's Water Infrastructure Act (AWIA) of 2018 (Public Law 115-270), and Section 505 of the Water Resources Development Act (WRDA) of 2020 (Public Law 116-260).

Since it was enacted in 1958, Section 104 of the RHA has authorized a comprehensive program to provide for prevention, control, and progressive eradication of noxious aquatic plant growths and aquatic invasive species from the navigable waters, tributary streams, connecting channels, and other allied waters of the United States, in the combined interest of navigation, flood control, drainage, agriculture, fish and wildlife conservation, public health, and related purposes, including continued research for development of the most effective and economic control measures, to be administered by the Chief of Engineers, under the direction of the Secretary of the Army. The authorization includes required consultation and coordination with Tribes, states, and other Federal agencies. In carrying out Section 104, the Secretary shall establish (as applicable), operate, and maintain new or existing watercraft inspection and decontamination stations at locations that have the highest likelihood of preventing the spread of aquatic invasive species into and out of Waters of the United States, which will be cost shared with the NFSs at 50 percent. Section 104 also authorizes the program to cost share activities such as rapid response, monitoring and contingency planning.

Beginning in 2014, Section 104 of the RHA was also amended to add Watercraft Inspection and Decontamination (WID) Stations, and Monitoring and Contingency Planning, as authorized programs. In carrying out Section 104, the Secretary shall establish (as applicable), operate, and maintain new or existing WID stations at locations that have the highest likelihood of preventing the spread of aquatic invasive species into and out of waters of the United States, as determined by the Secretary in consultation and coordination with states, tribes, and other Federal agencies. The program must be cost shared with NFSs at 50 percent. Section 104 also authorizes the program to cost share activities such as monitoring, contingency planning, and rapid response planning.

WRRDA 2014 amended Section 104 of the RHA to authorize USACE to cost-share watercraft inspections stations within the Columbia River Basin. USACE Headquarters provided guidance (USACE, HQ 2016) to undertake an evaluation to determine the locations for establishing watercraft inspection stations for the basin. The guidance required documentation in the form of a letter report and an appropriate NEPA document and outlined eight specific content requirements.

The WIIN Act of 2016 further amended the authorization, and in March 2017, USACE Headquarters provided updated implementation guidance (USACE, HQ 2017). The guidance removed the within-river basin protection requirements and authorized actions to occur anywhere in a state where the river basin is located, if the actions provide protection to the authorized river basin. The guidance also provided direction to assist these states in rapid response planning, preparation, and response.

The AWIA of 2018 further amended Section 104 of the RHA by authorizing the addition of the Upper Missouri River, Upper Colorado River, and South Platte River Basins. The Assistant Secretary of the Army (Civil Works) issued Implementation Guidance for AIWA 2018 on April 12, 2019, that directed USACE to use previous implementation guidance from 2016 and 2017 for the newly added basins.

WRDA 2020 amended Section 104 of the RHA to add the Russian River Basin, to replace the incorrect reference to the Arizona River Basin with the Arkansas River Basin, and to change the location criteria for inspection stations from those that prevented the spread of AIS at reservoirs operated and maintained by USACE, to “locations with the highest likely of preventing the spread of aquatic invasive species into or out of waters of the United States.”

Throughout Section 1, and in the Executive Summary, *waters of the United States* is used as a geographical term, rather than to describe waters under the regulatory jurisdiction of USACE, as associated with the Clean Water Act (CWA). In Sections 6.3.2 and 7.1.7, which address the CWA, the acronym for *waters of the United States* (WOTUS) is used to indicate the jurisdictional definition is intended. Section 1.3, Key Terminology, provides further information on this definition.

Due to the increasing concern of limiting further spread of zebra and quagga mussels (dreissenids) into, out of, or within the RRB and other western states, this report frequently calls out these species specifically. However, the Section 104 of the RHA, as amended, does allow actions to address any AIS, and therefore, other AIS are also mentioned throughout this report.

Letter reports and appropriate NEPA documentation for Federal participation in the Columbia, Upper Missouri, Upper Colorado, and South Platte River Basins watercraft and decontamination inspection station programs have been previously prepared and approved by USACE. The present letter report and NEPA document now focuses on Federal participation in watercraft and decontamination inspection station programs in the RRB.

1.2 STUDY AREA

The location of the proposed action is the RRB (as defined by the legislative authority) within the state of California (Figure 1). There are two reservoir projects within the RRB, Coyote Valley Dam, which created Lake Mendocino, and Warm Springs Dam, which created Lake Sonoma. Both projects are owned by USACE and jointly operated by USACE and Sonoma County Water Agency.

The RRB encompasses 1,500 square miles (3,850 kilometers²) of Mendocino County and Sonoma County, California. This region is bounded by the Maycamas Mountains (east), the Mendocino Range or Mendocino Highlands (west and north), and the Laguna de Santa Rosa (south). The major tributaries include Forsythe Creek (14 linear miles with 48.16 square miles of drainage), Big Sulphur Creek (21.8 linear miles with 53.64 square miles of drainage), Dry Creek (42.8 linear miles with 122.04 square miles of

drainage), Austin Creek (15.6 linear miles with 37.96 square miles of drainage), and Laguna de Santa Rosa, which terminates at Mark West Creek (13.6 linear miles with 93.01 square miles of drainage). The headwaters of the Russian River begin at Busch Creek near Pontiac Peak, and the East Fork of the Russian River near Foster Mountain, California. The rivers and creek flow south through the California Coastal Range. The East Fork flows through Potter Valley and empties into Lake Mendocino, converging with the main stem of the Russian River in Ukiah, California. The Russian River continues south, meandering along Highway 101 corridor until just south of the city of Healdsburg where the river flows to the southwest before emptying into the Pacific Ocean at Jenner, California.

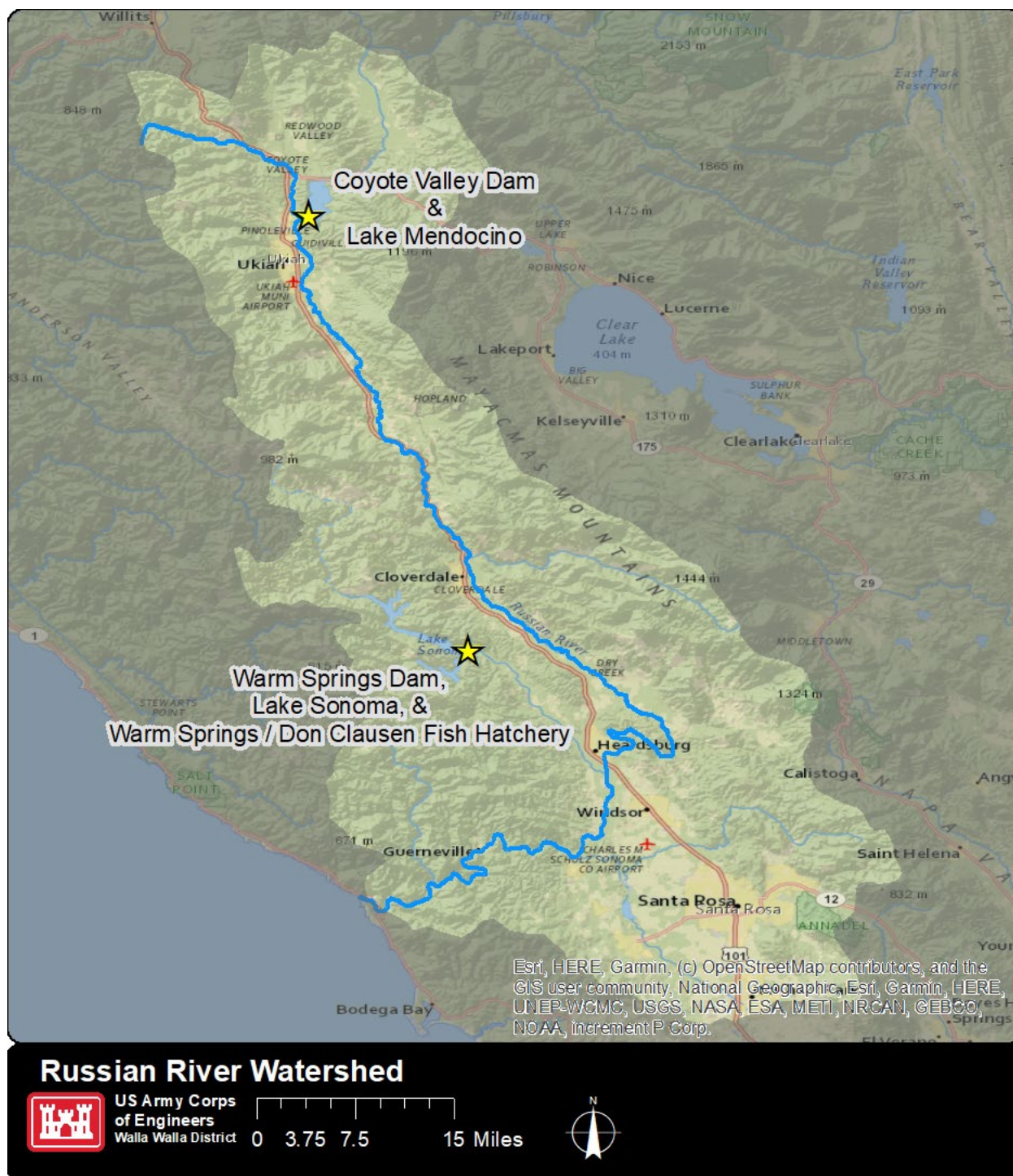


Figure 1. The Russian River Basin Boundary

Source: USACE, San Francisco District (SPN)

1.3 KEY TERMINOLOGY

Definitions of key terms used throughout this report are provided below.

Aquatic Invasive Species: An “invasive species” is defined with regard to a particular ecosystem, as a non-native organism whose introduction causes or is likely to cause economic or environmental harm, or harm to human, animal, or plant health (Executive Order [EO] 13751). Aquatic invasive species (AIS) are invasive species that inhabit the aquatic environment. Nationally, AIS of concern include zebra and quagga mussels (see Dreissenid, below), invasive carp (), and invasive aquatic plants like hydrilla () and flowering rush ().

Control Plan: Control Plan as defined in the California Code of Regulations (14 CCR § 672.1 § 672.1. Dreissenid Mussel Control and Prevention) is as follows:

(a) Control Plan. If a public or private agency that operates a water supply system detects dreissenid mussels, the agency shall immediately begin developing a dreissenid mussel control plan and implement measures to prevent further spread.

(C)(5) Control plans shall consist of a written document describing the status of the dreissenid mussel population at the time the plan is developed, control activities, and monitoring to determine changes in the population. A control plan may also include a description of maintenance activities to maintain functionality of the water supply facility.

Dreissenid: Currently, the AIS of particular concern in the RRB basin are zebra (*Dreissena polymorpha*) and quagga mussels (*Dreissena rostriformis bugensis*), which are freshwater mussels from the family Dreissenidae. Collectively, they are called dreissenids.

In this report, the term “dreissenids” is used throughout the document, unless the idea of AIS in general, or plant AIS is intended. In instances where information came from an outside source, the term mussel, zebra mussel, or quagga mussel was used, as applicable. Statements that pertain to a particular dreissenid species may or may not apply to the other species.

Facility Vulnerability Assessments: Facility vulnerability assessments are performed to determine the components of a hydropower facility that would be affected in the event of a dreissenid infestation and how the function of those components would be affected (DeBruyckere and Phillips 2015).

Regional Defense: Regional defense is defined as “using resources in a cost-effective, inter-jurisdictional, coordinated, and collaborative response to prevent mussels from entering uninfested areas and to contain aquatic invasive species at their source” (PNWER and PSMFC 2015).

Watercraft Inspection and Decontamination Station(s): A location where watercraft are intercepted and inspected for the presence of aquatic invasive species or indicators that a vessel may harbor those species. Stations may have decontamination capabilities on-

site, at separable locations away from the inspection location, or may not provide decontamination services. Typically, decontamination includes the use of pressurized hot-water sprays to clean boats of AIS and material that may harbor AIS, although additional methods may be employed depending on the watercraft and available equipment.

- Establishing a Watercraft Inspection and Decontamination Station: Establishing a watercraft inspection and/or decontamination station means to select and prepare the site, to provide and/or mobilize the equipment and materials needed to perform watercraft inspection activities, and to construct facilities as needed.
- Maintaining a Watercraft Inspection and Decontamination Station: Maintaining a watercraft inspection station means to perform routine equipment and annual facility maintenance (outside summer recreation season during the fall or spring months) required for the hot water pressure washers (wash unit), including winterization, changing the oil, and replacing tires, valves, thermostats, hoses, and fittings. It may include demobilizing the equipment and materials from the site and placing equipment at storage facilities.
- Operating a Watercraft Inspection and Decontamination Station: Operating a watercraft inspection station means to provide the manpower needed to set up and operate the station at a site for the duration of the season.

Veliger: A veliger is the free-swimming larvae of freshwater mussels, including zebra and quagga mussels.

Waters of the United States: Most instances of *waters of the United States* throughout the report refer to waters within the boundaries of the United States; it is intended to represent geography only (an acronym is not used for this definition).

As associated with the CWA, waters of the United States (WOTUS) are the oceans, rivers, streams, lakes, creeks, marshes, and wetlands within the regulatory jurisdiction of USACE. They are roughly defined as follows:

- All waters currently used, or were used in the past, or could be susceptible to use in interstate or foreign commerce, including traditional navigable waters, which are water bodies subject to the tide's ebb and flow.
- Interstate waters, regardless of navigability.
- Other waters such as intrastate lakes, rivers, streams (including intermittent streams), which could affect interstate or foreign commerce.
- The territorial sea.
- Wetlands adjacent to other waters that have a continuous surface connection.

1.4 PURPOSE AND NEED FOR ACTION

The purpose of the proposed action is to assist California State and county governments or other non-Federal public entities (NFSs) with establishing and operating watercraft inspection stations, monitoring, and rapid response planning to aid in preventing the spread of dreissenids or other aquatic invasive species of concern into, out of, or within the RRB. The proposed action would be conducted in collaboration with regional partners as part of a larger, comprehensive defense strategy to protect water bodies in the RRB, pursuant to Section 104 of the RHA 1958 (33 USC 610).

The proposed action is needed because the risk of the spread of AIS into, out of, or within the RRB is high, and the introduction and establishment of AIS (particularly dreissenids) has the potential to damage and create increased operation and maintenance costs to water-related infrastructure, recreation, and potentially irreversible ecosystem effects. Dreissenids present a direct threat to USACE authorized purposes including hydropower, navigation, and any associated fish and wildlife mitigation. Once a waterway is infected, dreissenids can reproduce rapidly and spread throughout a reservoir, and downstream in the watershed (Wong et al. 2010).

SECTION 2 - BACKGROUND

As stated in Section 1, the main AIS of concern in the RRB at this time are zebra and quagga mussels (Figure 2), which are also known as dreissenids. Dreissenids are native to the Black Sea region of Eastern Europe and spread to the Great Lakes through cargo ship ballast water. The first zebra mussel detection in the Great Lakes occurred between 1986 and 1989. Quagga mussels were first detected in Lake Erie in 1989. In the years post detection, dreissenids have completely infested Lake Erie, Lake Huron, Lake Michigan, and Lake Ontario.



Figure 2. Zebra and Quagga Mussels

Source: PSMFC GIS Center

Since then, dreissenids have been transported across the United States via privately owned watercraft, establishing populations in California, Nevada, Utah, Colorado, and Arizona. According to Pacific Northwest Economic Region (PNWER) and the Pacific States Marine Fisheries Commission (PSMFC) (2015), the Pacific Northwest is the only region without established populations of dreissenids. Figure 3 illustrates how they are distributed throughout the United States as of December 2020, including populations that were detected, but subsequently did not become established.

No mussels or veligers have been detected in the RRB to date. At present, the spread of invasive mussels appears to be limited to southern California (Figure 4). As of June 2020, the California Department of Fish and Wildlife (CDFW) has not reported the presence of invasive mussels in northern California waters, but they have been reported in central California in the San Justo Reservoir near Hollister.

