US Army Corps
of Engineers ®
Albuquerque District

INTEGRATED LETTER REPORT AND PROGRAMMATIC ENVIRONMENTAL ASSESSMENT

Federal Participation in Watercraft Inspection Stations Upper Colorado River Basin

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 the Water Infrastructure Improvements for the Nation Act of 2016, Section 1170 of the Water Resources Development Act of 2018, and Section 505 of the Water Resources Development Act of 2020.

June 2023

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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 state-managed program to prevent and control the spread of aquatic invasive species (AIS) in the Upper Colorado River Basin (UCRB). The UCRB states have successfully contained invasive zebra or quagga mussels (referred to as dreissenids) to a small number of isolated water bodies, and therefore federal participation in the state-managed program represents an excellent opportunity to further work to prevent the spread of dreissenids into and among waters of the UCRB.

The UCRB is at high risk of a dreissenid infestation due to the mobility of watercraft transported between and within watersheds over both interstate highways and other highways. 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 financial and environmental costs of infestation present serious problems to those who live, work, or recreate in or around the UCRB.

The existing watercraft inspection program has been managed collaboratively since 2009 by the states of Arizona, Colorado, New Mexico, Utah, and Wyoming. Watercraft transported along highways are inspected for the presence of dreissenids and other aquatic invasive species (AIS) and decontaminated when AIS are detected. If approved, the program would be cost shared at 50 percent with each state, and eligible activities would include: the establishment and operation of watercraft inspection stations, monitoring programs, contingency planning, and rapid response planning and preparation which would provide the greatest likelihood of preventing the spread of AIS into or out of waters of the U.S. within the UCRB.

A wide range of measures to augment and improve the effectiveness and efficiency of the program was considered. These measures include USACE participation 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 efforts and contingency and 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 by each state based on its need and ability to fund its portion of the program, the results of the regional coordination efforts, and the availability of federal funding.

The study period length is 50 years. 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. For the final total benefit figure, it was assumed that the

watercraft inspections could stave off a dreissenid infestation for at least 25 years from the project's inception. Conservative estimates of the average annual operations and maintenance cost savings (benefits) associated with deferring an infestation for 25 years is approximately $64,258,455. Estimated average annual costs of the inspection station program over 25 years is approximately $4,164,898 inside the basin, resulting in a benefit-cost ratio (BCR) of about 15.43 to 1 after 25 years. These economic benefits do not include the ecosystem benefits associated with delaying an infestation.

Because federal participation would augment an existing state-managed program that is operated primarily along developed portions of major highways, there are only minimal direct effects to the environment. The indirect environmental effects of the proposed action are beneficial. Based on limited scope and effects and the coordination performed for this study, no controversy is anticipated. Because federal support for expansion of state watercraft inspection programs has such a limited initial investment and scope, and can be terminated at any time, there is extremely low residual risk.

INTEGRATED LETTER REPORT AND PROGRAMMATIC ENVIRONMENTAL ASSESSMENT FEDERAL PARTICIPATION IN WATERCRAFT INSPECTION STATIONS UPPER COLORADO RIVER BASIN

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ACRONYMS AND ABBREVIATIONS

AIS	aquatic invasive species
ANSTF	Aquatic Nuisance Species Task Force (www.anstaskforce.gov)
AZFGD	Arizona Fish and Game Department (www.azgfd.gov)
BCR	benefit-cost ratio
BLM	Bureau of Land Management
BPA	Bonneville Power Administration
CFR	Code of Federal Regulations
CO_2	carbon dioxide
CPW	Colorado Parks and Wildlife (cpw.state.co.us)
DNA	deoxyribonucleic acid
DOI	U.S. Department of the Interior
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
HQ	Headquarters (U.S. Army Corps of Engineers)
IEAB	Independent Economic Analysis Board
LR/Programmatic EA	Letter Report and Programmatic Environmental Assessment
MBTA	Migratory Bird Treaty Act
mgd	million gallons per day
mil gal	million gallons
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMDFG	New Mexico Department of Game and Fish (wildlife.state.nm.us)
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRA	National Recreation Area
NWD	Northwestern Division (U.S. Army Corps of Engineers)
NWPCC	Northwest Power and Conservation Council
NWW	Walla Walla District (U.S. Army Corps of Engineers)
O&M	operation and maintenance
PL	Public Law
PNWER	Pacific Northwest Economic Region
PSMFC	Pacific States Marine Fisheries Commission
QZAP	Quagga-Zebra Mussel Action Plan
Reclamation	U.S. Bureau of Reclamation
RHA	River and Harbor Act
SHPO	State Historic Preservation Officer
System	Regional Watercraft Inspection and Decontamination Data Sharing System
UCRB	Upper Colorado River Basin

UDWR	Utah Division of Wildlife Resources
USACE	U.S. Army Corps of Engineers
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WAPA	Western Area Power Administration
WID	Watercraft Inspection and Decontamination
WRDA	Water Resources Development Act
WRP	Western Regional Panel on Aquatic Invasive Species (westernregionalpanel.org)

SECTION 1 - INTRODUCTION

This Integrated Letter Report and Programmatic Environmental Assessment (LR/Programmatic EA) presents the results of U.S. Army Corps of Engineers' (USACE) evaluations of potential and anticipated consequences of a proposed federal action to engage in several techniques to help prevent the spread of aquatic invasive species (AIS) into and out of the Upper Colorado River Basin (UCRB). The proposed action calls for USACE participation in a cost-shared effort to coordinate the establishment of new or bolster existing watercraft inspection stations maintained and operated by non-federal sponsors within the states of Arizona, Colorado, New Mexico, Utah, and Wyoming to help reduce the risks associated with infestations of AIS at USACE and other Waters of the U.S. within the UCRB. This report 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) as well as the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA, Title 40 CFR Parts 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 UCRB at locations with the highest likelihood of preventing the spread of AIS at into and out of Waters of the United States (WOTUS). If such effects are less than significant, a Finding of No Significant Impact (FONSI) will be issued, and USACE will 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 USC § 610), as amended by Section 1039(d) of the Water Resources Reform and Development Act (WRRDA) of 2014 (Public Law (PL) 113-121), Section 1178(b) of the Water Infrastructure Improvements for the Nation Act (PL 114-322), Section 1170 of the Water Resources Development Act (WRDA) of 2018 (PL 115-270), and Section 505 of WRDA of 2020 (PL 116-260).

Section 104 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 Water of the United States, which will be cost shared with the nonfederal sponsors at 50 percent. Section 104 also authorizes the program to cost share activities such as rapid response, monitoring and contingency planning.

WRRDA 2014 authorized 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. Table 1 lists the eight requirements and the sections in which they are addressed in this document.

WRDA 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 allowed for actions to occur anywhere in a state where the river basin is located, as long as it provides protection to the authorized river basin. The guidance also provided direction to assist these states in rapid response planning, preparation, and response.

WRDA 2018 further amended 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 WRDA 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 replace the incorrect reference to the Arizona River Basin with the Arkansas River Basin. It also changed the location criteria for inspection stations from those that prevented the spread of aquatic invasive species at reservoirs operated and maintained by USACE, to “locations with the highest likelihood of preventing the spread of AIS into or out of Waters of the United States”

Table 1. Water Resources and Reform and Development Act of 2014 Implementation Guidance Requirements (USACE, HQ 2016) and Location in Document

Guidance Requirements	Location Addressed in Document
1) Analysis of problems, needs, and opportunities in the affected area related to spread of AIS.	Section 3.1
2) Cost and impact information of invasive species on USACE projects and facilities.	Section 3.1 and 4.1.2.1
3) Locations of existing watercraft inspection stations operated by others.	Section 2.2.2
4) Identification of locations for establishing new watercraft inspection stations with the highest likelihood of preventing the spread of AIS into or out of waters of the U.S.	Sections 2.2.2, 3.4, and 9.1
5) Analysis on cost effectiveness, engineering feasibility, and environmental acceptability.	Sections 4.1 and 4.3 (cost effectiveness)
6) Lifecycle costs associated with any proposed watercraft stations.	Section 2.2.6 (Due to the simplicity of watercraft inspection stations, life cycle costs are minimal.)
7) Delineation of federal and non-federal roles and responsibilities, including real estate requirements.	Section 10
8) Recommendations on further action, including those that may require additional authorization to implement.	Section 9

1.2 STUDY AREA

The location of the proposed action is the states of Arizona, Colorado, New Mexico, Utah, and Wyoming (sometimes referred to as the study area states throughout the report) as the UCRB is contained in these states. This is illustrated in Figure 1.

The UCRB encompasses the drainage of approximately 75,530 square miles (668,000 kilometers^2) of the Southwest, comprising portions of Arizona, Colorado, New Mexico, Utah, and Wyoming. This region is bounded by the Rocky Mountains (north and east), the Great Basin (west), and the Colorado Plateau (south). The major tributaries include the Green River (730 miles long, draining 48,100 square miles) and the San Juan River (383 miles long, draining 24,600 square miles). The headwaters of the Upper Colorado begin at La Poudre Pass, Colorado. The river flows west through the Rocky Mountains, then southwest across the Colorado Plateau. Glen Canyon Dam divides the Upper Colorado from the Lower Colorado River. The Green River watershed covers Colorado,

Utah, and Wyoming. The San Juan River watershed begins in southwestern Colorado, passing through New Mexico and Utah before emptying into Lake Powell.

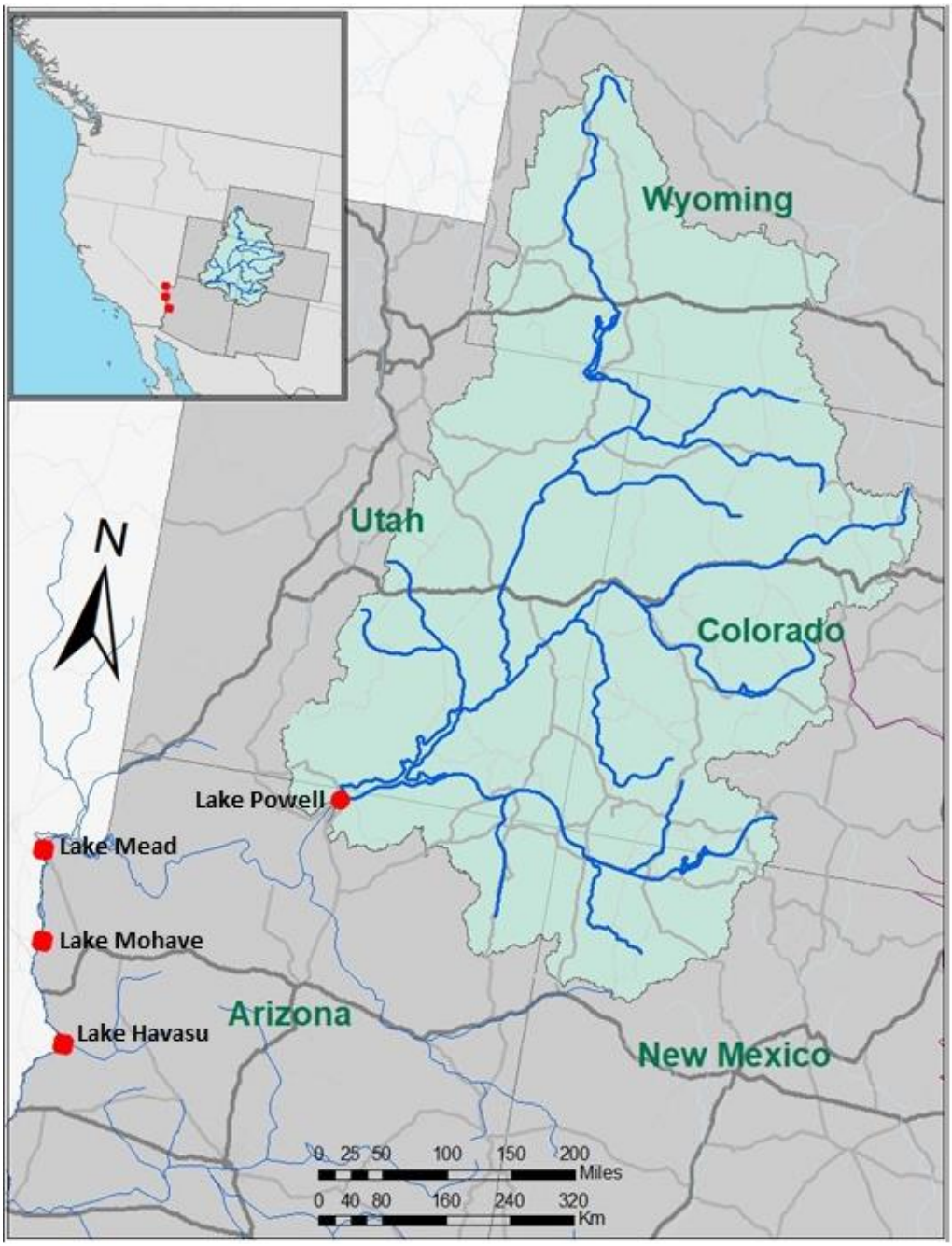

Figure 1. The Upper Colorado River Basin and State Boundaries

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, Safeguarding the nation from the Impacts of Invasive Species, December 5, 2016). AIS are invasive species that inhabit the aquatic environment.

Dreissenid

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

Due to the growing concern of a dreissenid infestation in the Upper Colorado River Basin, the focus of this LR/Programmatic EA is on dreissenids. However, methods used for preventing the spread of dreissenids are also effective for other types of AIS, such as Eurasian watermilfoil (*Myriophyllum spicatum*), flowering rush (*Butomus umbellatus*), curlyleaf pondweed (*Potamogeton crispus*), purple loosestrife (*Lythrum salicaria)* and common water hyacinth (*Eichhornia crassipes)* (EDDMapsS 2020).

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.

Establishing a Watercraft Inspection Station

Establishing a watercraft inspection 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.

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).

Maintaining a Watercraft Inspection 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 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.

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).

Veliger

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

1.4 PURPOSE AND NEED FOR ACTION

The purpose of the proposed action is to assist the states of Arizona, Colorado, New Mexico, Utah, and Wyoming with establishing and operating watercraft inspection stations, monitoring, and rapid response planning efforts to aid in preventing the spread of AIS into or out of Waters of the U.S. within the UCRB. 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 UCRB, pursuant to Section 104 of the RHA 1958 (33 USC 610).

The proposed action is needed because the risk of the spread of AIS to Waters of the U.S. the UCRB is high, and the introduction and establishment of AIS (particularly dreissenids) has the potential to cause damage and increased operation and maintenance (O&M) costs to water-related infrastructure, recreation, and the ecosystem. Dreissenids present a direct threat to USACE authorized purposes including hydropower, navigation, and fish and wildlife mitigation. Once a waterway is infested, dreissenids can reproduce rapidly and spread.

SECTION 2 - BACKGROUND

As stated in Section 1, the main AIS of concern in the Western United States at this time are zebra and quagga mussels (Figure 2), which are also known as dreissenids. Dreissenids are nonnative organisms that were first discovered in the Great Lakes in the late 1980s, and they quickly spread to the middle and northeastern United States. Since then, established populations have also been detected in California, Nevada, Utah, Colorado, and Arizona. According to the 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. **Error! Reference source not found.** 3 illustrates how they are distributed throughout the United States as of 2020, including populations that were detected, but subsequently did not become established.

