



Application for a New License
Major Project – Existing Dam

**Aquatic Invasive Species
Management Plan**

Security Level: Public

Yuba River Development Project
FERC Project No. 2246

April 2014

©2014, Yuba County Water Agency
All Rights Reserved

Table of Contents
Description

Section No.	Description	Page No.
	Glossary - Definition of Terms, Acronyms and Abbreviations	GLO-1
1.0	Introduction.....	1-1
1.1	Background.....	1-1
1.1.1	Yuba River Development Project	1-1
1.1.2	Aquatic Invasive Species	1-5
1.2	Purpose of the Aquatic Invasive Species Management Plan	1-5
1.3	Goals and Objectives of the Aquatic Invasives Management Plan	1-5
1.4	Contents of the Aquatic Invasive Species Management Plan.....	1-6
2.0	Species Information and History of Project Management.....	2-1
2.1	Species Life History.....	2-1
2.1.1	Quagga Mussel.....	2-1
2.1.2	Zebra Mussel.....	2-2
2.1.3	New Zealand Mudsnaill	2-4
2.1.4	Asian Clam.....	2-5
2.1.5	Didymo	2-6
2.2	Historic Management of AIS at Project Facilities	2-6
2.3	On-going State and Regional Prevention Initiatives.....	2-8
3.0	Aquatic Invasive Species Management and Monitoring	3-1
3.1	Standards and Best Management Practices.....	3-1
3.2	Monitoring	3-2
3.2.1	Species Monitoring.....	3-2
3.2.2	Incidental Observations Monitoring	3-3
4.0	Consultation, Reporting and Plan Review	4-1
4.1	Annual Agency and Tribes Meeting and Reporting	4-1
4.2	Plan Revisions.....	4-1
5.0	References Cited.....	5-1

List of Figures

Figure No.	Description	Page No.
1.1-1.	Yuba County Water Agency’s Yuba River Development Project and Project Vicinity.	1-3
2.2-1.	Aquatic invasive species signage at Cottage Creek Boat Launch.	2-7

Table No.	List of Tables Description	Page No.
None.		

List of Attachments

Attachment A	YCWA's November 2013 Dreissenid Mussel Vulnerability Assessment, which was provided to Cal Fish and Wildlife
Attachment B	Forest Service Manual 2900, Invasive Species Management
Attachment C	Executive Order 13112 (1999)
Attachment D	Zebra/Quagga Mussel Surface Survey Protocol, California Department of Fish and Wildlife (Cal Fish and Wildlife 2013)
Attachment E	Zebra/Quagga Mussel Artificial Substrate Monitoring Protocol, California Department of Fish and Wildlife (Cal Fish and Wildlife 2013)
Attachment F	California Fish and Wildlife Code § 2302

GLOSSARY - DEFINITION OF TERMS, ACRONYMS AND ABBREVIATIONS

AIS	aquatic invasive species
BMP	Best Management Practices
Cal Fish and Wildlife	California Department of Fish and Wildlife, formally California Department of Fish and Game
CDFA	California Department of Food and Agriculture
CCR	California Code of Regulations
F.G.C.	California Fish and Game Code
cm	centimeters
FERC	Federal Energy Regulatory Commission
Forest Service	United States Department of Agriculture, Forest Service
ft	feet
mg/L	milligrams per liter
mi	miles
NFS	National Forest System
O&M	Project operations and maintenance
Plan	Aquatic Invasive Species Management Plan on National Forest System Land
Project	Yuba River Development Project, FERC Project No. 2246
SWRCB	State Water Resources Control Board
USACE	United States Army Corps of Engineers
YCWA	Yuba County Water Agency

Page Left Blank

SECTION 1.0

INTRODUCTION

In April 2014, the Yuba County Water Agency (YCWA), pursuant to Section (§) 5.18 of Title 18 of the Code of Federal Regulations (C.F.R.), filed with the Federal Energy Regulatory Commission (FERC or Commission) an Application for a New License for Major Project – Existing Dam – for YCWA’s 361.9 megawatt Yuba River Development Project, FERC Project No. 2246 (Project). The initial license for the Project was issued by the Federal Power Commission (FERC’s predecessor) to YCWA on May 16, 1963, effective on May 1, 1963. The Federal Power Commission’s May 6, 1966, Order Amending License changed the license’s effective date to May 1, 1966, for a term ending on April 30, 2016.

YCWA included in its Application for a New License this Aquatic Invasive Species (AIS) Management Plan (Plan).

The United States Department of Agriculture, Forest Service’s (Forest Service) Federal Power Act Section 4(e) authority only applies in this Plan to Project facilities on National Forest System (NFS) land, and the United States Army Corps of Engineers’ (USACE) Federal Power Act Section 4(e) authority only applies in this Plan to Project facilities on federal land administered by the USACE. The Forest Service administers the Plumas National Forest in conformance with the Plumas National Forest Land and Resource Management Plan (USDA 1988) as amended, and administers the Tahoe National Forest in conformance with Tahoe National Forest Land and Resource Management Plan (USDA 1990), as amended.

1.1 Background

1.1.1 Yuba River Development Project

The Project is located in Yuba, Sierra and Nevada counties, California, on the main stems of the Yuba River, the North Yuba River and the Middle Yuba River, and on Oregon Creek, a tributary to the Middle Yuba River. Major Project facilities, which range in elevation from 280 feet (ft) to 2,049 ft, include: 1) New Bullards Bar Dam and Reservoir; 2) Our House and Log Cabin diversion dams; 3) Lohman Ridge and Camptonville diversion tunnels; 4) New Colgate and Narrows 2 power tunnels and penstocks; 5) New Colgate, New Bullards Minimum Flow and Narrows 2 powerhouses; and 6) appurtenant facilities and features (e.g., administrative buildings, switchyards, roads, trails and gages). The existing Project does not include any aboveground open water conduits (e.g., canals or flumes) or any transmission lines.

In addition, the Project includes 16 developed recreation facilities. These include: 1) Hornswoggle Group Campground; 2) Schoolhouse Campground; 3) Dark Day Campground; 4) Cottage Creek Campground;¹ 5) Garden Point Boat-in Campground; 6) Madrone Cove Boat-in

¹ Cottage Creek Campground was burned in 2010 and has not been rebuilt. YCWA is in discussions with the Forest Service regarding rebuilding the burned campground.

Campground; 7) Frenchy Point Boat-in Campground; 8) Dark Day Picnic Area; 9) Sunset Vista Point; 10) Dam Overlook; 11) Moran Road Day Use Area; 12) Cottage Creek Boat Launch;² 13) Dark Day Boat Launch, including the Overflow Parking Area; 14) Schoolhouse Trail; 15) Bullards Bar Trail; and 16) floating comfort stations.³ All of the recreation facilities are located on NFS land, with the exception of the Dam Overlook, Cottage Creek Boat Launch and small portions of the Bullards Bar Trail, which are located on land owned by YCWA. All of the developed recreation facilities are located within the existing FERC Project Boundary, except for a few short segments of the Bullards Bar Trail to the east of the Dark Day Boat Launch. In addition, the Project includes two undeveloped recreation sites at Our House and Log Cabin diversion dams, both located on NFS land and within the existing FERC Project Boundary.

Figure 1.1-1 shows the Project Vicinity,⁴ proposed Project, and proposed FERC Project Boundary.⁵

² Emerald Cove Marina provides visitor services at Cottage Creek Boat Launch, including houseboat and boat rentals, boat slips and moorings, fuel and a general store. The marina is operated under a lease from YCWA by a private company.

³ The Project recreation facilities included one campground that is no longer part of the Project. Burnt Bridge Campground was closed initially by the Forest Service in 1979 due to low use levels. FERC, in an August 19, 1993 Order, which approved YCWA's Revised Recreation Plan, directed YCWA to remove all improvements and restore the Burnt Bridge Campground to the condition it was in prior to development of the facility. YCWA consulted with the Forest Service and all that remains of Burnt Bridge Campground today is the circulation road and vehicle spurs; all other facilities were removed.

⁴ For the purpose of this Plan, "Project Vicinity" refers to the area surrounding the proposed Project on the order of United States Geological Survey 1:24,000 quadrangles.

⁵ The FERC Project Boundary is the area that YCWA uses for normal Project operations and maintenance. The Boundary is shown in Exhibit G of YCWA's Application for New License, and may be changed by FERC with cause from time to time during the term of the new license.