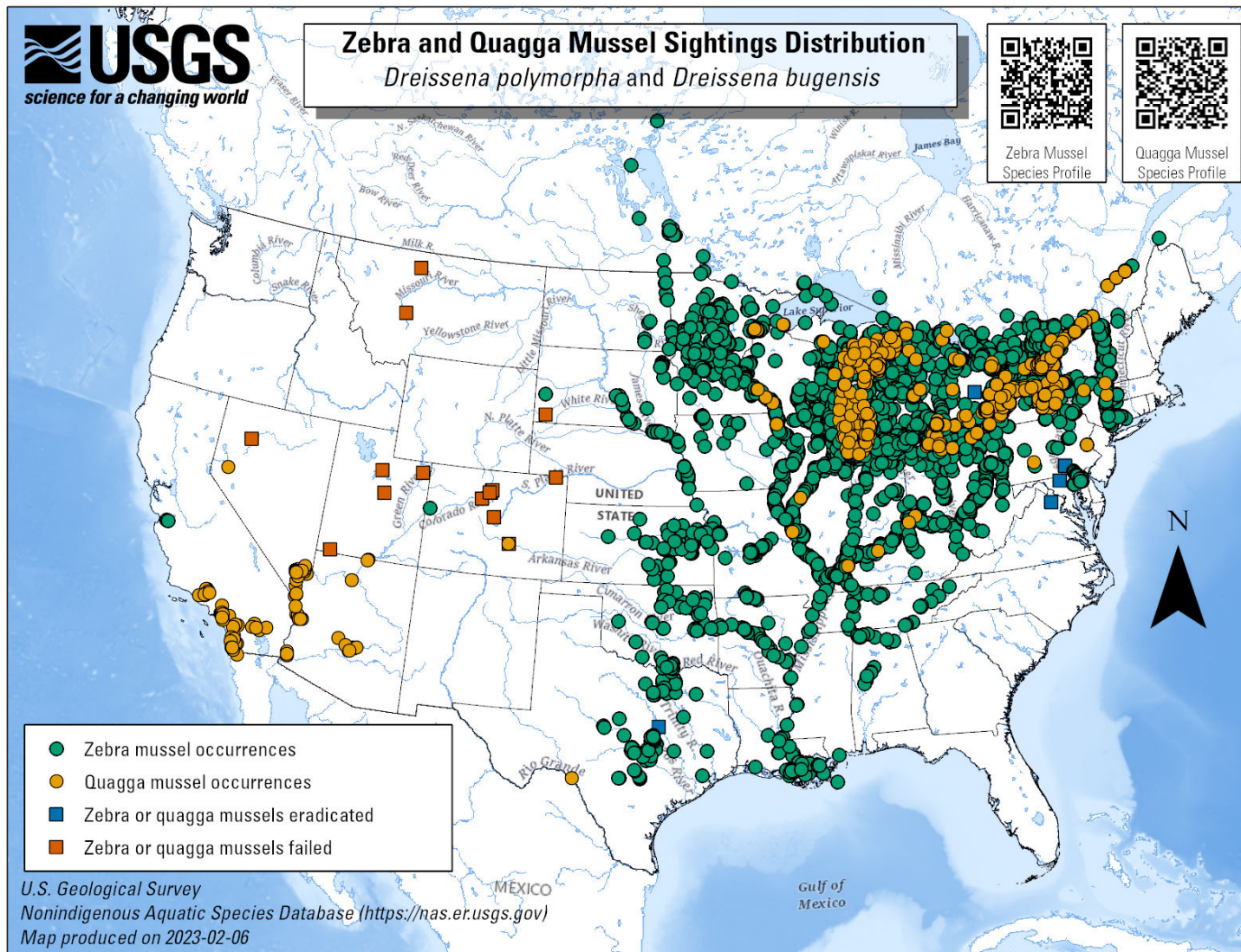


Figure 3. Established Dreissenid Populations in 2023

Source: USGS 2020

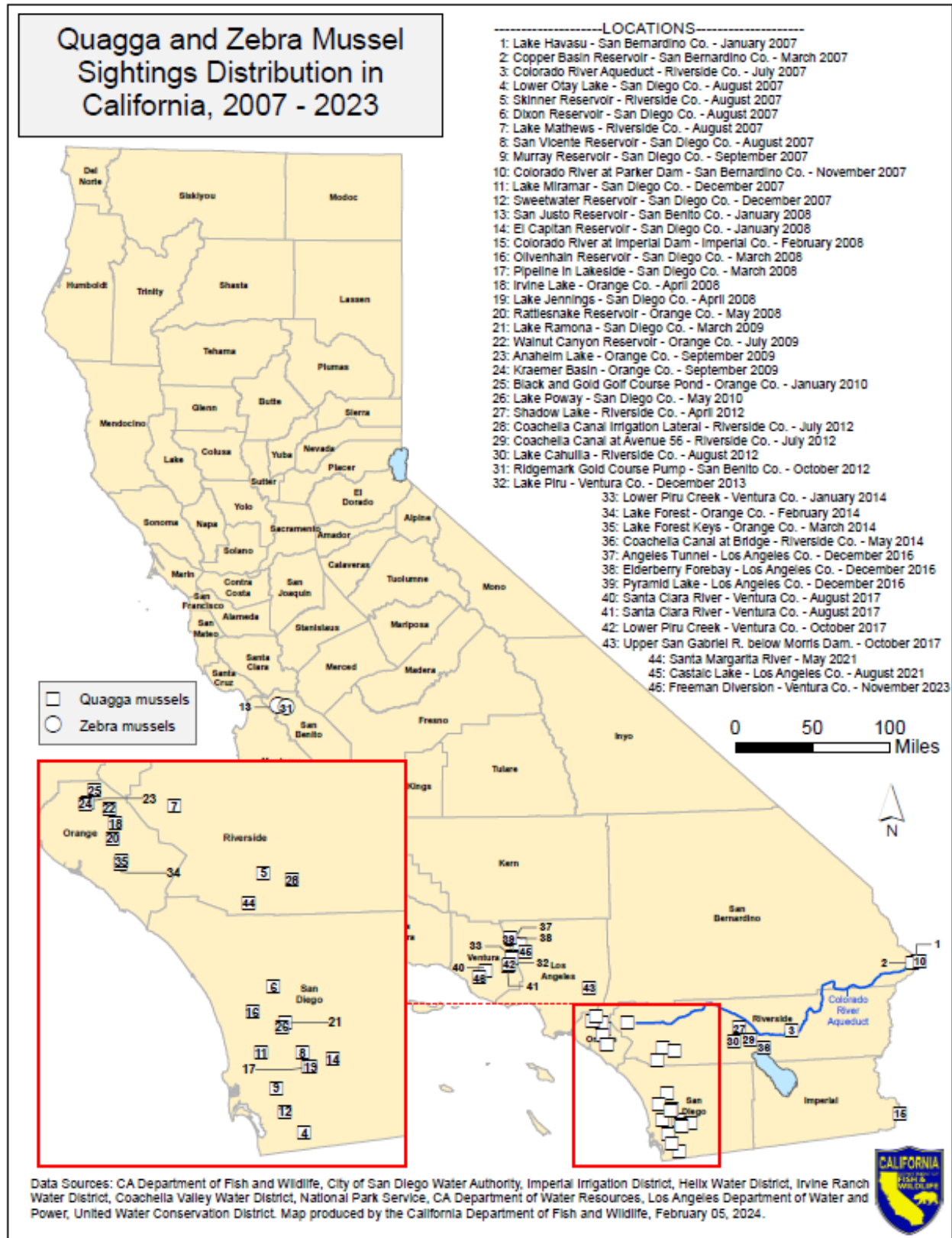


Figure 4. Established Dreissenid Populations in California

Source: California Department of Fish and Wildlife 2024.

Dreissenids have few natural predators, so introduced populations grow unchecked. Dreissenids reproduce rapidly and attach themselves to boats, docks, water control structures or any hard surface with their byssus, or beard (Haag 2012). They can live out of water for 2 weeks, and their larvae, known as veligers, use currents to colonize new waters. As many as 700,000 mussels can occupy a single square yard (Strayer et al. 2007). Once established, they cause considerable impacts to the ecosystem and water-related infrastructure. The invasion of dreissenids has already generated extensive costs related to infrastructure, biodiversity, and water quality in other regions of the United States.

Figure 5 shows an example of dreissenids attaching to a surface.



Figure 5. Adult Dreissenids Surface Attachment

Source: PSMFC 2024

2.1 WESTERN REGIONAL RESPONSE

The discovery of adult quagga mussels at Lake Mead, Nevada, in 2007, led many resource management agencies in the western United States to initiate watercraft inspection and decontamination programs (Elwell and Phillips 2021). Since then, not only have watercraft inspection station programs expanded significantly, but state, Federal, provincial, Tribal, local, and non-governmental organizations are engaged in regionally coordinated efforts in the defense against dreissenids throughout the west, including the RRB. Regional coordination occurs through partnerships with the AIS-prevention organizations described below.

The Aquatic Nuisance Species Task Force

The Aquatic Nuisance Species Task Force (ANSTF; www.anstaskforce.gov) was established by the Nonindigenous Aquatic Nuisance Species Prevention and Control Act of 1990 (Public Law 101-636). The ANSTF is an interagency organization co-chaired by the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) (USFWS 2023). Activities of the ANSTF include aquatic nuisance species prevention, research, and control; public and stakeholder education; and state coordination efforts (USFWS 2023). The ANSTF works with six regional panels. The mission of the Western Regional Panel is “to protect western aquatic resources by preventing the introduction and spread of non-native invasive or nuisance species into western marine, estuarine, and freshwater systems” through coordination with state, Tribal, Federal, and other entities (PNWER and PSMFC 2015).

The Stop Aquatic Hitchhikers! (stopaquatichitchhikers.org/) campaign was launched by the Aquatic Nuisance Species Task Force in 2002. It is designed to raise awareness about AIS with the Clean-Drain-Dry message for recreational watercraft.

Western Regional Panel on Aquatic Nuisance Species

The Western Regional Panel (WRP; westernregionalpanel.org) on Aquatic Nuisance Species is one of six regional panels under the ANSTF that meets annually to address the spread of invasive species in the waters of the western United States. The WRP Annual Meeting brings together the public and private sectors in the form of researchers, industry representatives, agency representatives, and legislators to discuss invasive species management in 19 western states and four Canadian provinces. The meeting focuses on ANS research and development, including the most innovative and forward-thinking research in the region. WRP documents (westernregionalpanel.org/key-documents/) provide stakeholders with standardized training for conducting inspections and monitoring.

Regional coordination efforts by the WRP also include establishing protocols and standards, which are provided in a PSMFC document called Uniform Minimum Protocols and Standards for Watercraft Inspection and Decontamination Programs for Dreissenid Mussels in the Western United States IV (Elwell and Phillips 2021). These

protocols and standards are scientifically based and are intended to help provide consistency across watercraft inspection stations in the western United States.

Aquatic Invasive Species Network

The (Western) Aquatic Invasive Species Network (AISN, westernais.org) website, supported by the PSMFC, is a collaborative source of information. It provides information on the efforts of states and provinces in the United States and Canada to prevent the introduction and spread of AIS. The network maintains documentation of a broad range of activities throughout western North America and around the world. The site complements information maintained by the WRP and other organizations.

The 100th Meridian Initiative

The 100th Meridian Initiative was one of the first organizations with a goal of preventing the spread of AIS in the Western United States. The 100th Meridian Initiative provided the foundation for the AIS prevention and control efforts. While the 100th Meridian Initiative no longer exists, activities and efforts that were previously undertaken by the initiative are now being funded by USFWS and undertaken by non-governmental, Tribal, state, interstate, and Federal agencies.

Regional Watercraft Inspection and Decontamination Data Sharing System

In addition to participation in a number of cooperative organizations, states coordinate their watercraft inspection station efforts through the Regional Watercraft Inspection and Decontamination Data Sharing System (WID System). The WID system is in use at more than 200 locations across the West (Figure 6; CPW 2020a, b).

Colorado Parks and Wildlife developed the WID System to record WID information electronically and share information in a timely manner across jurisdictions to aid collaborative efforts to prevent the spread of zebra and quagga mussels and other AIS. The WID System consists of a website, shared database, and phone app for iOS and Android devices. The WID System reduces operating costs for mobile data collection while increasing accuracy and reliability and can be queried for on-demand reporting. The WID System includes a risk assessment tool that shows where boats are moving after launching in mussel infested waters and sends an alert to the next known destination. With the benefits of data sharing proving to be abundant, several western states have been using the WID System to send out timely electronic alerts of watercraft leaving infested waters. This increased timely communication has directly increased the number of infested watercraft being intercepted within the western region before launching in uninfested waters.



Figure 6. Map Showing States Using the Watercraft Inspection and Decontamination Data Sharing System

Source: Brown 2021

2.2 TYPICAL WATERCRAFT INSPECTION STATIONS

Sections 2.2.1 – 2.2.4 provide typical descriptions of watercraft inspection stations throughout the Western states. Stations within the RRB currently operate as rampside inspection stations and are limited to access points at Lake Mendocino and Lake Sonoma (see Section 2.4.2).

2.2.1 Types of Watercraft Inspection Stations

The Western states use a variety of types of watercraft inspection stations, depending on each state's individual program. Several types are listed below.

- **Roadside Inspection Station** – This type of station is “conducted at a port of entry, major highway junction, management area, or other geographically relevant choke point. The roadside inspection is typically used to prevent AIS from entering a defined geographic area” (Elwell and Phillips 2021).
- **Rampside Inspection Station** – This type of station is set up at a specific water body to inspect watercraft entering/exiting a lake or reservoir (Elwell and Phillips 2021).
- **Roving Inspection Station** – This type of station is typically assigned to a predetermined geographical area, sometimes remaining in a location for only hours at a time, which makes it effective for inspections at high-use boating recreational areas or during watercraft-related activities such as fishing tournaments or boating-related competitions.
- **Inspection by Appointment** – Inspections may be conducted by appointment at locations determined by the managing agency. Commercial inspections may provide flexible options for inspection compliance if permitted by the managing agency.

2.2.2 Station Equipment and Inspection and Decontamination Procedures

A typical station consists of a covering, such as a shipping container, a construction trailer, canopy, or tent; a transport vehicle; a hot water pressure washer; outreach and educational materials; traffic control devices such as cones and signage; and applicable personnel amenities (heaters for cold weather, portable restrooms, etc.). Figure 7 shows examples of inspection stations.



Figure 7. Examples of Watercraft Inspection Stations in Utah

Western states follow similar protocols and standards for watercraft inspections based on the Uniform Minimum Standards and Protocols for Watercraft Inspection and Decontamination Programs for Dreissenid Mussels in the Western United States III (Elwell and Phillips 2021). Procedures include a screening interview to assess the risk level of the watercraft, distribution of information about AIS (Section 3.3), and a boat inspection based on risk level.

The screening interview includes questions pertaining to watercraft origin; usage, including when and where it was last used; whether it was cleaned, drained, and dried; and knowledge of AIS. Based on the interview, the inspector conducts an inspection ranging from a cursory investigation of key boat and trailer elements to a full investigation of all potentially infested areas. The outcome of the inspection results in either letting the boat pass through or performing a partial decontamination (often called a “hot wash” or standing water decontamination) or full decontamination.

A partial decontamination is typically performed when a vessel has recently been in a water body that is dreissenid infested, positive, or suspect, or when a vessel is grimy or contains dead mussels or AIS plants. Decontamination entails using a pressure washer to spray hot water over the exterior surface of the vessel and in the engine and other compartments that had been exposed to water to kill anything not seen and takes approximately 20 minutes to complete (USACE, NWW 2022).

A full (more extensive) decontamination is performed when live mussels are present. Full decontaminations involve the same equipment, but are more detailed, taking hours instead of minutes (Elwell and Phillips 2021). Some decontaminations can be performed onsite at the inspection station if equipment and situation allow, and some

decontaminations require sending the boat to another location, such as a shipyard, impound lot, or other location. Following a full decontamination, additional dry time may be required to ensure no live mussels remain on the vessel. In its simplest form, drying is a technique for desiccating dreissenids or other invasive species to decrease their viability (Morse 2009).

To achieve effective decontaminations (partial or full), inspectors use water temperatures of 120°F for interior compartments and 140°F for the exterior (hull, engine, and trailer) (Elwell and Phillips 2021).

2.2.3 Station Location Selection Process

The process of selecting locations for watercraft inspection stations considers the following factors: safety of personnel and public; ease of public access; infrastructure availability for setting up facilities (electricity, water, restrooms, etc.); and where applicable, availability of a suitable space for conducting decontamination procedures that does not pose any threat to the environment.

Although only water is used to decontaminate watercraft, watercraft inspection stations are set up in parking lots, gravel pits, or other areas where water run-off does not present an environmental concern. Some states use a catch mat that is placed under the vessel to capture the run-off, as shown in Figure 8.



Figure 8. An example of a Portable Decontamination Unit with a Containment Mat for Wastewater

Most watercraft inspection stations can be easily moved and placed in the most effective locations. Each year, agencies managing AIS prevention programs typically evaluate their locations and operations to determine whether stations should be added, relocated, or closed, or if hours of operation should be adjusted. This evaluation process includes coordination with other agencies and partners and considers their specific

budgets and statutory authorities, as well as data collected related to boat transportation traffic and fouled boat interceptions.

2.2.4 Public Awareness



Figure 9. Display Demonstrating How Mussels Can Attach to Watercraft

Public awareness about the seriousness of AIS is an important element of the ongoing efforts to prevent an introduction of dreissenids and further spread of other AIS within the RRB. The western states and regional organizations work to educate the general public about AIS issues and ways individuals can help with prevention efforts. Public outreach includes ad campaigns such as "Clean. Drain. Dry." And "Stop Aquatic Hitchhikers" and "Don't Let it Loose," which are aimed at keeping boats free from AIS. These and other AIS messages are communicated through targeted trainings and presentations, social media, news releases, videos, public service announcements, signage, materials included with fishing and boating licenses, and flyers and brochures distributed at sporting and boat shows, fairs, and other special events.

Watercraft inspection stations provide a valuable opportunity to increase public awareness. During the inspection education about AIS impacts and prevention is conveyed

regardless of whether a watercraft is fouled. Additionally, most inspection stations offer displays (Figure 9), posters, brochures, rack cards, etc. to educate the public about AIS.

2.3 WATERCRAFT INSPECTION STATIONS AT SOURCE WATER BODIES

Infested water bodies of significant concern include the Great Lakes; Lake Powell (Utah and Arizona), Lake Mead (Nevada and Arizona), and Lake Havasu (Arizona and California) on the lower Colorado River; Lake Pleasant (Arizona) on the Central Arizona Project; and Apache Lake, Canyon Lake, and Saguaro Lake on the Salt River in Tonto National Forest (Arizona).

Currently, there are many watercraft inspection/cleaning stations in the Great Lakes states operated by a combination of state, county, city, and private organizations. Watercraft inspection requirements at infested water bodies within or bordering Arizona are voluntary and variable. Lakes Powell and Mead are both within National Recreational Areas (NRA) and are administered by the National Park Service. Lake Powell is within the Glen Canyon NRA, and Lake Mead within the Lake Mead NRA

(Figure 10 is a photo from dreissenid infested Lake Mead, Arizona). Jurisdiction over Lake Havasu is complex, including Federal, state, Tribal, and local government agencies. The roles and responsibilities of these agencies at Lake Havasu are outlined in a memorandum of understanding (BLM 2014). Currently, contaminated boats can legally leave the NRAs in several states without requirement of decontamination.



Figure 10. Flip-Flop Covered with Quagga Mussels at Lake Mead

Source: National Park Service

2.4 CALIFORNIA PROGRAM

Assembly Bill 2065, signed into law in 2008, added requirements for any entity that owns or manages a reservoir where recreational activities are permitted to assess the vulnerability of those waters and systems to the introduction of dreissenids and to develop and implement a prevention program. Within the RRB there are two reservoirs, Lake Mendocino and Lake Sonoma that are owned by USACE and managed for flood control by USACE and for water supply storage purposes by Sonoma County Water Agency.

California Department of Fish and Wildlife has enforcement capabilities/jurisdiction over prohibited AIS and/or the possession or transportation of AIS that vary according to their statutes and regulations (enforcement programs are generally through fish and wildlife

agencies and/or state/county police agencies). The state code (California Fish and Game Code 2302) concerning mandatory watercraft inspection stations requires that persons transporting watercraft or conveyances must stop for inspection or be subject to penalties. On the Federal side, zebra mussels are listed as an injurious species under the Lacey Act (18 USC §§ 42-43; 16 USC §§ 3371-3378), which makes importation (transportation) across state lines a violation and therefore Federally enforceable.

2.4.1 California Inspection Stations

A watercraft inspection program was established in the State of California in 2007. Within California, several types of watercraft inspection stations are used. Most are rampside stations associated with lakes or reservoirs and California border stations. Rampside stations within the study area are usually established at locations to provide the primary defense against dreissenids and prevent the spread of locally established plants. Current inspection station information can be accessed using the following link: <https://wildlife.ca.gov/Conservation/Invasives/Quagga-Mussels/Mobile/Inspection>.

There are currently 107 watercraft inspection stations in the state of California. Of those, 91 are established near lakes and reservoirs. The other 16 are Border Protection Stations (Figure 11), which are operated under the California Department of Food and Agriculture (CDFA).

At CDFA Border Protection Stations in 2020, 183,682 watercrafts were inspected for dreissenids, and 14,141 watercrafts were cleaned, 38 of which carried organisms that were confirmed to be dreissenid mussels (California Department of Fish and Wildlife 2020).

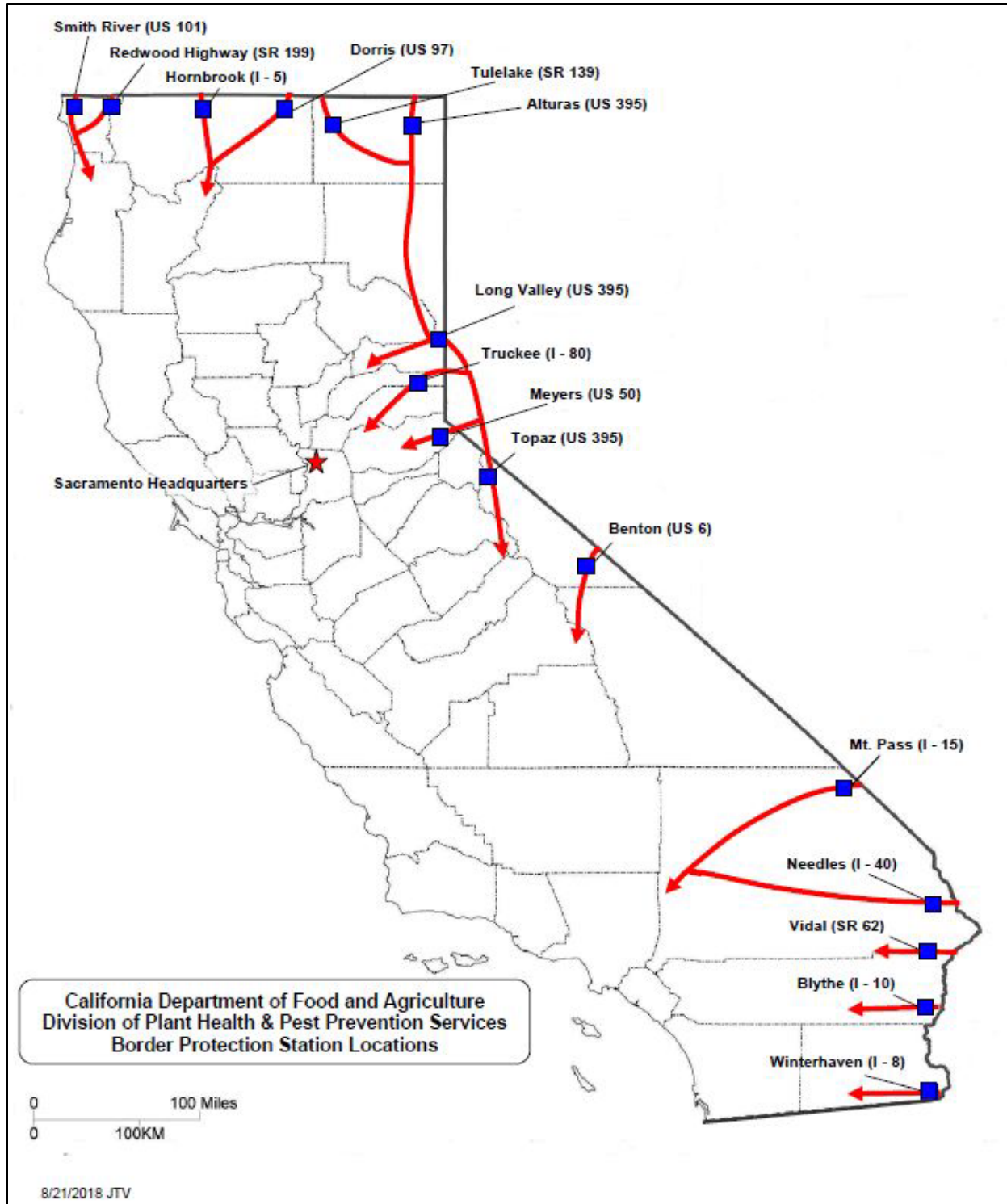


Figure 11. California Border Protection Station Location Map

Source: California Department of Food and Agriculture 2018.