Figure 2. Zebra and Quagga Mussels
Source: PSMFC GIS Center

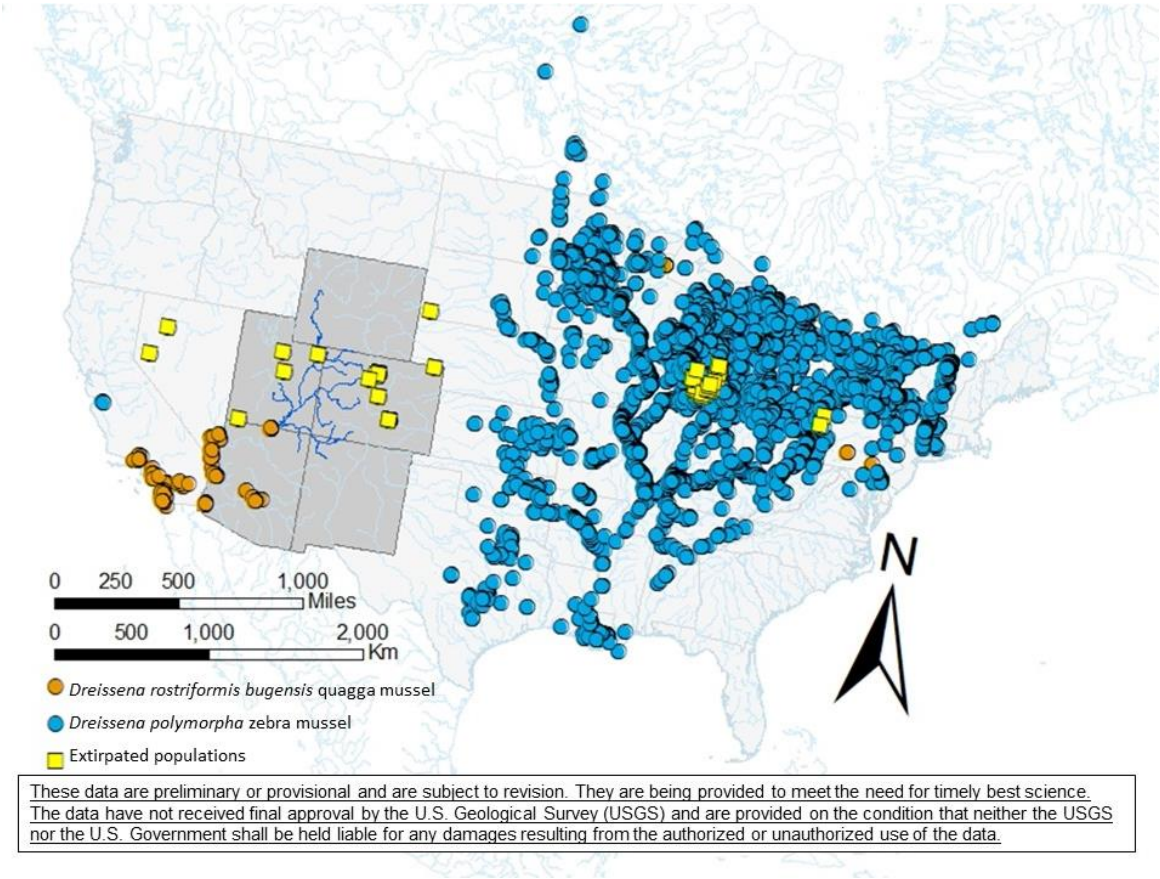

Figure 3. Established Dreissenid Populations in 2020
Source: USGS 2020b

Figure 4. Adult Dreissenids Surface Attachment
Source: Earthtec 2015

Dreissenids have few natural predators, so introduced populations grow unchecked. According to the Cary Institute of Ecosystem Studies (2020), dreissenids are highly prolific and attach themselves to boats or any hard surface with their byssus, or beard. They can live out of water for two weeks, and their larvae, known as veligers, use currents to colonize new waters. As many as 700,000 mussels can pile up in a square yard. Figure 4 shows an example of them attaching to a surface.

An example of their ability to quickly colonize and rapidly achieve high densities is provided in Figure 5, which demonstrates the increase in quagga mussel densities in Lake Michigan over a 10-year period. Once established, they cause considerable impacts to the ecosystem and water-related infrastructure, as described in Section 3.1 of this report. The invasion of dreissenids has already generated extensive costs related to infrastructure, biodiversity, and water quality in other regions of the United States.

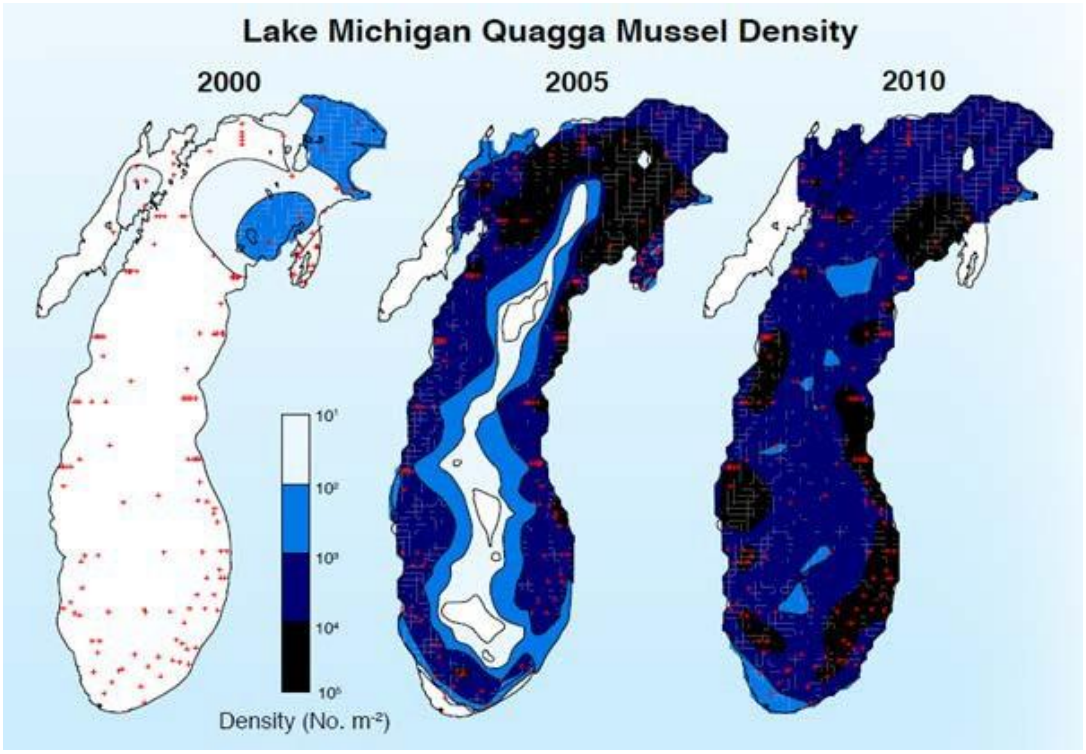

Figure 5. Quagga Mussel Density Lake Michigan 2000-2010
Source: NOAA Great Lakes Environmental Research Laboratory, n.d.

2.1 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 2016). 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 UCRB. The State of Colorado Zebra and Quagga Mussel Management Plan (2009) established training criteria for watercraft inspections and decontamination that have been replicated by other UCRB states. Arizona, Colorado, New Mexico, Utah, and Wyoming, in cooperation with other states, coordinate efforts and make decisions as part of this regional strategy, while operating within the scope of their specific budgets and statutory authorities. Regional coordination occurs through partnerships with the AIS-prevention organizations described below.

Aquatic Nuisance Task Force

The Aquatic Nuisance Species Task Force (ANSTF) was established by the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (PL 101-646). The ANSTF is an interagency organization co-chaired by U.S. Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration (NOAA) (USFWS 2022). Activities of the ANSTF include aquatic nuisance species prevention, research, and control; public and stakeholder education; and state coordination efforts (USFWS 2022). The ANSTF works with six regional panels including the Western, Great Lakes, Northeast, Mississippi River Basin, Mid-Atlantic, and Gulf and South Atlantic. 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 aquatic invasive species with the Clean-Drain-Dry message for recreational watercraft.

Western Regional Panel on Aquatic Nuisance Species

The Western Regional Panel on Aquatic Nuisance Species (WRP) (westernregionalpanel.org) 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 public and private sector researchers, industry representatives, agency representatives, and legislators to discuss invasive species management in 19 western states and four Canadian provinces. The meeting focuses on aquatic nuisance species research and development, including the most innovative and forward-thinking research in the region.

WRP documents (https://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 III (Elwell and Phillips 2016). These protocols and standards are scientifically based and are intended to help provide consistency across watercraft inspection stations in the Western United States. The five states in the study area aim to meet these standards and protocols commensurate with their budgets and authorities.

Aquatic Invasive Species Network

The (Western) Aquatic Invasive Species Network (AISN, https://www.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 links to a broad range of activities throughout western North America and around the world. The site complements information maintained by the WRP and other organizations.

100th Meridian Initiative

The 100th Meridian Initiative (www.100thmeridian.org/) 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 WRP.

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 (WID) Data Sharing System (System), which is in use at more than 200 locations across the Western United States (Figure 6; CPW 2020a, b).

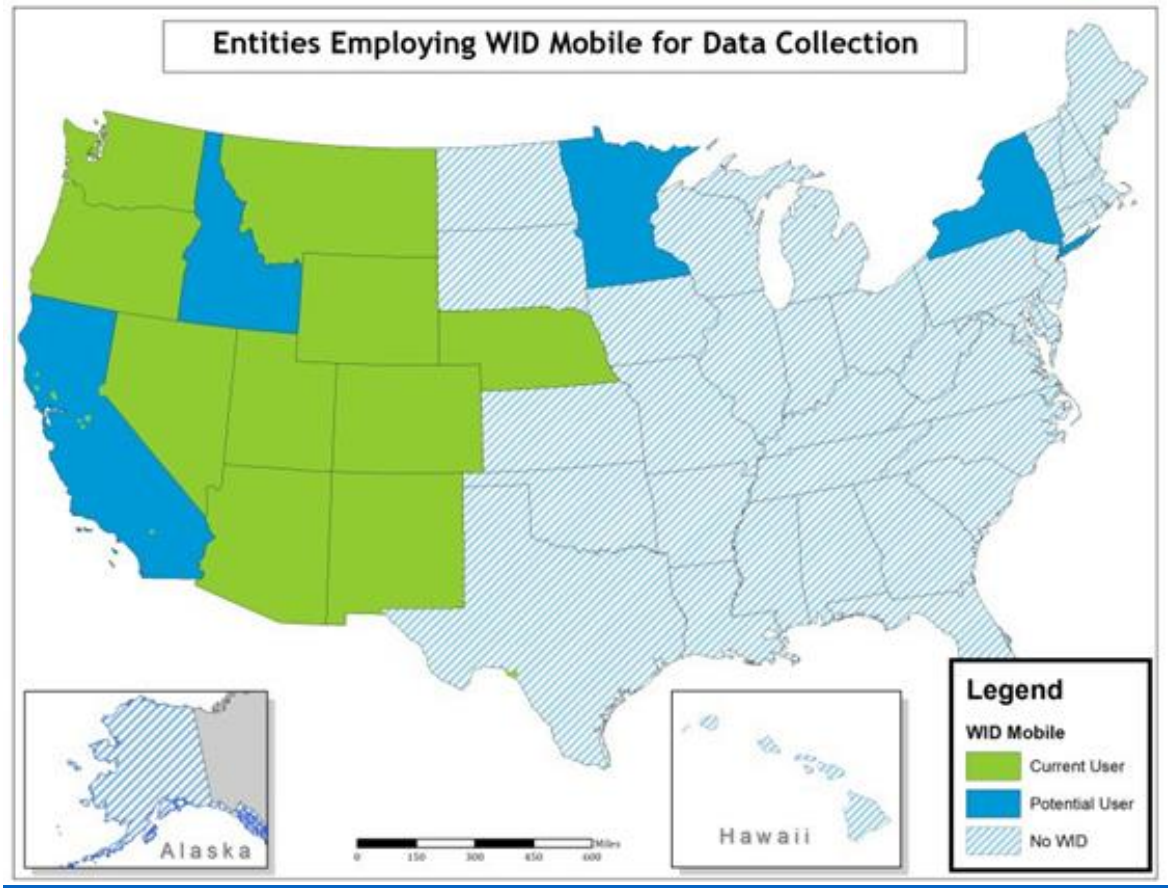

Figure 6. Map Showing States Using the Watercraft Inspection and Decontamination Data Sharing System

Colorado Parks and Wildlife (CPW) 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 phone app for iOS and Android devices. The System reduces operating costs for mobile data collection while increasing accuracy and reliability and 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 it 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 into un-infested waters.

Western Area Power Administration

The Western Area Power Administration (WAPA 2020) was established in 1977 as an interstate agency under the Department of Energy for managing hydropower across 15 western and central states, including those that contain the UCRB. WAPA is a federal

partner in the Upper Colorado River Endangered Fish Recovery Program established in 1988 (Conservation Innovation Center 2022).

Pacific Northwest Economic Region

The Pacific Northwest Economic Region (PNWER) is a statutory bi-national body that coordinates state AIS efforts with the Canadian jurisdictions of British Columbia, Alberta, Saskatchewan, Yukon, and Northwest Territories. Coordination with the Canadian provinces in the defense against a dreissenid introduction in the Columbia River Basin is important because the Columbia River flows north into Canada, and then south into Washington State. Dreissenids have been known to spread from Minnesota, across the border and into Manitoba through the Red River.

Northwest Power and Conservation Council

The Northwest Power and Conservation Council (NWPCC) is an interstate compact agency (Washington, Oregon, Idaho, and Montana) established in 1980 under the authority of the Northwest Power Act. It is charged with developing a 20-year energy plan for the Pacific Northwest, as well as a Columbia River Basin Fish and Wildlife Program (NWPCC 2014, 2020). Under the Fish and Wildlife Program, the NWPCC provides independent scientific review of fish and wildlife projects implemented by four federal action agencies (i.e., USACE, Bonneville Power Administration (BPA), U.S. Bureau of Reclamation (Reclamation), and the Federal Energy Regulatory Commission). A key strategy of the NWPCC's 2014 Fish and Wildlife Program focuses on reducing the threats from AIS through preventing the establishment of dreissenids, monitoring and managing introduction pathways, promoting regional coordination and collaboration, and promoting public education and outreach about invasive species.

2.2 EXISTING WATERCRAFT INSPECTION STATIONS IN UCRB

As previously stated, watercraft inspection stations are part of the regional response to the growing concern of an introduction of dreissenids into the UCRB. Watercraft inspection programs were established in the states of Arizona, Colorado, New Mexico, Utah, and Wyoming between 2006 and 2011. Watercraft inspection stations for these states are operated by the following organizations:

- Arizona – Aquatic Invasive Species Program, Arizona Game and Fish Department (AZGFD 2011).
- Colorado – Aquatic Invasive Species Program, Colorado Parks and Wildlife (CPW 2020b).
- New Mexico –Aquatic Invasive Species Program, New Mexico Department of Game and Fish (NMDGF 2008).
- Utah – Aquatic Invasive Species Program, Utah Division of Wildlife Resources (UDWR 2022).

- Wyoming – Aquatic Invasive Species, Wyoming Game and Fish Department (WGFD 2022).

These states have 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 common state law concerning mandatory watercraft inspection stations is that persons transporting watercraft and/or conveyances must stop for inspection or be subject to criminal prosecution in state courts. On the federal side, zebra mussels are listed as an injurious species under the Lacey Act (18 USC §§ 42-43 *et seq*.; 16 USC §§ 3371-3378 *et seq*.), which makes importation (transportation) across state lines a violation and, therefore, federally enforceable.

2.2.1 Types of Watercraft Inspection Stations and Operations

Many watercraft inspection stations in Arizona, Colorado, New Mexico, Utah, and Wyoming are established at selected locations near popular lakes each year during the recreation season, or made available by appointment at state wildlife management offices (Arizona; Wyoming) or private businesses. The recreation season typically ranges from early spring to early fall, depending on the state and specific station. Hours of operation vary by state and specific station. Operations for most stations begin between approximately 7 a.m. and 10 a.m. and end between 5 p.m. and 9 p.m. Stations are typically operated by two personnel for each shift, with additional personnel for high traffic areas or on weekends and holidays.

For this LR/Programmatic EA, watercraft inspection stations were separated into five types:

- Roadside inspection station, which 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 2016).
- Rampside station, which is set up at a specific water body to inspect watercraft entering/exiting a lake or reservoir (Elwell and Phillips 2016).
- Inspection conducted by appointment at state agency offices, which is available in most of the UCRB states.
- Authorized private inspections by appointment. Independent contractors identified by the state agency are available by appointment to inspect boats at locations throughout the state. These commercial inspections provide flexible options for inspection compliance.
- Roving station, which are typically assigned to a predetermined geographical area, sometimes remaining in a location for only

hours at a time, which makes them effective for inspections at high-use boating recreational areas or during watercraft-related activities such as fishing tournaments or boating-related competitions.