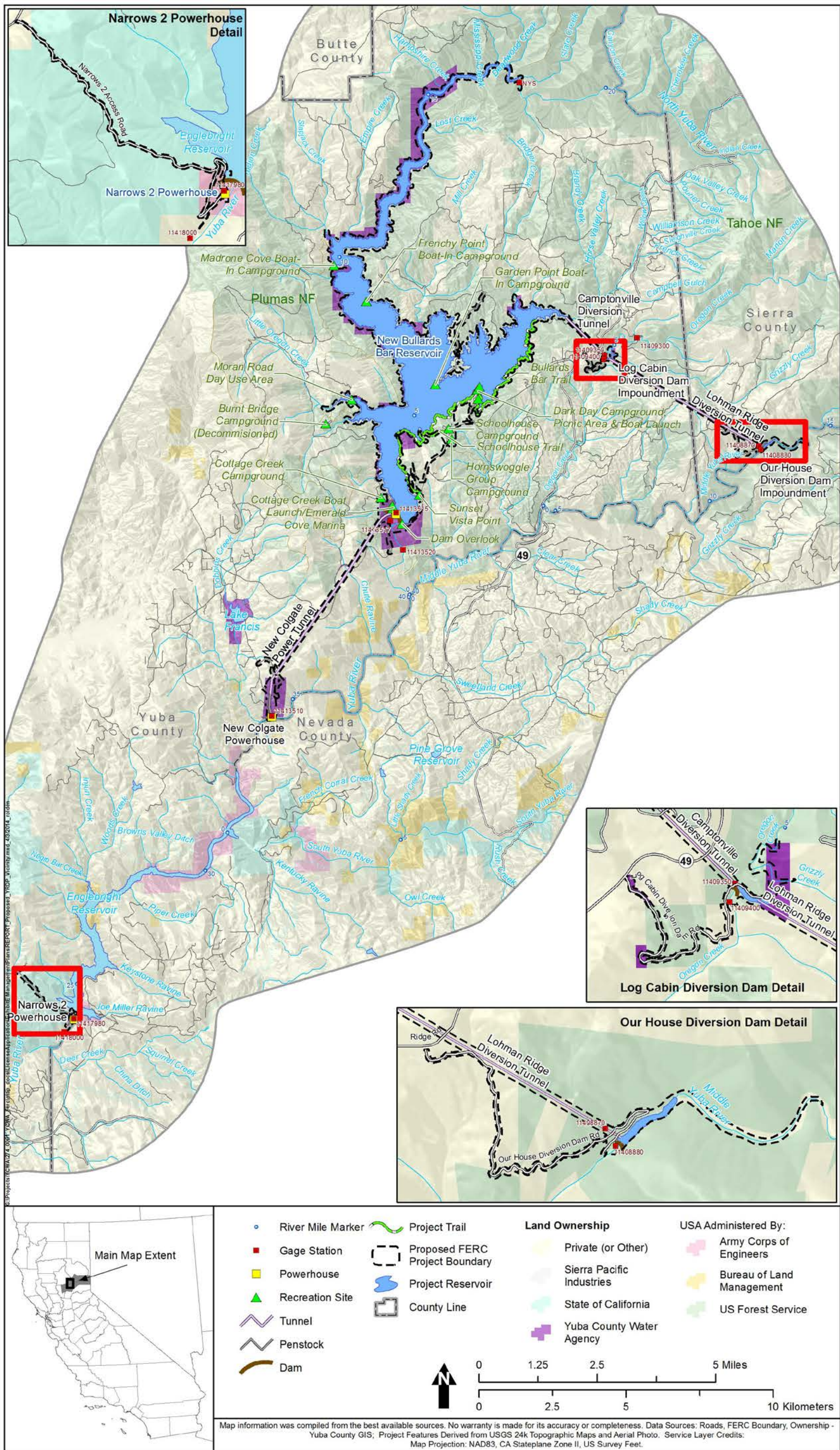


Figure 1.1-1. Yuba County Water Agency's Yuba River Development Project and Project Vicinity.

Page Left Blank

1.1.2 Aquatic Invasive Species

For the purpose of this Plan, AIS are defined as:

- Mollusks
 - quagga mussel (*Dreissena rostriformis bugensis*)
 - zebra mussel (*D. polymorpha*)
 - New Zealand mudsnail (*Potamopyrgus antipodarum*)
 - Asian clam (*Corbicula fluminea*)
- Other
 - didymo (*Didyomosphenia geminata*)

With the exception of didymo, none of the AIS have been reported to occur in Project reservoirs or impoundments, or in the Project Vicinity.

Aquatic invasive plants, such as Eurasian watermilfoil (*Myriophyllum spicatum*) and hydrilla (*Hydrilla verticillata*), are addressed in the Integrated Vegetation Management Plan, which is included in the license, and are not addressed by this AIS Plan. If aquatic invasive plants are found, including new species, like curly leaf pondweed (*Potamogeton crispus*), they will be added to Integrated Vegetation Management Plan, as provided for in that plan.

1.2 Purpose of the Aquatic Invasive Species Management Plan

This Plan provides guidance to prevent the spread of AIS within the FERC Project Boundary, and to the extent the Project directly affects the USACE's Englebright Reservoir as well.

YCWA will coordinate the efforts required under this Plan with other Project resource efforts, including implementation of other resource management plans and measures included in the new license.

1.3 Goals and Objectives of the Aquatic Invasive Species Management Plan

The goals of this Plan are to: 1) implement AIS prevention activities; 2) provide public education regarding AIS; 3) monitor for AIS; and 4) comply with federal and State of California law, and with Forest Service directives and orders regarding AIS.

The objective of the Plan is to provide necessary guidance to meet the Plan goal.

1.4 Contents of the Aquatic Invasive Species Management Plan

This Plan includes the following:

- Section 1.0. Introduction. This section includes introductory information, including the purpose and goals of the Plan.
- Section 2.0. Species Information and History of Project Management. This section includes life histories and historical Project management of AIS.
- Section 3.0. Aquatic Invasive Species Management. This section includes a description of preventative and monitoring guidelines for AIS.
- Section 4.0. Consultation and Plan Review. This section details consultation commitments under the Plan between YCWA, California Department of Fish and Wildlife (Cal Fish and Wildlife) and the Forest Service.
- Section 5.0. References Cited. This section provides a list of the references cited in the Plan.

SECTION 2.0

SPECIES INFORMATION AND HISTORY OF PROJECT MANAGEMENT

2.1 Species Life History

2.1.1 Quagga Mussel⁶



Quagga mussel is a small (up to 4 centimeters, or cm), freshwater mollusk, native to the Dneiper River drainage of Ukraine and Ponto-Caspian Sea. Ballast water discharge from transoceanic liners carried mollusks to North America, and larval drift and recreational and commercial boating have facilitated their spread. Quagga mussels were first found in the United States in 1989 in the Great Lakes and have since moved west (USGS 2013a).

The closest current known location of quagga mussel to the Project are Lake Mead and the Colorado River downstream of Lake Mead, as well as all watersheds receiving water via the Colorado Aqueduct System. In California, these are in Southern California, the closest of which is approximately 500 miles (mi) south of the Project (USGS 2013b). In Nevada, veligers were detected in Lahontan Reservoir, as well as in Rye Patch Reservoir, in 2011 and have not been located in sampling since that time (NDOW 2012).

Quagga mussel can inhabit freshwater lakes, reservoirs and streams and colonize soft and hard substrates. The mussels can cause tremendous damage to hydro facilities and aquatic ecosystems once they invade a system. They clog water intakes and fish screens, as well as impede recreation opportunities by growing on recreation facilities.

In addition, quagga mussel consumes large quantities of microscopic plants and animals, which are the basis of native communities, and thus, lead to the disturbance of the natural ecosystem, harming plants and wildlife (USFWS 2011).

A single female can produce over a million eggs a year (USGS 2013a).

In North America, quagga mussel cannot survive in water with salinity over 5 parts per thousand (USGS 2013a). Currently, the best scientific date indicates quagga mussels need calcium concentration levels of at least 11 milligrams per liter (mg/L) to survive and at least 15 mg/L to

⁶ Photo from < <http://www.100thmeridian.org/Images/Mead/quagga.jpg> >

moderately infest waterbodies. There are other water quality parameters that appear to also limit the ability of quagga mussel to successfully invade, including pH, hardness and water temperature (Claudi & Prescott 2011).

Much research is currently being conducted on the management of quagga mussel once it has invaded a waterbody; although there are promising leads, prevention is the only effective management strategy (USGS 2013a).

Under California Code of Regulations (CCR), California Fish and Game Code (F.G.C.), Title 14, Section 671(c)(10), quagga mussel is listed as a Restricted Species, which means it is *...unlawful to import, transport, or possess live animals... except under permit issued by the department...* Additionally, pursuant to this regulation, all species of *Dreissena* are termed “detrimental,” which means they pose a threat to native wildlife, the agricultural interests of the state, or to public health or safety.