2.4.2 Current Russian River Basin Watercraft Inspection Activities

In the RRB, quagga and zebra inspection activities have been conducted at both Lake Mendocino and Lake Sonoma by Sonoma County Water Agency, a non-Federal entity, since 2010. Support has also been provided by the California Department of Fish and Wildlife in the past through a grant. There has been no Federal involvement for inspections apart from the inspection stations being located on USACE-owned lands.

The average daily cost of operating the stations at these two lakes is \$1,200 (FY24 price level), which includes the use of canines. In addition to operating costs, annual maintenance required for the hot water pressure washers (wash unit) includes winterization, changing the oil, and replacing tires, valves, thermostats, hoses, and fittings. The average annual maintenance cost per wash unit is \$1,500.

Within the last 4 years, there have been two positive detections discovered during inspections, one at Lake Mendocino and one at Lake Sonoma. In each instance, the boats were sent to other sites for decontamination.

The following are descriptions of each lake and their inspection activities.

Lake Mendocino

Lake Mendocino sits within the Coyote Valley, which is a southerly trending valley about 1 to 1.5 miles wide by 3 miles long (Figure 12). It is flanked by rolling hills that rise about 400 feet from the valley floor to the west of Lake Mendocino, and it abuts the steeper hills to east. The upstream end of the reservoir extends northeastward up the gorge of the East Fork toward the mouth of Cold Creek. The lake is within a half mile of many Mendocino County residential developments and 3 miles from the city limits of Ukiah.

Lake Mendocino is located in Mendocino County and has a storage capacity of 122,500 acre-feet. The inflow is the East Fork Russian River, and the outflow is the Russian River. It is owned and operated by USACE San Francisco District (SPN), and its authorized purposes are flood risk management, water supply, irrigation, recreation, and hydropower. There are no commercial marina operations, and Corps manages two public boat ramps. Watercraft accessing the lake are registered in various states including Michigan, Georgia, Nevada, Washington, and Oregon.

Current watercraft inspection stations at Lake Mendocino are located at the north and south boat ramps. The recreation season typically ranges from early or late spring to late summer or early fall, depending on lake water levels, wildland fire incidents, and staffing. Inspections are daily from 7 a.m. to 3 p.m. during peak recreation season. Stations are typically operated by two personnel, with additional personnel for high traffic areas or on weekends and holidays. Watercraft inspections at Lake Mendocino totaled 2,194 in 2019, and 2,662 in 2020.



Figure 12. Lake Mendocino Map

Lake Sonoma

Lake Sonoma sits within the Dry Creek Valley, which is a southerly trending valley about 30 miles wide by 25 miles long. It is flanked by rolling hills that rise about 400 feet from the valley floor to the west of Lake Sonoma (Figure 13) and abuts the steeper hills to east. The Warm Springs Dam is at the confluence of Warm Springs Creek and Dry Creek, approximately 14 miles northwest of Healdsburg, California, in Sonoma County. The upstream end of the reservoir extends 12 miles up Dry Creek and 7 miles up Warm Springs Creek. The lake is within a 15-minute drive of many Mendocino County residential developments.

Lake Sonoma has a storage capacity of 381,000 acre-feet. The inflow is the Dry Creek and Warm Springs Creek, and outflow is Dry Creek. It is owned and operated by USACE SPN, and its authorized purposes are flood risk management, water supply, and recreation. Secondary benefits of the project include wildlife management and hydropower. There is one commercial marina operation, and USACE manages one public boat ramp. Watercraft accessing the lake are registered in various states, including Florida, Texas, New Jersey, Nevada, and Oregon.

Current watercraft inspections at Lake Sonoma are conducted at the visitor center. Owners are given a ticket that confirms an inspection has been completed and no

dreissenids were detected. The peak boater recreation season typically ranges from early or late spring to late summer or early fall, depending on lake water levels, wildland fire incidents, and staffing. Inspections are conducted daily from 7 a.m. to 3 p.m. during peak recreation season. During the winter months, the inspection station moves to the public boat ramp. Stations are typically operated by two personnel, with additional personnel for high traffic areas or on weekends and holidays. Boaters launching at the marina present their inspection ticket. Watercraft inspections at Lake Sonoma totaled 6,794 in 2019, and 12,129 in 2020.

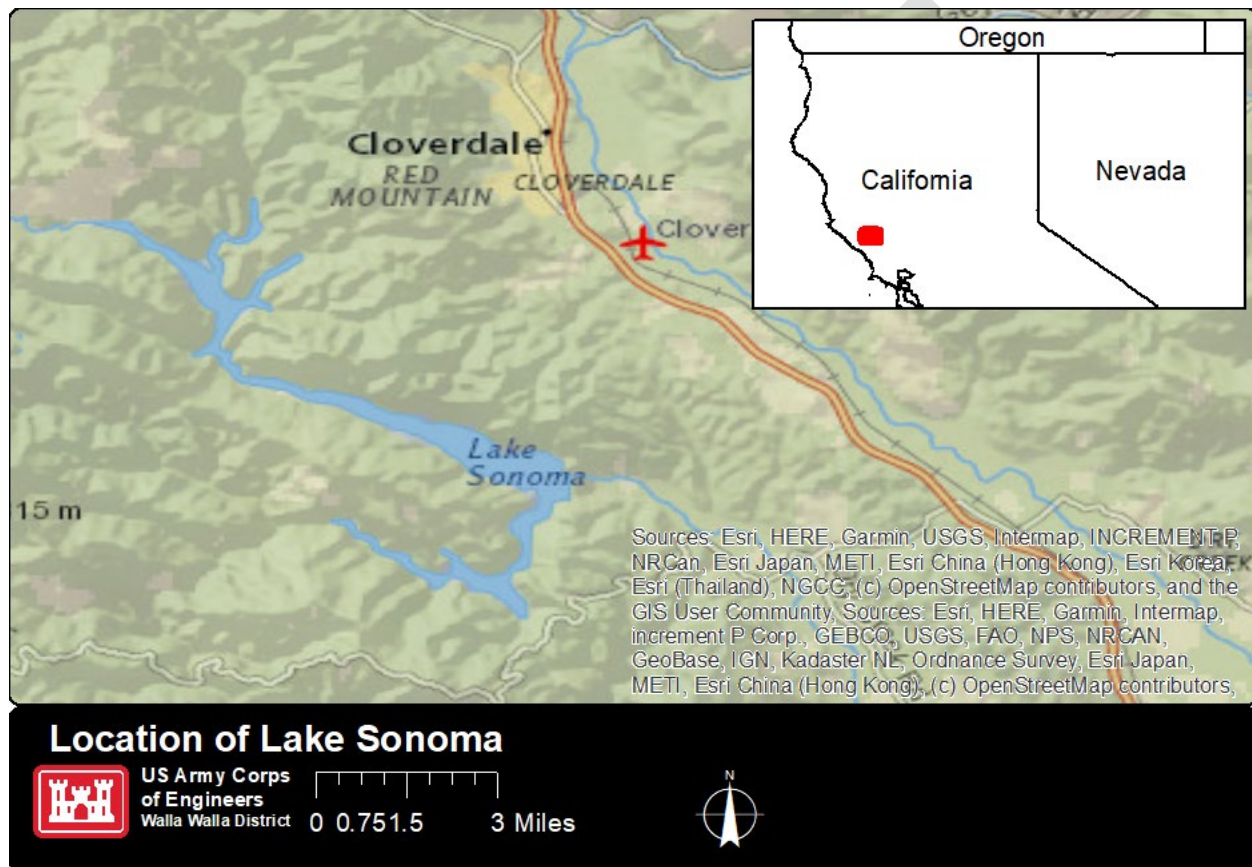


Figure 13. Lake Sonoma Map

2.4.3 Current Russian River Basin Monitoring Activities

Early detection monitoring includes seasonal veliger sampling via plankton tows and solid substrate inspections. A plankton tow is a method of collecting plankton, other organisms, and sedimentation by towing a net-like structure through the water. Solid substrate inspections involve placing a structure in the water that is composed of various surface types known to be conducive to dreissenid establishment and inspecting regularly for the presence of dreissenids.

Detection monitoring is required to assess the efficacy of prevention efforts like watercraft inspection programs, and for the early detection of new dreissenid populations. Under certain circumstances, small isolated dreissenid populations could

be controlled or eradicated. Failure to detect new populations through early detection programs would likely result in rapid uncontrolled spread of dreissenids throughout the RRB. No mussels or veligers have been detected in the RRB to date. A summary of monitoring activities completed in the RRB in 2019-2020 are shown in Tables 1 and 2.

Table 1. Summary of Early Detection Monitoring Activities at Lake Mendocino, 2019-2020

Type and Location	2019	2020
Plankton Tow – Lake Mendocino and Dam Outflow	June – December	June – December
Surface Survey – Western Shore	June – December	June – December
Artificial Substrate – Multiple Locations	June – December	June – December

Drought conditions from October through December 2020 limited the plankton tow and artificial substrate monitoring.

Table 2. Summary of Early Detection Monitoring Activities at Lake Sonoma, 2019-2020

Type and Location	2019	2020
Plankton Tow – Marina and Public Boat Ramp	July – November	July – November
Surface Survey – Marina	July – November	July – November
Artificial Substrate – Multiple Locations	July – November	July – November

2.5 EXISTING CONTINGENCY AND RESPONSE PLANNING

Regional Efforts

Wimbush et al. (2009) demonstrated the potential for eradicating zebra mussels with a robust rapid response plan. The Western Regional Panel developed the Quagga-Zebra Mussel Action Plan (QZAP; WRP 2010) in response to the rising threat of invasive quagga and zebra mussels in the West. The QZAP summarizes strategies to address the invasion of zebra and quagga mussels in the West, and to identify and prioritize the specific actions that are needed to comprehensively prevent the further spread of quagga and zebra mussels, respond to new infestations, and manage existing infestations. In 2019, an update was issued that documents progress made since the 2010 QZAP (WRP 2019), and a new QZAP was issued in 2020 (WRP 2020) “to inform ongoing partnership efforts intended to minimize the spread and impacts from zebra and quagga mussels in the western United States.”

Federal Efforts

The Department of Interior framework (DOI 2016) provides guidance for developing rapid response plans. A recent Memorandum of Understanding (MOU) was finalized among USACE, U.S. Department of the Agriculture, Forest Service, the U.S.

Department of the Interior (DOI), Bureau of Indian Affairs (BIA), Bureau of Land Management (BLM), U.S. Bureau of Reclamation (Reclamation), U.S. Fish and Wildlife Service (USFWS), National Park Service (NPS), and the U.S. Geological Survey (USGS).

The MOU articulates the strengthening of Federal coordination, communication, and collaboration to enhance the capacity of Federal, state, and Tribal agencies to rapidly respond to new infestations of Dreissenid mussels in western waters. Western waters include water bodies in the following 19 States: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Kansas, Montana, North Dakota, Nebraska, New Mexico, Nevada, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming.

SECTION 3 - PLAN FORMULATION

Development of this report followed the USACE six-step planning process. This process identifies and responds to problems and opportunities associated with the Federal objective, as well as specified state and local concerns. The process provides a flexible, systematic, and rational framework to make determinations and decisions at each step based on constraints, objectives, and assumptions. This allows the interested public and decision-makers to be fully aware of the basic assumptions employed, the data and information analyzed, the areas of risk and uncertainty, and the significant implications of each plan that is considered.

3.1 PROBLEMS

The RRB is at high risk of a dreissenid infestation due to the mobility of recreational boats and other watercraft, which are trailered across watersheds and over interstate transportation networks, providing an easy mechanism for transferring infestations. Other flotation devices (such as personal watercraft, tubes, and rafts) are also potential means by which mussels could make their way into the RRB reservoirs.

Fishing is a popular activity that takes place at USACE reservoirs, and in the rivers and creeks upstream and downstream of the reservoirs. Even without using boats, anglers could potentially transport mussels with contaminated recreational equipment and unintentionally infest rivers and streams.

In addition, the high survival rate of dreissenids once established, their ability to be hidden on or inside of boats and other structures, and the high fiscal and environmental costs of infestation present serious problems to those who live, work, or recreate in the RRB. Fundamentally, the problems can be divided into three categories: (1) infrastructure impacts; (2) health and safety impacts; and (3) environmental impacts. These impacts are summarized in the bullets, below. Additional details related to the impacts are provided in the subsequent paragraphs and in Section 4.

Infrastructure Impacts:

- Dreissenids attach to submerged hydropower, navigation, and water supply infrastructure, making equipment and infrastructure less efficient or entirely ineffective, resulting in significant impacts to electrical generation; the movement of goods; and irrigation, municipal, and industrial water supplies.
- A dreissenid infestation is rapid and destructive and may not be noticed until it causes a failure of operations of critical infrastructure. By that time, significant actions may be required to clean and restore infrastructure functions.

Health and Safety Impacts:

- Infestation could present safety issues for employees of utilities, dams, wineries, and other facilities if fire suppression systems are impacted or disabled by dreissenids.

- The presence of dreissenids and the shells of dead dreissenids along beaches raise the risk of physical injury (cuts and scrapes), albeit minor, to the recreating public.
- Dense colonies of dreissenids attached to docks, buoys, and other recreational boating infrastructure can negatively impact the integrity of such structures and represent safety risks to the recreating public.

Environmental Impacts:

- Dreissenids colonize rapidly and have potential to dramatically affect water quality once established (Wong et al. 2010). Their ability to filter and remove nutrients from the water affects the base of the food chain by significantly reducing the nutrients that are available to other organisms.
- The habitat impacts of an infestation of dreissenids and the potential cascading effects to the food chain would be expected to negatively impact Endangered Species Act (ESA)-listed species in the RRB in a significant way (see Federal Natural Resources Law Compliance and Biological Evaluation appendix for a list of threatened or endangered species). An uncontrolled infestation in the RRB could reduce the quality of designated critical habitat for ESA-listed native fish, diminish necessary aquatic resources that contribute to the critical habitat, and undo millions of dollars in Federal investment in fish recovery improvements made over the previous 30 years.
- An infestation of dreissenids in the RRB could significantly disrupt hatchery operations, affecting sport fish abundance, and recovery efforts for Federally endangered Central California Coast Coho and Central California Coast Steelhead species.

The inherent potential for dreissenids to spread via fouled watercraft, combined with the large adverse impacts to existing infrastructure and ecosystems that would result from an infestation, present significant risks to the RRB. Once established in one area, they can rapidly spread downstream within watersheds during their free-swimming larval stage.

Dreissenids have an ability to rapidly colonize, and their high-water filtration rate (Fanslow et al. 1995) causes dramatic effects on water quality and the base of the food chain. This causes detrimental effects to native fish populations and the entire food web, with the potential for cascading trophic effects. Invasive mussels filter particles from the water column and concentrate nutrients in their feces, changing the nutrient regime and enriching sediment. Water clarity can increase as plankton are filtered out of the water column, which can alter the prey base of native fishes. This can also lead to an increase in aquatic plants, as well as aquatic plants taking root in deeper water.

Conditions for invasive plants and non-native fish continue to improve, which further decreases habitat for native organisms and could result in increased competition and predation on native fishes, including ESA-listed species. In the Great Lakes, zebra mussels contributed to a bloom of toxic cyanobacteria (Vanderploeg et al. 2001),

sometimes called blue-green algae, which can have a detrimental effect on water quality, as well as cause health impacts to people and pets.

Adult dreissenids attach to surfaces, and as they colonize, they can biofoul all types of water-related infrastructure. Many facilities located in basins already infected by dreissenids face costs from control measures and additional O&M required to manage the impacts of an infestation. These costs are typically passed on to consumers or taxpayers. From 1989 to 2006, estimated direct costs associated with zebra mussels in the Great Lakes and Mississippi Basins ranged from \$1 billion to \$1.5 billion, and similar costs are expected in the west in the event of an invasion (Connelly et al. 2007).

Based on the facility vulnerability assessments completed by Reclamation, USACE authorized purposes (e.g., hydropower, navigation, and fish and wildlife mitigation) at USACE projects are all vulnerable to the impacts of a dreissenid infestation. Examples of infestation impacts are described below:

- Major hydropower components at risk of being fouled or damaged by a dreissenid infestation include the following:
 - Raw water systems, which could result in a powerhouse shutdown.
 - Flap gates, which could result in water entering protected areas.
 - Instrumentation, which could result in operation problems.
- Major water control components at risk of being fouled, or damaged, by a dreissenid infestation include raw water systems, instrumentation, and gate seals.
- Major fish passage and hatchery facility components at risk of being fouled or damaged by a dreissenid infestation include all submerged surfaces in low velocity areas, screens, and fish passage systems.
- Major water supply and treatment facilities components at risk of being fouled or damaged by a dreissenid infestation include all submerged surfaces and screens.
- Dreissenid establishment in the passage system and piping of juvenile and adult fish passage and monitoring facilities would cause extraordinary stress on ESA-listed fish due to injury, descaling, and impact trauma.
- Due to their water filtration abilities, dreissenids can affect the food chain, decreasing the food supply for young and small fish, and disrupting ecosystem balance.
- Recreation, Tourism, and Down Stream Property Values – a dreissenid infestation also affects recreational fishing at the lakes by altering fish population dynamics, and the freshwater beaches, turning sandy beaches to jagged shorelines due to the life cycle of dreissenids. The negative effects to both recreational fishing and the quality of the freshwater beaches will reduce recreation and tourism in the affected area.

An example of the degree of damage they can impose is shown in Figure 14. More detailed descriptions of impacts and associated estimated costs to USACE authorized purposes, as well as to water supply, recreation, and tourism, is provided in Section 4.



Figure 14. Quagga Mussels on the Davis Dam in California

Source: Reclamation 2007

3.2 OPPORTUNITIES

Within the limits of the authorizing legislation, several opportunities were identified to address the significant problems associated with dreissenids and other AIS by working to prevent the spread of AIS into, out of, or within the RRB.

USACE has the opportunity to continue and expand coordination with California State and county governments or other non-Federal public entities in the Northern California Bay Area Region to do the following:

- Use existing knowledge to identify high risk infestation areas, transportation corridors, and types of infrastructure to address RRB vulnerabilities to an infestation by inspecting watercraft traveling from infested waters to the RRB.
- Educate recreational users (motorized and especially non-motorized) of watercraft and public lands about the risk and damages caused by AIS.
- Intercept dreissenids to reduce the risk of an infestation in the RRB.

- Monitor the water chemistry in the RRB and compare it to the water chemistry of infested water bodies to help determine the risk of dreissenids from specific infested water bodies becoming established in the RRB. This provides an opportunity to inform risk management decisions.
- Detect veligers before populations of dreissenids become established in the RRB.
- Share inspection information in a timely manner.
- Prevent organisms from infesting new waters through strategically placed watercraft inspection stations, public education, maintaining communication with agencies, and effective coordinated rapid response planning.
- Develop rapid response plans, which may be used to inform control plans and response efforts upon initial detection of dreissenids in the RRB.