2.2.2 Station Locations

Though all types of watercraft inspection stations are used by states within the study area, Colorado, New Mexico, and Utah primarily operate rampside stations associated with lakes or reservoirs (Figure 7). 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 plant AIS (e.g., Eurasian watermilfoil (*Myriophyllum spicatum*), flowering rush (*Butomus umbellatus*), curlyleaf pondweed (*Potamogeton crispus*), purple loosestrife (*Lythrum salicaria*) and common water hyacinth (*Eichhornia crassipes*); EDDMapsS 2020). Roadside inspection stations are strategically located along state borders, with an emphasis on major routes entering the UCRB basin from the Lower Colorado River Basin and the Great Lakes, two areas in which dreissenids are well established. Many of these stations have a site arrangement that allows some equipment to remain onsite until the end of season. Figure 7 illustrates the station network, operated by the states within the UCRB. Up-to-date inspection station information can be accessed using the hyperlinks in **Error! Reference source not found.**. The map does not show commercially operated station locations.

Table 2. Upper Colorado River Basin AIS Inspection Station Locations

State	Station Information
Arizona	www.azgfd.gov/AIS
Colorado	cpw.state.co.us/Documents/ANS/WatercraftInspectionStations
New Mexico	www.wildlife.state.nm.us/fishing/fishing-regulations/aquatic-invasive-species/
Utah	utahdnr.maps.arcgis.com/apps/webappviewer/index.html
Wyoming	wgfd.wyo.gov/Fishing-and-Boating/Aquatic-Invasive-Species-Prevention/

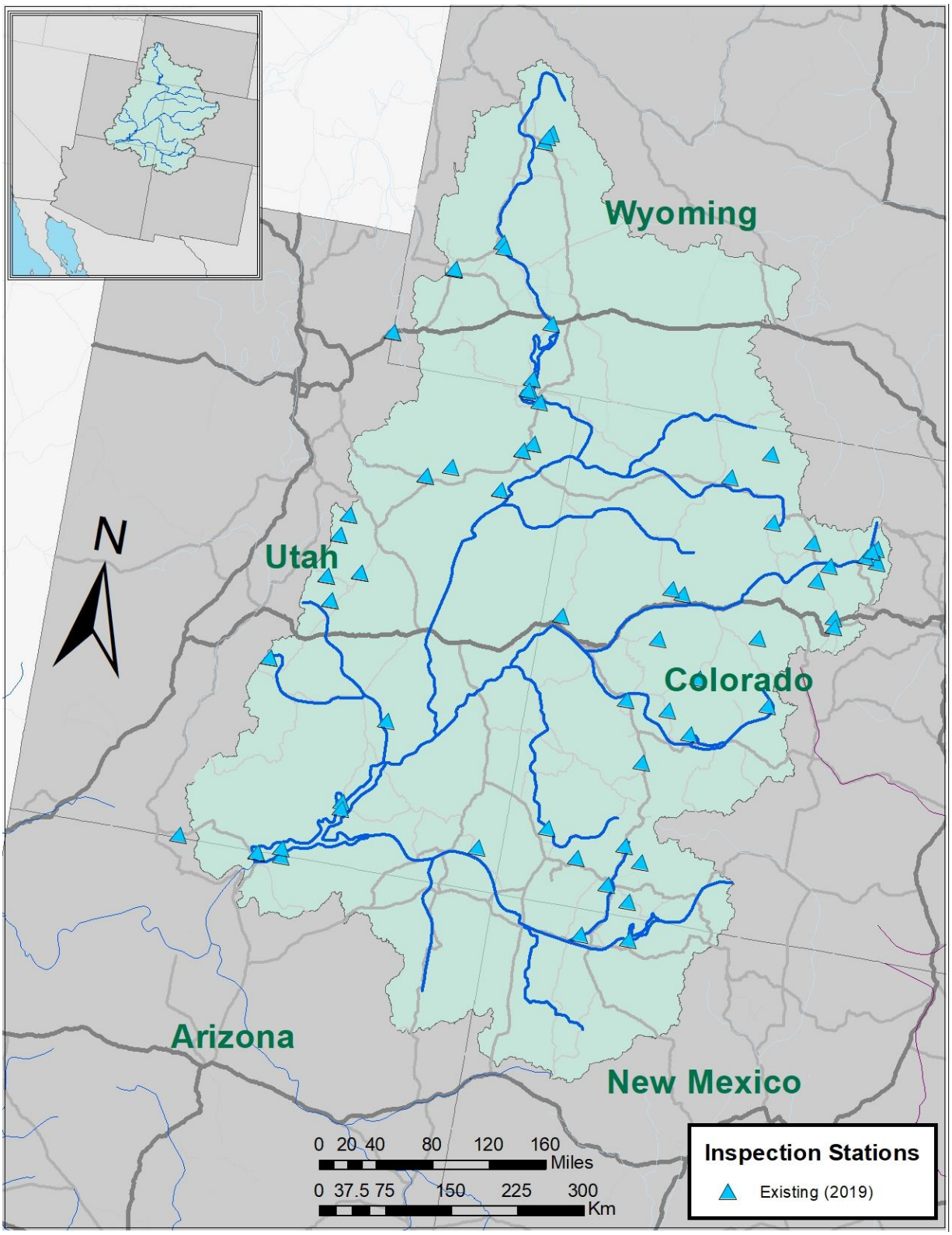

Figure 7. 2019 UCRB Watercraft Inspection Stations Operated by State Agencies
Stations by state: Arizona-2; Colorado-29; New Mexico-2; Utah-17; Wyoming-8.
Note: Legend was modified to reflect terminology in this LR/Programmatic EA.

The process of selecting locations for watercraft inspection stations includes 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 runoff does not present an environmental concern. Some states use a catch mat that is placed under the vessel to capture the runoff, as shown in the figure below (Figure 8).

Figure 8. A Portable Decontamination Unit with a Containment Mat for Wastewater

Most watercraft inspection stations can easily be moved and placed in the most effective locations. Each year, the states 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 includes coordination among states and takes into account their specific budgets and statutory authorities, as well as data collected related to boat transportation traffic and fouled boat interceptions.

Together, the states provide multiple levels of protection as vessels travel north or west through the region. As stated in the report by PNWER and PSMFC (2015), "[i]t is important to understand that no one station is the key to prevention efforts. There are examples of fouled conveyances passing through stations or avoiding stations on certain roadways. As a result, a network of perimeter and interior stations, including permanent and roving stations, is integral to preventing a dreissenid introduction."

The states have been refining the selection of watercraft inspection station locations for several years. Colorado and Utah are further in this process than Arizona, New Mexico, and Wyoming, which are still gathering data to determine the most effective locations. Nearly all of the inspection stations in Colorado, Wyoming, and Utah are established in the same location for the entire season, and many of the roadside and rampside

stations have a site arrangement that allows some equipment to remain onsite until the end of the season. Some stations in Utah are set up for shorter time periods, ranging from hours to days and they cover significantly more locations than the other states.

2.2.3 Station Equipment and Inspection and Decontamination Procedures

A typical station 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.).

Figure 9. Watercraft Inspection Stations in Utah

The 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 2016; WRP 2019). Procedures include a screening interview to assess the risk level of the watercraft, distribution of information about AIS (Section 2.2.5), 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; may have a layer of biofilm and algae on the hull or attached aquatic plants. It 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 2016).

A full decontamination is performed when live or dead mussels are present. Full decontaminations involve the same equipment, but are more detailed, taking hours instead of minutes (Elwell and Phillips 2016). 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 the UCRB states, a 30-day dry time is the typical protocol. In its simplest form, drying is a technique for desiccating dreissenids or other invasive species to decrease their viability (Morse 2009).

On occasion, watercraft owners request a decontamination if they have been at infested water bodies; these decontaminations may be performed at the owner's home if there are adequate containment provisions. 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 2016).

2.2.4 Magnitude of Existing Watercraft Inspection Programs

Table 3 identifies the numbers of boats inspected in 2019, with the number of fouled dreissenid boats intercepted. The states provided 2019 data to establish a baseline, and it is anticipated that they will have similar numbers of sites and costs in the future. Of the over 844,000 watercraft that passed through inspection stations in the five UCRB states, 362 were fouled.

Note that, in Arizonia, watercraft are only required to be inspected if they have been in state listed 'infested waters' for six (6) or more consecutive days and inspections are conducted by appointment. The result is that within Arizonia there are relatively fewer total inspections, but a higher proportion of them are infested.

Table 3. 2019 Watercraft Inspection/Interception Program Data by Select States

State	Number of Stations	Total Days	# Boats Inspected	Fouled Dreissenid Boats Intercepted
Arizona	16	264	617	235
Colorado	72	9,900	481,453	86
New Mexico	8	1,124	42,363	12
Utah	17	3,020	301,332	12
Wyoming	4	462	18,642	17
Total	117	14,770	844,407	362

Data was provided by the five UCRB states: Arizona, Colorado, New Mexico, Utah, and Wyoming.

2.2.5 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 UCRB. The states of Arizona, Colorado, New Mexico, Utah, and Wyoming 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.

Figure 10. Display Demonstrating How Mussels Can Attach to Watercraft

Watercraft inspection stations provide a valuable opportunity to increase public awareness. During the inspection, educating the public about AIS is a focus of every inspector/boat owner interaction, whether or not any type of AIS is found on the watercraft. Additionally, most inspection stations offer displays (Figure 10), posters, brochures, rack cards, or other materials to educate the public about AIS. Signage used to direct traffic to the inspection station location may include educational messages.

Advances to more modern platforms in station technology are also improving outreach and education. For example, mobile and fixed stations can be wrapped like a public billboard, and closed-circuit WiFi accessible to the public can provide mobile device connectivity for digital education resources. Custom applications or platforms could provide interactive data and feedback from users, such as having the user certify that prevention or decontamination tasks were completed and track the number and timing of users. Interactive technology may provide users a sense of belonging and purpose in the fight against AIS and promote the outreach and education aspect as an increasingly effective tool.

In addition to educating recreational boaters about AIS, PSMFC and PNWER are communicating with commercial entities on the issue. They are communicating with boat manufacturers about providing easy access to ballast water tanks on wakeboard boats, which would allow decontamination of water left in the ballast tanks. The

regional partners are also communicating with commercial boat haulers, boat brokers, auctions, online sale sites, and marinas with moored boats in infested water bodies such as the Lower Colorado River and Great Lakes.

2.2.6 Current Costs

In 2019, there were 117 watercraft inspection stations established in the states of Arizona, Colorado, New Mexico, Utah, and Wyoming (**Error! Reference source not found.**). Of those stations, 58 were located in the UCRB, and 59 outside of the UCRB. The same number of stations or more are projected for current and future years. Annual costs for operating watercraft inspection stations in each state are provided in **Error! Reference source not found.**.

Table 4. Annual Watercraft Inspection Station Operating Costs by State (Fiscal Year 2019)

State	Outside UCRB	Inside UCRB	Total	Average Daily Station Cost
Arizona	$466,621	$87,491	$554,112	$110
Colorado	$3,167,245	$2,136,049	$5,303,294	$536
New Mexico	$285,662	$202,275	$487,937	$434
Utah	$798,500	$1,384,810	$2,183,310	$294
Wyoming	$125,000	$73,500	$198,500	$430
Total	$4,843,027	$3,884,125	$8,727,153	---

Source: Data provided by the five UCRB states Arizona, Colorado, New Mexico, Utah, and Wyoming.

In addition to operating costs for the hot water pressure washers (wash unit), required annual maintenance includes replacing tires, valves, thermostats, hoses, fittings, changing the oil, and winterization of the units. The annual maintenance cost for the wash unit averages $1,500 per unit, and the total estimated annual maintenance cost for the wash units for stations inside the UCRB is $39,000 and outside the UCRB is $28,500.

2.3 EXISTING 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). In 2015, over half of the fouled vessels intercepted at watercraft inspection stations in the Columbia River Basin originated from these lakes (USACE, NWW 2022, Table 8).

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 is within the Lake Mead NRA. 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, fouled boats can legally leave the NRAs in several states without requirement of decontamination. However, no fouled boat is legally allowed to leave Glen Canyon NRA within Utah. Over a third of the fouled boats intercepted in Idaho, Montana, Oregon, and Washington in 2015 originated from Lake Mead, Lake Powell, and Lake Havasu (USACE, NWW 2022, Table 8). For an illustrative example of boater movement from the Lake Mead regaion, see Figure 11 below.

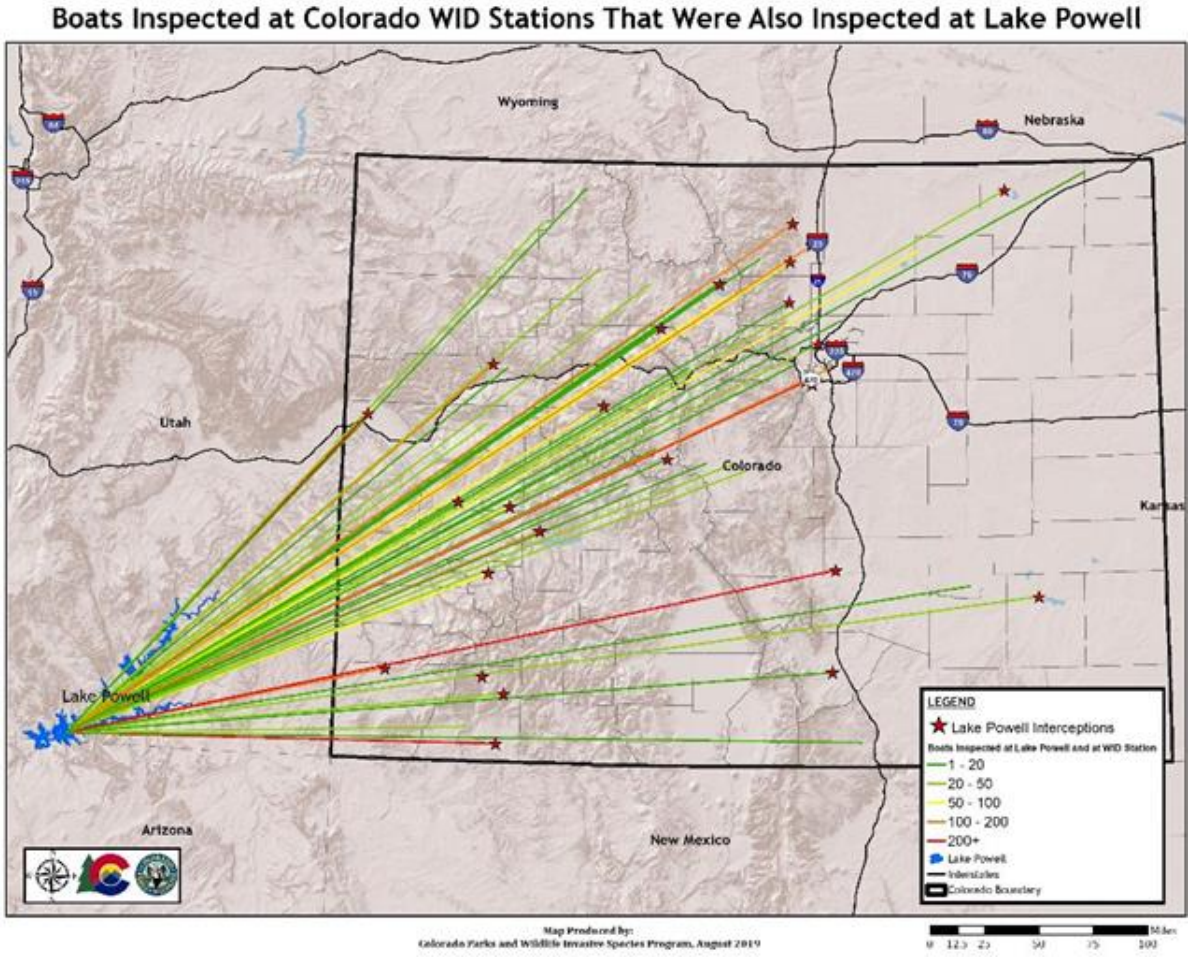

Figure 11. Dispersal of Boats from Lake Powell into Colorado
Source: (CPW 2020a)

In September 2018, the Arizona Game and Fish Department updated Director's Order 3 – R09/18 (originally issued May 2016), which establishes the mandatory conditions and protocols for all watercraft movement from AIS-infested waters and locations (AZGFD 2018). The protocols use exposure time in infested waters to determine which treatment to apply to watercraft, vehicles, conveyances, or other equipment. For example, if the watercraft was exposed or moored in infested waters less than 5 days,

the watercraft is only required to use the clean, drain, dry criteria, and remove the drain plug during transport. If AIS are observed on a boat, it will be mandated for a partial decontamination (see Section 2.2.3 for description). If the watercraft was exposed or moored in infested waters 6 or more days, the watercraft is mandated for a decontamination with drying times of 7 days during May through October and 18 days during November through April.