In addition, F.G.C. Sections 2301 and 2302 provide specific regulations on dreissenid mussels, including quagga mussel. F.G.C. Sections 2301 states that nobody shall *...possess, import, ship, or transport in the state, or place, plant, or cause to be placed or planted in any water within the state, dreissenid mussels...* This law also gives the ‘director’ the right to conduct inspections, order conveyances to be drained, impound or quarantine conveyances, and close or restrict access to conveyances. In cooperation with the department, public and/or private agencies with a water supply system are to develop prevention plans for mussels and management plans for mussels, if they are located in a water supply. Additionally, any entity which discovers dreissenid mussels must immediately report the finding.

F.G.C. Section 2302 (Attachment F) regulations refer directly to any entity which owns or manages a reservoir where recreational boating or fishing takes place, mandating that the owner assess the vulnerability of the reservoir to invasion and develop a prevention program, which shall include public education, monitoring and management of recreational, boating and fishing activities.

Forest Service Manual 2900, Invasive Species Management, Section 2903-Policy (USDA 2011) and Executive Order 13112 (1999) provide guidance and direction related to management of AIS on NFS land (Attachments A and B, respectively).

2.1.2 Zebra Mussel⁷

Zebra mussel is a small (around 0.5-cm), freshwater mollusk, native to the Black, Caspian and Azov seas. Ballast water discharge from a single commercial cargo ship into the Great Lakes in 1988 is responsible for their introduction into the United States. Since then, larval drift and recreational and commercial boating have facilitated their spread (USGS 2013c).

⁷ Photo from <http://watrnews.com/2012/07/zebra-mussels-found-in-lake-ray-roberts/>



The closest current known location of zebra mussels to the Project is the currently-closed San Justo Reservoir in California, approximately 250 mi south of the Project (San Benito County 2013). There are no known other zebra mussel occurrences in California or Nevada (USGS 2013d).

Zebra mussel can inhabit freshwater lakes, reservoirs and streams and colonize any stable substrates. They can also settle on submerged plants and be transported with them on bait buckets, fishing gear or boats (USDA 2013). These mussels can cause tremendous damage to hydrofacilities and ecosystems once they invade a system. They clog water intakes and fish screens, as well as impede recreation opportunities by growing on recreation facilities.

Additionally, zebra mussels consume large quantities of microscopic plants and animals, which are the basis of native communities, and thus, lead to the disturbance of the natural ecosystem, harming plants and wildlife (USFWS 2011).

A single female can lay 40,000 eggs in a single reproductive cycle and up to one million in a spawning season (USGS 2013c).

Zebra mussels can tolerate only very low salinity (USGS 2013c). Currently, the best scientific date indicates zebra mussels need calcium levels of at least 11 mg/L to survive and at least 15 mg/L to moderately infest waterbodies. There are other water quality parameters that appear to also limit the ability of zebra mussels to successfully invade, including pH, hardness and water temperature (Claudi & Prescott 2011).

Extensive research is currently being conducted on the management of zebra mussel once it has invaded a waterbody; although there are promising leads, prevention is the only effective management strategy (USGS 2013c).

Per the federal Lacey Act, zebra mussels are prohibited from importation or shipment into the United States, or any territory of the United States. If found, any zebra mussels brought into the United States will be promptly destroyed or exported by the United States Department of Interior, Fish and Wildlife Service at the cost of the importer.

Under F.G.C. Title 14, Section 671(c)(10), zebra mussels are listed as a Restricted Species, which means it is *...unlawful to import, transport, or possess live animals... except under permit issued by the department...* Additionally, pursuant to this regulation, all species of *Dresseina* are termed “detrimental,” which means they pose a threat to native wildlife, the agricultural interests of the state, or to public health or safety.

In addition, F.G.C. Sections 2301 and 2302 provide specific regulations on dreissenid mussels, including zebra mussels. F.G.C. Sections 2301 states that nobody shall *...possess, import, ship,*

or transport in the state, or place, plant, or cause to be placed or planted in any water within the state, dreissenid mussels... This law also gives the ‘director’ the right to conduct inspections, order conveyances to be drained, impound or quarantine conveyances, close or restrict access to conveyances, and work with public and/or private agencies with a water supply system to develop prevention plans for mussels and management plans for mussels, if they are located in a water supply. Additionally, any entity which discovers dreissenid mussels must immediately report the finding.

F.G.C. Section 2302 (Attachment F) regulations refer directly to any entity which owns or manages a reservoir where recreational boating or fishing takes place, mandating that they assess the vulnerability of the reservoir to invasion and develop a prevention program, which shall include public education, monitoring and management of recreational, boating and fishing activities.

Forest Service Manual 2900, Invasive Species Management, Section 2903-Policy (USDA 2011) and Executive Order 13112 (1999) provide guidance and direction related to management of AIS on NFS land (Attachments A and B, respectively).

2.1.3 New Zealand Mudsnail⁸



New Zealand mudsnail is a small (around 4 to 6 millimeters), freshwater mollusk, native to the lakes and streams in New Zealand and nearby small islands. Ballast water discharge from commercial cargo ships into the Great Lakes is most likely responsible for their introduction into the United States. Since then, recreationists and recreational and commercial boating have facilitated their spread westward (Cal Fish and Wildlife 2013).

The closest current known location of zebra mussels to the Project is below Natoma Reservoir in California, approximately 80 mi south of the Project. The species is fairly widespread in California (USGS 2013e).

New Zealand mudsnails can inhabit freshwater and brackish lakes, reservoirs and streams. They can tolerate siltation and benefit from disturbance and high nutrient flows. These snails can compete with other grazers and cause decreases in species richness. Reduction in algal production can rapidly reduce food resources for native species. An inhibiting factor for the species is temperature, as it cannot tolerate temperatures below freezing or above 34 degrees Centigrade (Cal Fish and Wildlife 2013).

There are a couple of potential management strategies for New Zealand mudsnails, mostly for small waterbodies that can be isolated from the rest of a system. Methods include chemical

⁸ Photo from < <http://www.seagrant.umn.edu/newsletter/2006/06/images/mudsnail.jpg>>

control and draining water to allow substrate to heat and freeze. Management in large waterbodies is difficult, and research is ongoing (Cal Fish and Wildlife 2013).

Under F.G.C. Title 14, Section 671(c)(10), New Zealand mudsnails are listed as a Restricted Species, which means it is *...unlawful to import, transport, or possess live animals... except under permit issued by the department...* Additionally, pursuant to this regulation, New Zealand mudsnails are termed “detrimental,” which means they pose a threat to native wildlife, the agricultural interests of the state, or to public health or safety.

Forest Service Manual 2900, Invasive Species Management, Section 2903-Policy (USDA 2011) and Executive Order 13112 (1999) provide guidance and direction related to management of AIS on NFS land (Attachments A and B, respectively).

2.1.4 Asian Clam⁹



Asian clam is a small (around 0.5-cm), freshwater mollusk, native to temperate and tropical southern Asia, west to the eastern Mediterranean and then to the Southeast Asian islands and into Australia. This species was first located in the United States in 1938 in the Columbia River and is believed to have been brought by Chinese immigrants as food. People have spread the species through bait buckets, aquaculture and intentional introductions for consumption (USGS 2013f).

The closest current known location of Asian clams to the Project is in Donner Lake in California, approximately 80 mi southeast of the Project. In California, Asian clams are known in the Sacramento and San Joaquin drainages, Santa Barbara County south to San Diego County, and west to the Salton Sea in San Francisco Bay (USGS 2013g).

Asian clams can inhabit freshwater lakes, reservoirs and streams. These snails can fail complex power and water systems and have temporarily closed down nuclear power plants and weakened concrete structures in the United States. An inhibiting factor for the species is temperature, as they have a low tolerance to cold temperatures, which can cause their populations to fluctuate (USGS 2013f). Asian clams found in Lake Tahoe are smaller than those in warmer waters (TERC 2008). The species is also sensitive to salinity, drying, low pH and siltation (USGS 2013f).

Management methods for Asian clam include mechanical (e.g., scraping colonies off of substrate), chemical and temperature alteration, though some of these techniques cannot be used in many water bodies. Prevention remains the best means of management (USGS 2013f).

⁹ Photo from <m.wxxi.org>

Forest Service Manual 2900, Invasive Species Management, Section 2903-Policy (USDA 2011) and Executive Order 13112 (1999) provide guidance and direction related to management of AIS on NFS land (Attachments A and B, respectively).

2.1.5 **Didymo**¹⁰



Didymo is a freshwater diatom, native to the northern latitudes in North America, Europe and Asia, which has become invasive in both the Western and Eastern United States. Didymo can form extensive mats and choke out native species. Didymo is spread predominantly by recreationists on boats and equipment. There are no known treatments for didymo, besides the prevention of further spread (EPA 2013).