3.3 PLANNING OBJECTIVES AND CONSTRAINTS

Planning objectives were discussed and developed in cooperation with the State of California AIS coordinator, U.S. Fish and Wildlife Service, NMFS, Sonoma Water and the North Coast Regional Water Quality Control Board. They were generated to describe how problems and challenges could be addressed by taking advantage of available opportunities. The following objectives for the RRB were identified for this evaluation and cover a 50-year period of analysis (2022-2072):

- Intercept watercraft on existing pathways between infested water bodies to detect dreissenids on watercraft and decontaminate the watercraft to reduce the risk of infestation in the RRB.
- Identify water chemistry of the RRB and compare it to the water the chemistry of infested water bodies to better understand the risks of AIS from specific infested water bodies becoming established in the RRB. This provides an opportunity to inform risk management decisions.
- Prepare rapid response plans to support potential response actions in the event dreissenids are detected.
- Complete a vulnerability assessment and coordinate with Federal, state, local and partners with a focus on areas that monitoring efforts determined to be a priority.

Planning Constraints

Project constraints are resource, legal, or policy considerations that limit the range or type of actions that could be implemented to meet planning objectives. The following constraints were identified for this evaluation within the RRB, which includes Lake Mendocino and Lake Sonoma:

- Comply with Federal, state, and local laws, and regulations and policies.

- Implement the program consistent with the authorizing legislation and guidance.
- Minimize adverse effects to Threatened and Endangered Species.
- Manage resources consistent with the appropriate USACE Master Plan when/where activities would occur within lands, or land interests, acquired for a civil works project.

3.4 MEASURES

The purpose of the following sections is to show potential improvements and expansions of the current operations through a Federal partnership. This evaluation does not attempt to precisely define the future program. Instead of attempting to define an optimal set of conditions, this report assumes that providing Federal funding to assist the non-federally managed program across the RRB will result in an increase in the investment and effectiveness of the overall program and a decrease in the risk of infestations.

Measure 1 – Federal Participation in the Process to Strategically Select and Prioritize Locations to Establish Watercraft Inspection Stations in the RRB

This measure would augment the future program by allowing USACE to participate in the process used to select locations to establish watercraft inspection stations to reduce the risk of dreissenids or other AIS spreading into, out of, or within the RRB.

Measure 2 – Increase the Number of Watercraft Inspection Stations in the RRB

This measure would augment the future program by increasing the number of watercraft inspection stations in the program to reduce the risk of AIS spreading into, out of, or within the RRB. The type of inspection locations would be roadside, rampside, and roving. New inspection locations would be established, depending on the availability of Federal funding, the need to increase program effectiveness, and the ability of potential NFSs to share in the associated costs.

Measure 3 – Extend Daylight Inspection Hours of the Watercraft Inspection Program in the RRB

This measure would augment the future program by extending daylight inspection hours to reduce the risk of AIS spread into, out of or within the RRB. Daylight inspection hours would be expanded based on the need to increase program effectiveness and the ability of potential NFSs to share in the associated costs.

Measure 4 – Increase Nighttime Watercraft Inspections in the RRB

This measure would augment the future program by adding or increasing the number of nighttime inspections that are performed. Nighttime inspections would be added depending on the availability of Federal funding, and the need to increase program effectiveness, and the ability of potential NFSs to share in the associated costs. If a Federal partnership is established, the nighttime operations could be phased in as

potential NFSs establish agreements with law enforcement and as inspection personnel are hired and trained. The nighttime inspection locations and nighttime shift durations would be further developed based on the regional strategy.

Measure 5 – Construct Site Improvements in the RRB

This measure would augment the future program by helping to construct site improvements at water inspection stations such as, but not limited to, utility connections and pavement.

Installing utilities at watercraft inspection stations provides several benefits, including lighting for expanded hours of operation, electricity without the need for portable generators, and increased reliability of systems that require electricity, such as data input and real-time communications. Utility connections would be implemented depending on the availability of Federal funding, the need to increase program effectiveness, and the ability of potential NFSs to share in the associated costs.

Paving and otherwise developing site conditions at watercraft inspection stations has the potential to increase the efficiency and effectiveness of the existing inspection stations. Hardening the stations by adding pavement (concrete or asphalt) or gravel would provide additional safety buffers and ease ingress and egress at the inspection stations. Site improvements would be implemented depending on the availability of Federal funding, the need to increase program effectiveness, and the ability of potential NFSs to share in the associated costs.

Providing electrical hookups and constructing trailer pads would have the added benefit in remote areas of attracting potential watercraft inspectors requiring living quarters. Inspectors could either bring their own trailers, or trailers could be provided.

The details of site improvements would be developed after the Federal partnership is established. When improvements are planned at an inspection station location that involves any ground disturbance, USACE would need to tier from this LR/Programmatic EA and complete site-specific NEPA analysis, to include National Historic Preservation Act (NHPA) Section 106 review.

Measure 6 – Add Canine Detection Capabilities to the Existing Watercraft Inspection Program in the RRB

Utilizing canines at stations could assist with the various challenges of inspections, particularly nighttime stations with inadequate lighting. Dogs can use their keen sense of smell to detect dreissenids and have been shown to be more effective than human inspectors. The Canadian Province of Alberta, and the states of California and Washington, have trained dogs to successfully locate dreissenids at watercraft inspection stations and have demonstrated substantial results through their K-9 programs. K-9 programs in California have also intercepted hydrilla and other noxious aquatic weeds. Montana has also collaborated with Alberta in training dogs for use in some of their watercraft inspection stations. This measure would augment the future program by increasing canine detection capabilities and would be implemented

depending on the availability of Federal funding, the need to increase program effectiveness, and the ability of potential NFSs to share in the associated costs.

Measure 7 – Increase Public Awareness and Education Related to the Existing Watercraft Inspection Program in the RRB

This measure would augment the future program by increasing public awareness and education efforts, which could include ad campaigns, communication with commercial boat haulers and marinas, and the addition of permanent signs at locations where inspection stations are routinely established each year (such as at points of entry along interstates and major highways). Informing the public of the risks of AIS can increase their involvement in prevention efforts and potentially decrease the numbers of infested boats that enter or travel within the RRB. Increasing public awareness and education efforts would be implemented depending on the availability of Federal funding, and the need to increase program effectiveness, and the ability of potential NFSs to share in the associated costs.

Measure 8 – Require Watercraft Inspections at Federal Facilities at Infested Lakes

This measure would require that watercraft leaving infested water bodies (e.g., Great Lakes in the Midwest, Mississippi River Basin, and multiple Federal lakes in the southwest) be inspected and decontaminated.

Measure 9 – Monitor to Identify RRB Water Chemistry and Compare to Water Chemistry of Infested Water Bodies

This measure would augment the future program by identifying water chemistry of the RRB for comparison to the water chemistry of infested water bodies to help determine if water conditions in the RRB are suitable for dreissenids. This would help inform early monitoring locations and risk management decisions within the RRB.

Measure 10 – Monitoring

This measure would augment the future program by leveraging the efforts of both USACE and potential NFSs to engage in monitoring activities to increase early detection, determine population extent or dynamics, analyze infestation impacts, and assess risk of colonization by dreissenids or other AIS in the RRB.

Monitoring activities provide an additional level of defense in the event prevention measures fail and live mussels or other AIS invade a water body in the RRB. Monitoring for early detection increases the chances that invasive plants such as hydrilla can be discovered before entering their seasonal reproductive period. Early detection monitoring and having appropriate response plans in place increase the chances of initiating an effective response before widespread establishment of an AIS occurs.

Water quality measurements, environmental deoxyribonucleic acid (eDNA), and Petite Ponar grab sampler are some indirect methods of monitoring for dreissenid mussels, invasive carp, and invasive macrophytes. Water quality parameters, including calcium,

temperature, salinity, pH, dissolved oxygen, and visibility, are measurements at each site to help identify the highest-risk water bodies and the times of year that water bodies are at greatest risk of a viable introduction. Monitoring for eDNA would require two liters of lake water to be collected at sample sites. Environmental DNA analysis would then be performed in a lab or in the field. Benthic samples would be collected using a petite Ponar grab sampler at each site from a watercraft for the presence of invertebrate AIS such as dreissenid mussels during their post-veliger life history stage (post settlement to adults).

Section 104 of the RHA, as amended, provided authority to conduct fish tissue sampling; however, dreissenids and other regional AIS of concern do not require a host fish during their larval development, and therefore fish tissue samples are not included as part of the proposed action.

Measure 11 – Regional Watercraft Inspection and Decontamination Data Sharing System

This measure would reimburse participating NFSs who use the Regional WID Data Sharing System (System) to document inspections and share data with other agencies throughout the United States.

Colorado Parks and Wildlife developed the system to record WID information electronically and share information in a timely manner across jurisdictions to aid collaborative efforts to prevent the spread of zebra and quagga mussels and other AIS. The System consists of a website, shared database, and app for iOS and Android devices. The System reduces operating costs for mobile data collection while increasing accuracy and reliability, and it can be queried for on-demand reporting. The System includes a risk assessment tool that shows where boats are moving after launching in mussel-infested waters and sends an alert to the next known destination. With the benefits of data sharing proving to be abundant, the states of Arizona, Nevada, and Utah have been using the System to send out timely electronic alerts of watercraft leaving infested waters. This increased timely communication has directly increased the number of infested watercraft being intercepted within the western region before launching in uninfested waters.

Measure 12 – Develop and Implement Real-time Tracking of Watercraft Transportation

This measure would support the program through future development of a real-time tracking system for watercraft traveling between lakes across the region, both within and outside the RRB. The system would direct boaters toward inspection and cleaning stations to decrease the risk of introduction of invasive species into uninfested waters.

Measure 13 – Evaluate Traffic Patterns for Recreational Boating

This measure would support the future program by periodically funding regional traffic studies for identifying highway use patterns by the boating public traveling between lakes within and outside the RRB. Understanding movement patterns of boaters would

help identify effective locations for permanent or roving inspection stations, support public awareness and education campaigns, and provide information for contingency and rapid response planning.

Measure 14 – Contingency Planning

This measure would augment the future program by helping to develop vulnerability assessments and site-specific response plans for water resource facilities.

Measure 15 – Rapid Response Planning and Preparation

This measure would help develop rapid response plans and share the costs of related training and equipment purchases.

Preventing the introduction of invasive species is the first line of defense against biological invasion (Draheim et al. 2017; PSMFC 2019). However, for invasive species that circumvent prevention systems, early detection and rapid response—a coordinated set of actions to find and eradicate potential invasive species before they spread and cause harm—can help stop the next lionfish, cheatgrass, or invasive carp (DOI 2016).

Where monitoring detects the presence of dreissenids or other AIS, rapid response is the next most cost-effective management tool to quickly eliminate or minimize infestation impacts. This measure would aid in development of rapid responses plans and approaches. While execution of rapid response actions falls within the current authority, Federal reimbursement of expenses occurred during such an action would require additional site-specific environmental compliance.

3.5 MEASURE SCREENING

All measures were screened against the objectives and the purpose and need (described in Section 1.4), as shown in Table 3, and the constraints, as shown in Table 4. All measures met at least one planning objective, and all measures except Measure 8 avoided violating planning constraints. Measure 8 was removed from further consideration because USACE does not have authority under Section 104 of the RHA to require NFSs to operate watercraft inspections at specific USACE-determined locations. All other measures were carried forward in alternative formulation.

Table 3. Screening Measures by Objectives and Purpose and Need

Measures	Intercept Watercraft	Water Chemistry	Rapid Response Planning	Contingency Planning	Purpose & Need
Measure 1 – Federal Participation in Selection of Watercraft Inspection Station Locations	X				X
Measure 2 – Increase Watercraft Inspection Stations	X				X
Measure 3 – Extend Daylight Inspection Hours	X				X
Measure 4 – Increase Nighttime Inspections	X				X
Measure 5 – Construct Site Improvements	X				X
Measure 6 – Add Canine Detection	X				X
Measure 7 – Increase Public Awareness and Education	X				X
Measure 8 – Require Watercraft Inspections at Federal Facilities at Infested Lakes	X				X
Measure 9 – Monitor to Identify Water Chemistry		X		X	X
Measure 10 – Monitor for Early Detection		X	X		X
Measure 11 – Regional WID Data Sharing System	X		X		X
Measure 12 – Develop and Implement Real-time Tracking of Watercraft Transportation	X		X		X
Measure 13 – Evaluate Traffic Patterns for Recreational Boating	X			X	X
Measure 14 – Contingency Planning				X	X
Measure 15 – Rapid Response Planning and Preparation			X		X

Table 4. Screening Measures by Planning Constraints

Measures	Consistent with Authorizing Legislation (Sec. 104 of RHA)	Minimize Effects to Threatened and Endangered Species	Comply with Federal, State, and Local Laws, Regulation, and Policies	Can Be Managed Resources Consistent with Appropriate USACE Master Plan	Retained
Measure 1 – Federal Participation in Selection of Watercraft Inspection Station Locations	Yes	Yes	Yes	Yes	Yes
Measure 2 – Increase Watercraft Inspection Stations	Yes	Yes	Yes	Yes	Yes
Measure 3 – Extend Daylight Inspection Hours	Yes	Yes	Yes	Yes	Yes
Measure 4 – Increase Nighttime Inspections	Yes	Yes	Yes	Yes	Yes
Measure 5 – Construct Site Improvements	Yes	Yes	Yes	Yes	Yes
Measure 6 – Add Canine Detection	Yes	Yes	Yes	Yes	Yes
Measure 7 – Increase Public Awareness and Education	Yes	Yes	Yes	Yes	Yes
Measure 8 – Require Watercraft Inspections at Facilities at Infested Lakes	No	Yes	Yes	Yes	No

Measure 9 – Monitor to Identify Water Chemistry	Yes	Yes	Yes	Yes	Yes
Measure 10 – Monitor for Early Detection	Yes	Yes	Yes	Yes	Yes
Measure 11 – Regional WID Data Sharing System	Yes	Yes	Yes	Yes	Yes
Measure 12 – Develop and Implement Real-time Tracking of Watercraft Transportation	Yes	Yes	Yes	Yes	Yes
Measure 13 – Evaluate Traffic Patterns for Recreational Boating	Yes	Yes	Yes	Yes	Yes
Measure 14 – Contingency Planning	Yes	Yes	Yes	Yes	Yes
Measure 15 – Rapid Response Planning and Preparation	Yes	Yes	Yes	Yes	Yes

3.6 ALTERNATIVES

For this LR/Programmatic EA, Section 104 of the RHA of 1958, as amended, serves as a guide for determining the range of alternatives to be considered. When an action is taken pursuant to a specific statute, the statutory objectives of the project serve as a guide by which to determine the reasonableness of objectives outlined in the NEPA document. This LR/Programmatic EA presents economic justification to support the Federal interest determination in a cost-share program for ongoing or future non-federally managed programs to prevent and control the spread of AIS into, out of, and within the RRB. In compliance with NEPA, the alternatives analysis, therefore, focuses

on identification of measures/alternatives that can be implemented under such a program.

NEPA does not require an agency to consider all alternatives; rather, only “reasonable alternatives” need to be explored and objectively evaluated. As such, USACE considered a number of alternatives but screened them until only two remained: the No Action Alternative and Alternative 2 (Comprehensive Adaptive Improvements), which is made up of all measures identified in Section 3.4 (except measure 8). Alternatives containing discrete subsets of measures would not be holistically applicable to the RRB and would not satisfy the purpose and need of the proposed action. Therefore, Alternative 2, Comprehensive Adaptive Improvements, was carried forward for further analysis, including the broad list of measures with the flexibility to address the varying and unique regional/local scenarios for watercraft inspection.

It is important to note that the No Action Alternative is the result of a decade of iterative planning on the part of the NFS. Several of the measures listed above have been considered and/or implemented to greater or lesser extents, with different timing, locations, and scale, and subject to the constraint of available funding. Absent Federal partnership, the Sonoma County Water Agency would continue to refine their AIS program, with the scale and components of those programs evolving from year to year. That is why the No Action Alternative can also be referred to as “No Change to Current Practice.”

Similarly, while Alternative 2 provides for comprehensive improvements it is subject to the constraint of available funding and the individual program authorities, policies, and preferred methods of potential NFSs. Alternative 2 is more of a framework for an annual adaptive planning process, with input provided by USACE at a regional scale. The measures listed are ones that were developed through prior regional experiences and by states that already have established programs. It would be possible to construct alternatives that included the listed measures separately, or in various combinations other than the final combination presented here, but they would not present a complete solution for all the jurisdictions in the basin.

Existing Programs and Activities

While existing programs in the RRB study area, as outlined in detail in Section 2.4, do not define the proposed alternative, which includes any of the actions described in the Comprehensive Adaptive Improvements Alternative, they do become a component of the proposed alternative when a potential NFS is reimbursed for those actions. As Sonoma County Water Agency’s program is already active in part of the study area, it is the first example of actions in the RRB that would be part of the cost reimbursement program. It should be noted however that the intent of the Comprehensive Adaptive Improvements Alternative is to expand the Sonoma County Water Agency’s efforts to prevent and control AIS. It is expected that new programs, within the scope of the Comprehensive Adaptive Improvements Alternative, would be initiated to prevent and control AIS within the study area. These programs could be implemented by Sonoma County Water Agency, or other NFSs. However, new programs across the RRB are

likely to be substantially similar to those already operated in the RRB. The actions below, while not the entirety of the Comprehensive Adaptive Improvements Alternative, can serve as potential examples of this alternative in action.

3.6.1 Alternative 1, No Change to Current Practice (No Action Alternative)

Alternative 1 represents a continuation of the current practices (see Section 2.4), in which USACE would not partner with Sonoma Water County Agency, or other potential NFSs, to establish watercraft inspection stations, conduct monitoring, develop contingency plans, and conduct rapid response planning and preparation to prevent the spread of AIS into, out of, and within the RRB.

3.6.2 Alternative 2, Comprehensive Adaptive Improvements

Alternative 2, Comprehensive Adaptive Improvements, is made up of all measures (shown in Table 5) identified in Section 3.4 (except Measure 8) that meet the study objectives without violating any planning constraints. This alternative assumes USACE would partner with one or more NFSs—state, county, or other non-Federal entities, such as Sonoma County Water Agency—using Federal funding to expand and support existing programs (Section 2.4), or establish new ones, resulting in increased effectiveness in the AIS prevention and control programs to decrease the vulnerability of a dreissenid or other AIS infestation. In coordination with their regional partners, the NFSs would use the data gathered during the inspection season to develop a strategy and adjust the program to provide a more effective regional defense. The NFSs would implement existing quality assurance and quality control (QA/QC) protocols in their AIS programs and revise or adapt QA/QC protocols towards improved AIS prevention and control efficacy during periods of strategy development. An example is partnering with local interest groups or universities to evaluate accuracy in following inspection station protocols.

Table 5. Measures included in Alternative 2

Measures	Cost Share 50% Federal / 50% Non-Federal
Measure 1 – Federal Participation in Selection of Watercraft Inspection Station Locations	X
Measure 2 – Increase Watercraft Inspection Stations	X
Measure 3 – Extend Daylight Inspection Hours	X
Measure 4 – Increase Nighttime Inspections	X
Measure 5 – Construct Site Improvements	X
Measure 6 – Add Canine Detection	X
Measure 7 – Increase Public Awareness and Education	X
Measure 9 – Monitor to Identify Water Chemistry	X
Measure 10– Monitor for Early Detection	X
Measure 11 – Regional WID Data Sharing System	X
Measure 12 – Develop and Implement Real-time Tracking of Watercraft Transportation	X

Measure 13 – Evaluate Traffic Patterns for Recreational Boating	X
Measure 14 – Contingency Planning	X
Measure 15 – Rapid Response Planning	X

Under the future program, each of the measures identified in Table 5 would be adjusted annually by the potential NFSs based on the need to increase program effectiveness, their ability to fund their portion of the program, the results of the regional coordination effort, and the availability of Federal funding. Over time, the locations of stations and the nature and timing of their operations may change considerably as potential NFSs continues to refine and optimize the program's overall effectiveness.

3.6.3 Alternatives Considered but Eliminated

USACE briefly considered, but ultimately screened out an alternative (Alternative 3) that was similar to Alternative 2, but with a smaller scale and fewer measures. Alternative 3 did not include Measure 4 (increasing nighttime inspections) or Measure 6 (adding canine detection). As mentioned elsewhere in this report, nighttime inspections are more expensive due to the need to secure law enforcement personnel. Canine detection also requires specially trained personnel, and while having a long history of use in drug interdiction efforts, is a relatively new tool for enhancing the effectiveness of watercraft inspection stations. Alternative 3 was originally considered because of the increased cost associated with these measures. However, Alternative 3 failed to address the significant and documented concern that a high number watercraft could be transported within the basin at night, a concern that these two measures directly addressed: the first by having inspection stations open at night, and the second by making these stations more effective, due to the canine ability to detect the presence of mussels without the need for light. USACE determined that Alternative 3 would not effectively address a significant percentage of the watercraft that could potentially be transferring AIS into or within the RRB, and therefore it was eliminated from further consideration and evaluation.