Several states mentioned above with infested water bodies do not have mandatory conditions and protocols for watercraft movement from AIS waters. All boats leaving Lake Powell within Utah must be fully drained of all water and free of all mussels. UDWR has the authority to require a boat to be decontaminated prior to leaving Lake Powell on the Utah side.

2.4 EXISTING MONITORING ACTIVITIES

This LR/Programmatic EA addresses two kinds of monitoring, water chemistry monitoring and early detection monitoring. Water chemistry monitoring includes monitoring water bodies to identify a variety of characteristics, including temperature, minerals, sedimentation, etc. Water chemistry information of infested and uninfested water bodies can be compared to determine the likelihood of dreissenids in particular infested water bodies becoming established in particular uninfested water bodies due to similar water chemistry. When considered in conjunction with pathways (transportation routes and boater traffic) that exist between the water bodies, this information can help determine the level of risk different infested water bodies may pose to a specific uninfested water body, such as specific USACE reservoirs. Currently, USACE does not perform water chemistry monitoring within the UCRB.

Early detection monitoring is required to assess the efficacy of prevention efforts, like watercraft inspection programs, and 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 UCRB.

Reclamation, along with the States of Colorado, New Mexico, Utah, and Wyoming, perform early detection monitoring for dreissenids in the UCRB and the surrounding area within the five states of the study area. The PSMFC (2022a) monitoring database can be found at http://psmfc.maps.arcgis.com/apps/MapSeries/index.html?appid=d317e395e88c48de8302a5753cf8789c (PSMFC 2022a). However, current monitoring efforts are insufficient according to a report by Counihan and Bollens (2017) that discusses early detection monitoring for veligers. Without adequate monitoring, dreissenids could go undetected and become established, while at the same time, watercraft inspections stations are established in locations based on inaccurate dreissenid population location data. The following example demonstrates the importance of monitoring. Montana tested positive for veligers in the Tiber Reservoir in November 2016, although they were previously not thought to be present in the state at all (FWP 2016). With this information, FWP

increased watercraft inspections to reduce the risk of the mussels spreading. Reservoir drawdown may have killed mussels in the shallows before they became established.

Monitoring supports WID and possible rapid response activities to halt the spread of dreissenids by identifying infested waters within the UCRB, and in adjacent river basins. Seasonal veliger sampling and adult mussel monitoring at locations within the five states use two standard methods: 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.

Monitoring locations are generally determined by the proximity of watercraft recreation areas to river confluences and likely areas of introduction. Sampling typically starts in early June and runs until early October, which is when the number of veligers is expected to be the highest. Samples from these monitoring activities are processed at various labs using standard methods for analysis.

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. The most recent QZAP update (WRP 2019) documents progress made over the last ten years, provides direction, and informs future decision making for quagga and zebra mussel management.

State Efforts

The earliest invasive species rapid response plan was written by WRP (2003). Colorado includes a rapid response strategy in their aquatic nuisance species management plan (CPW 2020b). Other UCRB states (Arizona, New Mexico, Utah, and Wyoming) have identified the importance and need for rapid response planning in their management plans. Development of specific rapid response plans for 23 high risk waters within state of Wyoming, including Flaming Gorge and Fontenelle Reservoirs, have been completed (WGFD, 2023). The Columbia River Basin (2017), Oregon (2013, 2017), Washington (2014, 2017), and Idaho (2012) have free-standing rapid response planning documents. These plans provide critical guidance for natural resource managers to plan and implement a rapid response effort to a dreissenid mussel infestation in their state waters.

Federal Efforts

The Department of Interior framework (DOI 2016) provides guidance for developing rapid response plans. The Reclamation Regional Plan covers the UCRB basin along with the Rio Grande River Basin. Reclamation compiled data for 18 UCRB hydropower facilities at risk from zebra mussels (Figure 12).

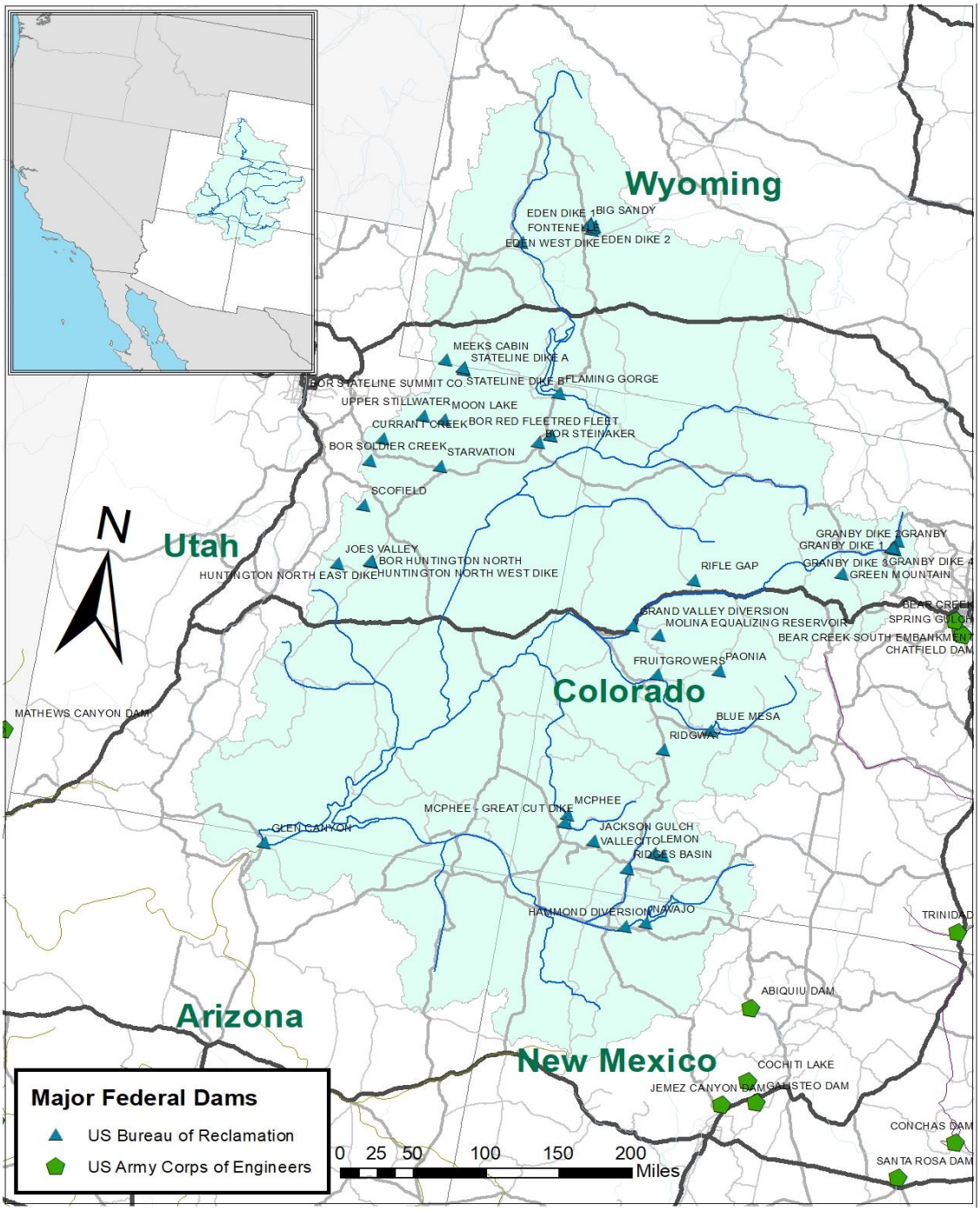

Figure 12. Major Upper Colorado River Basin Dams

SECTION 3 - PLAN FORMULATION

Development of this report generally 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 UCRB is at high risk of dreissenid infestation due to the mobility of recreational boats and other watercraft that are trailered across watersheds over interstate transportation systems, providing an easy mechanism for transferring infestations. In addition, the high survival rate of the dreissenids once established, their ability to be hidden on or inside of boats and other structures, and the high financial and environmental costs of infestation present serious problems to those who live, work, or recreate in or around the UCRB. Fundamentally, the problems can be divided into three categories: Impacts to Infrastructure; Health and Safety Impacts; and Environmental Impacts. These impacts are summarized 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, 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)-protected species in the UCRB in a significant way (see attached *Federal Natural Resource Compliance and Biological Evaluation* appendix for a list of threatened or endangered species). An uncontrolled infestation in the UCRB 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 20 years.
- An infestation of dreissenids in the UCRB could significantly disrupt hatchery operations, affecting sport fish abundance, and recovery efforts for endangered Colorado River 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 UCRB. Once established in one area, they can rapidly spread downstream within watersheds during their free-swimming larval stage. The presence of veligers at Apache Lake, Canyon Lake, and Saguaro Lake on the Salt River in Tonto National Forest (Arizona) is further indication of the level of risk.

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, causing 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 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 Basin ranged from $1 billion to $1.5 billion, and similar costs are expected in the Western United States in the event of an invasion (Connelly et al. 2007).

Based on the facility vulnerability assessments completed by Reclamation, authorized purposes at USACE projects (e.g., hydropower, navigation, and fish and wildlife mitigation) 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:
  - 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 plant operation problems.
- 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 by decreasing the food supply for young and small fish, and increasing habitat for fish that prey on ESA-listed fish.
- Recreation, Tourism, and Waterfront Property Values: a dreissenid infestation affects the recreational fishery by altering fish population dynamics, and the fresh-water beaches, turning sandy beaches to jagged shorelines due to the life cycle of dreissenids. The negative effects to both the recreational fishery and the quality of fresh-water beaches will reduce recreation and tourism in the affected area.

An example of the degree of damage they can impose is shown in Figure 13. More detailed descriptions of impacts and associated estimated costs to USACE authorized purposes, as well as to water supply, recreation, and tourism are provided in Section 4.

Figure 13. 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 decreasing the risk of infestations within the UCRB and at USACE-owned and operated reservoirs. The opportunities, which were developed by collaborating with the states of Arizona, Colorado, New Mexico, Utah, and Wyoming, include augmenting the AIS detection and decontamination efforts and expanded monitoring and contingency planning activities.

USACE has the opportunity to collaborate in a multi-state and multi-agency partnership that will do the following:

- Use existing knowledge to identify high risk infestation areas, transportation corridors, and types of infrastructure to address UCRB vulnerabilities to an infestation by inspecting watercraft traveling from infested waters to the UCRB.
- Educate recreational users of watercraft and public lands about the risk and damages caused by aquatic invasive species.

- Intercept dreissenids to reduce the risk of an infestation in the UCRB.
- Monitor the water chemistry in the UCRB 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 UCRB. This provides an opportunity to inform risk management decisions.
- Detect veligers before populations of dreissenids become established in the UCRB.
- Prevent organisms from infesting new waters through strategically placed watercraft inspection stations, public education, and effective rapid response plans.
- Develop rapid response plans, which would be implemented upon initial detection of dreissenids in the UCRB.

3.3 PLANNING OBJECTIVES AND CONSTRAINTS

Planning Objectives

- Planning objectives represent desired positive changes. They are generated to describe how problems could be addressed by taking advantage of available opportunities. The following objectives for the UCRB were identified for this evaluation and cover a 50-year period of analysis (2023-2073):

  - Intercept watercraft on existing pathways between infested and non-infested waters in the UCRB to detect dreissenids on the watercraft and decontaminate the watercraft to reduce the risk of infestation.
  - Identify water chemistry of the UCRB and compare it to the water chemistry of infested water bodies to better understand the risks to waters of the U.S. in the UCRB, and to prioritize areas for development of follow-up actions.
  - Prepare rapid response plans in the event dreissenids are detected.
  - Using the existing facility vulnerability assessments performed by Reclamation (2013; 2015a-e), prepare site-specific contingency plans with a focus on areas that monitoring efforts determine are 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:

- Comply with federal, state, and local laws, and regulations and policies.
- Implement the program consistent with the authorizing legislation and guidance.
- Avoid adverse effects to threatened and endangered species.

3.4 MEASURES

The following sections show potential improvements and expansions of the current operations through a federal partnership. This evaluation does not attempt to precisely define the future program. Optimization will occur annually at the regional level. Instead of attempting to define an optimal set of conditions, this report assumes that providing federal funding to assist the state programs across the region will result in an increase in the investment and effectiveness of the overall program and a decrease in the risk of infestations. The measures discussed below were developed in cooperation with state AIS coordinators.

Measure 1 – Federal Participation in the Process to Strategically Select and Prioritize Locations to Establish Watercraft Inspection Stations in the States of Arizona, Colorado, New Mexico, Utah, and Wyoming

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 being introduced into waters of the U.S. in the UCRB (see Section 2.2, Existing Watercraft Inspection Stations in the UCRB, for further description). There is an opportunity to increase communication among state and federal partners through periodic virtual meetings.

Measure 2 – Increase the Number of Watercraft Inspection Stations in the States of Arizona, Colorado, New Mexico, Utah, and Wyoming

This measure would augment the future program by increasing the number of watercraft inspection stations in the program to reduce the risk of dreissenids being introduced into the UCRB. The type of inspection locations would be roadside, rampside, and roving (see Section 2.2.1, Types and Operations, for further description). New inspection locations would be established, depending on the availability of federal funding and each state's need to increase program effectiveness and its ability to share in the associated costs.

Measure 3 – Extend Daylight Inspection Hours to the Watercraft Inspection Program in the States of Arizona, Colorado, New Mexico, Utah, and Wyoming

This measure would augment the future program by extending daylight inspection hours to reduce the risk of dreissenids being introduced into waters of the U.S. in the UCRB. Daylight inspection hours would be expanded based on each state's need to increase program effectiveness and its ability to share in the associated costs.

Measure 4 – Increase Nighttime Watercraft Inspections in the States of Arizona, Colorado, New Mexico, Utah, and Wyoming

This measure would augment the future program by adding or increasing the number of nighttime inspections that are performed. In 2015, Washington State Department of Fish and Wildlife (WDFW) implemented nighttime operations, from 10 p.m. to 6 a.m., through a grant from PSMFC and Bonneville Power Administration. Nighttime operations were conducted on six different occasions in August in Plymouth, Ridgefield, and Spokane, Washington. During this pilot program, 182 boats were inspected.

Although no dreissenids were found during these inspections, two boats originated from waters infested with dreissenids. A majority of the boats (~70%) were stopped between 3 a.m. and 6 a.m. (WDFW and PSMFC 2015). The effectiveness of nighttime inspection stations is dependent on the location of the inspection station and major events in the area. This pilot program proved there can be a significant amount of nighttime watercraft transportation occurring within and outside a basin. The pilot program indicated a potential for boats originating from infested waters to enter the basin at night. Establishing nighttime operations at consistent locations could further reduce the risk of a dreissenid introduction in Waters of the U.S. in the UCRB. Night operations are not typically conducted without the presence of law enforcement, due to the need to ensure the safety of watercraft inspection personnel and the public. Law enforcement personnel can significantly increase the cost of station operations, and they are not always available. In some locations, law enforcement agencies either do not patrol after 10 p.m. or reduce their nighttime patrols, which limits their availability to assist with watercraft inspection stations. The ability to hire inspectors for night operations could also present a challenge, especially in more remote areas where recruiting daytime inspectors has been challenging. Another challenge is that the lack of effective lighting at night can limit the inspector's ability to accurately conduct inspections.