Observations of didymo were common upstream of the Project in the Middle and South Yuba rivers during previous relicensing studies conducted by Pacific Gas and Electric Company and Nevada Irrigation District. YCWA field staff did not report any observations of didymo in the Project Area during relicensing studies. However, there are reports of didymo in the Yuba River downstream of Englebright Dam.

Forest Service Manual 2900, Invasive Species Management, Section 2903-Policy (USDA 2011) and Executive Order 13112 (1999) provide guidance and direction related to management of AIS on NFS land (Attachments A and B, respectively).

2.2 **Historic Management of AIS at Project Facilities**

In conformance with Cal Fish and Wildlife regulations, YCWA historically and currently engages in a variety of AIS management activities at Project facilities. These include:

- In accordance with F.G.C. Section 2302, YCWA prepared an assessment for New Bullards Bar Reservoir, Our House Diversion Dam impoundment and Log Cabin Diversion Dam impoundment for their vulnerability to the introduction of non-native dreissenid mussel species (i.e., quagga and zebra mussels). The vulnerability assessment, which concluded a low risk for invasion at each impoundment, was provided to Cal Fish and Wildlife and is attached to this Plan (Attachment A).
- YCWA maintains signs at Cottage Creek and Dark Day boat launches, the two existing developed boat launches on New Bullards Bar Reservoir. The signs provide information on aquatic invasive mussels and how to prevent their introduction to New Bullards Bar Reservoir (Figure 2.2-1).

¹⁰ Photo from < <http://www.epa.gov/region8/water/didymosphenia/>>



Figure 2.2-1. Aquatic invasive species signage at Cottage Creek Boat Launch.

- YCWA posts mussel awareness notices at the Emerald Cove Marina on New Bullards Bar Reservoir.
- YCWA has conducted artificial substrate monitoring in New Bullards Bar Reservoir since 2009. Artificial substrate, which dreissenid mussels will colonize, was put in New Bullards Bar at a floating workstation on the buoy line near Cottage Creek Boat Launch. Twice each month, the substrate is removed and inspected for any attached dreissenid mussels. YCWA maintains records from the monitoring.

No aquatic invasive mussels have been identified during monitoring.

- Before new houseboats are placed on New Bullards Bar Reservoir, boats are inspected by YCWA personnel to ensure that no aquatic invasive species are present in or on the houseboats. Additionally, houseboats are inspected when they are removed from the reservoir for maintenance.

No AIS have been identified during inspections.

In addition, in partnership with Cal Fish and Wildlife, which approved and funded the work, YCWA volunteered to begin veliger net monitoring in New Bullards Bar Reservoir. Veliger net monitoring is done in the same vicinity twice a year: the week after Independence Day and Labor Day holiday weekends. Samples are analyzed by Cal Fish and Wildlife for the presence of dreissenid mussel veliger. YCWA maintains records from the monitoring. This is a partnership program and not required by Cal Fish and Wildlife.

No aquatic invasive mussels have been identified during monitoring.

Further information on the historic and current management of AIS on the Project is included in Attachment A.

2.3 On-going State and Regional Prevention Initiatives

Both the Nevada Department of Wildlife and the Tahoe Resource Conservation District have boater fee collection and decal programs that fund AIS prevention measures, including boat inspections (NDOW 2013; TRCD 2013). Their campaigns have increased boater awareness of AIS and how to prevent the spread of AIS.

California's Department of Parks and Recreation, Division of Boating and Waterways, has adopted regulations to set procedures for the collection and use of the quagga and zebra infestation prevention fee (i.e., ~\$18 per boat registered). Collection of the fee as required by California Harbors and Navigation Code Chapter 5, Division 3, Article 1.3, Sections 675 through 676, beginning with the 2014 recreational vessel registrations payable on December 31, 2013 and thereafter on a bi-annual basis. Hence, starting December 31, 2013, the State of California collects fees from boaters who use Project facilities, and 85 percent of these fees are used to address quagga and zebra monitoring and prevention in state waters by granting them to qualified entities with prevention plans. Not all state waters are granted funds.

In addition, a boater traveling to Lake Tahoe is required to pay a fee for boat inspections to prevent the introduction of AIS (TRCD 2013).

SECTION 3.0

AQUATIC INVASIVE SPECIES MANAGEMENT AND MONITORING

3.1 Standards and Best Management Practices

YCWA's goal is that its Project AIS Plan meet all applicable local, state and federal laws and regulations regarding the prevention of introduction and monitoring for AIS into New Bullards Bar Reservoir; and if AIS are detected and become established in New Bullards Bar Reservoir, the AIS Plan meet all local, state and federal regulations regarding the treatment of the AIS found in the reservoir. YCWA intends to update this Plan from time-to-time over the term of the new license, as described in Section 4.2, if and when local, state and federal laws and regulations change.

YCWA will implement AIS prevention and control activities on Project reservoirs/impoundments, following the guidelines below:

- YCWA will implement a public education program on New Bullards Bar, Log Cabin Diversion Dam and Our House Diversion Dam,¹¹ including signage and information pamphlets at designated, developed public boat launch facilities,¹² covering the following prevention actions to be undertaken by the recreationist at his or her own recognizance:
 - Drain water from boat, motor, bilge, live well and bait containers before leaving a water access site.
 - Remove visible plants, animals and mud from boat before leaving waterbody.
 - Clean and dry boats and fishing equipment, using Cal Fish and Wildlife accepted protocols, for the prevention of all AIS before entering any waterbody area.
 - Dispose of unwanted bait in trash, including earthworms.
 - Avoid the release of plants and animals into a waterbody unless they came from that waterbody.
- If AIS, other than didymo,¹³ are detected by YCWA anywhere within the FERC Project Boundary, YCWA will consult with the Forest Service and Cal Fish and Wildlife,¹⁴ and notify the SWRCB, and institute an appropriate plan of action.¹⁵

¹¹ New Bullards Bar is the only project reservoir with developed recreation facilities.

¹² Designated boat launch facilities covered in the plan include Cottage Creek Boat Launch and Dark Day Boat Launch. If other developed boat launches are built during the term of the new license, they will be added to the Plan. Alternative options will be considered for Our House and Log Cabin Diversion dams.

¹³ Didymo has already been detected upstream and downstream of the Project, no specific regulations exist for its management and no effective management strategies, beyond the prevention guidelines already specified in the Plan.

¹⁴ For hydrilla only, the California Department of Food and Agriculture will also be notified.

¹⁵ A plan of action may include provisions like signage, access restrictions and equipment inspection before placing the equipment in the reservoir or impoundments.

- YCWA will develop Best Management Practices (BMPs) for individual operations and maintenance (O&M) projects (e.g., major construction or maintenance activities in the reservoir, undertaken by YCWA or its contractors; not including day-to-day use of the reservoir or if covered by other plan included in the FERC license), which have the potential to introduce AIS into New Bullards Bar Reservoir, Our House Diversion Dam impoundment, Log Cabin Diversion Dam impoundment¹⁶ or Englebright Reservoir to prevent the spread of AIS, and submit the written BMPs for the work to the Forest Service, Cal Fish and Wildlife, and USACE, if appropriate, at the annual agency and tribes meeting specified in YCWA's proposed Condition GEN1 – Meet with Agencies and Indian Tribes Annually. Development of BMPs for these individual O&M projects shall include the following, as applicable:
 - List of AIS with potential to be introduced.
 - Control or preventive measures for AIS with potential to be introduced by YCWA or YCWA's contractors.
 - Identifying critical control points for prevention of AIS with potential to be introduced.
 - Any necessary implementation monitoring for potential AIS to ensure BMPs are followed.
 - Actions that will be taken if an introduction of AIS is found during the O&M activity.

3.2 Monitoring

3.2.1 Species Monitoring

YCWA is responsible for conducting the following monitoring, according to Cal Fish and Wildlife's surface and artificial substrate¹⁷ protocols, or as otherwise updated and adapted by Cal Fish and Wildlife (protocols available at <http://www.dfg.ca.gov/invasives/quaggamussel/>), at the Project sites designated below. Where there are differences between Cal Fish and Wildlife protocols and this Plan, YCWA shall follow this Plan. Surveyors will be properly trained in the Cal Fish and Wildlife protocols. The frequency and areas to be covered in the surveys are:

- Zebra and Quagga Mussel Surface Survey Protocol (Attachment D). At New Bullards Bar Reservoir, once each calendar year after issuance of the new license, YCWA shall perform a surface survey at the end of the recreation season.¹⁸ Each survey will include a

¹⁶ Not all individual O&M projects have the potential to introduce AIS into a Project reservoir. An example of an activity with a potential to introduce AIS into New Bullards Bar Reservoir is if YCWA proposed to place a barge into the reservoir for work on the upstream face of the dam.