SECTION 4 - ECONOMIC AND ECOSYSTEM CONSIDERATIONS

The RRB is one of the last areas in the United States that has not been infested by dreissenids. There is regional, statewide, and local effort to reduce the potential damage and economic impacts to water resource-related infrastructure and ecological resources that would result from dreissenids becoming established in California, as well as the basin. The expansion of dreissenid populations from infested regions to other parts of the United States, and the human-assisted pathways and movement that exist between infested water bodies and the RRB present a risk of an infestation in the RRB. Based on that risk, this report assumes that an infestation would occur at some point in the future and that the risk reduction efforts described in the previous sections would lower the overall risks, thus delaying future infestations. It further assumes that investments in watercraft inspection stations, decontamination stations, and monitoring would be re-evaluated and adjusted at both the Federal, state and local levels if a major infestation occurs.

Unless stated otherwise, values in the economic analysis are presented at fiscal year (FY) 2024 price level. Annualized computations use the FY 2024 Federal discount rate of 2.75 percent over a 50-year period of analysis with base year 2024.

This section evaluates the costs and benefits of the proposed action to address the economic elements of the Federal Objective. As stated in the Economic and Environmental Principles for Water and Related Land Resources Implementation Studies (U.S. Water Resources Council 1983), the Federal Objective is “to contribute to national economic development while protecting the nation’s environment.” For there to be Federal interest, the benefits must exceed the costs.

4.1 ECONOMIC CONSIDERATIONS

4.1.1 Infestation Impacts

This section does not attempt to provide the total economic costs of a dreissenid infestation in the RRB; such an effort would significantly exceed the scope of this report. Instead, this report focuses on describing the potential impacts to the water resource-related infrastructure and activities (Federal and non-Federal) within the RRB that are most likely to be affected by a dreissenid infestation, including infrastructure related to USACE-authorized purposes.

The associated impact estimates are based on historic available data from as early as 1995 (updated to FY 2024 price levels using the indices of Engineer Manual 1110-2-1304, dated September 30, 2023) and reflect additional operation and maintenance (O&M) costs. Additional O&M costs are defined as the increased annual cost incurred to maintain current levels of performance in an infested watershed. These costs include accelerated cleaning schedules involving clearing any potential fouled piping, anti-fouling chemical applications, and other routine maintenance schedules impacted by the invasive species.

Cost estimates were derived from several academic studies, as well as USACE reports, such as the Columbia River Basin watercraft inspection report, which presents results of evaluations related to Federal participation in watercraft inspection station programs in Oregon, Washington, Idaho, Nevada, Wyoming, and Montana (USACE 2022). Many other government and non-government sources were used to find cost data for the infrastructure in the RRB.

Hydropower Facilities

According to the Western Regional Panel on Aquatic Invasive Species (WRP 2010), “U.S. Congressional researchers have estimated that dreissenid mussel infestations in the Great Lakes area has cost the power industry \$3.1 billion between 1993-1999, with an economic impact to industries, businesses and communities of more than \$5 billion.” The major hydropower components at risk of being fouled or damaged by a dreissenid infestation include raw water systems, instrumentation, and flap gates. The raw water systems are used to provide water for cooling and fire suppression purposes and could become clogged, resulting in a complete powerhouse shutdown.

Flood control infrastructure, such as emergency spillway gates, stoplogs, and flap gates are susceptible to an infestation and may be difficult to inspect. If this infrastructure is fouled and rendered inoperable, high river stage flood waters could enter protected areas, disrupting hydropower facility pools’ supply of water to the local area for municipal use, fish hatcheries, and irrigation.

Cost estimates developed by a Reclamation-commissioned study indicate that an expected increase in recurring maintenance costs could be as high as \$505,000 per facility, and an increase in annual costs for additional O&M implementation could be as high as \$118,000 dollars per facility per year (Rumzie 2021). These costs represent recurring fees expected for labor and capital requirements involved in anti-fouling paint applications and parts replacement for all susceptible systems. Additionally, maintenance schedules for pipe and in-take cleaning are likely to be increased due to threat of fouling.

There are two non-Federal facilities that can produce hydroelectric power in the RRB: The City of Ukiah and Sonoma County Water Agency. Using the Reclamation-commissioned study cost estimates, the total additional O&M costs could be as high as approximately \$237,000 per year for all facilities, provided that non-Federal facilities implement the same measures and operational changes.

Hydropower outages are likely to occur if intake fouling occurs at a high rate. The costs associated with outages could create issues for both consumers and producers in the power market. These costs are a function of the magnitude of infestation, the cost of response measures, and the extent of impact vulnerabilities. Although dams like the Hoover, Davis, and Parker Dam are attempting to treat their infestation issues to avoid power outages, the RRB has several unique threatened and endangered species that may require response measures different from those in other watersheds. At this time, no cost estimates have been developed for response measures specific to the RRB.

Irrigation and Agriculture

There is substantial wine and other agricultural production in the study area; the amount of annual business revenue related to wine and agriculture production accounts for approximately \$743 million in economic impacts (LAFCo of Mendocino County, Russian River Flood Control District 2015). Water drawn from Lake Mendocino covers approximately 120,614 acres of agriculture. Total water demand for this agriculture is approximately 25,669 acre-feet per year (Lewis et al. 2008). Nelson (2019) uses quagga mussel mitigation rate data from Coachella Valley Water District, approximately \$2.94 per acre-foot (the lower bound) and \$6.07 per acre-foot (the upper bound), to identify total costs of an infestation on irrigation infrastructure such as pumps, pipelines, sprinklers, etc. (Nelson 2019). For Lake Mendocino, total economic costs are approximated to be \$4.50 per acre-foot, resulting in a total estimated irrigation and agriculture additional O&M expense of \$116,000 per year.

Boats and Associated Infrastructure

The possible invasion of dreissenids into Lakes Mendocino and Sonoma could result in negative consequences for recreational boaters. The County of Mendocino reports that “quagga and zebra mussels can reproduce quickly, clog pipes and ruin boat motors . . . and colonize on hulls, engines, and steering components of boats” (County of Mendocino 2022).

According to the recent information from the State of California Department of Motor Vehicles, there were approximately 3,788 total boats registered in the County of Mendocino and 13,737 total boats registered in the County of Sonoma in 2018. A 1991 research study that surveyed 109 boat owners in Lake Erie reported four categories of expenditures explicitly caused by zebra mussels: protective paints (\$94), additional maintenance (\$171), increase in insurance costs (\$207), and direct damages (\$50) (Vilaplana and Hushak 1994). In total, per boat expenditures are assumed to be approximately \$550 in 2024 price levels (Mann et al. 2010). Assuming all 17,525 boats registered in Sonoma and Mendocino Counties are impacted, boaters in the RRB may need to expend up to \$9.68 million per year in the event of a full infestation.

A research study undertaken by the New York Sea Grant and the National Zebra Mussel Information Clearinghouse in 1995 studied 436 infrastructure operators throughout 36 states between 1989-1994 and found that two infested marinas expended approximately \$7,500 total on mussel-related cleanup (O'Neill 1997). In total, the RRB has one marina and four boat ramps. It is expected that the RRB would face costs of up to approximately \$750 per boating facility (in 1995 price level), or \$1,500 (in 2024 price level) in the event of an infestation (Mann et al. 2010). Total expenditures for the RRB in terms of boating ramps and marinas would thus be \$7,500 per year.

Fish Hatchery Facilities

Fish hatcheries are at risk for incurring dreissenid-related costs. One of the biggest impacts to hatcheries would be the clogging of surface water supply systems. The

results from the 1995 National Zebra Mussel Information Clearinghouse study suggest that total expenditures for infested fish hatcheries could be up to \$5,860 per facility per year (in 1995 price level) or \$12,000 per year (in 2024 price level) (Mann et al. 2010). There are three fish hatcheries in the RRB basin; based on these numbers, additional O&M costs could total approximately \$35,000 per year for a full infestation, provided the same O&M measures are implemented at non-Federal hatcheries at similar costs.

Water Supply and Treatment Facilities

In 2004, Connelly et al. administered a follow up survey to the New York Sea Grant and the National Zebra Mussel Information Clearinghouse Study (O'Neill 1997). They found that expenditures are correlated with facility capacity in terms of millions of gallons per day (mgd) (Table 6).

Table 6. Total Average Yearly Variable Costs As a Function of Millions of Gallons per Day

	<1 mgd	2-10 mgd	≥11 mgd
Total Average Yearly Variable Costs	\$4,577	\$3,690	\$17,808

Total Average Yearly Variable costs include lost production and revenues, chemical treatment, filtration or other mechanical exclusion, monitoring and inspection, mechanical removal, nonchemical treatment, research and development, personnel training, customer education, and other related expenses. The costs in the table reflect 2009 price levels. Based on these estimates, and the fact that Mendocino City Community Services District Wastewater Treatment Plant treats approximately 0.3 million gallons of water a day, the O&M costs resulting from a dreissenid infestation would be approximately \$6,400 per year (in 2024 price levels).

Recreation, Tourism, and Waterfront Property Values

While many of the impacts on the resources in the RRB can be captured quantitatively, an infestation can cause numerous other impacts that cannot be easily shown in dollars. Where dreissenids have infested waterways, they have had serious impacts on freshwater beaches that include beach goers experiencing severe cuts on their feet and the stench caused by massive dreissenid die-offs covering the shoreline. In addition, watercraft inspection lines for boats departing infested waters can be extremely long, particularly on busy holiday weekends. Long wait times to depart an infested water may discourage many boaters from visiting that waterbody, impacting both recreational opportunities and local economies.

Mussels often compete with native species for food and minerals and can bioaccumulate organic pollutants in their tissues, which can bio-magnify up the food chain when consumed by predators such as fish and crayfish (Hoddle 2022). Consequently, anglers can see a decrease in the number and size of fish they catch in dreissenid-infested waters and may choose not to travel to the contaminated watershed.

This would have a significant impact on the waterways of the basin, which generate tourism and recreation revenue; a USACE study on the potential economic impact to the Lake Tahoe Region caused by quagga or zebra mussels found that the combined economic impacts to recreation tourism and recreational and property values, as well as increased boat/pier maintenance is estimated at \$417.5 million over a 50-year period with an annualized value of \$2.4 million per year (USACE, SPK 2009).

4.1.2 Federal Interest

To meet the economic criteria for the Federal objective, the economic benefits of a proposed action must exceed the economic costs. A Federal interest is determined to exist when those benefits exceed the costs. The ratio of the benefits to the costs is referred to as a benefit-cost ratio (BCR). This analysis included a comparison of the relative cost of the O&M measures to the cost of the risk reduction measures. In other words, benefits are derived by computing the O&M costs in the event of a total infestation and costs are derived through the application of actions such as establishing watercraft inspection stations to reduce the risk of the spread of dreissenids into the RRB.

4.1.2.1 Benefits

Table 7 highlights the costs per facility for operation and maintenance performed that were discussed in the previous sections. Non-Federal impacts have the capacity to far exceed the Federal impacts. Non-Federal cost drivers are boats and boating facilities, non-Federal hydropower, and private boat maintenance.

Table 7. Average Annual Operation and Maintenance Costs of a Total Infestation (FY24 Price Level)

Infrastructure	Units	O&M Cost per Unit	Total Yearly O&M Cost
Hydropower Facilities	2	\$118,259	\$236,518
Agriculture and Irrigation	25,669 acre-feet	\$4.50	\$115,596
Boats	17,525	\$552	\$9,677,766
Marinas	1	\$1,482	\$1,482
Boat Ramps	4	\$1,482	\$5,930
Fish Hatchery Facilities	3	\$11,615	\$34,844
Water Supply and Treatment Facilities	1	\$6,430	\$6,430
Total RRB Yearly O&M (Benefits)			\$10,078,567

4.1.2.2 Risk Reduction Costs – Watercraft Inspection Stations

Table 8 shows the costs associated with watercraft inspection station operations and water body monitoring based on current spending at Lake Mendocino and Lake Sonoma. For 2024 inspection stations will not require construction, therefore construction cost expenditures were not included. The total expected annual cost for inspection and monitoring activities is approximately \$632,000.

Table 8. Total Average Yearly Costs of Watercraft Inspection Stations and Monitoring at Lakes Mendocino and Sonoma (FY24 Price Level)

Activity Type	Average Periodic Cost	Total Average Yearly Cost*
Inspections	\$1,161/day with canine, and \$591/day for two-person inspection team	\$614,523
Monitoring	\$528/month colder months, and \$897/month warmer months	\$16,989
-	-	\$631,513

4.1.2.3 Benefit-Cost Ratio

For the purposes of developing a benefit-cost ratio, it was assumed that the purpose of watercraft inspection stations is to defer impact costs through risk reduction measures. Research suggests that the time between detection and maximum invasive species density, or total infestation, varies between 3 to 12 years, depending on the characteristics of the body of water, and has an intrinsic growth rate, or the theoretical maximum rate of increase of a population per individual, of 3.39, or 30-fold annually. It is estimated that infestation of the RRB would occur in seven years (the mean of the observed estimate). It was also noted that smaller lakes may experience higher growth rates since veligers can settle closer together resulting in greater adult population density during the next mussel generation. Culminating in a scenario where over several generations, the mussel population size in a small lake could increase faster and obtain carrying capacity sooner than in a larger lake (Jones and Montz 2020).

Total net benefits for the 7-year protection of \$65.1 million were calculated by summing the present values of the 7-year onset, \$217 million, which is then subtracted from the present value sum of the no-protection option, (i.e., no infestation total benefits). The no infestation delay total benefits is \$282 million. It was assumed under the no infestation delay option the onset would start in year zero, which is what would occur in the absence of any watercraft inspection program in the RRB. Similar total net benefits computations were repeated for a 3-year, 12-year, and 50-year level of protection options, to show a full range of potential protection scenarios.

The average annual net benefits per delay scenario are calculated as the difference between the no infestation scenario average annual total benefits and the individual infestation delay scenario average annual benefits. Where the total yearly benefits per

delay scenario are computed by summing the present values per delay scenario and multiplying the resulting summed figure by a capital recovery rate of 0.03704.

Assuming total infestation would occur in year 7, which is a conservative estimate, total infestation costs could be as high as \$10.1 million in the RRB. The average annual net benefits and BCR are \$2.41 million and 3.8 respectively – calculated at a FY 2024 price level and Federal discount rate of 2.75 percent over a 50-year period of analysis (Table 9).

Table 9. Benefit-Cost Ratio (FY24 Price Level and Federal Discount Rate)

	No Infestation Delay	3-Year Infestation Delay	7-Year Infestation Delay	12-Year Infestation Delay	50-Year Infestation Delay
Total Benefits	\$282,171,351	\$252,737,659	\$217,039,955	\$177,534,972	\$0
Average Annual Total Benefits	\$10,451,886	\$9,361,635	\$8,039,360	\$6,576,059	\$0
Total Net Benefits	\$0	\$29,433,692	\$65,131,396	\$104,636,380	\$282,171,351
Average Annual Net Benefits	\$0	\$1,090,251	\$2,412,527	\$3,875,828	\$10,451,886
Benefit-Cost Ratio	-	1.7	3.8	6.1	16.6

Rapid response/control plans are low-cost tools for organizing state and Federal agencies to contain invasive species when they are initially detected in a water body. Rapid response training exercises are relatively brief activities that involve multiple agencies evaluating the effectiveness for implementing invasive species containment measures. The avoidance costs for successful rapid response/control plans haven't been documented for use in calculating benefit-cost ratios.

If an infestation in the RRB runs the same course as the infestation in the Great Lakes region, firms and agencies would likely have to spend far more money than they currently are spending on routine operations. This would likely impact public and private budgets by increasing power, recreation, and water supply costs for individual taxpayers. The net benefits derived in this model are a total of the savings produced by avoiding or deferring those costs over the 50-year period.

4.2 ECOSYSTEM CONSIDERATIONS

If dreissenids become established in the RRB, many changes to the aquatic environment would occur. As the density of dreissenids increases, water clarity would increase due to plankton being consumed. This would decrease the food supply for young and small fish. As water clarity increases, light penetration would also increase, which would lead to aquatic plants being able to take root in deeper water. The area of rooted aquatic plants would increase which would provide additional habitat for fish that might prey on native fish. The bottom substrate would become covered with live and

dead mussels. Shorelines would be lined with sharp shells. Dreissenids would also attach to native mussels, competing with them for food and eventually killing them.

Millions of dollars each year have been invested since the early-1990s to protect and recover native ESA-listed fishes and their habitat in the RRB. An infestation of dreissenids would not only change the ecosystem but could cause physical injury as fish migrate. Recreational fisheries could also be affected. Modified water quality could lead to habitat changes, which affect fish populations and composition. Native fish populations could also be negatively affected.

It may not be possible to avoid an infestation and associated impacts forever, but even delaying the establishment of dreissenids would allow additional time for preparation. There could be additional education to reach a wider audience of the potential effects of transporting invasive species.

4.3 CONCLUSION

As described in Section 4.1, a conservative estimated annual cost avoided by delaying an infestation by one year exceeds the estimated annual costs associated with the watercraft inspection station program, thus demonstrating an economic benefit. Alternative 2 helps to address the vulnerability issues indicated in this section. The risk reduction efforts would also protect the environment by delaying potential impacts described in Section 4.2 (effects of the prevention efforts on the environment is provided in Section 6).

As previously described in Section 4.2 and later in Section 6, Alternative 2 would also generate significant ecosystem quality benefits that have not been quantified. These benefits are considered in USACE decision-making process.

Consistent with the USACE planning process, alternatives must be formulated with consideration of the four criteria—completeness, effectiveness, efficiency, and acceptability—defined in the Principle and Guidelines Report (U.S. Water Resources Council 1983). These criteria are described below in relation to this LR/PEA:

- **Completeness.** Alternative 2, Comprehensive Adaptive Improvements, is the most complete solution available to reduce the risk of a dreissenid infestation. The methodologies presented in Alternative 2 address all planning objectives, without violating any planning constraints, creating powerful preventive actions, including monitoring, educational opportunities, planning for contingencies, and preparing for quick response to potential infestations. While this alternative cannot completely eliminate the possibility of a dreissenid infestation, it is the most comprehensive solution available.
- **Effectiveness.** Alternative 2, Comprehensive Adaptive Improvements, includes a combination of different actions to prevent the spread of dreissenids, while allowing watercraft to be transported between infested and uninfested areas of the country. In addition, the alternative promotes collaboration within the State and Northern California Bay Area Region to continue developing methods to

reduce the risk of AIS infestations. This alternative is not 100 percent effective, but it is a broad solution that will do much to prevent a dreissenid infestation.

- **Efficiency.** Based on the current level of knowledge, if dreissenids infest USACE-managed reservoirs within the RRB, it is likely they would become permanently established. For every year an infestation can be deferred through the actions that comprise Alternative 2, Comprehensive Adaptive Improvements, significant costs associated with an infestation can be avoided. The costs of improvements detailed in Alternative 2 would be a small fraction of the costs associated with O&M costs resulting from an infestation.
- **Acceptability.** Alternative 2, Comprehensive Adaptive Improvements, is acceptable to all entities per applicable laws, regulations, and public policies. The collaborative effort in the region allows for effective communication about relative laws and regulations, and how to best intercept, and prevent potential infestations, educate the public, and lead to continuous improvements in the early detection of dreissenids and other AIS within the RRB. While the solution is not all-encompassing, it is accepted as the most complete and effective solution available.