Nighttime inspections would be added depending on the availability of federal funding and each state's need to increase program effectiveness and its ability to share in the associated costs. If a federal partnership is established, the nighttime operations could be phased in as states 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 at Watercraft Inspection Locations in the States of Arizona, Colorado, New Mexico, Utah, and Wyoming

This measure would augment the future program by helping to construct site improvements 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 and each state's need to increase program effectiveness and its ability 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 and each state's need to increase program effectiveness and its ability 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.

In locations where water availability is scarce, providing additional water capacity in the form of large water containers or through the construction of a wastewater recirculation and filtration system could increase the capability of inspection station staff to perform hot water decontaminations on high-risk boats.

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 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.

Measure 6 – Add Optional Canine Detection Capabilities to the Existing Watercraft Inspection Program in the States of Arizona, Colorado, New Mexico, Utah, and Wyoming

For states that determine nighttime inspections are feasible and effective in certain areas, the use of canines can assist with the challenge of inadequate lighting. Dogs can use their keen sense of smell to detect dreissenids without light, and they have been shown to be more effective than human inspectors. Both 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. 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 and each state's needs to increase program effectiveness and its ability to share in the associated costs.

Measure 7 – Increase Public Awareness and Education Related to the Existing Watercraft Inspection Program in the States of Arizona, Colorado, New Mexico, Utah, and Wyoming

This measure would augment the future program by increasing public awareness and education efforts, which could include ad campaigns; communication with commercial

boat haulers, marinas, etc.; 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 the UCRB. Development of a social science survey/study would support the states with outreach strategies. Studies would identify which stakeholders and communities would benefit from additional educational materials, which messages more effectively communicate issues and increase watercraft inspection compliance, and how to prevent introduction of mussels into water bodies. Increasing public awareness and education efforts would be implemented depending on the availability of federal funding and each state's needs to increase program effectiveness and its ability to share in the associated costs.

Measure 8 – Require Watercraft Inspections at Federal Facilities at Infested Water Bodies

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 UCRB Water Chemistry and Compare to Water Chemistry of Infested Water Bodies

Dreissenids acclimated to the water chemistry of a particular water body could become established in the UCRB more easily than those established in a water body with a differing water chemistry. This measure would augment the future program by identifying water chemistry of the UCRB for comparison to the water chemistry of infested water bodies to help inform early monitoring locations and risk management decisions within the UCRB. Using these monitoring results, USACE would develop a risk assessment matrix of infested water bodies of similar water chemistry to the UCRB to determine the risk of those dreissenid populations becoming established in the UCRB.

Measure 10 – Monitor for Early Detection

This measure would augment the future program by leveraging both states and USACE efforts to engage in monitoring activities for early detection of veligers in the states of Arizona, Colorado, New Mexico, Utah, and Wyoming, with a focus on protecting the UCRB. These efforts would focus on locations determined by the water chemistry data to be of highest risk and locations that state collection data indicate are high-use areas by boaters traveling from water bodies of concern.

Monitoring activities provide an additional level of defense in the event prevention measures fail and live mussels invade a water body in the states of Arizona, Colorado, New Mexico, Utah, and Wyoming. Early detection monitoring and having appropriate response plans in place increase the chances of initiating an effective response before widespread establishment occurs.

Water quality measurements, environmental DNA, and petite Ponar grab sampler are some indirect methods of monitoring for Dreissenid mussels. Sets of water quality measurements consisting of calcium, temperature, salinity, pH, dissolved oxygen, and visibility are conducted 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 environmental DNA would require two liters of lake water to be collected at sample sites. Environmental DNA analysis would then be performed in a lab following rigorous quality control protocol developed by the Asian Carp Monitoring Program's Quality Assurance Project Plan, both in the field and laboratory, to ensure samples are not contaminated (USFWS 2015). Benthic samples would be collected using a petite Ponar grab sampler at each site from a watercraft for the presence of 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 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 encourage, and possibly require, participating agencies to use the Regional WID Data Sharing System (System) to document inspections and share data with other agencies throughout the Western United States (CPW 2020a and b).

CPW 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 phone 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 traveling to after launching into 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 into 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 by the states for watercraft traveling between lakes across the region, both within and outside the UCRB. The system would direct boaters toward inspection and cleaning stations to decrease the risk of introduction of invasive species into un-infested 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 UCRB. Understanding movement patterns of boaters would 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 site-specific plans at USACE and other federal facilities, based on the facility vulnerability assessments conducted by Reclamation (2013; 2015a-e) (see Section 3.1 for information about vulnerability assessments).

Measure 15 – Rapid Response Planning

This measure would augment the future program by helping to develop rapid response measures at USACE and other Waters of the U.S. to find and eradicate dreissenids before they further spread and cause damage (see Section 2.5 for further information).

Preventing the introduction of invasive species is the first line of defense against biological invasion (Draheim et al. 2017; PSFMC 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 Asian carp (DOI 2016).

Where monitoring detects the presence of dreissenids, rapid response is the next most cost-effective management tool to quickly eliminate or minimize infestation impacts. Rapid response measures include prevention, containment, control, eradication, enforcement, and education/training and outreach actions. Interagency (federal, state, local) exercises are essential for testing the strengths and identifying the weaknesses of rapid response plans. USACE, in collaboration with agencies in the five study area states, must be prepared to quickly respond to contain and limit any infestation in the entire water system in the UCRB.

3.5 MEASURES SCREENING

Table 5 lists the measures identified for this report and the individual objectives.

Table 5. Measure Screening by Objectives

Measures	Intercept Watercraft	Water Chemistry	Rapid Response	Contingency Planning
Measure 1 – Federal Participation in Selection of	X			

Watercraft Inspection Station Locations				
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 8 – Require Watercraft Inspections at Federal Facilities at Infested Lakes	X			
Measure 9 – Monitor to Identify Water Chemistry		X		X
Measure 10 – Monitor for Early Detection		X	X	
Measure 11 – Regional WID Data Sharing System	X		X	
Measure 12 – Develop and Implement Real-time Tracking of Watercraft Transportation	X		X	
Measure 13 – Evaluate Traffic Patterns for Recreational Boating	X			X
Measure 14 – Contingency Planning				X
Measure 15 – Rapid Response Planning			X	

The measures were then screened to determine which did not violate any identified planning constraints (Table 6). Measure 8, Require Watercraft Inspections at Federal Facilities at Infested Waterbodies was eliminated from further consideration due to the geographical limitations of Section 104 of RHA. Currently, USACE does not have the authority to execute Measure 8. All other measures were carried forward for consideration (alone or in combination) as shown in Table 6, below.

Table 6. Measure Screening by Planning Constraints

Measures	Consistent with Authorizing Legislation (Sec. 104 RHA)	Avoid Adverse Effects to Threatened and Endangered Species	Comply with Federal, State, and Local Laws, Regulation, and Policies	Retained for Consideration
Measure 1 – Federal Participation in Selection of Watercraft Inspection Station Locations	Yes	Yes	Yes	Yes
Measure 2 – Increase Watercraft Inspection Stations	Yes	Yes	Yes	Yes
Measure 3 – Extend Daylight Inspection Hours	Yes	Yes	Yes	Yes
Measure 4 – Increase Nighttime Inspections	Yes	Yes	Yes	Yes
Measure 5 – Construct Site Improvements	Yes	Yes	Yes	Yes
Measure 6 – Add Canine Detection	Yes	Yes	Yes	Yes
Measure 7 – Increase Public Awareness and Education	Yes	Yes	Yes	Yes
Measure 8 – Require Watercraft Inspections at Federal Facilities at Infested Lakes	No	Yes	No	No
Measure 9 – Monitor to Identify Water Chemistry	Yes	Yes	Yes	Yes
Measure 10 – Monitor for Early Detection	Yes	Yes	Yes	Yes
Measure 11 – Regional WID Data Sharing System	Yes	Yes	Yes	Yes
Measure 12 – Develop and Implement Real-time Tracking of Watercraft Transportation	Yes	Yes	Yes	Yes
Measure 13 – Evaluate Traffic Patterns for Recreational Boating	Yes	Yes	Yes	Yes
Measure 14 – Contingency Planning	Yes	Yes	Yes	Yes
Measure 15 – Rapid Response Planning	Yes	Yes	Yes	Yes

See amendments to Section 104 of the RHA of 1958.

3.6 ALTERNATIVES

3.6.1 Alternative 1, Existing Conditions (No Action Alternative)

Alternative 1, also referred to as the No Action Alternative, represents a continuation of the states' current practice, in which USACE would not partner with the states to establish watercraft inspection stations to prevent the spread of AIS into and out of Waters of the U.S. within the UCRB (see Section 2.2 for a description) Although the No Action Alternative does not meet the Purpose and Need Statement, it will be carried forward for further consideration and evaluation as required by NEPA for a baseline from which to compare other alternatives.

3.6.2 Alternative 2, Comprehensive Adaptive Improvements

Alternative 2, Comprehensive Adaptive Improvements, is made up of all measures identified in Section 3.4 that meet the study objectives without violating any planning constraints. This alternative assumes USACE would partner with the states and their agencies using federal funding to expand and support existing state programs, resulting in increased effectiveness in the watercraft inspection program to decrease the probability of a dreissenid infestation. In coordination with their regional partners, the states 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 Comprehensive Adaptive Improvements alternative also includes monitoring, contingency planning, and rapid response planning for USACE facilities and reservoirs. These actions are not currently eligible for cost sharing (WRDA 2014, 2016). The measures in Alternative 2 are listed in Table 67.

Table 7. 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 **Error! Reference source not found.**would be adjusted annually by each state based on its need and ability to fund its 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 substantially as the states continue to refine and optimize the program's overall effectiveness.

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 is being prepared to determine if there is a federal interest in an AIS monitoring and watercraft inspection program in the states of Arizona, Colorado, New Mexico, Utah, and Wyoming (cost shared with the states) to protect the UCRB from the spread of AIS. This 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 initially considered four alternatives, but screened them until only the No Action Alternative and Alternative 2 (Comprehensive Adaptive Improvements), which is made up of all measures identified in Section 3.4 that meet the study purpose and need statement and objectives without violating any planning constraints, remained. Alternatives containing discrete subsets of measures would not be holistically applicable to the UCRB and would not satisfy the purpose and need of the action. Therefore, Alternative 2, Comprehensive Adaptive Improvements, was carried forward for further consideration and evaluation. This alternative includes 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 states, as they each developed their own watercraft inspection station programs and grew to work together towards a regional strategy. A number 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 states would continue to refine their watercraft inspection station programs, with the scale and components of those programs evolving from year to year.

Similarly, while Alternative 2 provides for comprehensive adaptive improvements (see Section 3.4 Measures, and

Table 5) subject to the constraint of available state funding for cost share, it is more of a framework for an annual adaptive planning process, with input provided by USACE. The measures listed **Error! Reference source not found.**are ones that were developed and analyzed through prior experience by the states. 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 jurisdictions within the basin.

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 with fewer measures. Alternative 3 did not include Measure 4 (increasing nighttime inspections) or Measure 6 (adding canine detection). As mentioned earlier in this report, nighttime inspections entail higher costs than daytime inspections due to the necessity of securing 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. Because of the increased cost associated with these measures, an alternative that did not include them was considered. This alternative was screened out, however, because it failed to address the significant and documented concern that a high number of watercraft were being transported within the UCRB at night, a concern these two measures directly addressed: the first by having inspection stations open at night, and the second by then 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 3would not effectively address a significant percentage of the watercraft that could potentially be bringing aquatic invasive species into the UCRB, therefore it was eliminated from further consideration and evaluation.

A fourth alternative (Alternative 4) that was briefly considered focused on locating new watercraft inspection stations at USACE reservoirs, and to have USACE employees or staff contracted by USACE operate and maintain them. However, Alternative 4 was eliminated from further consideration very early in the process because it was determined that locating these stations at USACE reservoirs did not provide the highest likelihood of preventing the spread of aquatic invasive species throughout the study area. As previously mentioned, the states have yearly refined their station location selection process, based on previous years' experience and data tracking. An important part of their selection process is to determine not only where boat traffic is most prevalent, but also where boats originate. Their focus is on a more efficient regional strategy that aims to intercept fouled boats before they have the opportunity to reach the UCRB. USACE and the states share a common goal of keeping the UCRB free from an infestation, which would result in high financial and environmental costs to federal and state interests.

SECTION 4 - ECONOMIC AND ECOSYSTEM CONSIDERATIONS

The UCRB is one of the last areas in the United States that has not been infested by dreissenids, and there is a regional effort to reduce the risk and the potential damage and economic impacts to water resource-related infrastructure and ecological resources that would result from dreissenids becoming established in the basin. The expansion of dreissenid populations from the Great Lakes to other parts of the United States and the human-assisted pathways that exist between nearby infested water bodies and the UCRB present a risk of an infestation in the UCRB. Based on that risk, this report assumes that an infestation will 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 would be re-evaluated at both the federal and state levels and would be adjusted if a major infestation occurs.

Values in the economic analysis are based on fiscal year (FY) 2023 price levels and the FY 2023 federal discount rate of 2.5 percent unless otherwise noted. Annualized benefits and costs are computed using a 50-year period of analysis.

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 UCRB; 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 UCRB 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 current available data (2019-2020) related to additional 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 the Idaho Aquatic Nuisance Species Taskforce’s 2009 report, Bonneville Power Administration’s Zebra Mussel Response Plan (Athearn and Darland 2007), and the Economic Risk of Zebra and Quagga Mussels in the Columbia River Basin report (IEAB 2013). Although anti-fouling paint cost estimates

are included in this section as part of hydropower and fish ladder maintenance, there are currently no methods known to eradicate a dreissenid infestation in an open water environment. Additionally, established anti-fouling paint application measures may be more limited in application in the UCRB due to potential impacts on ESA-listed species.

Price levels were escalated from their initial studies using EM 1110-2-1304 Composite Yearly Cost Indices dated 30 September 2022. EM 1110-2-1304 was used because its purpose is for use in escalating USACE Civil Works (CW) project costs and applies to all USACE commands having CW design cost responsibilities. The Yearly Cost Indices are used instead of Quarterly Cost Indices because the months of the original price level are unknown via the initial studies.

Other impacts presented in the sections below include those related to water supply and treatment facilities, boating and marine infrastructure, recreation, and tourism.

Hydropower Facilities

According to Arizona Game and Fish Department (AZGFD 2016), "Congressional researchers estimated that zebra mussels alone cost the power industry $3,100,000,000 in the 1993-1999 period, with their impact on industries, businesses, and communities more than $5,000,000,000." 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 be clogged, resulting in a complete powerhouse shutdown.

Hydropower instrumentation also runs the risk of being fouled and causing plant operation problems. Flap gates are not only susceptible to an infestation, but they are also difficult to inspect. If a flap gate is fouled and will not close, high river stage flood waters could enter protected areas. Various hydropower facility pools supply water to the local area for municipal use, fish hatcheries, irrigation, and other requirements. These systems are as susceptible to zebra mussel infestations as are hydropower facilities.

Cost estimates referenced by a BPA-commissioned study indicate that an expected average annual cost for additional O&M implementation could be as high as $100,000 per facility (Phillips et al. 2005). 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 intake cleaning are likely to be increased due to threat of fouling. The updated cost per facility estimated for 2023 is $144,000.

Currently, there are approximately 87 federal and non-federal facilities capable of producing hydroelectric power in the UCRB. Using the BPA-commissioned study cost estimates, additional facility O&M costs could be as high as $12.5 million per year for all facilities. If the same measures and operational changes are implemented for non-

federal facilities, per unit costs would likely be similar 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 Hoover, Davis, and Parker Dams are attempting to treat their infestation issues to avoid power outages, the UCRB has 65 unique threatened and endangered species (see appendix) 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 UCRB or other watersheds.

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. O'Neill's (1997) base cost estimates were escalated to present dollars, and these new estimates indicate that hatcheries may be forced to spend up to $15K per year in the event of an infestation. There are three federal hatcheries in the UCRB, with seven additional federal hatcheries across the five states. The UCRB states operate another 21 fish hatcheries. Based on these numbers, additional O&M costs could total $466K per year for a full infestation (Table 8). As with hydropower, non-federal hatcheries would also experience similar costs if the same O&M measures are implemented.