¹⁷ YCWA, in partnership with and funding from Cal Fish and Wildlife, has performed veliger tow surveys on New Bullards Bar Reservoir, which have not located any invasive dreissenid mussels. Given the lack of findings, low probability of dreissenid mussel invasion, and the Plan's implementation of surface and artificial substrate monitoring, the veliger tow monitoring is unnecessary and is not proposed as part of this Plan. However, should Cal Fish and Wildlife desire to continue this program, YCWA would cooperate with Cal Fish and Wildlife outside this Plan.

¹⁸ The recreation season begins on the Memorial Day holiday weekend and ends immediately following the Labor Day holiday weekend.

visual and tactile survey of the exposed (i.e., not submerged) portions of the boat launch areas at Dark Day and Cottage Creek boat launches and any exposed concrete or large, smooth rocks within 100 ft of the boat launch areas. YCWA will maintain records from the monitoring.

- Zebra and Quagga Mussel Artificial Substrate Monitoring Protocol (Attachment E). At New Bullards Bar Reservoir, each calendar year after issuance of the new license, YCWA at Dark Day and Cottage Creek boat launches shall conduct monthly artificial substrate monitoring (i.e., one artificial substrate panel) during the recreation season. The artificial substrate, which shall be submerged, shall be attached to the floating boat dock at the boat launch. YCWA will perform a visual inspection of the artificial substrates for evidence of Zebra or Quagga mussels and will maintain records from the monitoring.

The above monitoring satisfies the requirements of current local, state and federal laws and regulations. As described in Section 4.2, the above monitoring will be modified (i.e., Plan revised) if locale, state and federal laws and regulations change.

3.2.2 Incidental Observations Monitoring

During aquatic monitoring that may be specifically required as part of the new license, YCWA shall record on field data sheets incidental observations of AIS and American bullfrog (*Lithobates catesbeianus*). Field personnel performing the monitoring will be trained in the identification of the species. This initial list may be revised if other potential AIS are identified.

Page Left Blank

SECTION 4.0

REPORTING, CONSULTATION AND PLAN REVISIONS

4.1 Reporting and Consultation

YCWA will immediately (i.e., within 1 business day of positive identification) report any observations of quagga or zebra mussels to the Cal Fish and Wildlife and Forest Service. YCWA will fill out a Suspect Invasive Species Report Form for reporting to Cal Fish and Wildlife, available at https://www.dfg.ca.gov/invasives/inv_reporting/sightingReport.html.

If AIS were detected or American bullfrog occurred during the previous calendar year, 60 days prior to the annual agency and tribes meeting described in YCWA's proposed Condition GEN1, YCWA shall provide to the Forest Service and Cal Fish and Wildlife electronic copies of a map showing occurrences, the Global Positioning System coordinates, if available, and a summary of changes in distribution of each species from the previous year, as applicable. The information will be discussed at the annual agencies and tribes meeting.

4.2 Plan Revisions

YCWA, in consultation with the Forest Service and Cal Fish and Wildlife, will review, update, and/or revise the Plan, as needed, when significant changes in the existing conditions occur. Additional monitoring may be part of any plan revisions. Changes or revisions to the Plan would be expected if AIS conditions change as a result of unforeseen effects, either from new or existing Project-related activities, the potential for new AIS to occur, or from natural events or if other regulatory or legal requirements are established. Changes in the existing conditions could include such things as new methods for the treatment of didymo. Any updates to the Plan will be prepared in coordination and consultation with the Forest Service and Cal Fish and Wildlife. Sixty days will be allowed for the Forest Service and Cal Fish and Wildlife to provide written comment and recommendations before YCWA files the updated plan with FERC for FERC's approval. YCWA will include all relevant documentation of coordination/consultation with the updated Plan filed with FERC. If YCWA does not adopt a particular recommendation by the Forest Service or and Cal Fish and Wildlife, the filing will include the reasons for not doing so, based on Project-specific information. YCWA will implement the Plan as approved by FERC.¹⁹

¹⁹ The Plan will not be considered revised until FERC issues its formal approval.

Page Left Blank

SECTION 5.0

REFERENCES CITED

- California Department of Fish and Wildlife (Cal Fish and Wildlife). 2013. New Zealand Mudsnail. Available online: <<http://www.dfg.ca.gov/invasives/mudsnail/>>. Accessed May 6, 2013. Last updated 2013.
- Claudi, R. and K. Prescott. 2011. Examination of Calcium and pH as predictors of Dreissenid Mussel Survival in the California State Water Project. Prepared for the California Department of Water Resources, Division of Operations and Maintenance, Aquatic Nuisance Species Program.
- Executive Order 13112. 1999. Invasive Species. Federal Register: February 8, 1999 (Volume 64, Number 25).
- Nevada Department of Wildlife. 2013. AIS Decal Information. Available online: <http://www.ndow.org/Boat/Aquatic_Invasive_Species/Decal_Information/>. Accessed March 9, 2014. Last updated 2013.
- _____. 2012. Aquatic Invasive Species Prevention Program. Available online: <http://www.ndow.org/Boat/Aquatic_Invasive_Species/>. Accessed November 1, 2013. Last updated 2012.
- San Benito County. 2013. San Benito County Official County Government Website. Available online: <<http://www.cosb.us/county-departments/parks-recreation/regional-parks/san-justo/>>. Accessed March 25, 2013. Last updated 2013. San Benito County, California.
- Tahoe Environmental Research Center (TERC). University of California, Davis. 2008. Aquatic Invasive Species. Available online: <<http://terc.ucdavis.edu/research/aquaticinvasives.html>>. Accessed March 8, 2014. Davis, CA.
- Tahoe Resource Conservation District (TRCD). 2013. Tahoe Boat Inspections. Available online: <<http://tahoeboatinspections.com/>>. Accessed March 8, 2014. Last updated 2013.
- United States Department of Agriculture (USDA), Forest Service. 2013. Invasive Species Program- Species Profiles. Available online: <<http://www.fs.fed.us/invasivespecies/speciesprofiles/index.shtml>>. Accessed March 9, 2014. Last updated December 16, 2013.
- _____. 2011. Forest Service Manual- 2900. Invasive Species Management. December 5, 2011.
- _____. 1990. Tahoe National Forest Land and Resource Management Plan. Pacific Southwest Region. San Francisco, California.

- _____. 1988. Plumas National Forest Land and Resource Management Plan. Pacific Southwest Region. San Francisco, California.
- United States Environmental Protection Agency (EPA). 2013. Didymosphenia geminata: A nuisance freshwater alga. Available online: <<http://www.epa.gov/region8/water/didymosphenia/>>. Accessed September 16, 2013. Last updated January 18, 2013.
- United States Fish and Wildlife Service. 2011. Bay Delta Rapid Response Plan for Dreissenid Mussels. Developed for the California Department of Fish and Game. Sacramento, CA.
- United States Geological Survey. 2013a. Nonindigenous Aquatic Species- quagga mussel (*Dreissena rostriformis*) FactSheet. Available online: <<http://nas.er.usgs.gov/queries/FactSheet.aspx?speciesID=95>>. Accessed: May 5, 2013. Last updated: April 19, 2013.
- _____. 2013b. Nonindigenous Aquatic Species- quagga mussel Point map. Available online: <<http://nas2.er.usgs.gov/viewer/omap.aspx?SpeciesID=95>>. Accessed November 1, 2013. Last updated: November 1, 2013.
- _____. 2013c. Nonindigenous Aquatic Species- zebra mussel (*Dreissena polymorpha*) FactSheet. Available online: <<http://nas.er.usgs.gov/queries/FactSheet.aspx?speciesID=5>>. Accessed May 6, 2013. Last updated: April 19, 2013.
- _____. 2013d. Nonindigenous Aquatic Species- zebra mussel Point map. Available online: <<http://nas2.er.usgs.gov/viewer/omap.aspx?SpeciesID=5>>. Accessed November 1, 2013. Last updated: November 1, 2013.
- _____. 2013e. Nonindigenous Aquatic Species- New Zealand mudsnail distribution. Available online: <<http://nas.er.usgs.gov/taxgroup/mollusks/newzealandmudsnaildistribution.aspx>>. Accessed November 1, 2013. Last updated: November 1, 2012.
- _____. 2013f. Nonindigenous Aquatic Species- Asian clam (*Corbicula fluminea*) FactSheet. Available online: <<http://nas.er.usgs.gov/queries/factsheet.aspx?speciesid=92>>. Accessed May 7, 2013. Last updated: April 19, 2013.
- _____. 2013g. Nonindigenous Aquatic Species- Asian clam Point map. Available online: <<http://nas2.er.usgs.gov/viewer/omap.aspx?SpeciesID=92>>. Accessed November 1, 2013. Last updated: November 1, 2013.