4.3.1 Proposed Action Alternative

Using this guidance, each alternative was evaluated to determine if it met the four criteria described above. Using these criteria, it was determined that only Alternative 2 meets the study objectives and will contribute to an effective and efficient plan to defer dreissenid and other AIS infestations and the associated negative impacts to the environment and infrastructure in the RRB. There are no significant technical or engineering challenges associated with any of the measures. Compared to Alternative 1 (the No Action Alternative), Alternative 2 reduces the risk of dreissenid and other AIS infestations by delaying the rate of development through the proposed measures such as Federal participation in the selection of watercraft inspection station locations, increasing the number of watercraft inspection stations, extending daylight inspection hours, and more (see Table 5 for full list of measures). If successful, risk would be reduced by staving off an infestation for at least 25 years from the project's inception. From there an infestation would develop gradually and thus incurring costs at Year 26 from project inception as opposed to Year 1 with No Action Alternative. Based on strong Federal interest and environmental acceptability, Alternative 2, is the Proposed Action Alternative to be considered further during the environmental consequences and compliance analysis.

SECTION 5 - EXISTING CONDITIONS

This section provides general information about the environmental conditions within the approximately 1,485 square miles of the RRB in Mendocino and Sonoma counties, in California. The background environmental information provided is limited due to a general lack of impacts associated with existing inspection stations, monitoring, and rapid response planning and preparation in other areas of the country where these programs are currently very active (USACE 2022). Seven environmental components/resources were identified as not affected or relevant to this project: air quality, environmental justice, geology, vegetation, soils, noise, and transportation.

Eight environmental components/resources were identified as being relevant to this project: fish and aquatic resources; water quality; wildlife and terrestrial resources; aesthetics and visual resources; recreation; cultural and historic resources; climate change, and Environmental Justice.

5.1 FISH AND AQUATIC RESOURCES

The RRB study area contains habitat for many species of native and non-native aquatic organisms. The most notable fish are sport fish and endangered and threatened species which occur in the basin. The mainstem and tributaries of the RRB comprise important habitat for ESA-listed coho salmon (*Oncorhynchus kisutch*), steelhead (*O. mykiss*), and Chinook salmon (*O. tshawytscha*) along with other native species such as Sacramento pikeminnow (*Ptychocheilus grandis*) and tule perch (*Hysterocarpus traskii*), and non-native species such as largemouth bass (*Micropterus salmoides*) in California (Moyle et al. 2002). Several of these species migrate upstream to spawn with their offspring dispersing downstream after hatching.

Coyote Valley Dam, which created Lake Mendocino, was constructed in 1958 and prevents migrating fish from accessing habitat upstream in the East Fork Russian River. Similarly, Warm Springs Dam created Lake Sonoma when it was constructed in 1983; it blocks access to upstream habitat in Dry Creek, a tributary to the Russian River. Two fish hatchery facilities, the Don Clausen Fish Hatchery (also known as Warm Springs Hatchery) located at Warm Springs Dam and the Coyote Valley Fish Facility at Coyote Valley Dam were constructed to mitigate for the loss of fish habitat and fish production associated with the dams. Coho salmon are raised in a captive broodstock program at Don Clausen Fish Hatchery. Steelhead also are raised at both Don Clausen Fish Hatchery and Coyote Valley Fish Facility. Juveniles and smolts are released at various locations in the RRB.

USACE and Sonoma County Water Agency have restored over a mile of fish habitat in Dry Creek downstream of Warm Springs Dam as a requirement of NMFS's 2008 biological opinion assessing the effects of water supply, flood control operations, and channel maintenance activities on ESA-listed salmon and steelhead. Fish monitoring indicates extensive use of this habitat by coho and Chinook salmon, and steelhead.

5.2 WATER QUALITY

The RRB is located in forested, sparsely populated areas of Mendocino and Sonoma Counties. Lake Mendocino provides drinking water to the cities of Ukiah, Healdsburg, Cloverdale, and Hopland. Lake Sonoma provides municipal, domestic, and industrial water supply for most of the lower Russian River and parts of Sonoma and Marin Counties (SWRCB 1986; NMFS 2008).

The Russian River is not an effluent-dominated water body (Maruya et al. 2018). However, the North Coast Regional Water Quality Control Board describes the RRB as impaired for sediment, temperature, pathogens, mercury, phosphorus, and dissolved oxygen. Notably, the State Water Resources Control Board periodically issues warnings to swimmers, boaters, and other recreational water users about toxic blue-green algal blooms in the Russian River.

Lake Mendocino and Lake Sonoma have changed the water quality characteristics of the Russian River. Lake Mendocino in particular has contributed to increased turbidity to the extent that threatened and endangered salmon and steelhead may be adversely affected and may contribute to bluegreen algal blooms (USACE 2022). Regulated water releases from Coyote Valley Dam and Warm Springs Dam also tend to dampen high winter storm flows, whereas summer flows tend to be higher, and temperatures tend to be lower compared to historical conditions.

5.3 WILDLIFE AND TERRESTRIAL RESOURCES

Vegetation communities and wildlife habitats in the Russian River Basin include a mosaic of herbaceous-, shrub-, and tree-dominated types, as well as aquatic and developed types. Broad vegetative community categories within the watershed include scrubs and chaparrals, oak savannas and woodlands, coniferous forests and woodlands, grasslands, vineyards, and riparian communities. The endangered Burke's goldfields (*Lasthenia burkei*) plant is known to occur at Lake Mendocino, especially in the area below the dam. Other endangered plant species with the potential to be at Lake Mendocino are Contra Costa goldfields (*Lasthenia conjugens*) and Indian clover (*Trifolium amoenum*).

Wildlife present throughout the basin include both large and small mammals such as blacktailed deer (*Odocoileus hemionus columbianus*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), brush rabbit (*Sylvilagus bachmani*), and black-tailed jackrabbit (*Lepus californicus*). A wide variety of birds and reptiles also are present. There are several protected species such as ESA-listed endangered California freshwater shrimp (*Syncaris pacifica*), marbled murrelet (*Brachyramphus marmoratus*), and Northern spotted owl (*Strix occidentalis caurina*), and threatened California red-legged frog (*Rana draytonii*). The endangered Burke's goldfields (*Lasthenia burkei*) is known to occur at Lake Mendocino, especially in the area below the dam. Other endangered species with the potential to be at Lake Mendocino are Contra Costa goldfields (*Lasthenia conjugens*) and Indian clover (*Trifolium amoenum*). There is no ESA designated critical habitat in the project area.

5.4 AESTHETICS AND VISUAL RESOURCES

Aesthetics or visual resources are the natural and cultural features of the landscape that can be seen and that contribute to the public's appreciation for and enjoyment of the environment. The aesthetic quality of an area is a subjective measure of one's perception of how pleasing an area is. Lands within the RRB consists of rolling coastal hills, mountains, tributary valleys, and open oak woodland and grasslands. However, the aesthetic values of the RRB, the mountains, and surrounding landscapes vary based on the viewer's perspectives and values.

5.5 RECREATION

The RRB provides a wide variety of opportunities for outdoor recreation, which in turn provides genuine value to residents, as well as economic opportunities through tourism. Due largely to its rural nature and scenic terrain, the RRB provides many recreation areas that attract visitors to the region. A considerable industry has been established due to water- and land-based recreational opportunities. Depending on the particular location, popular activities include boating, swimming, water skiing, jet skiing, fishing, camping, hiking, walking, biking, and bird and wildlife viewing.

5.6 CULTURAL AND HISTORIC RESOURCES

Cultural resources or historic properties, as defined under Section 106 of the National Historic Preservation Act, can take on several different types of tangible and intangible forms, ranging from precontact and historic archaeological sites, architectural properties such as buildings, bridges, and infrastructure, and resources that have cultural or traditional importance to Native American Tribes, including traditional cultural properties and sacred sites.

Cultural resources and historic properties are representative of broad patterns, themes, events, and people in California's precontact and historical periods. Both pre- and post-construction archaeological studies have been completed at Warm Springs Dam and Coyote Valley Dam, from the early 19th century into the 1960s.

Although some additional cultural resource investigations were completed in 2001 and 2010, few intensive studies have been conducted since then. These past studies determined that the environment was favorable during the prehistoric period with riparian and other inland resources accessible along the Russian River and other water sources flowing through the region. Past studies indicate that Native Americans intensively occupied the region 2,000–5,000 years before the present. However, Native American presence likely predated this time span, and in some cases continues into the present.

Additionally, the research completed in the 1970s included an ethnographic study that recorded pre-contact, historic, and contemporary histories of Native American use of the Lake Sonoma area. Studies suggest that prehistoric populations increased over time in the region, with a shift from a hunter-gatherer regimen to more permanent settlements

with the development of stable and predictable subsistence procurement and food storage.

The site types identified at both Lake Sonoma and Mendocino indicate that locations attributed to Native American occupation were sought for proximity to available resources, accessibility, and protection from seasonal flooding in the area. Additionally, the prehistoric quarrying evident at both areas indicate the area may have played a role in an important trade network between the Clear Lake Basin and the coast (Basgall and Bouey 1991, Newland 2001).

Under Section 110 of the National Historic Preservation Act, USACE is required to take responsibility for historic properties by establishing a program to identify, evaluate, and nominate (if appropriate) these sites to the National Register of Historic Places (NRHP). Identification and evaluation of these properties are to be performed by individuals qualified under the Secretary of the Interior's Standards for Archaeology and Historic Preservation (36 CFR Part 61 Appendix A). To comply with Section 110, a survey of USACE fee-title lands around Warm Springs Dam and Lake Sonoma Reservoir, as well as Coyote Valley Dam and Lake Mendocino, was completed (Reddy 2011) with several new historic sites being discovered and evaluated for eligibility on the NRHP.

5.7 CLIMATE CHANGE

Indications are that average global atmospheric temperatures are trending upward over the previous several decades and are correlated to increased atmospheric carbon dioxide levels (IPCC 2022). Internal combustion engines emit carbon dioxide (CO₂) and air pollutants as one byproduct of efficient burning of fuel (gasoline or diesel). International efforts are being directed at reducing carbon release into the atmosphere.

In the RRB, changes in hydrology, stream flows, average precipitation, maximum and minimum air temperature, and forest cover are already occurring (Flint L.E. and Flint A.L. 2012). Future climate change would likely continue to influence these changes. Average annual temperature in the region has increased by 1° C and is predicted to continue to increase by 2-4° C by the end of the century (Flint L.E. and Flint A.L. 2012). Water temperature predictions show an increase of current temperatures in traditionally cooler riverine systems (Fullerton et al. 2017).

However, the response of hydrologic variables, including runoff, recharge, and streamflow, is highly sensitive to variation in precipitation. According to global climate models, changes in spatially distributed runoff and recharge in the Russian River Valley during the 21st century range from increases of approximately 250 millimeters per year (mm/yr) to decreases of 250 mm/yr, which are reflected in estimates of future basin discharge (Flint L.E. and Flint A.L. 2012).

5.8 ENVIRONMENTAL JUSTICE

The Council on Environmental Quality (CEQ) has developed a Climate Change and Economic Justice Screening tool (CEJST) (Version 1.0) to identify disadvantaged

communities. The tool identifies census tracts that are burdened in one or more categories, including climate change, energy, health, housing, pollution, transportation, water, and workforce. A community is highlighted as disadvantaged on the CEJST map if it is in a census tract that is (1) at or above the threshold for one or more environmental, climate, or other burdens, and (2) at or above the threshold for an associated socioeconomic burden. Federally Recognized Tribes, including Alaska Native Villages, are also considered disadvantaged communities.

The tool is also available as a geographic information system (GIS) dataset. This dataset was downloaded on 10 August 2023, and census tracts within the RRB were selected for analysis. According to the CEQ Climate and Economic Justice Screening Tool 18 of the 95 census tracts in the RRB are disadvantaged in at least one burden category and a corresponding socioeconomic category, and many are disadvantaged across multiple burden categories (Table 10). The most common category of burden was Climate Change, with 13 tracts identified as disadvantaged in Climate Change and Low Income. The second most commonly burdened category was Traffic. 5 tracts in the RRB were identified as disadvantaged in the Traffic category.

Table 10. Summary of Climate and Economic Justice Screening Tool Reports

Tract Number	County	Climate	Energy	Traffic	Housing	Pollution	Water	Health	Low Income	Workforce	HS Education
06097153103	Sonoma	Yes							Yes		Yes
06097154201	Sonoma	Yes							Yes	Yes	Yes
06097153104	Sonoma			Yes	Yes				Yes	Yes	Yes
06097152802	Sonoma								Yes	Yes	Yes
06097152000	Sonoma			Yes					Yes		
06097151900	Sonoma			Yes					Yes		Yes
06097151402	Sonoma	Yes		Yes					Yes		Yes
06097153102	Sonoma			Yes					Yes		Yes
06097152903	Sonoma	Yes							Yes		Yes
06045010802	Mendocino	Yes							Yes		
06045011600	Mendocino	Yes				Yes			Yes	Yes	Yes
06045011500	Mendocino	Yes							Yes	Yes	Yes
06045011300	Mendocino	Yes				Yes			Yes		Yes
06045010600	Mendocino	Yes								Yes	Yes
06045011800	Mendocino	Yes							Yes	Yes	Yes
06033000100	Mendocino	Yes								Yes	Yes
06033001000	Mendocino	Yes							Yes		Yes
06033000300	Mendocino	Yes						Yes	Yes		Yes

SECTION 6 - ENVIRONMENTAL CONSEQUENCES

While Section 4 describes the economic and ecosystem effects of a potential dreissenid infestation in the RRB, this section addresses the environmental and social consequences of the proposed Federal action. Specifically, this section discusses effects anticipated to occur over a wide range of environmental resources resulting from implementation of the proposed action, as well as related social considerations. The anticipated effects associated with the No Action Alternative are compared to those of the Proposed Action Alternative (Comprehensive Adaptive Improvements). The USACE analysis did not identify any adverse environmental effects.

Seven environmental components/resources were identified as not affected and relevant to this project: air quality, environmental justice, geology, vegetation, soil, noise, and transportation.

Eight environmental components/resources were identified as being relevant to this project: fisheries and aquatic resources; water quality; wildlife, terrestrial, threatened and endangered species; aesthetics and visual resources; recreation; cultural and historic resources; climate change; and socioeconomics.

Federal participation in the program would be dependent on the State continuing to fund the program and Congress specifically appropriating funds for the program. In 2020, expenditures by the State totaled approximately \$3.29 million in prevention efforts.

Although the State budget fluctuates annually, the initial estimated annual cost to the Federal government to fully participate in the program would be the same. The commitment of resources may increase or decrease based on risk. It could even be eliminated if an infestation becomes permanently established within the RRB.

As a result of coordination with the State, the process of selecting locations for watercraft inspection stations (see Section 2.2) accounted for existing land uses.

USACE considered but did not identify any potential significant effects to threatened and endangered species, noise pollution, vegetation, air quality, or hazardous/toxic materials. Thus, those resource areas are not detailed below. However, a biological evaluation may be necessary should rapid response implementation measures be required in the future (See Appendix).

The proposed action is intended to reduce the risk of invasive species infestations and, as a result, avoid or delay the adverse economic, environmental, and social consequences of such infestations.

6.1 ALTERNATIVES

6.1.1 Description of the No Action Alternative (No Change to Current Practice)

The existing conditions are described in Section 5. The No Action Alternative represents a continuation of the current practice, in which USACE would not support establishing

additional watercraft inspection stations, establishing decontamination stations, nor coordinating or developing a rapid response plan to respond to a possible infestation in the RRB USACE water-related waters and infrastructure therein. Section 2.4 provides information pertaining to existing watercraft inspection stations and their operation.

6.1.2 Description of the Proposed Action Alternative

The Proposed Action Alternative includes USACE's continued collaboration with Sonoma County Water Agency and potentially other NFSs. Such collaboration would support existing watercraft inspection stations and establish new stations, including decontamination stations, and continue monitoring efforts and rapid response planning/control plan coordination and strategy development to address a potential infestation at Lake Mendocino and Lake Sonoma. Monitoring reservoirs in the RRB for the early detection of dreissenid veligers would continue, and protocols would be updated as necessary and/or if there are new, effective technologies available. Additional inspection and decontamination stations could be identified in the future within the RRB and outside of USACE-managed lands and reservoirs.

USACE would partner with the potential NFSs to establish watercraft inspection stations very similar to the existing watercraft inspection station program in terms of configuration and operations. Potential NFSs would also coordinate and direct the operation of inspection stations within its boundaries that fall outside the watershed boundary of the RRB with the intent to best protect RRB waters from cross-basin transfer of dreissenids on, for example, trailered watercraft. Individual site-specific environmental assessments, to include ESA compliance documentation and an NHPA Section 106 review, tiered from this LR/Programmatic EA, would be required to analyze each of the following types of actions prior to cost-share reimbursement: (1) watercraft inspection and decontamination stations proposed for a Federal cost share program outside of the RRB, (2) implementation of rapid response plans, and (3) actions with any ground-disturbing activities.

6.2 FISHERIES AND AQUATIC RESOURCES

6.2.1 No Action Alternative (No Change to Current Practice)

AIS are a direct threat to native aquatic resources. A dreissenid infestation would adversely impact fisheries and aquatic resources within the RRB, including impacting species under the ESA. The quality of food and shelter for fish and aquatic resources would be altered, changing the types and abundance of species able to survive. Spawning and rearing habitat, including critical habitat, for some ESA-listed species would also be negatively impacted downstream of Warm Springs and Coyote Valley dams. Physical injury to fish could occur from abrasion, especially at fish passage facilities.

If the No Action Alternative was implemented, the risk of an AIS infestation affecting fisheries and other aquatic resources would increase. Sonoma County Water Agency would continue with their program; however, a lack of funding may limit how much it can

do. Taking no action would increase environmental effects to aquatic resources, as the risk of an AIS infestation would escalate. The No Action Alternative would limit the benefits to fisheries and other aquatic resources.

6.2.2 Proposed Action Alternative

Similar to the existing program, watercraft inspection stations would be established in paved, gravel, or compacted areas. Any runoff from cleaning a vessel would be contained. It would either be collected, percolate directly into the ground, evaporate, or go into a retention basin where it would evaporate or percolate into the ground. No new ground disturbance would occur to establish additional watercraft inspection stations or decontamination stations without further environmental review.

Monitoring reservoirs for the early detection of dreissenid veligers would have no effect on fisheries or aquatic resources. Early detection monitoring includes seasonal veliger sampling, plankton tows, and solid substrate inspections and monitoring. These activities would occur episodically and involve no or only minor, temporary (during the few hours at a monitoring site) disturbance to the aquatic environment. No ESA-listed species occur in either Lake Mendocino or Lake Sonoma, but hatchery operations for listed species draw water from both lakes.

On occasion, watercraft owners may request a decontamination at their home if they have been at infested water bodies. In such instances, trained staff would evaluate the location, including where any runoff could go. If there is any chance of discharging to an uninfested water body, the watercraft would be hauled to an area where no water or debris from the wash/decontamination would be discharged to a water body.

A coordinated rapid response/control plan strategy would be developed in collaboration with Federal and state wildlife, fisheries and water agencies and local contacts (see Section 3.6.3 Comprehensive Adaptive Improvements). A dreissenid infestation would be extremely undesirable; therefore, measures to prevent and a response to eliminate an infestation would be positive for the RRB, hatchery operations, and fisheries habitat downstream of the lakes.

Contingency planning and rapid response preparation and planning would not have significant adverse effects to fisheries or aquatic resources. Most planning activities are administrative in nature and would not have direct effects to the environment. Purchased equipment would be stored in existing facilities. Rapid response training exercises could have minimal, short-term effects to water bodies if training included in-water activities such as deployment of silt barriers or isolation bladders. These effects could include brief periods of localized turbidity. Training locations would be chosen to minimize adverse effects to aquatic ecosystems and to avoid ESA-listed species.

The proposed action would not negatively affect fisheries or other aquatic resources in the RRB. There would be no additional cumulative effects on this resource. The proposed action would positively affect fisheries and other aquatic resources due to the

reduced risk of infestation provided by the additional funding allocated to support the program.

6.3 WATER QUALITY

6.3.1 No Action Alternative (No Change to Current Practice)

The No Action Alternative would adversely impact water quality within the RRB. The adult mussels would filter huge quantities of water as they feed. While dreissenids can improve the appearance of a water body by increasing clarity, they actually degrade water quality in the lakes and rivers they infest. Their high density and rapid metabolism consume available oxygen and loads the water with nutrients (Strayer et al. 1999). Some eastern rivers have been categorized as impaired due to low dissolved oxygen levels or excess phosphates following infestation by dreissenids (MacIsaac 1996). Water clarity increases can have negative effects on the ecosystem, by alternating food chains and increasing predation. In addition to the negative effects to aquatic resources, rooted aquatic plants would persist into deeper water than normal.