Fish Passage Facilities

A total of 12 federal fish passage facilities are located within the basin. The Upper Colorado River Recovery Program (https://coloradoriverrecovery.org/) operates six fish passage facilities in Colorado (5) and Utah (1), while the San Juan River Basin Recovery Implementation Program (USFWS 2020) operates six passage facilities on the San Juan River in New Mexico. Adult fish passage facilities are at risk in the event of a dreissenid infestation. All submerged surfaces in low velocity areas could become colonized. Screens in places can easily become fouled as dreissenids colonize and build up, which creates blockages that may require in-water inspection and cleaning. The range of impacts to fish passage and monitoring facilities could impact normal fish operations and/or existing maintenance periods. Decontamination and recommissioning costs in the form of cleaning and clearing fish ladders at UCRB facilities could be as high as $11,000 per year in the event of an infestation.

Water Supply and Treatment Facilities

Recent studies done at multiple water treatment facilities suggest that "the O&M-based unit costs of mussel control varied from $34.32/mil gal [million gallons] for 1-mgd [million gallons per day] capacity to $12.63/mil gal for 2,640-mgd capacity. The capital cost and O&M-based equivalent annual unit cost for treatment varied from $78.56/mil gal for 1-mgd capacity to $13.41/mil gal for 2,640-mgd capacity. Costs for larger water treatment

plants (i.e., >10 mgd) varied between $1.00/mil gal and $13.00/mil gal" (Chakraborti et al. 2016). The Great Lakes infestation has been a prime source of impact estimates for other watersheds due to the number of historical examples indicating direct impacts on private businesses and localities. In one instance, "a Michigan town lost water for three days after a mussel colony clogged its water-intake pipe" (Franklin County Emergency Management and Homeland Security 2013, p. 320).

There are approximately 643 water treatment facilities in the UCRB. This number comes from the USGS water supply inventory. While this inventory is not frequently updated, it is one of the best sources for finding the number of intakes on multi-state rivers. The only other way to fully calculate the number of intakes on the Upper Colorado River would involve visiting each county's website and searching for active approved intakes on the river. Because of the scope of this study, this option was not pursued. Using an estimate cost of $41,000 per intake, the total yearly damages will be $26,300,000 for the entire basin's water intake inventory.

Boats and Associated Infrastructure

The invasion of dreissenids into Lake Mead has caused concern for recreational boaters. Reports suggest that "without regular maintenance to brush away the fingernail-sized mussels, colonies can build up on the hull and in the cooling water intake of outdrives," which could result in "serious safety problems caused by drag on the boat and lack of cooling water" (Rogers 2008). According to information from the states, there are approximately 563,494 boats currently registered. Based on the percentage of each state that lies within the UCRB, there are 336,093 within the region that run the risk of additional maintenance costs in the event of infestation. Research from Lake Erie suggests that per boat costs were $265 in 1994 (Vilaplana and Hushak 1994). When these costs are escalated to current 2023 year dollars, boaters in the region may face annual maintenance costs of up to $160,800,000 in total costs per year if all boats are impacted.

Recreation and Tourism

Where dreissenids have infested waterways, they have had serious impacts on freshwater beaches. Impacts include beach goers getting 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 discourage many boaters from visiting that water, impacting both recreational opportunities and local economies. This would have a significant impact on the waterways of the Southwest, which generate tourism and recreation revenue.

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). For this analysis, the BCR compares the relative cost of the potential impacts deferred and the cost of the risk reduction measures. In other words, benefits are derived by deferring O&M costs through actions such as establishing watercraft inspection stations to reduce the risk of the spread of dreissenids into the UCRB.

4.1.2.1 Benefits

Table 8 highlights the costs per facility for O&M 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 municipal water supplies, non-federal hydropower, and private boat maintenance.

Table 8. Average Annual O&M Costs of a Total Infestation

Structure	Number Impacted			O&M Cost Increase per Unit	Average Annual O&M Cost Increase
	USACE	Other Federal	Non-Federal		
Boats	0	0	336,093	$1,000	$160,800,000
Surface water treatment	0	0	643	$41,000	$26,300,000
Hydropower Facilities	13	24	50	$144,000	$12,500,000
Fish Passage	0	12	0	$11,000	$128,000
Fish Hatchery Facilities	0	10	21	$15,000	$466,000
Average Annual O&M Costs Deferred for a Total Infestation					$200,300,000

Note: October 2022 FY (23) price level, Period of Analysis: 50 years, Values displayed in $1, Interest Rate 2.5%

The average annual O&M cost increases provided in Table 8 were based on a 50-year period of analysis. The table also indicates that total average annual additional O&M costs could be as much as $200 million per year for a full-scale infestation in the UCRB.

4.1.2.2 Risk Reduction Costs

shows the costs associated with watercraft inspection station operations and water body monitoring based on current state spending inside and outside of the basin. The total 2023 cost is $4,949,752.

Table 9. Annual Watercraft Inspection Station Operating Costs by State

State	Inside the UCRB
Arizona	$111,000
Colorado	$2,720,000
New Mexico	$258,000
Utah	$1,760,000
Wyoming	$94,000
Total	$4,950,000

Data provided by the five UCRB states include monitoring and rapid response planning.

4.1.2.3 Benefit-Cost Ratios

The total benefits of the implementation of watercraft inspections in the UCRB utilizes the 2.50 percent Federal Discount Rate for the year 2023. The study period length is 50 years. 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. For the final total benefit figure, it was assumed that the watercraft inspections could stave off a dreissenid infestation for at least 25 years from the project's inception. A 25-year assumption is based on biological rates of infestation from the Thomas (2010) study, as well success rates of the states' program implementation. In some areas, watercraft inspection stations are highly effective; the Idaho Invasive Species Law of 2008 enabled the Idaho State Department of Agriculture to run state-wide inspection and prevention programs. These programs have shown to successfully intercept infested watercraft and points to a direct decrease in risk for watersheds within the state (Quagga-Zebra Mussel Action Plan for Western U.S. Waters (WRP 2010)). However, the success of these programs and inspections cannot be guaranteed, as there are thousands of watercrafts that travel across the country every week. Inspection stations and targeted risk reduction can only reduce a portion of the long-term risk that dreissenid infestations pose to the Upper Colorado.

The calculation of benefits assumes all benefit categories (annual costs avoided via boats, surface water treatment, hydropower, etc) occur at the same time. There are two key reasons for inclusion of an instantaneous infection (less than or equal to one year's time) across a watershed. The first is the possibility, without mitigation efforts, that multiple infested watercraft could be placed in the waterways in the same year, leading to an infestation of aquatic invasive species that spread from multiple vectors. This was deemed to be a reasonable assumption based on watershed managers' and USACE biologists' expertise. Second, it would be difficult to determine what portion of the watershed an infestation of aquatic invasive species may occur in. Because an infestation could occur from the most remote portion or the most populated (where a majority of the affected facilities are) portion of the region, it could spread slower or faster than the one-year time frame while regardless, the majority of the basin has the ability to get infected. If it is adult (breading) introduction of infestation, it is constant introduction until water temperature and other breading factors are no longer conducive to veliger production. Adult introduction could lead to a large window in which veliger spread can inhabit, spread, and establish in the system. This could be multiple events and locations within a year, leading to the lost benefits categories all occurring in one year as a large portion or majority of the system can be impacted. Furthermore, while the relevant facilities may not all be infected at once, it is reasonable to assume they would take precautionary measures. Because the lost benefits are measured in terms of cleaning costs, the 10-year ramp-up period where the cleaning costs are slowly applied can be viewed as the beginning of precautionary cleanings to infrastructure in

preparation for a full infestation of aquatic invasive species. Preventative measures include costs to operations that reduce and keep veligars out as well as reduce adult establishment, creating overlap between prevention and cleaning costs that typically occur simultaneously.

Table 10 shows a sensitivity analysis of the avoided costs associated with a 10-year delay in infestation versus longer infestation delays resulting from the program.

Table 10. Benefit Ranges

Benefits	0-year Infestation Delay	10-year Infestation Delay	25-year Infestation Delay	50-year Infestation Delay
Total Benefits	$0	$1,432,000,000	$3,213,000,000	$4,849,000,000
Average Annual Benefits	$0	$50,500,000	$113,000,000	$171,000,000

The costs represented in the benefit category would begin to occur after year 25. It is unlikely that the costs would reach the 100 percent full infestation figure in the first year, and it would take some time for the infestation to spread. Therefore, it was assumed that the one-time hydropower retrofits would occur in year one, while the yearly total costs would increase from 10 percent in year one to 100 percent in year ten.

The total benefit for the 25-year protection is calculated by summing the present values of the 25-year onset subtracted from the sum of the no-protection option, which assumes that the onset starts in year zero—which is what would occur in the absence of any watercraft inspection program in the Upper Colorado Basin.

The average annual benefits per delay scenario are calculated as the difference between the no infestation scenario yearly benefits and the individual infestation delay scenario yearly benefits. Where the 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 0.03526.

The current BCR range for the UCRB is between 34.54 and 10.20 for the different sensitivities, which is above the 1.0 threshold needed to federally justify the implementation of a project. These calculations can be seen in Table 11. The most likely projected outcome is the 25-year protection plan, which results in a 22.89 BCR. These calculations are shown in Table 11.

Table 11. BCR Calculations

Length of Infestation Delay	Annual Benefit	Annual Cost	BCR
10-Year Infestation Delay	$50,500,000	$4,950,000	10.20
25-Year Infestation Delay	$113,000,000	$4,950,000	22.89
50-Year Infestation Delay	$171,000,000	$4,950,000	34.54

4.2 ECOSYSTEM CONSIDERATIONS

If dreissenids become established in the UCRB, 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 fishes (see 5.1 Fisheries/Aquatic Resources). 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.

Hundreds of millions of dollars have been invested within the UCRB to protect and recover native ESA-listed fishes and their habitat in the UCRB (see Section 5.1, Fisheries/Aquatic Resources). 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 for additional time for preparation. There could be additional education to reach a wider audience of the potential effects of transporting invasive species. Additional monitoring in the UCRB could occur that would allow for implementation of rapid response plans in an effort to suppress their spread.

4.3 CONCLUSION

Based on the information evaluated in this LR/Programmatic EA, USACE has determined that there is federal interest in partnering with the states of Arizona, Colorado, New Mexico, Utah, and Wyoming to address the vulnerability of the UCRB to a dreissenid infestation. 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. Although they have not been quantified, these benefits are considered in the USACE decision-making process.

Consistent with the USACE planning process, alternatives must be formulated in consideration of the four criteria described in the Principle and Guidelines Report (U.S.

Water Resources Council 1983) for completeness, effectiveness, efficiency, and acceptability, which are described below.

- **Completeness.** Alternative 2, Comprehensive Adaptive Improvements, is the most complete solution available to reduce the risk of a dreissenid infestation. It includes every potential measure considered except Measure 8, which is outside existing authority. Together, these measures 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 between the Western States 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 the waters of the UCRB, 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 O&M costs resulting from an infestation.
- **Acceptability.** Alternative 2, Comprehensive Adaptive Improvements, is acceptable to all entities. The collaborative effort between the states would promote effective communication, intercept, and prevent potential infestations, educate the public, and lead to continuous improvements in the early detection of dreissenids within the UCRB. The public would be able to transport watercraft from infested states to non-infested states with minimal disruption. While the solution is not all-encompassing, it is accepted as the most complete and effective solution available. The recommended alternative will not conflict with other regulation efforts.

4.3.1 Plan Selection

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 would contribute to an effective and efficient plan to defer dreissenid infestation and the associated negative impacts to the environment and infrastructure in the UCRB. 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 deissenid 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 9 for additional details). Risk is reduced through a delay based on the assumption that with success, an infestation could be staved off for at least 25 years from the project's inception and from there, develop gradually and thus incurring costs at Year 26 from project inception as opposed to Year 1 with FWOP. Based on the federal interest and environmental acceptability, Alternative 2 is the Recommended Alternative.

SECTION 5 - EXISTING CONDITIONS

This section provides general information about the environmental conditions within the approximately 75,530-square-mile study area. The background environmental information provided is limited due to a general lack of impacts associated with the existing inspection stations, as well as any anticipated changes to the watercraft inspection station sites or their operation.

5.1 FISHERIES/AQUATIC RESOURCES

The UCRB study area contains habitat for hundreds of species of native and non-native aquatic organisms. The most notable fish are sport fish and endangered species that occur in the basin. The mainstem of the Colorado River is important habitat for Colorado Pikeminnow, Razorback Sucker, Bonytail, and Humpback Chub (UCREFRP 2019). Several of these species migrate upstream to spawn with their offspring dispersing downstream after hatching.

Fish passage and screening facilities have been constructed by the San Juan River Basin (USFWS 2020) and Upper Colorado River Endangered Fish Recovery Programs (7; Conservation Innovation Center 2022).

5.2 WATER QUALITY

Surface water in the UCRB is relatively clean compared to other regions in the nation. However, concern about the permanence of this status has been growing. Population growth, mining, logging, agriculture, and industry have created, and are continuing to create water quality issues and concerns. While some streambank erosion is natural, human alterations in the watershed have caused additional erosion, leading to increased turbidity at certain times of the year.

Manmade reservoirs have changed water quality characteristics of the large rivers. Due to the large volume of stored water, temperatures do not fluctuate as much as in a natural river. The reservoirs warm slower in the summer and cool slower in the fall. Daily temperature fluctuations are also depressed. Slower water velocity and water quality changes have also modified the types and density of various plankton, which affects water clarity and nutrient levels.

5.3 WILDLIFE/TERRESTRIAL RESOURCES

Terrestrial habitat within the basin includes many types, from desert to alpine tundra, and mountainous forests to wide river valleys. The large quantity of water in the rivers of the basin make irrigated agriculture possible. There are approximately 1.5 million acres of irrigated agriculture (Maupin et al. 2018; Reclamation 2019), which has dramatically altered native habitats. Wildlife present throughout the basin includes both large and small mammals, birds, and reptiles. There are several protected species. Other terrestrial resources, such as plants, including a variety of trees, shrubs, forbs,

and grasses, can be found near the many and diverse habitat types throughout the states in the study area.

5.4 AESTHETICS / VISUAL RESOURCES

Aesthetics or visual resources are the natural and cultural features of the landscape that can be seen and contribute to the public's appreciative enjoyment of the environment. The aesthetic quality of an area is a subjective measure of one's perception of how pleasing an area is. The UCRB consists of a complex tapestry of mountains, high plateaus, desert basins, river valleys, rolling uplands, and deep gorges woven together by the Colorado River and its tributaries. Mountains are a major and dramatic presence in the UCRB. There are numerous mountain ranges in central Utah forming the western border of the UCRB basin, with the Rocky Mountains on the eastern border. However, the aesthetic values of the Colorado River, the mountains, and surrounding landscapes vary based on the viewer's perspectives and values.

5.5 RECREATION

The UCRB 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 UCRB 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, hunting, walking, biking, and bird and wildlife viewing.

5.6 CULTURAL RESOURCES

The rivers and tributaries in the UCRB have provided the resources needed for human occupation of the basin for thousands of years. Prehistoric populations subsisted on riverine resources well before 9,000 B.C. (Chatters and Pokotylo 1998). These riverine cultures remained along the rivers and tributaries up until the middle and late 19th century when they were relocated to reservations (Walker 1998). During their extensive occupation along the rivers and tributaries of the UCRB, Native Americans subsisted on the abundant fish and aquatic resources available, and Traditional Cultural Properties and Historical Properties of Religious and Cultural Significance to Indian Tribes reflect important fishing locations and fishing villages native peoples occupied for collecting such resources.

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 (CO_2) 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 Colorado River Basin, changes in snowpack, streamflows, and forest cover are already occurring (Colorado River Connected 2020). Future climate change would likely continue to influence these changes. The loss of snow from climate change is resulting in decreased river discharge in the Colorado River (Milly and Dunne 2020). Average annual temperature in the region is projected to increase by 3-10° F by the end of the century, with the largest increases expected in the summer. Precipitation in the region has seen a decline in both the amount of total snowfall and the proportion of precipitation falling as snow. Changes in average annual precipitation in the region are likely to vary over the century. Winter precipitation in the form of rain not snow is projected to increase while summer precipitation is projected to decline by as much as 30 percent, with less frequent but heavier downpours (EPA 2016). Along with rising air temperatures, there would be a corresponding rise in stream temperature.