**Aquatic Invasive Species
Management Plan**

Attachment A

Dreissenid Mussel Vulnerability Assessment

**Yuba River Development Project
FERC Project No. 2246**

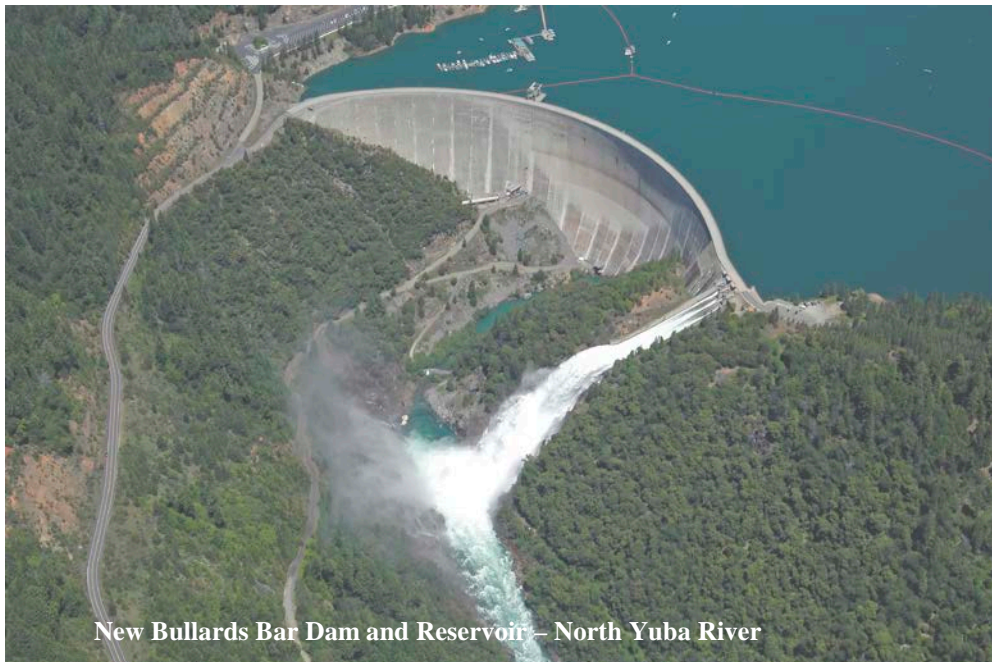
April 2014

©2014, Yuba County Water Agency
All Rights Reserved



YUBA COUNTY WATER AGENCY

Yuba River Development Project



New Bullards Bar Dam and Reservoir – North Yuba River

Dreissenid Mussel Vulnerability Assessment

April 2014

© 2014, Yuba County Water Agency
All rights reserved.

Table of Contents

Section No.	Description	Page No.
1.0	Introduction.....	1
2.0	Dreissenid Mussels & Need for Vulnerability Assessment.....	2
3.0	Vulnerability Assessment	3
3.1	New Bullards Bar.....	4
3.1.1	Recreation Use.....	4
3.1.2	Water Quality.....	4
3.2	Our House Diversion Impoundment.....	6
3.2.1	Recreation Use	6
3.2.2	Water Quality.....	6
3.3	Log Cabin Diversion Impoundment	6
3.3.1	Recreational Use	6
3.3.2	Water Quality.....	7
3.4	Lake Frances	7
3.4.1	Recreational Use	7
3.4.2	Water Quality.....	7
4.0	Prevention Program	8
5.0	Conclusions.....	9
6.0	References.....	9

List of Figures

Figure No.	Description	Page No.
None.		

List of Tables

Table No.	Description	Page No.
3.0-1.	Comparison of Water Quality Parameters Necessary for Mussel Invasion with Measurements in New Bullards Bar Reservoir.....	4
3.0-2	Conditions of low, marginal, and high calcium and pH that are unable, potentially able, and able to support dreissenid mussels.	5

Page Left Blank

1.0 Introduction

In January 1959, Yuba County went to the California Legislature with a bill to create a local water agency, and the Yuba County Water Agency (YCWA) was formed. Currently, YCWA owns and operates four impoundments with a total storage capacity of one million acre-feet (ac-ft) and four powerhouses that can collectively generate up to 397 megawatts of energy. The primary functions of YCWA are the generation of hydroelectric power, flood control, fishery enhancement and recreation, as well as the conservation, storage and sale of water.

The four impoundments held by YCWA are: New Bullards Bar, Our House Diversion Dam Impoundment, Log Cabin Diversion Dam Impoundment and Lake Frances (YCWA 2013a). New Bullards Bar Reservoir is a storage reservoir on the North Yuba River formed by New Bullards Bar Dam. At its normal maximum water surface elevation of 1,956 feet (ft), New Bullards Bar Reservoir extends about 13 miles (mi) upstream, has an estimated storage capacity of 966,103 ac-ft, a surface area of 4,790 acres (ac), a shoreline of about 71.9 mi, and a drainage area of 488.6 square miles (sq mi). Recreation facilities located on New Bullards Bar Reservoir include Emerald Cove Marina, Hornswoggle Group Camp, Schoolhouse Family Camp, Dark Day Campground, Dark Day Boat Ramp, Garden Point Campground, Madrone Cove Campground, and Cottage Creek Boat Ramp. There are three boat ramps on New Bullards Bar: the developed Cottage Creek Boat Ramp, the developed Dark Day Boat Launch, and the undeveloped, informal ramp at Moran Road Day Use Area (YCWA *in press*). Vehicle access is via Highway 20/Marysville Road. A variety of boats can be rented at New Bullards Bar for use solely on the reservoir, including houseboats, ski boats, patio boats, jet skis and fishing boats. Fishing with live bait is allowed on the reservoir.

Our House Diversion Dam Impoundment is a diversion impoundment on the Middle Yuba River, formed by Our House Diversion Dam. The dam is 70 ft high with a crest length of 368 ft and a crest elevation of 2,049 ft. Water levels in the impoundment fluctuate a great deal throughout the year, filling during spring run-off and gradually dropping as flows are diverted through tunnels or provided downstream. At full pool the reservoir extends less than 0.5 mi upstream, has an impoundment capacity of 280 ac-ft, a surface area of 14 ac, and a drainage area of 144.8 sq mi.¹ Year-round, the water's residence time in the impoundment is approximately one day. No recreation facilities are associated with this impoundment, and no hydropower is generated through the dam. Vehicle access to the diversion impoundment occurs via Highway 49 to Ridge Road and then 1.8 mi along the paved Our House Dam Road. Informal parking is available at the end of the Our House Dam Road, where visitors have foot access to the shoreline. Boats are not used in the impoundment.

Log Cabin Diversion Dam Impoundment is a diversion impoundment on Oregon Creek, formed by Log Cabin Diversion Dam. The dam is 53 ft high with a crest length of 300 ft and a crest elevation of 1,979 ft. Water levels in the impoundment fluctuate a great deal throughout the year, filling during spring run-off and gradually dropping as flows are diverted through tunnels or provided downstream. At full pool the reservoir extends less than 0.25 mi upstream, has an

¹ Since the impoundments formed by Our House and Log Cabin diversion dams are so minor, the drainage area is given at the dam rather than at the normal maximum water surface elevation formed by the dam.

impoundment capacity of 90 ac-ft, a surface area of 5 ac, and a drainage area of 29.1 sq mi.² Year-round, the water's residence time in the impoundment is approximately one day. No recreation facilities are associated with this impoundment, and no hydropower is generated through the dam. Vehicle access to the diversion dam is restricted. YCWA, with the permission of the United States Department of Agriculture, Forest Service, has installed and keeps locked a vehicular gate on National Forest Service land at the start of Log Cabin Road at Highway 49. Visitors can park their vehicles along the shoulder of Highway 49 and hike 1.2 mi into the diversion dam. Boats are not used in the impoundment.

The only impoundment that is not part of the Yuba River Development Project, Lake Frances (also called Lake Francis), is a small reservoir located approximately 7 mi west of New Bullards Bar on Dobbins Creek. The dam is 79 ft high and 1,341 ft wide (FindLakes.com n.d.). Originally erected in 1899 and rebuilt in 2000, the water levels do not fluctuate within the impoundment, but are maximized year-round. The impoundment has a capacity of 2,410 ac-ft, a surface area about 92 acres, and a drainage area of 6.3 sq mi. Lake Frances is used solely for recreation; no hydropower is generated through the dam. Recreation activities in the lake include fishing (with live bait), non-gasoline powered boating, and swimming. Rental boats - kayaks and pedal-boats - are available at the lake. There are no boat launches on the reservoir. Vehicle access is via Highway 20/Marysville Road to Dobbins, California. Access to the impoundment is exclusively through Lake Frances RV Resort (Lake Francis Resort 2013).