If the No Action Alternative was implemented, the risk of an AIS infestation affecting water quality would increase. Sonoma County Water Agency would continue with their programs; however, a lack of funding may limit how much it can do. Taking no action would increase environmental effects to water quality, as the risk of an AIS infestation would escalate. The No Action Alternative would limit any benefits to water quality.

6.3.2 Proposed Action Alternative

The potential effects on water quality when establishing and operating watercraft inspection stations, would be the same as discussed in the fisheries/aquatic resources section. The watercraft inspections stations, monitoring, and planning would not negatively affect water quality in the RRB directly in either the short term or long term. Because no fill material would be placed in wetlands, or other WOTUS, a Clean Water Act Section 404(b)(1) Evaluation is not required, and therefore, no Least Environmentally Damaging Practicable Alternative needs to be identified. There would be no additional cumulative effect on this resource. The indirect effects would be positive due to the reduced risk of infestation and spread of AIS provided by the Federal cost-share program.

6.4 WILDLIFE AND TERRESTRIAL RESOURCES

6.4.1 No Action Alternative (No Change to Current Practice)

The No Action Alternative would adversely impact wildlife and terrestrial resources within the RRB. Terrestrial animals, which depend on aquatic organisms as a food source, could be impacted if the type and abundance of fish and aquatic invertebrate species were altered by the establishment of dreissenids in the watershed. Ducks that consume mussels could be poisoned (Petrie et al. 2005).

If the No Action Alternative was implemented, the risk of an AIS infestation affecting wildlife, terrestrial, and threatened and endangered species would increase. Sonoma County Water Agency would continue with their programs; however, a lack of funding may limit how much it can do. Taking no action would increase environmental effects to wildlife, terrestrial, and threatened and endangered species, as the risk of an AIS infestation would escalate. The No Action Alternative would limit any benefits to wildlife, terrestrial, and threatened and endangered species.

6.4.2 Proposed Action Alternative

Under the Proposed Action, some wildlife could be present near an inspection station occasionally. However, most inspection sites are established in areas that have constant human presence, and wildlife would not be present. Some forbs or grasses could be trampled if shelters, equipment, or work vehicles are parked in vegetated areas alongside the watercraft inspection site.

The proposed action incorporates the following stipulations, which while designed to eliminate any impacts to ESA-listed and other protected species, would also be generally protective of all terrestrial wildlife:

1. No new ground disturbance would occur to establish watercraft inspection stations without performing a survey of the area for ESA-listed wildlife species or protected migratory bird nests if they might be present in the area. If surveys indicate the presence of listed species or active nests, then a minimum buffer distance of 250-feet will be observed. No runoff associated with ground disturbing activities will enter any waterbody.
2. Water or debris from a hot wash or other decontamination would be prevented from entering any water body.
3. Wash water would not be allowed to flow over land covered by any type of vegetation without performing a survey of the area for ESA-listed plants in specific areas.
4. Any runoff from washing/decontaminating a vessel would either evaporate, percolate directly into the ground, be collected in a retention basin with no possibility of reaching water bodies or wetlands or be captured and transferred to a location away from any water body.
5. There could be instances where a wash/decontamination would be performed at a watercraft owner's residence. In such instances, trained staff would evaluate the location, including where any runoff could go. If there is any chance of discharging to an uninfested water body, the watercraft would be hauled to an area where no water or debris from the wash/decontamination would be discharged into a water body.
6. There would be no wetland disturbances or other negative effects to wetlands.

7. Watercraft inspection station sites would be assessed/surveyed to determine presence/absence of suitable habitat/location of ground-nesting or shrub-nesting birds. No trees, shrubs, or other bird habitat is proposed to be cut or damaged by the establishment of watercraft inspection stations.
8. Watercraft inspection stations would be located a minimum of 250-feet away from known roosting trees or culverts for threatened or endangered species. Monitoring activities in reservoirs for the early detection of dreissenid veligers would be conducted in a manner that would have no effect on ESA-listed wildlife/terrestrial resources.
9. Training activities would not be conducted on water bodies where species protected by the ESA may be present.

By following the above stipulations to avoid impacts to wildlife and terrestrial resources there would be no direct or indirect, short-term or long-term, or cumulative effects caused by implementation of the proposed action. In the absence of adverse impacts on terrestrial resources overall, the proposed action would be expected to be positive due to the reduced risk of infestation provided by the additional funding allocated to support the program.

6.5 AESTHETICS AND VISUAL RESOURCES

6.5.1 No Action Alternative (No Change to Current Practice)

The No Action Alternative would have notable adverse effects to aesthetics and visual resources. If a dreissenid infestation were to occur there would be negative impacts on this resource. Small mussels would attach to virtually all hard surfaces, including rocks and man-made structures such as water intake pipes, boats, and others, and the shoreline would eventually be lined with dead mussel shells.

If the No Action Alternative was implemented, the risk of an AIS infestation affecting aesthetics and visual resources would increase. Sonoma County Water Agency would continue with their programs; however, a lack of funding may limit how much it can do. Taking no action would increase environmental effects to aesthetics and visual resources, as the risk of an AIS infestation would escalate. The No Action Alternative would limit any benefits to aesthetics and visual resources.

6.5.2 Proposed Action Alternative

Implementation of the proposed action would cause minimal changes to the aesthetic or visual resources of areas where watercraft inspection stations would be located in already developed areas. Most travelers on major highways and county roads would not likely notice a station. Inspection stations would include signage along the travel route requiring watercraft haulers to stop for an inspection. This is the only visual difference most travelers would notice. At the inspection location, there would most likely be a storage container or canopy, a portable restroom, and various equipment such as a pickup truck and wash-water tank, which would not be significantly aesthetically

displeasing. Equipment associated with inspection stations is part of the expected viewshed at likely station locations.

Monitoring reservoirs for the early detection of dreissenids veligers would have no effect on visual resources as all monitoring is conducted via watercraft, a familiar sight on Lake Mendocino and Lake Sonoma. Training exercises would briefly introduce unfamiliar equipment into the viewshed, but training would be brief in nature, likely taking less than a full day.

Implementation of the proposed action would not substantially affect aesthetic or visual resources in the RRB directly or indirectly in either the short term or long term. There would be no additional significant cumulative effect on this resource.

6.6 RECREATION

6.6.1 No Action Alternative (No Change to Current Practice)

Infestation of water bodies within the RRB by AIS would have adverse effects to recreation. If dreissenids were to become established in the RRB, recreationists would be negatively impacted. Anyone walking along the shoreline or in the water would need to wear shoes, or risk being cut by sharp shells. Dreissenids reduce the productivity of the waters they infest by filtering the plankton that forms the base of the food web. As a result, the types, size, and abundance of fish sought by anglers would likely change. Additional impacts to the quality of recreation from an infestation would be due to subsequent cleanup and maintenance at the infested water body. Cleanup and maintenance could include a range of actions, from closure of the water body from boat traffic and swimming to drawing down water levels to allow winter freeze kill of dreissenids. These impacts would likely endure for multiple years following dreissenid infestation and establishment.

If the No Action Alternative was implemented, the risk of an AIS infestation affecting recreation would increase. Sonoma County Water Agency would continue with their programs; however, a lack of funding may limit how much it can do. Taking no action would increase environmental effects to recreation, as the risk of an AIS infestation would escalate. The No Action Alternative would limit any benefits to recreation.

6.6.2 Proposed Action Alternative

USACE involvement in establishing additional watercraft inspection stations, establishing decontamination stations, and coordinating rapid response/control plan development would have negligible effects on recreation and the recreating public in the proposed action area. Watercraft inspections have been conducted in California and the RRB for the past 10 years or more, and most people hauling boats and other watercraft are accustomed to the routine of stopping for inspections. However, an initial negative reaction to non-motorized watercraft inspection may occur.

Some people may initially have a negative reaction to the inspection stations due to the feeling they are being inconvenienced and delayed. However, many may change their

position once they learn the importance of stopping the spread of AIS (especially dreissenids) and that taking the necessary cleaning actions and precautions will shorten the length of their delay. Monitoring reservoirs for the early detection of dreissenids veligers would have no effect on recreation resources.

Neither monitoring, nor planning and preparation would affect recreation.

The proposed action would therefore not negatively affect recreational activities in the RRB directly or indirectly in either the short term or long term. There would be no additional cumulative effect on this resource. The indirect effects would be positive due to the reduced risk of infestation provided by the additional funding allocated to support the program.

6.7 CULTURAL AND HISTORICAL RESOURCES

6.7.1 No Action Alternative (No Change to Current Practice)

If dreissenids and other AIS were to become established in water bodies within the RRB, cultural and historic resources would be negatively impacted. AIS displace and outcompete native species that are the foundations of first foods and indigenous traditions. Research indicates that sixty-two percent of Native Americans surveyed were “very concerned” about the impacts of invasive species on both local food systems and communal traditional ecological knowledge, and 53 percent were “very concerned” about impacts on cultural identity (Reo et al. 2017). If AIS were to infest Traditional Cultural Properties or Historical Properties of Religious and Cultural Significance to Indian Tribes, they could alter the character of these properties or inhibit traditional uses.

6.7.2 Proposed Action Alternative

The proposed action would require USACE to collaborate with AIS coordinators of the study area (two lakes) to continue with existing watercraft inspection stations and establish new and rotating watercraft inspections stations that protect the RRB. Establishing a decontamination station would be within the RRB perimeter. Both inspection and decontamination stations would be located where infrastructure would support the facilities, and where a suitable space for decontamination is available that does not allow contaminated effluent to reach RRB waters. This would, therefore, limit inspection stations to existing parking lots, gravel pits, and other previously surface-disturbed localities. If permanent improvements are proposed, specifically if they include any ground-disturbing activity, USACE would complete a separate NEPA analysis integrating NHPA Section 106 review. After the site-specific analysis is complete and corresponding consultation with appropriate entities (California State Historic Preservation Officers and culturally affiliated Tribes) concur with the findings, the improvements would be authorized.

There would be no additional cumulative effects to cultural or historic resources.

6.8 CLIMATE CHANGE

6.8.1 No Action Alternative (No Change to Current Practice)

Thermal ranges for dreissenid persistence are from approximately 3°C to as high as 30°C. Optimal thermal conditions for dreissenid reproduction and larval development are from 14°C to 22°C and would generally occur in the spring and summer (USGS 2016).

The Russian River and major tributaries are between 11° C to 25°C, which is within the temperature range for mussel reproduction from May to November. Summer temperatures can exceed this range (USGS 2021). The Russian River Basin is currently susceptible to dreissenid infestation, as water temperatures are suitable for reproduction.

Potential consequences of climate change include reduced water flow and rising air and water temperatures. These conditions are likely to result in higher stream temperatures and an extended range of time within the suitable dreissenid thermal reproductive range, which could result in higher susceptibility to infestation and greater impacts of infestation.

The 2021 EO 14008, Tackling the Climate Crisis at Home and Abroad, is a government-wide approach to the climate change challenges that are being faced. The goal of the USACE Climate Action Plan 2021 is to plan for future climate change conditions and vulnerabilities that affect the mission for managing public land and waters. This assessment is consistent with the current EO.

There would not be any effects to climate change as a result of implementing the No Action Alternative. Gradual climate change would continue, in correlation with increasing CO₂ emissions worldwide. In addition, climate change would not affect implementation of the No Action Alternative.

There is no available estimate of GHG emissions generated by the current watercraft inspection program in the RRB. A coarse estimate based on expected miles driven associated with the operation of the existing stations and during monitoring, the heating of water to decontaminate watercraft, and fuel burned by idling vehicles during inspections, suggests that up to 92 metric tons of CO₂ (MTCO₂e) equivalents may be emitted annually. Emissions from the existing inspections and monitoring would likely continue at or near these levels. Emissions may decrease in the future if more fuel efficient or electric vehicles are used for transportation of boats and crews to and from work sites. The emissions associated with the No Action Alternative do not have a measurable effect on climate change.

6.8.2 Proposed Action Alternative

There would be extremely negligible effects on climate change as a result of implementing the proposed action. If the activities were doubled through the use of Federal funding, as much as 92 MTCO₂e could be emitted as a result of the proposed

action. Given the minuscule contribution of CO₂ emissions resulting from the proposed action to overall global emissions, effects are considered to be insignificant. Therefore, there would be no significant direct, indirect, short-term, long-term, or cumulative effects to climate change.

As with the No Action Alternative, there would be no additional effects to climate change, and climate change would not affect implementation of the proposed action.

6.9 ENVIRONMENTAL JUSTICE

6.9.1 No Action Alternative (No Change to Current Practice)

A dreissenid or other AIS infestation could adversely impact environmental justice within the RRB. A new infestation could reduce tourism to the RRB or to specific lakes within the RRB, which could lead to income or job loss. Infestations of infrastructure could also create job loss or increase energy costs. Infestations of irrigation facilities would increase expenses for facility operators which could directly drive agriculture loss, a key component of the Climate Change burden category.

6.9.2 Proposed Action Alternative

There would be negligible to minor effects to environmental justice from implementing the proposed action. Delaying new infestations in the RRB would preserve present economic opportunities and infrastructure the RRB. These are direct beneficial effects, but difficult to quantify. Monitoring, planning, and rapid response planning and preparation would have no additional effects to environmental justice.

The watercraft inspection stations may have negligible effects to environmental justice. Inspection stations are along roadways and highway and may contribute slightly to traffic burdens. However, inspection stations would not meaningfully contribute to traffic burdens as they are few in number when compared to traffic as a whole and would not be noticed by most motorists. Inspection stations would increase travel time for those towing boats, but this is also a very small fraction of total roadway traffic and would have extremely minor impacts to overall traffic burdens. Therefore, there would be no significant direct, indirect, short-term, long-term, or cumulative effects to environmental justice.

6.10 CUMULATIVE EFFECTS

NEPA and the CEQ regulations for implementing NEPA require Federal agencies to consider the cumulative effects of their actions. Cumulative effects are defined as effects “on the environment which result from incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time” (40 CFR § 1508.7).

The primary goal of a cumulative effects analysis is to determine the magnitude and significance of the environmental consequences of the proposed action in the context of the cumulative effects of other past, present, and reasonably foreseeable future actions.

Past and Present: Prior to 2007 there were no regional organizations whose primary missions were focused on AIS prevention in the RRB. The 100th Meridian Initiative was one of the first organizations with a goal of preventing the spread of AIS (specifically zebra and quagga mussels) in the west and was for many years the cornerstone of consistent efforts between the United States and Canada. Currently, the activities and efforts of the 100th Meridian Initiative are being funded by USFWS and undertaken by non-governmental, Tribal, state, interstate, and Federal agencies.

Since 2020, USACE has implemented a cost reimbursement program similar to the proposed action in other river basins in the Western United States. The program began in the Columbia River Basin, with the first reimbursements distributed in 2017. Since then, USACE has been working to set up reimbursement programs in multiple basins across the west including the Upper Missouri River basin, the South Platte River basin, and the Arkansas River basin.

Reasonably Foreseeable Future: Federal investment in the proposed action would further expand and support the existing program, resulting in increased effectiveness in the AIS prevention and control programs to decrease the existing vulnerability of a dreissenid and other AIS infestations to the RRB. It is likely that the program would expand into the future to address a wide suite of aquatic pests.

The analysis of the environmental resources above concludes that implementation of the proposed action would not result in significant adverse effects, either individually or cumulatively with other effects.

SECTION 7 - COMPLIANCE WITH APPLICABLE ENVIRONMENTAL LAWS AND REGULATIONS

This section identifies the legal, policy, and regulatory requirements applicable to the Proposed Action Alternative and discusses the implications for each of those requirements. Summaries of compliance and coordination activities for each of the laws, policies, or regulation are also provided, as well as additional authorities and guidance related to the proposed action.

7.1 FEDERAL LAWS

7.1.1 National Environmental Policy Act

As required by NEPA and subsequent implementing regulations promulgated by the Council on Environmental Quality, this LR/Programmatic EA was prepared to determine whether the proposed action constitutes a "...major Federal action significantly affecting the quality of the human environment..." and whether an EIS is required. This LR/Programmatic EA documents the evaluation and consideration of potential environmental effects associated with the proposed action.

USACE is providing this LR/Programmatic EA and Draft FONSI to Federal and state agencies, Tribes, and the public for a 30-day review and comment period beginning on or about May 13, 2024. USACE identified no impacts significantly affecting the quality of the human environment prior to distribution of the LR/Programmatic EA. If no significant effects are identified during the review and comment period, the FONSI will be issued, and USACE will proceed with the Recommended Plan. If the environmental effects are determined to be significant, an EIS will be prepared before a decision is reached on whether to implement the Recommended Alternative.

7.1.2 Endangered Species Act

The ESA established a national program for the conservation of threatened and endangered fish, wildlife, and plants and the habitat upon which they depend. Section 7(a)(2) of the ESA requires Federal agencies to consult with USFWS and/or NMFS if an action may affect a listed species to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or adversely modify or destroy their critical habitats. Section 7(c) of the ESA and the Federal regulations on endangered species coordination (50 CFR § 402.12) require that Federal agencies prepare biological assessments of the potential effects of major actions on listed species and critical habitat.

There are 10 ESA-listed species that could potentially be present in the RRB. If any ESA-listed small mammal or plant species could be present where watercraft inspection stations or decontamination stations are established, rapid response/control plan actions are implemented, and any ground disturbing or vegetation disturbing activity is planned, surveys for their presence would be conducted and the protected species

avoided. Table 11 lists the ESA-listed species and the locations where surveys would be conducted to ensure there would be no effect on them.

Table 11. ESA-Listed Species Requiring Site Specific Survey for Any Projects with Ground-Disturbing or Vegetation-Disturbing Activities

Species	Location
Burke's goldfields	Russian River/Eel River
Contra Costa goldfields	Russian River/Eel River
Marbled murrelet	Russian River
Northern spotted owl	Russian River
Showy Indian clover	Russian River/Eel River

Although marbled murrelets fly back and forth daily from the coast to inland breeding sites, it is extremely likely that marbled murrelets would avoid nesting near an inspection or decontamination station due to the human activity and associated noise. USACE determined that activities proposed in this LR/Programmatic EA would have no effect on ESA-listed species or designated or proposed critical habitat. Monitoring at water bodies for the early detection of dreissenids would have no effect on terrestrial or aquatic ESA-listed species. Rapid response planning and preparation would also have no effect to ESA-listed species.

Rapid response implementation could have effects to ESA-listed species. ESA Section 7 consultation would be completed prior to the reimbursement of costs incurred during a rapid response action.

7.1.3 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 USC §§ 703-712, as amended) prohibits the taking of and commerce in migratory birds (live or dead), any parts of migratory birds, their feathers, or nests. Take is defined in the MBTA to include by any means or in any manner, any attempt at hunting, pursuing, wounding, killing, possessing, or transporting any migratory bird, nest, egg, or part thereof.

Watercraft inspection station sites would be assessed/surveyed to determine presence/absence of suitable habitat/location of ground-nesting or shrub-nesting birds. No trees, shrubs, or other bird habitat is proposed to be cut or damaged by the establishment of watercraft inspection stations. Birds would not be affected. There would be no take of migratory birds.

7.1.4 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C 668-668c) prohibits anyone, without a permit issued by the Secretary of the Interior from taking bald or golden eagles, including their parts, nests, or eggs. Take is defined in the BGEPA as any attempt to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest,

or disturb. Disturb is defined the BGEPA as, to agitate or otherwise bother a bald or golden eagle such that it is likely to cause (1) injury, (2) interference with breeding, or (3) nest abandonment.

Watercraft inspection station sites would be assessed/surveyed to determine presence/absence of suitable habitat/location of bald or golden eagles. No trees, shrubs, or other bald or golden eagle habitat is proposed to be cut or damaged by the establishment of watercraft inspection stations. Bald or golden eagles would not be affected. There would be no take of bald or golden eagles.