5.8 ENVIRONMENTAL JUSTICE

Executive Order 14008 *Tackling the Climate Crisis at Home and Abroad* states that environmental and economic justice are key concerns for the federal government and its implementing agencies. It further directs agencies to develop programs to address disproportionately high and adverse impacts to disadvantaged communities. A key tool for achieving these goals is the Justice40 Initiative which established a goal that 40 percent of the overall benefits of federal investments flow to disadvantaged communities.

The Council on Environmental Quality (CEQ) has developed a Climate Change and Economic Justice Screening Tool (CEJST) (Version 1.0) to identify these 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 12 April 2023, and census tracts within the UCRB were selected for analysis. According to the CEJST, 90 of the 273 census tracts in the UCRB are disadvantaged in at least one category, and many are disadvantaged across multiple burden categories (Table 12). The most common category of burden was Climate which identifies communities that are at high risk of projected flood and wildfire risk or at high risk of agricultural, building, or population loss due to climate change. Sixty-two tracts were identified as disadvantaged in terms of Climate – these tracts are above the 90th percentile of one of the climate burdens and above the 65th percentile for low income. The second most commonly burdened category was Pollution, which identifies low-income tracts that have one or more abandoned mines or defense sites or

are above the 90th percentile in proximity to hazardous waste sites including Superfund sites and Risk Management Plan Facilities. Sixty-one tracts in the UCRB were identified as disadvantaged in the Pollution category. Forty-five tracts were identified as disadvantaged in the Housing category which indicates low-income tracts with historic underinvestment or those that are in the 90th percentile for housing costs, lack of green space, lead paint, or lack of indoor plumbing. Numerous tracts were disadvantaged across multiple categories; on average each disadvantaged tract was disadvantaged in 3.6 different categories.

Table 12. Summary of Environmental Justice Statistics

State	Tracts	DA Tracts	Climate	Energy	Traffic	Housing	Pollution	Water	Health	Work-force
Arizona	18	17	11	2	10	17	13	0	16	16
Colorado	149	28	20	8	4	4	15	5	4	10
New Mexico	45	29	21	7	15	20	18	1	20	22
Utah	36	12	7	3	2	3	11	1	4	5
Wyoming	25	4	3	1	0	1	4	0	1	1
Grand Total	273	90	62	21	31	45	61	7	45	54

SECTION 6 - ENVIRONMENTAL CONSEQUENCES

While Section 4 describes the economic and ecosystem effects of a potential dreissenid infestation in the UCRB, 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 implementing 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. The USACE analysis did not identify any adverse environmental effects for the Proposed Action Alternative.

Federal participation in the program would be dependent on the states continuing to fund the program and Congress specifically appropriating funds for the program. In 2019, expenditures by the states totaled about $7.3 million in prevention efforts.

Although individual state budgets fluctuate 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 if risks increase, or it may decrease, or the program may be eliminated if an infestation becomes permanently established within the UCRB.

As a result of coordination with the states, the USACE did not identify any conflicts to land-use plans. The process of selecting locations for watercraft inspection stations (see Section 2.2.2) accounted for existing land uses.

USACE considered, but did not identify, any potential effects to threatened and endangered species, noise pollution, vegetation, air quality, or hazardous/toxic materials. Therefore, those resource areas are not detailed below. However, a biological evaluation is included as an appendix, which describes the threatened and endangered species analysis and determinations.

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

The existing conditions are described in Section 5. The No Action Alternative represents a continuation of the states' current practice, in which the USACE would not support establishing any watercraft inspection stations to protect the UCRB and USACE water-related infrastructure therein. Section 2.2 provides information pertaining to existing watercraft inspection stations and their operation.

6.1.2 Description of the Proposed Action Alternative

Implementation of the proposed action alternative would mean that USACE, in collaboration with the AIS coordinators of the states of Arizona, Colorado, New Mexico, Utah, and Wyoming, would establish watercraft inspection stations at locations that have the highest likelihood of preventing the spread of AIS at reservoirs operated and maintained by the federal government. Monitoring reservoirs within and outside the UCRB for the early detection of dreissenids veligers would occur independent of watercraft inspection stations.

USACE would partner with the states' AIS coordinators to establish watercraft inspection stations and monitoring very similar to the existing programs in terms of configuration and operations (see Sections 2.2 and 3.4, Measure 1). If watercraft inspection and decontamination stations are proposed for cost share outside of the five UCRB states, a tiered EA would be required to analyze that action outside of the study area. Similarly, rapid response plans should include tiered environmental compliance as a component of plan development. Implementation of rapid response plans may likely require emergency environmental and ESA compliance.

6.2 FISHERIES/AQUATIC RESOURCES

A dreissenid infestation would adversely impact fisheries and aquatic resources within the UCRB, to include impacting species and habitats protected under the ESA. The amount 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 species would also be negatively impacted. Physical injury to fish could occur from abrasion, especially at fish passage facilities.

6.2.1 No Action Alternative

Under the No Action Alternative, the risk of infestation affecting fisheries and other aquatic resources would remain similar to existing conditions, and thus would not result in any benefits. Taking no action would not result in direct or indirect, short-term, long-term, or cumulative effects to aquatic resources, as the risk of an AIS infestation would also remain at levels similar to the existing conditions.

6.2.2 Proposed Action Alternative

Similar to the existing program, watercraft inspection stations would be established in paved or gravel 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 percolate into the ground. No new ground disturbance would occur to establish watercraft inspection stations without further environmental review. Monitoring reservoirs for the early detection of dreissenids veligers would have no effect on fisheries or aquatic resources.

There would be no threat of runoff into any water body, as inspection stations would not be located close enough to any water body. 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.

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

An infestation would adversely impact water quality within the UCRB. The adult mussels would filter huge quantities of water as they feed. Water clarity would increase, which would have negative effects on the ecosystem. In addition to the negative effects to aquatic resources, rooted aquatic plants would persist into deeper water than normal.

6.3.1 No Action Alternative

Under the No Action Alternative, water quality would remain at levels similar to the existing conditions because the risk of an AIS infestation would also remain at levels similar to the existing conditions. Taking no action would therefore not result in direct or indirect, short-term, long-term, or cumulative effects to water quality.

6.3.2 Proposed Action Alternative

The effects on water bodies of establishing and operating watercraft inspection stations, and thus water quality, would be the same as discussed in the fisheries/aquatic resources section. The proposed action would not negatively affect water quality or wetlands in the UCRB directly or indirectly in either the short term or long term. Because no fill material would be placed in wetland, or other Waters of the U.S., a Clean Water Act Section 404(b)(1) Evaluation is not required, and therefore, no Least Environmentally Damaging Practicable Alternative (LEDPA) need 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 provided by the additional funding allocated to support the program.

6.4 WILDLIFE/TERRESTRIAL RESOURCES

An infestation would adversely impact wildlife and terrestrial resources within the UCRB, potentially to a significant degree. Those adverse impacts would be expected to be conveyed through the ecosystem.

6.4.1 No Action Alternative

Under the No Action Alternative, the conditions related to wildlife and terrestrial resources would remain similar to the existing conditions. The risk of an AIS infestation would also remain at levels similar to the existing conditions. Taking no action would therefore not result in direct or indirect, short-term, long-term, or cumulative effects to wildlife or terrestrial resources.

6.4.2 Proposed Action Alternative

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

The following stipulations would be followed to eliminate any impacts to ESA-listed and other protected species:

1. No new ground disturbance would occur to establish watercraft inspection stations without performing a survey of the area for ESA-listed species or protected migratory bird nests if they might be present in the area (see Table 12 in Section 7.1.2).
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 (see Table 13 in Section 7.1.2).
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 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. Monitoring reservoirs for the early detection of dreissenids veligers would have

no effect on wildlife/terrestrial resources.

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 impacts caused by 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/VISUAL RESOURCES

If a dreissenid infestation were to occur there would be negative impacts on aesthetic and visual resources. Small mussels would attach to virtually all hard surfaces, including rocks and man-made structures such as water intake pipes, boats, and others. The shoreline would eventually be lined with dead mussel shells.

6.5.1 No Action Alternative

Under the No Action Alternative, conditions related to aesthetics and visual resources would remain at levels similar to the existing conditions. No significant changes would be anticipated. Taking no action would therefore not result in indirect or indirect, short-term, long-term, or cumulative effects to aesthetic or visual resources.

6.5.2 Proposed Action Alternative

The proposed action would cause minimal changes to the aesthetic or visual resources of areas where watercraft inspection stations would be located, as the stations would be placed in already developed areas. Most travelers on major interstates may not 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 (Figure 14). Monitoring reservoirs for the early detection of dreissenids veligers would have no effect on visual resources.

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

Figure 14. State-Operated Watercraft Inspection Station in Wyoming

6.6 RECREATION

If dreissenids were to become established, 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. The types 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.

6.6.1 No Action Alternative

Under this alternative, the AIS coordinators in the five study area states would continue their programs to prevent the spread of dreissenids, and the risk would remain unchanged. Taking no action would therefore not result in direct or indirect, short-term, long-term, or cumulative effects to recreation resources.

6.6.2 Proposed Action Alternative

USACE involvement in establishing watercraft inspection stations would have negligible effects on recreation and the recreating public in the proposed action area. Because the state AIS coordinators have been conducting watercraft inspections for the past 10 years, most people hauling boats and other watercraft are accustomed to the routine of stopping for inspections.

Some people transporting watercraft may initially have a negative reaction to the inspection stations due to the feeling they are being inconvenienced or being required to stop for additional or multiple stations. However, many of these people 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.

The proposed action would therefore not negatively affect recreational activities in the UCRB 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 HISTORIC RESOURCES

6.7.1 No Action Alternative

The five study area states are likely to continue their watercraft inspection programs without federal funding or support. Therefore, negligible impacts to cultural and historic resources would remain as they are today, which is minimal.

6.7.2 Proposed Action Alternative

The proposed action would require USACE to collaborate with AIS coordinators of the five study area states to establish watercraft inspection stations at and within the perimeter of the UCRB. These inspection stations would be located where infrastructure would support the facilities, and where a suitable space for decontamination exists that does not allow contaminated runoff to reach UCRB waters. This would, therefore, limit inspection stations to parking lots, gravel pits, and other surface-disturbed localities. If permanent improvements are proposed, specifically if they include any ground-disturbing activity, USACE would complete a separate NEPA analysis to include National Historic Preservation Act (NHPA) Section 106 review. After the site-specific analysis and corresponding consultation with appropriate entities (State Historic Preservation Officers (SHPO), Tribal Historic Preservation Officers, and concerned Tribes) are complete, and those entities provide concurrence with the findings, the improvements would be authorized.

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

6.8 CLIMATE CHANGE

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 Colorado River and major tributaries are typically within the temperature range for mussel reproduction from May to as late as November. Summer temperatures typically do not exceed this range (USGS 2020a). The UCRB is currently highly susceptible to dreissenid infestation as water temperatures are suitable for reproduction with a long potential reproductive season.

Potential consequences of climate change include reduced snowpack, higher winter stream flows, earlier snowmelt-generated peak flows, and lower summer flows (Ecology 2016). 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.

6.8.1 No Action Alternative

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 CO_2 emissions worldwide. In addition, climate change would not affect implementation of the No Action Alternative.

6.8.2 Proposed Action Alternative

There would be extremely negligible effects on climate change as a result of implementing the proposed action. Vehicles idling at watercraft inspection stations is a part of world-wide cumulative contributions to change in climate by way of increases in greenhouse gas emission. Given the minuscule contribution of CO_2 emissions resulting from the proposed action to overall global emissions, effectsinsignificant. Therefore, there would be no significant direct, indirect, short-term, long- term, or cumulative effects to climate change.

As with the No Action Alternative, climate change would not affect implementation of the proposed action.

6.9 ENIVRONMENTAL JUSTICE

6.9.1 No Action Alternative

A dreissenid or other AIS infestation could adversely impact environmental justice within the UCRB. A new infestation could reduce tourism to the area or to specific lakes within the UCRB, which could lead to income or job loss. Infestations of infrastructure could also create job loss or increase energy costs. An infestation could adversely alter shorelines at parks and reservoirs, effectively reducing green space and further burdening communities already disadvantaged in the Housing category. While not specifically addressed as part of the water category, a new infestation of dreissenids would adversely affect water quality, potentially intensifying existing burdens in the UCRB.

6.9.2 Proposed Action Alternative

There would be minor beneficial effects to environmental justice from implementing the Proposed Action Alternative. Delaying new infestations in the UCRB would preserve present economic opportunities and be protective of infrastructure in the UCRB. These are direct beneficial effects, but difficult to quantify. Monitoring, contingency planning, and rapid response planning and preparation would have similar minor beneficial effects to environmental justice. The proposed action would not have adverse impacts to Justice40 communities. Given that the benefits to fish, wildlife, and water quality would be distributed broadly across the UCRB, the proposed action would likely support the Justice40 Initiative, as more than 40% of census tracts in the proposed action area are disadvantaged.

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 adverse 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 aquatic invasive species prevention in the UCRB. 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 U.S. and Canada. Currently, the activities and efforts of the 100th Meridian Initiative are being funded by the USFWS and

undertaken by non-governmental agencies, Tribal, state, interstate, and federal agencies.

Reasonably Foreseeable Future: Federal investment in this project would further expand and support existing state and Canadian programs, resulting in increased effectiveness in the watercraft inspection program to decrease the existing vulnerability of a dreissenid infestation to the UCRB. 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 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. Also included in this section are 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 did not identify any impacts significantly affecting the quality of the human environment as a result of the analyses conducted in Section 6 of this LR/Programmatic EA. The Draft FONSI and this LR/Programmatic EA were distributed to relevant federal, state, and local agencies, the Services, the Tribes, and the public for a 30-day review and comment period from October 26, 2020, through November 26, 2020. All comments received were addressed. Due to editorial changes made to this LR/Programmatic EA, coupled with the extended time finalizing the document, USACE deemed it necessary to conduct a second public review, that began on April 3, 2023, and concluded on April 17, 2023. A letter from the White Mountain Apache Tribe stating that the project will have "No Adverse Effect" to the tribe's cultural heritage resources and/or historic properties was received on April 15, 2023, and incorporated as part of the administrative record.

Compliance with NEPA will be achieved upon signing the FONSI, the decision document associated with this LR/Programmatic EA.

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 the USFWS 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.

If any ESA-listed small mammal or plant species could be in a county or watershed where watercraft inspection stations are established and any ground-disturbing or vegetation-disturbing activity is planned, surveys for their presence would be conducted and impacts to the protected species avoided. Table 12 lists the ESA-listed species and the locations where surveys would be conducted to ensure there would be no effect on them.

Table 13. ESA-Listed Species Requiring Site-Specific Survey for Any Projects with Ground Disturbing or Vegetation Disturbing Activities

Location	Species
Utah	Utah Prairie Dog
Arizona and Utah	Mexican Spotted Owl
Utah and Western Colorado	Yellow-billed Cuckoo
Utah and Western Colorado	Southwestern Willow Flycatcher
Utah	Barneby Reed-mustard
Utah	Barneby Ridge-cress
Utah	Clay Phacelia
Utah	Clay Reed-mustard
Utah	Heliotrope Milk-vetch
Utah	Jones Cycladenia
Utah	Kodachrome Bladderpod
Utah	Last Chance Townsendia
Utah	Navajo Sedge
Utah	Pariette Cactus
Utah	San Rafael Cactus
Utah	Shrubby Reed-mustard
Utah	Siler Pincushion Cactus
Utah	Uinta Basin Hookless Cactus
Utah	Ute Ladies'-tresses
Utah	Welsh's Milkweed
Utah	Winkler Cactus
Utah	Wright Fishhook Cactus

USACE determined that the establishment of watercraft inspection stations 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 plans should include a separate programmatic biological assessment for initiating ESA consultation. However, there are some stipulations required to justify this determination (see Section 6.4.2 and appendix for detailed discussion).