2.0 Dreissenid Mussels & Need for Vulnerability Assessment

Dreissenid mussels (which include both quagga mussels [*Dreissena bugensis*] and zebra mussels [*Dreissena polymorpha*]) were first brought to the United States from Europe in ship ballasts and first discovered in the Great Lakes in 1988. By 2007, dreissenid mussels had spread westward to Lake Mead in Nevada. In 2008, zebra mussels were discovered in California, in San Justo Reservoir, part of the Central Valley Project located in San Benito County; San Justo Reservoir has been closed to the public since that time due to the infestation (San Benito County 2013). San Justo Reservoir is approximately 200 mi from New Bullards Bar reservoir.

The closest known zebra mussel infestation outside of California is in Electric Lake in Utah (USGS 2013), approximately 600 mi away from New Bullards Bar. With the exception of Lake Mead National Recreation Area and the lower Colorado River, adult mussels have not been found in Nevada. However, in April 2011, Lahontan and Rye Patch Reservoirs in Northern Nevada tested positive for the presence of quagga mussel veligers (larvae). Subsequent sampling since that time has not found any veligers or adult mussels (NDOWa 2013).

The Tahoe Resource Conservation District (TRCD) has been inspecting trailered boats for aquatic invasive species since 2009. Each year, TRCD has found dreissenid mussels adults and veligers in boats bound for Lake Tahoe. In the 2013 recreation season, through boat inspections, 11 boats were found containing mussels (TRCD 2013). Over 14,000 boats were inspected in 2013, so fewer than one percent were found to have the invasive mussels (Lake Tahoe News 2013). Lake Tahoe is about 100 mi from New Bullards Bar.

² Since the impoundments formed by Our House and Log Cabin diversion dams are so minor, the drainage area is given at the dam rather than at the normal maximum water surface elevation formed by the dam.

If not properly cleaned, transported and trailered boats can carry dreissenid mussels between watersheds and are a primary vector of the spread of dreissenid mussels between otherwise unconnected waterbodies (USFWS 2009). Once populated, dreissenid mussels can cause tremendous damage to hydrofacilities and ecosystems. They clog water intakes and fish screens, as well as impede recreation opportunities by growing on recreation facilities. Additionally, quagga and zebra mussels consume large quantities of microscopic plants and animals, which are the basis of native communities, and can thus, lead to the disturbance of the natural ecosystem, harming plants and wildlife (USFWS 2011).

Per the federal Lacey Act, zebra mussels are prohibited from importation or shipment into the United States, or any territory of the United States. If found, any zebra mussels brought into the United States will be promptly destroyed or exported by the United States Department of Interior, Fish and Wildlife Service at the cost of the importer.

Under California Code of Regulations, California Fish and Game Code (CFGF), Title 14, §671(c)(10), quagga and zebra mussels are listed as a Restricted Species, which means it is “...*unlawful to import, transport, or possess live animals... except under permit issued by the department...*” Additionally, pursuant to this regulation, all species of *Dresseina* are termed “detrimental”, which means they pose a threat to native wildlife, the agricultural interests of the state, or to public health or safety.

In addition, CFGF §§ 2301 and 2302 provide specific regulations on dreissenid mussels, including zebra and quagga mussels. CFGF §§ 2301 states that nobody shall “...*possess, import, ship, or transport in the state, or place, plant, or cause to be placed or planted in any water within the state, dreissenid mussels...*” This law also gives the ‘director’ the right to conduct inspections, order conveyances to be drained, impound or quarantine conveyances, and close or restrict access to conveyances. In cooperation with the department, public and/or private agencies with a water supply system are to develop prevention plans for mussels and management plans for mussels, if they are located in a water supply. Additionally, any entity which discovers dreissenid mussels must immediately report the finding. CFGF §§ 2302 also mandates that “*any...local agency, district...that owns or manages and reservoir...where recreational, boating, or fishing activities...shall...assess the vulnerability of the reservoir for the introduction of nonnative dreissenid mussel species...*”

Per this last requirement, the remainder of this document addresses the susceptibility of YCWA’s impoundments to invasion by dreissenid mussels (Section 3.0), as well as preventative measures already implemented by YCWA (Section 4.0).

3.0 Vulnerability Assessment

The susceptibility of waterbodies to invasion by dreissenid mussels is determined using a combination of factors, including recreation use, and water quality.

3.1 New Bullards Bar

New Bullards Bar was evaluated for vulnerability for mussel invasion based on two factors: type and frequency of recreational use, and water quality.

3.1.1 Recreation Use

The maximum water surface carrying capacity for New Bullards Bar Reservoir is 420 boats-at-one-time, a number of boats that is routinely observed during the recreation season (YCWA 2013c). The majority of boats are trailered or otherwise transported to the reservoir from elsewhere. There are three boat ramps on New Bullards Bar that serve trailered boats. Of these, two are developed Cottage Creek and Dark Day, and one is undeveloped, at Moran Road. Therefore, there is the possibility of introduction of dreissenid mussels by recreational boaters on New Bullards Bar. However, given that of the 14,000 boats inspected going to Lake Tahoe, only 11 were found to be carrying dreissenid mussels, the probability is still relatively low.

3.1.2 Water Quality

Using the parameters from the *Examination of Calcium and pH as Predictors of Dreissenid Mussel Survival in the California State Water Project* (Claudi and Prescott 2011), developed by the California Department of Water Resources (DWR) for predicting dreissenid mussel survival, should an adult or larval dreissenid mussel be introduced to New Bullards Bar, the water quality conditions do not favor invasion by dreissenid mussels. Multiple factors, including calcium concentration, alkalinity, total hardness and phosphorus concentration, all fall outside the range currently considered by the best available science to be necessary for successful invasion.

Table 3.0-1 below compares the parameters documented in Claudy and Prescott (2011) as necessary for successful mussel invasion with those same parameters measured in New Bullards Bar Reservoir, both historically and in 2012, during YCWA’s Water Quality relicensing study (Technical Memorandum 2-3) (YCWA 2013b).

Table 3.0-1. Comparison of Water Quality Parameters Necessary for Mussel Invasion (Unable [red], Potentially Able [yellow], and Able [green]) with Measurements in New Bullards Bar Reservoir.

Parameter	From Claudy & Prescott (2011), Table 1.				New Bullards Bar Reservoir		
	Adults Do Not Survive Long-term	Uncertainty of Veliger Survival	Moderate Infestation Level	High Infestation Level	Historical Data ¹ (YCWA 2010)	Study 2-3, Water Quality (YCWA 2013b)	Potential to support dreissenid mussels
Calcium (mg/L)	< 8 to < 10	< 15	16-24	≥ 24	--	6.44-9.57	Unable
Alkalinity (mg CaCO ₃ /L)	< 30	30-55	45-100	> 90	--	26-38	Unable
Total Hardness (mg CaCO ₃ /L)	< 30	30-55	45-100	≥ 90	30-38	25-38	Unable/ Uncertain
pH	< 7.0 or > 9.5	7.1-7.5 or 9.0-9.5	7.5-8.0 or 8.8-9.0	8.2-8.8	6.8-8.4	6.65-8.49	Uncertain/ Moderate
Mean Summer Temperature (°F)	< 64	64-68 or > 83	68-72 or 77-83	72-75	45.3-77	69.7-73.9	Moderate/ High
Dissolved Oxygen (mg/L)(% Saturation)	< 3 (25%)	5-7 (25-50%)	7-8 (50-75%)	≥ 8 (>75%)	1.8-8.02	5.14-8.61	Uncertain/ Moderate

Table 3.0-1. (continued)

Parameter	From Claudi & Prescott (2011), Table 1.				New Bullards Bar Reservoir		
	Adults Do Not Survive Long-term	Uncertainty of Veliger Survival	Moderate Infestation Level	High Infestation Level	Historical Data ¹ (YCWA 2010)	Study 2-3, Water Quality (YCWA 2013b)	Potential to support dreissenid mussels
Conductivity (µS/cm)	< 30	< 30-60	60-110	≥ 100	--	0.1-82	Moderate
Salinity (mg/L) (ppt)	> 10	8-10 (< 0.01)	5-10 (0.005-0.01)	< 5 (< 0.005)	--	--	--
Secchi depth (m)	< 0.1 or > 8	0.1-0.2 or > 2.5	0.2-0.4	0.4-2.5	--	4 – 6	Unable
Chlorophyll a (µ/L)	< 2.5 or > 25	2.0-2.5 or 20-25	8-20	2.5-8	--	--	--
Total Phosphorous (µg/L)	< 5 or > 50	5-10 or 30-50	15-25	25-35	0.028J ²	0.036J -0.22	Unable

Notes:

-- not available or not applicable; µS/cm = micro-Siemens per centimeter; mg/L = milligrams per liter; m = meter; µ/L = microns per liter; µg/L = micrograms per liter

Key:

^J Estimated value. Results are greater than method detection limit, but lower than the reporting limit

¹ Samples were collected from New Bullards Bar Reservoir in 1965, 1967, and 2009.