7.1.5 National Historic Preservation Act

The National Historic Preservation Act of 1966 (NHPA), as amended (16 USC § 470 *et seq.*), directs Federal agencies to consider the effects of their undertakings, including Federally licensed or funded activities or programs on properties determined eligible for the National Register of Historic Places. Under Section 106 of the NHPA, a Federal agency establishes an undertaking and determines whether Section 106 review is needed for the proposed undertaking. If there is a potential for impacts to historic properties, the Federal agency then works to identify potential historic properties by defining the Area of Potential Effects (APE) and working with the State Historic Preservation Office and other consulting parties such as interested Native American Tribes in identifying significant historic properties within the APE. Section 110 of the NHPA requires that Federal agencies exercise responsible stewardship of the cultural resources located on their lands. This includes a responsibility to maintain and preserve any historic properties while also identifying historic properties and assessing impacts on Federally owned land.

USACE has determined that activities proposed in this LR/Programmatic EA have no potential to affect historical properties. However, all proposed improvements, particularly additional amenities requiring ground-disturbing activity must first meet compliance requirements of the National Historic Preservation Act, as amended, and associated Section 106 review.

7.1.6 The American Indian Religious Freedom Act

The American Indian Religious Freedom Act (42 USC § 1996) of 1978 protects the rights of Native Americans to exercise their traditional religions by ensuring access to sites, use and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites.

USACE has determined activities proposed in this LR/Programmatic EA have no potential to affect traditional religious sites, objects or worship and traditional rites. However, if additional amenities requiring ground-disturbing activity are requested, supplemental Section 106 review would be required before approval.

7.1.7 Clean Water Act

The Federal Water Pollution Control Act (33 USC § 1251 *et seq.*, as amended) is more commonly referred to as the Clean Water Act. This act is the primary legislative vehicle for Federal water pollution control programs and the basic structure for regulating discharges of pollutants into WOTUS. The act was established to restore and maintain the chemical, physical, and biological integrity of the Nation's waters and sets goals to eliminate discharges of pollutants into navigable water, protect fish and wildlife, and prohibit the discharge of toxic pollutants in quantities that could adversely affect the environment. The act has been amended numerous times and given a number of titles and codifications.

Section 402 of the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) program, pertains to discharge of pollutants. No pollutants would be discharged into WOTUS by activities proposed in this LR/Programmatic EA; therefore, a NPDES permit would not be needed.

Section 404 of the Clean Water Act regulates the discharge of dredged or fill material into wetlands or other WOTUS. Because no fill material would be placed in wetlands, or other WOTUS, a Clean Water Act Section 404(b)(1) Evaluation is not required, and therefore, no Least Environmentally Damaging Practicable Alternative needs to be identified.

Rapid response implementation could involve the discharge of pollutants into waters. All required CWA compliance would be completed prior to the reimbursement of costs incurred during a rapid response action.

7.2 EXECUTIVE ORDERS

7.2.1 Executive Order 11988, Floodplain Management

EO 11988 of 1977 requires Federal agencies to recognize the significant values of floodplains and to consider the public benefits that would be realized from restoring and preserving floodplains. The objective of this EO is the avoidance, to the extent possible, of long- and short-term adverse impacts associated with the occupancy and modification of the base floodplain and the avoidance of direct and indirect support of development in the base floodplain wherever this is a practicable alternative. Each Federal agency must evaluate the potential effects of actions on floodplains and avoid undertaking actions that directly or indirectly induce development in the floodplain or adversely affect natural floodplain values.

Due to the very nature of the proposed cost-share program (assisting states in bolstering existing and/or building new) watercraft inspection stations, it is probable that some watercraft inspection stations are currently, or would be, located in the designated floodplain. However, because a typical station only consists of a shelter/covering, such as a shipping container, a construction trailer, canopy, or tent; a transport vehicle; a hot water pressure washer; outreach and educational materials; directional devices such as cones and signage; and applicable personnel amenities (heaters for cold weather,

portable restrooms, etc.), or is a roving station, there would be no long-or short-term adverse impacts, no alteration of the floodplain, and development in the floodplain would not be induced or promoted.

7.2.2 Executive Order 11990, Protection of Wetlands

EO 11990 of 1977 directs Federal agencies to provide leadership in minimizing the destruction, loss, or degradation of wetlands. Section 2 of this order states that, in furtherance of the NEPA, agencies shall avoid undertaking or assisting in new construction located in wetlands unless there is no practicable alternative. Wetlands would not be impacted by inspection stations (current and proposed), decontamination stations and development of a rapid response/control plan.

7.2.3 Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

EO 12898 of 1994 directs Federal agencies to make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories and possessions, the District of Columbia, the Commonwealth of Puerto Rico, and the Commonwealth of the Mariana Islands.

USACE determined that implementation of the Proposed Action Alternative would comply with this EO.

7.2.4 Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks

EO 13045 of 1997 directs Federal agencies to make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children and ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.

USACE determined that implementation of the Proposed Action Alternative would comply with this EO.

7.2.5 Executive Order 13985, Advancing Racial Equity and Support for Underserved Communities Through the Federal Government

EO 13985 of 2021 directs Federal agencies with advancing equity for all, including communities that have long been underserved, and addressing systemic racism in our Nation's policies and programs. By advancing equity, the Federal Government can support and empower all Americans, including the many communities in America that have been underserved, discriminated against, and adversely affected by persistent poverty and inequality.

USACE determined that implementation of the Proposed Action Alternative would comply with this EO.

7.2.6 Executive Order 13990, Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis

EO 13990 of 2021 directs Federal agencies to immediately review, and take action to address, Federal regulations promulgated and other actions taken during the previous 4 years that conflict with national objectives to improve public health and the environment; ensure access to clean air and water; limit exposure to dangerous chemicals and pesticides; hold polluters accountable, including those who disproportionately harm communities of color and low-income communities; reduce greenhouse gas emissions; bolster resilience to the impacts of climate change; restore and expand national treasures and monuments; and prioritize both environmental justice and employment.

USACE determined that implementation of the Proposed Action Alternative would comply with this EO.

7.2.7 Executive Order 14008, Tackling the Climate Crisis at Home and Abroad

EO 14008 of 2021 states that environmental and economic justice are key concerns for the Federal government and its implementing agencies. It further directs Federal agencies to develop programs to address disproportionately high and adverse impacts to disadvantaged communities.

Implementation of the Proposed Action Alternative would not have adverse effects to human health or the environment, nor to any particular socioeconomic group. The effects of the proposed program are expected to be broadly positive due to the reduced risk of infestation provided by the additional funding allocated to support the program. The proposed action would not adversely or disproportionately affect minority or low-income populations.

7.2.8 Executive Order 14096, Revitalizing Our Nation's Commitment to Environmental Justice for All

EO 14096 of 2023 builds on and supplements the foundational efforts of EO 12898 and directs Federal agencies, as appropriate and consistent with applicable law, to identify, analyze, and address disproportionate and adverse human health and environmental effects and hazards of Federal activities, including those related to climate change. It also directs agencies to actively facilitate meaningful public participation and just treatment of all people in agency decision-making.

USACE determined that implementation of the Proposed Action Alternative would comply with this EO.

7.2.9 Executive Order 13112, Invasive Species

EO 13112 of 1999 directs Federal agencies to act to prevent the introduction of, or to monitor and control, invasive (nonnative) species; to provide for restoration of native species; to conduct research; to promote educational activities; and to exercise care in taking actions that could promote the introduction or spread of invasive species. EO 13751 of 2016 amends EO 13112 and directs Federal agencies to continue coordinated prevention and control efforts related to invasive species. The proposed action would implement actions to prevent, monitor, and respond to dreissenids, an invasive species.

7.3 ADDITIONAL AUTHORITY AND GUIDANCE

Additional authority and guidance related to the proposed action includes the following:

EO 11987, Exotic Organisms. EO 11987 of 1977 directs Federal agencies as follows:

- Executive agencies shall, to the extent permitted by law, restrict the introduction of exotic species into the natural ecosystems on lands and waters which they own, lease, or hold for purposes of administration; and shall encourage the states, local governments, and private citizens to prevent the introduction of exotic species into natural ecosystems of the United States.
- Executive agencies, to the extent they have been authorized by statute to restrict the importation of exotic species, shall restrict the introduction of exotic species into any natural ecosystem of the United States.

EO 13751, Safeguarding the Nation from the Impacts of Invasive Species. EO 13751 of 2016 requires Federal agencies to prevent the introduction, establishment, and spread of invasive species, as well as to eradicate and control populations of invasive species that are established. (See also, EO 13112.)

USACE Invasive Species Policy. USACE Invasive Species Policy of 2023 compliments the National Invasive Species Act (and related laws) and directs Civil Works to address invasive species concerns in analyses of project impacts and authorizes permits to include stipulations regarding control of invasive species.

USACE Environmental Operating Principles. USACE Environmental Operating Principles (EOPs) have been taken into consideration throughout the study process and would continue to be part of the implementation of the proposed action. Below are the USACE EOPs:

- Foster sustainability as a way of life throughout the organization.
- Proactively consider environmental consequences of all USACE activities and act accordingly.
- Create mutually supporting economic and environmentally sustainable solutions.

- Continue to meet our corporate responsibility and accountability under the law for activities undertaken by USACE, which may impact human and natural environments.
- Consider the environment in employing a risk management and systems approach throughout the life cycles of projects and programs.
- Leverage scientific, economic, and social knowledge to understand the environmental context and effects of USACE actions in a collaborative manner.
- Employ an open, transparent process that respects views of individuals and groups interested in USACE activities.

In coordination with the agencies and other stakeholders, the USACE proactively considered the environmental consequences several measures and developed a comprehensive solution that supports economic and environmentally sustainable solutions.

SECTION 8 - COORDINATION, CONSULTATION, AND PUBLIC INVOLVEMENT

In preparation of developing this LR/Programmatic EA, USACE sent information letters to 26 Native American Tribes on April 28, 2022, notifying them of the proposed action and upcoming opportunity to review the LR/Programmatic EA. In this letter, USACE extended the invitation of Government-to-Government consultation.

The State AIS coordinator provided information on their current watercraft inspection program and reviewed sections of the document during development. Additionally, U.S. Fish and Wildlife Service, the California Department of Fish and Wildlife AIS coordinator, State Water Board, North Coast Regional Water Quality Control Board, and Sonoma County Water Agency contributed information during document development. USACE also contacted USFWS and NMFS.

The Draft FONSI and this LR/Programmatic EA will be released to Federal and state agencies, Tribes, and the public for a 30-day review and comment period beginning on or about May 20, 2024. The documents will be available on the USACE Walla Walla District website, <https://www.nww.usace.army.mil/Missions/Environmental-Compliance/>. Any other information or announcements regarding this study will also be posted on the website.

SECTION 9 - RECOMMENDATIONS

Based on the information evaluated in this LR/Programmatic EA, USACE selects Alternative 2, Comprehensive Adaptive Improvements, as the Recommended Alternative. The features of the Recommended Alternative include augmenting the future AIS programs with the potential cost-shared measures below:

- Measure 1 - Federal Participation in Selection of Watercraft Inspection Station Locations
- Measure 2 – Increase Watercraft Inspection Stations
- Measure 3 – Extend Daylight Inspection Hours
- Measure 4 – Increase Nighttime Inspections
- Measure 5 – Construct Site Improvements
- Measure 6 – Add Canine Detection
- Measure 7 – Increase Public Awareness and Education
- Measure 9 – Monitor to Identify Water Chemistry
- Measure 10– Monitor for Early Detection
- Measure 11 – Regional WID Data Sharing System
- Measure 12 – Develop and Implement Real-time Tracking of Watercraft Transportation
- Measure 13 – Evaluate Traffic Patterns for Recreational Boating
- Measure 14 – Contingency Planning
- Measure 15 – Rapid Response Planning

9.1 WATERCRAFT INSPECTION AND DECONTAMINATION STATIONS IN THE RUSSIAN RIVER BASIN

The NFS annually establishes seasonal watercraft inspection stations in strategic locations inside the RRB based on several factors: safety of personnel and public; ease of public access; infrastructure availability for setting up facilities (electricity, water, restrooms, etc.); and where applicable, availability of a suitable space for conducting decontamination procedures that does not pose any threat to the environment. Although only water is used to decontaminate watercraft, watercraft inspection stations are set up in parking lots, gravel pits, or other areas where water runoff does not present an environmental concern.

The NFS's goal, as part of a regional strategy, is to build a multi-layered line of defense, first by intercepting fouled boats coming across state lines (within and outside of the RRB), and then providing additional protection closer to and within the RRB. The NFS would continue to implement existing quality assurance and quality control (QA/QC)

protocols in their inspection station programs and revise or adapt QA/QC protocols towards improved station efficacy during periods of strategy development, for example, partnering with local interest groups or universities to evaluate accuracy in following station protocols. It is recommended that NFS report their QA/QC results and include plans for improving QA/QC procedures, as necessary, in their annual scope of work review and/or submissions for cost share requests. USACE has deemed this strategy to be the most effective means of protecting all waters in the RRB, including those maintained and operated by USACE. To focus only on preventive efforts inside the basin excludes a critical layer of protection.

The Recommended Alternative assumes the Federal investment would augment NFS funds, resulting in increased effectiveness in the AIS prevention and control programs to decrease the risk of a dreissenid infestation. In accordance with the regional strategy, the NFS would use the data gathered during the inspection season to adjust the program to provide a more effective regional defense. With a BCR of 5.46 (derived as the most likely outcome protection projections from Table 9), USACE has determined that there is Federal interest in partnering with the NFS to address the vulnerability of water bodies in the RRB to an AIS infestation. The Recommended Alternative also includes regional data sharing efforts, real-time tracking of watercraft transportation and traffic pattern evaluation (measures 1-7 and 9-15).

9.2 MONITORING

Identification of water chemistry and comparison to water chemistry of infested water bodies could be used to inform risk management decisions within the RRB. Additional monitoring strategies (e.g., plankton tows, artificial substrate, surface survey, etc.) augment a complex, multi-layered program to provide for early detection of dreissenids and facilitate rapid response/control plan measures to minimize infestation impacts. Monitoring activities are authorized to be cost-shared up to 50 percent Federal/50 percent non-Federal within the RRB, including at USACE-managed reservoirs and lands. Reimbursements for monitoring would not be used to supplement or replace USACE monitoring activities typically conducted with O&M funding.

9.3 RAPID RESPONSE/CONTROL PLAN DEVELOPMENT

Prevention remains the first priority for addressing the threat of dreissenid mussels in the RRB. This includes keeping contaminated watercraft from entering uncontaminated water bodies in the basin. However, should prevention efforts fail, and live mussels invade the RRB, advanced planning is needed to ensure an effective inter-jurisdictional response. USACE recommends the development of site-specific plans at the facilities using the facility vulnerability assessment methods conducted by Reclamation, with a focus on priority areas identified in the risk assessment matrix. USACE also recommends continued development of rapid response measures in coordination with regional Federal, state, and local agencies.

9.4 PUBLIC AWARENESS

Public awareness about the seriousness of AIS is an important element of the ongoing efforts to prevent an introduction of dreissenids and further spread of other AIS within the RRB. USACE recommends the following pertaining to public awareness:

- Increase signage directing boaters to and at inspection station locations including electronic signs, banners, kiosks, etc.
- Create inspection and decontamination “Frequently Asked Question” handouts to post or hand out at inspection stations, the marina, and boat ramps, and make available on agency websites. The printed handout could include a quick response (QR) code that links to the electronic version of the handout.
- Increase efforts to educate all lake visitors on the importance of infestation prevention by contacting sporting good businesses, staff booths at local fairs, and other events about displaying dreissenid information.
- Explore options to reinstate the radio ads/segments promoting the program.
- Develop dreissenid interpretive displays for visitor centers.
- Develop a visitor map to include dreissenid information.

SECTION 10 - ROLES AND RESPONSIBILITIES

This section generally describes how the program would function. Upon review and approval of the LR/Programmatic EA, USACE will execute a Project Partnership Agreement (PPA) with interested NFSs.

The Watercraft Inspection Station Program is authorized by Section 104 of the 1958 Rivers and Harbor Act, as amended (33 USC § 610). Under 33 USC § 610, Congress authorized USACE to enter into cost-share agreements with states in specific river basins to establish, operate, and maintain new or existing watercraft inspection stations, among other activities, for the purpose of preventing the spread of AIS into, out of, or within the RRB.

After USACE receives the Federal funds for the watercraft inspection program, USACE would distribute letters to participating non-Federal partners requesting statements of work for the upcoming season with the budget amount based on the Federal funds available. USACE would then work with the NFS to draft a statement of work that contains potential inspection station activities and estimated costs for the upcoming inspection season.

The term “inspection station activities” means the establishment, operation, and maintenance of new or existing watercraft inspection stations, including, but not limited to, the evaluation and selection of station locations, installation of stations, scheduling of daylight and night-time inspection hours, writing rapid response plans and implementing rapid response exercises, use of canine detection, increasing public awareness and education and other inspection enhancements, and station site improvements, such as surface hardening, trailer pads, and utility connections, as generally described in this LR/Programmatic EA.

The term “inspection station activities costs” means all costs incurred following the date of execution of the statement of work by USACE, in accordance with the terms of the PPA that are directly related to inspection station activities, including inspection, design, establishment, operation and maintenance, related supervision and administration costs, and USACE’s costs of monitoring, inspection, and auditing of inspection stations activities.

The term “rapid response actions” means the operation and implementation of rapid response actions including, but not limited to, the on-the-ground implementation and coordination, evaluation of effectiveness, documenting the rapid response actions and implementing rapid response exercises, public outreach, and applying for pesticide permit from the NFS prior to infestation and as generally described in this LR/Programmatic EA.

During the statement of work preparation, USACE and the NFS would engage in an evaluation process to determine whether stations should be added, relocated, or closed, or if hours of operation should be adjusted. This evaluation process takes into account Federal and NFS budgets and statutory authorities, as well as data related to boat

transportation traffic and fouled boat interceptions. The inspection stations must protect the RRB and provide the highest likelihood of preventing the spread of AIS into, out of, or within the RRB.

USACE, with the NFS's assistance, shall complete all environmental compliance requirements, obtain all applicable licenses and necessary permits, and comply with applicable Federal labor laws covering non-Federal construction.

The NFS is responsible for ensuring that any real property or less than fee property interests acquired for the placement of a watercraft inspection station or related activity meet USACE Real Estate appraisal standards. Sponsors are encouraged to identify potential property purchases in their annual work plans so that USACE can provide guidance and insight on the documentation needed to help ensure reimbursement can be made.

When site improvements are planned at an inspection station location that involves any ground disturbance, USACE may need to tier from this LR/Programmatic EA and complete site-specific NEPA analysis, depending on the nature and magnitude of proposed work and associated impacts. USACE would review any planned construction activities and the associated environmental compliance documentation before the construction activity is advertised for bids or executed with any in-house labor forces. After the analysis is complete, the improvements would be allowed to proceed.

After the statement of work is finalized and approved by USACE, the statement of work will be signed by USACE. Costs incurred may be reimbursed following the execution of a PPA within a statement of work's performance period. After the statement of work is finalized, USACE will approve and sign it. Signing the statement of work will obligate the funds to make them available for reimbursement.

No later than the 15th of each month, or as soon thereafter as practicable, the NFS shall submit properly executed and duly certified invoices covering inspection station activities performed during the preceding month. Appropriate documentation includes invoices and certification of specific payments to contractors, suppliers, and NFS employees that are performing inspection station activities. USACE shall review such documentation to determine and certify the inspection station activities costs as either allowable costs, not allowable costs, or costs that require additional supporting information. The NFS's submission must include sufficient information to support a determination by USACE that the costs are necessary to establish, operate, and maintain those inspection and decontamination stations to protect the RRB at locations with the highest likelihood of preventing the spread of AIS into, out of, or within the RRB. Such written certification by USACE is required in order to support any payments under this authority. Following such certification, and subject to the availability of funding appropriated for watercraft inspection stations, USACE shall make payment in accordance with the authority and PPA.

Federal participation in the program would be dependent on the NSF's ability to fund their portion of the program and Congress specifically appropriating funds for the

program. Although State budgets fluctuate annually, the initial estimated annual cost to the Federal government to fully participate in the program within the RRB would be about \$600,000, with the exception of expensive infrastructure such as mussel gates. This number may increase if risks increase, or the program is expanded. It may decrease due to available funding, as one-time equipment purchases are completed, or the program may be eliminated if an infestation becomes permanently established within the RRB.

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