7.1.3 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 USC §§ 703-712 *et seq*., 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 USC §§ 668-668c *et seq*.) 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 NHPA of 1966, as amended, directs federal agencies to assume responsibility for all cultural resources under their jurisdiction. Section 106 of the NHPA requires agencies to consider the potential effect of their actions on properties that are listed, or are eligible for listing, on the National Register of Historic Places. The NHPA implementing regulations, 36 CFR Part 800, require that the federal agency consult with the SHPO, Tribes, and interested parties to ensure that all historic properties are adequately identified, evaluated, and considered in planning for proposed undertakings.

USACE has determined the establishment of watercraft inspection stations, as currently operated, has no potential to affect historic properties. However, if additional amenities requiring ground-disturbing activity are requested, supplemental Section 106 review will be required before approval.

7.1.6 Native American Graves Protection and Repatriation Act

The Native American Graves Protection and Repatriation Act (25 USC §§ 3001 *et seq*.) addresses the discovery, identification, treatment, and repatriation of Native American and Native Hawaiian human remains and cultural items (i.e., associated funerary objects, unassociated funerary objects, sacred objects, and objects of cultural patrimony).

Although not expected, in the event of an inadvertent discovery during construction, work would immediately halt, and reasonable resource protective measures would be implemented. After the area is secured, the appropriate authorities would be contacted, including local law enforcement, the federal land manager, appropriate SHPO, and regional Tribal groups.

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 waters of the United States. 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 is the National Pollutant Discharge Elimination System (NPDES) Program which regulates the discharge of pollutants. No pollutants would be discharged into Waters of the United States by activities proposed in this LR/Programmatic EA. A NPDES permit would not be needed, because there is no discharge of pollutants. Section 402 also regulates storm water runoff; however a Construction General Permit would not be required because ground disturbance would be less than an acre.

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

7.2 EXECUTIVE ORDERS

7.2.1 Executive Order 11988, Floodplain Management, May 24, 1977

EO 11988 requires federal agencies to recognize the significant values of flood plains and to consider the public benefits that would be realized from restoring and preserving flood plains. The Executive Order has an objective – the avoidance, to the extent possible, of long-and short-term adverse impacts associated with the occupancy and modification of the base flood plain and the avoidance of direct and indirect support of development in the base flood plain wherever this 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 flood plain or adversely affect natural flood plain 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 flood plain throughout the UCRB in the states of Arizona, Colorado, New Mexico, Utah, and Wyoming. 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 flood plain, and development in the flood plain would not be induced or promoted.

7.2.2 Executive Order 11990, Protection of Wetlands, May 24, 1977

EO 11990 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.

No wetlands would be impacted by implementation of the Recommended Alternative.

7.2.3 Executive Order 14008, Tackling the Climate Crisis at Home and Abroad, January 27, 2021

EO 14008 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 Recommended 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 program would not adversely or disproportionately affect minority or low-income populations.

7.3 ADDITIONAL AUTHORITY AND GUIDANCE

Additional authority and guidance related to the Recommended Alternative includes the following:

Executive Order 13751, Safeguarding the Nation from the Impacts of Invasive Species. Under EO 13751, federal agencies are required to prevent the introduction, establishment, and spread of invasive species, as well as to eradicate and control populations of invasive species that are established.

USACE Invasive Species Policy. USACE Invasive Species Policy of June 2, 2009, 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. The USACE Environmental Operating Principles (EOPs) (https://www.usace.army.mil/Missions/Environmental-Operating-Principles) have been taken into consideration throughout the study process and would continue to be part of the implementation of the Recommended Alternative. 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 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, USACE has proactively considered the environmental consequences of several measures and developed a comprehensive solution that supports economic and environmentally sustainable solutions.

SECTION 8 - COORDINATION, CONSULTATION, AND PUBLIC INVOLVEMENT

As part of the development of this Integrated Letter Report and Programmatic Environmental Assessment, federal Participation in Watercraft Inspection Stations, Upper Colorado River Basin (Draft, October 2020), USACE sent information letters to 30 Native American Tribes in the UCRB to notify them of the proposed action and the upcoming opportunity to review the NEPA documents. In this letter, USACE also extended the invitation for Government-to-Government consultation. USACE received responses from the White Mountain Apache Tribe and the Hopi Tribe. The White Mountain Apache Tribe determined that the proposed action would "Not have an Adverse Effect" on their cultural resources, while the Hopi Tribe requested continuing consultation on review of any proposal that involves ground-disturbing activities. These comments did not require a direct response from USACE, but continuing consultation will occur as requested. As such, USACE will make good faith efforts to engage Tribes to ascertain interest in USACE projects and obtain information relevant to USACE decisions.

The USACE Tribal Consultation Policy is composed of the following six principles: Tribal Sovereignty, Tribal Responsibility, Government to Government Relations, Pre-Decisional and Honest Consultation, Self-Reliance, Capacity Building and Growth, Natural and Cultural Resources. Specific to this action, USACE Albuquerque District, strives to establish relationships that focus on successful communications and a collaborative process that ensures Tribal involvement in project development and implementation.

USACE did not identify any impacts significantly affecting the quality of the human environment as a result of the analyses conducted in Section 6 of this LR/Programmatic EA. The Draft FONSI and this LR/Programmatic EA were distributed to relevant federal, state, and local agencies, the Services, the Tribes, and the public for a 30-day review and comment period from October 26, 2020, through November 26, 2020. All comments received were addressed. Due to editorial changes made to this LR/Programmatic EA based on USACE policy and legal review, coupled with the extended time finalizing the document, USACE deemed it necessary to conduct a second public review, that began on April 3, 2023, and concluded on April 17, 2023. A letter from the White Mountain Apache Tribe stating that the project will have "No Adverse Effect" to the tribe's cultural heritage resources and/or historic properties was received on April 15, 2023 and incorporated as part of the administrative record.

Compliance with NEPA will be achieved upon signing the FONSI, the decision document associated with this LR/Programmatic EA.

The documents are available on the Albuquerque District Corps of Engineers website at https://www.spa.usace.army.mil/Missions/Environmental/Environmental-Compliance-Documents/Environmental-Assessments-FONSI/.

The distribution list includes, but is not limited to, the following:

Albuquerque-Bernalillo County Water Utility Authority
Arch Hurley Conservation District
Arizona Fish and Game Department
Audubon
Carlsbad Municipal Water District
City of Aurora
City of Boulder
City of Westminster
City of Westminster
CO Dept. of Health & the Environment
Colorado Attorney General
Colorado Department of Agriculture
Colorado Parks and Wildlife
Colorado River Water Conservancy District
Colorado Springs Utilities
Denver Water
Dinghy Dick's Marine
Dolores Water Conservancy
Elephant Butte Water District
Great Lakes Marine
Larimer County
Middle Rio Grande Conservancy District
National Aquatic Invasive Species Management Association
Navajo Agriculture Product Industry
New Mexico Bass Nation
New Mexico Department of Game and Fish
New Mexico Energy, Mineral, Natural Resources Department
New Mexico Interstate Stream Commission
New Mexico Office of the State Engineer
New Mexico State Parks Department
New Mexico State University
New Mexico Wake
Northern Water
Pine River irrigation District
Private Aquaculture Industry, Fish Health Board, Lake and Chaffee County Weed Boards
Pueblo Board of Water Works
Ruedi Water & Power Authority
San Juan Marine
Sierra Club
The Nature Conservancy
Town of Grand Lake
Trout Unlimited
U.S. Bureau of Indian Affairs
U.S. Bureau of Reclamation
U.S. Fish and Wildlife Service
U.S. Forest Service
U.S. National Park Service
Utah Division of Wildlife Resources
Wyoming Game and Fish Department
Comanche Nation of Oklahoma
Eastern Shoshone Tribe
Jicarilla Apache Nation
Kewa Pueblo
Kiowa Tribe
Navajo Nation
Northern Arapaho Tribe
Ohkay Owingeh
Pueblo de Cochiti
Pueblo of Acoma
Pueblo of Isleta
Pueblo of Jemez
Pueblo of Laguna
Pueblo of Picuris
Pueblo of Pojoaque
Pueblo of San Felipe
Pueblo of San Ildefonso
Pueblo of Sandia
Pueblo of Santa Ana
Pueblo of Santa Clara
Pueblo of Taos
Pueblo of Tesuque
Pueblo of Zia
Pueblo of Zuni
San Juan Southern Paiute
Southern Ute Tribe
Hopi Tribe
Ute Indian Tribe
Ute Mountain Ute Tribe
White Mountain Apache Tribe

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

The following recommendations include actions within the authority of Section 104 of the RHA of 1958 (33 USC § 610), as amended by Section 1039(d) of the Water Resources Reform and Development Act of 2014 (PL 113-121), Section 1178(b) of the Water Infrastructure Improvements for the Nation Act (PL 114-322), Section 1170 of WRDA of 2018 (PL 115-270), and Section 505 of WRDA of 2020 (PL 116-260), as well as actions that will require additional authority to implement.

9.1 WATERCRAFT INSPECTION STATIONS IN ARIZONA, COLORADO, NEW MEXICO, UTAH, AND WYOMING

Arizona, Colorado, New Mexico, Utah, and Wyoming annually establish seasonal watercraft inspection stations in strategic locations both in and outside the UCRB 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 states' 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

UCRB), and then providing additional protection closer to and within the UCRB. USACE has deemed this strategy to be the most effective means of protecting all waters in the UCRB, 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 state funds, resulting in increased effectiveness in the watercraft inspection program to decrease the risk of a dreissenid infestation. In accordance with the regional strategy, the states would use the data gathered during the inspection season to adjust the program to provide a more effective regional defense. With a BCR of 15.43 (derived as the most likely outcome protection projections from Table 11), USACE has determined that there is federal interest in partnering with the states of Arizona, Colorado, New Mexico, Utah, and Wyoming to address the vulnerability of the UCRB to a dreissenid infestation. The Recommended Alternative also includes inspection stations at federal facilities at infested lakes, regional data sharing efforts, real-time tracking of watercraft transportation and traffic pattern evaluation (measures 1-8 & 11-13).

9.2 MONITORING

Identification of water chemistry within the states of Arizona, Colorado, New Mexico, Utah, and Wyoming and comparison to water chemistry of infested water bodies could be used to inform risk management decisions within and outside the UCRB. Monitoring water bodies within the five UCRB states could provide early detection of dreissenids and facilitate rapid response measures to minimize infestation impacts. Monitoring water bodies within the UCRB states could provide early detection of dreissenids and facilitate rapid response measures to minimize infestation impacts. Therefore, monitoring in the UCRB is key to prevention efforts (measures 9 & 10).

9.3 CONTINGENCY PLANNING AND RAPID RESPONSE PLANS

Prevention remains the first priority for addressing the threat of dreissenid mussels in the UCRB. This includes keeping contaminated watercraft from entering uninfested water bodies in the basin. However, should prevention efforts fail, and live mussels invade a water body within the UCRB, 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 assessments conducted by Reclamation (2013; 2015a-e), with a focus on priority areas identified in the risk assessment matrix. USACE also recommends developing rapid response measures in coordination with the States of Arizona, Colorado, New Mexico, Utah, and Wyoming to find and eradicate dreissenids in the event an introduction occurs (measures 9-15).

9.4 PUBLIC AWARENESS

As previously mentioned, 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 UCRB. USACE recommends the following pertaining to public awareness (measure 7):

- Continue AIS ad campaigns, with collaboration among states, where possible, to obtain greater consistency and better recognition as boaters travel through the UCRB.
- Target outreach efforts to commercial boat haulers and other boat vector pathways such as boat brokers, auctions, online sale sites, and marinas with moored boats in infested hot spots such as the Lower Colorado River and Great Lakes. For example, PSMFC and partners including Idaho Department of Agriculture, Nevada Department of Wildlife, and others will be undertaking an outreach project in the coming years to provide messaging to these sources/haulers on the dreissenid issue and what they can do to reduce the risk of spreading dreissenids and lessen their chances of unknowingly (or knowingly) breaking state and federal laws.
- Increase efforts to communicate and work with boat manufacturers—especially to provide easy access to ballast water tanks on wakeboard boats, which would allow decontamination of water left in the ballast tanks.
- Continue to provide brochures, literature, and ads about AIS in state fishing and boating license applications and at recreational boating outlets and events.

Would require additional authority to implement:

9.5 WATERCRAFT INSPECTION STATIONS – IN OTHER STATES

The states of Nevada and California currently lack laws governing watercraft movement from AIS infested water bodies similar to the Arizona Fish and Game Department Director's Order 3 – R09/18 (AZGFD 2018). Until reciprocal state laws are passed, mandated watercraft inspections at federally owned water bodies (based on appropriate authority) in Arizona, Nevada, and California would support protection of the UCRB. Additionally, all watercraft inspection stations that border the UCRB to the south should have mandatory inspections, especially at infested water bodies.

Considering the numerous access points at the Great Lakes, the establishment of the watercraft inspection program in that area may be impracticable or infeasible; however, there is still a need to inspect watercraft leaving the Great Lakes traveling to the UCRB. Performing regional inspections with a decontamination database system with standard protocols potentially could be a first step. This would allow the other states to accept the inspections and decontamination performed in other locations.

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 the Watercraft Inspection Program Project Partnership Agreement (PPA) with a non-federal sponsor in each basin, typically with a state or other organization(s) that represent several states. The non-federal sponsor may coordinate with and consider other entities' input on their program activities to reduce the risk of AIS within the basin including hydropower, hatchery, and marina facilities. While USACE may be involved in those discussions, the agency's primary relationship is with the non-federal sponsor(s) in the basin.

Prior to each upcoming recreation season, USACE would receive the federal funds for the watercraft inspection program and would then distribute letters to participating states or organizations requesting statements of work for the upcoming season with the budget amount based on the federal funds available. USACE would then work with state AIS coordinators to draft a statement of work for each state that contains inspection station activities and inspection station activities 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 of rapid response plans implementing rapid response exercises, increasing monitoring, use of canine detection, increasing public awareness and education and other inspection enhancements, constructing 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 Project Partnership Agreement that are directly related to inspection station activities, including inspection and rapid response planning, engineering, design, establishment, operation and maintenance, related supervision and administration costs, and USACE costs of monitoring, inspection, and auditing of inspection stations activities.

During the statement of work preparation, USACE and the states 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 includes coordination among states and takes into account their specific budgets and statutory authorities, as well as collection of data related to boat transportation traffic and fouled boat interceptions. The inspection stations will typically be located in the states of Arizona, Colorado, New Mexico, Utah, and Wyoming, and the stations must protect the UCRB and provide the highest likelihood of preventing the spread of aquatic invasive species at reservoirs operated and maintained by USACE.

USACE, with the states' 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 non-federal sponsor 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 using lands already within the State's or Non-federal sponsors' control (fee or less than fee interests) they shall provide the real property interests required for the inspection station activities at no cost to the Government.

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 states' 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. 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 states 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 state employees that are performing inspection station, monitoring, and contingency planning 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 states' submission must include sufficient information to support a determination by USACE that the costs are necessary to establish, operate, and maintain those inspection stations to protect the UCRB at locations with the highest likelihood of preventing the spread of aquatic invasive species at reservoirs operated and maintained by USACE. 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, monitoring, contingency planning, and rapid response capability, USACE shall make payment in accordance with the authority and PPA.

Federal participation in the program would be dependent on the states continuing to fund the program and Congress specifically appropriating funds for the program. As a baseline, in 2019, expenditures by the states totaled about $3.88 million within the

UCRB and about $4.84 million outside the UCRB. Federal funding would potentially support state expansion of watercraft inspections, monitoring, and contingency planning. However, based on 2019 expenditures, the initial estimated annual cost to the federal government in the UCRB would be about $1.94 million and about $2.42 million outside the UCRB. As states adapt their programs based on new data and the inclusion of the cost-share program, it is anticipated that their programs would increase hours and dates of operation for existing stations, and potentially add new stations to address risk. Therefore, as the states expand their programs to protect the basin, the estimated federal cost may increase, subject to federal appropriation limits. States will provide an estimate of their anticipated cost-share activities in their annual statement of work, which will be reviewed and approved by USACE to ensure that USACE is helping to inform a watershed-based approach, that proposed activities are eligible for reimbursement under the program, and that USACE has sufficient funding to meet the anticipated need.

SECTION 11 - REFERENCES

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