² Orthophosphate only.

Based on historical data and data collected during the 2012 relicensing water quality study, five of the nine measured parameters were outside the range necessary for mussel survival long-term (calcium concentration, alkalinity, total hardness, secchi depth, and phosphorus concentration) and any one of the parameters would render the water inhospitable for the mussels and/or their larvae. The combined measurements of water quality fell into ranges considered of low potential for mussel invasion.

Additionally, Claudi and Prescott (2011) point out that, based on mussel life history characteristics, two of the variables, pH and calcium, are actually linked. Calcium is essential for shell formation and without adequate calcium, introduced adults will not survive and veligers will not develop into reproducing adults. At the same time, the solubility of calcium carbonate (shell) increases as pH decreases, so regardless of the presence of adequate calcium for dreissenid growth, if pH is low, mussel shells will become thin and eroded. Hence, without adequate shell thickness, adult mussels will not survive and veligers will not develop into reproducing adults.

Table 3.0-2. Conditions of low, marginal, and high calcium and pH that are unable (red), potentially able (yellow), and able (green) to support dreissenid mussels (from Claudi and Prescott 2011).

pH Level	Calcium Concentration		
	Ca ≤ 12 mg/L	12 mg/L < Ca ≤ 15 mg/L	Ca > 15 mg/L
pH ≤ 7.3	Unable	Unable	Unable
7.3 < pH ≤ 7.8	Unable	Potentially Able	Potentially Able
pH > 7.8	Unable	Potentially Able	Able

mg/L = milligrams per liter

≤ Less than or equal to

< Less than or not detected at the value presented

> More than

The pH range measured in New Bullards Bar was 6.65-8.49, while the calcium range was measured as 6.44-9.57 milligrams per liter (mg/L). So, in addition to having five parameters outside of the range for longterm dreissenid survival, when pH and calcium are considered in tandem, water quality conditions do not support dreissenid survival, growth, or reproduction.

New Bullards Bar has a low potential to be invaded by dreissenid mussels given the combination of incompatible water quality parameters. When these conditions are combined with YCWA's Prevention Program (Section 4.0), the probability decreases further.

3.2 Our House Diversion Impoundment

Our House Diversion Impoundment was evaluated for vulnerability for mussel invasion based on two factors: type and frequency of recreational use, and water quality.

3.2.1 Recreation Use

As pointed out, no recreation facilities are associated with and boats are not used in the impoundment. Access to the impoundment is poor, the water is shallow, and the water's residence time is fast.

As part of YCWA's relicensing *Recreational Use and Visitor Survey Study* (Study 8.1), YCWA surveyed recreational visitors at Project diversion dam impoundments (YCWA 2013c). Visitors to these impoundments were asked a range of questions about their use and the facilities. Only one respondent stayed overnight (at Our House Diversion Dam). Most of the day-use recreationists visit often, with friends and family; with an average of group size of three people. The number of visitor-days per year was a few hundred. Most groups were there to swim, pan for gold, watch wildlife, or hike. These activities are not considered do not generally include recreational gear that might carry mussels between waterbodies.

3.2.2 Water Quality

YCWA collected surface water samples from Our House Diversion Impoundment in the spring of 2010 and summer of 2009 and 2010 (YCWA 2013b). In spring, the pH measured in Our House Diversion impoundment was 6.8 and calcium was 11.9 mg/L. In summer, the pH was 7.5 – 7.6 and calcium range was 20.7 – 20.9 mg/L

3.3 Log Cabin Diversion Impoundment

Log Cabin Diversion Impoundment was evaluated for vulnerability for mussel invasion based on two factors: type and frequency of recreational use, and water quality.

3.3.1 Recreational Use

Our House Diversion impoundment has a low potential to be invaded by dreissenid mussels. Though summer water quality suggests a moderate potential for survival, spring water quality

does not. Given the remote location, lack of boating and water quality measures, Our House Diversion Impoundment has a very low potential for invasion.

As pointed out, no recreation facilities are associated with this impoundment and boats are not used in the impoundment. Access to the impoundment is poor, the water is shallow, and the water's residence time is fast. As with Our House Diversion Impoundment, Log Cabin Diversion Impoundment hosts a few hundred visitor-days each year who swim, pan for gold, watch wildlife, or hike. These activities are not considered do not generally include recreational gear that might carry mussels between waterbodies.

3.3.2 Water Quality

YCWA collected surface water samples from Log Cabin Diversion impoundment spring of 2010 and in summer of 2009 and 2010 (YCWA 2013b). In spring, the pH measured in Log Cabin Diversion impoundment was 7.2 and calcium range was 6.12 mg/L. In summer the pH was 7.6 – 8.1 and calcium range was 11.3 – 21 mg/L. The spring measurements indicated that mussels would be unable to survive. The summer measurements indicate a potential for survival.

Log Cabin Diversion impoundment has a low potential to be invaded by dreissenid mussels. Water quality suggests a low potential for survival. The facility is also remote and does not support trailered boating.

3.4 Lake Frances

Lake Frances was evaluated for vulnerability for mussel invasion based on two factors: type and frequency of recreational use and water quality.

3.4.1 Recreational Use

Because gasoline-powered boats are not allowed on the lake, there is no boat ramp for trailered boats, and all access is through the Lake Frances RV Resort, the potential for the introduction of dreissenid mussels to Lake Frances is very low (Lake Francis Resort 2013).

3.4.2 Water Quality

Frances Lake's calcium concentration were was measured in April 2013 and found to be between 6.1 and 6.6 mg/L, which is below the range necessary for adult mussel survival long-term (above 8 to 10 mg/L). By this parameter, Lake Frances would have a low potential for invasion, although it is only a single data point. There is no additional water quality data available for Lake Francis at this time; however, this information will be added and compared to the Claudi and Prescott (2011) parameters if the data are collected in the future.

Based on recreation access, with the added support of the one calcium reading, Lake Frances has a low potential for invasion by dreissenid mussels. When these conditions are combined with YCWA's Prevention Program (Section 4.0), the probability decreases further.

4.0 Prevention Program

YCWA has implemented several measures to prevent the invasion of New Bullards Bar Reservoir by dreissenid mussel species, consisting of signage, education, monitoring and boat inspection. Signs were installed at all launches prior to 2009 with information on aquatic invasive mussels and how to prevent their introduction to the reservoir. Mussel awareness posters have been posted at the marina. Additionally, representatives from the United States Department of Agriculture, Forest Service hand out pamphlets about dreissenid mussels to boaters at the three boat launches.

YCWA conducts a couple of types of monitoring for dreissenid mussels on New Bullards Bar. Substrate monitoring, using California Department of Fish and Wildlife's (Cal Fish and Wildlife) protocol (most recently updated 4/2013), has been conducted in two places (a log boom a couple hundred yards upstream of the dam and one near Dark Day Boat Launch) on a monthly basis since 2009. When new houseboats are going to be added to the reservoir, they are inspected prior to being put in the water. Additionally, houseboats are also generally inspected when they are removed from the reservoir for maintenance. These inspections are general and not specifically for dreissenid mussels, but they would be detected during inspection.

YCWA notes that, with funding from Cal Fish and Wildlife, since 2011, using Cal Fish and Wildlife's protocol (most recently updated 4/2013), YCWA has been veliger net monitoring in the reservoir twice a year, after the 4th of July and just after Labor Day. Cal Fish and Wildlife's laboratory is used to analyze samples. No dreissenid mussels have been located during protocol monitoring, boat inspections, or as incidental observations during relicensing studies or any other time.

YCWA's prevention program augments State and local agency prevention programs. Both the Nevada Department of Wildlife and the TRCD have boater fee collection and decal programs that fund aquatic invasive species (AIS) prevention measures, including boat inspections (NDOW 2013; TRCD 2013). Their campaigns have increased boater awareness of AIS and how to prevent the spread of AIS. Though not tracked, it is possible that their inspection program, and the boat cleaning requirement when found, has intercepted boats carrying AIS, bound to New Bullards Bar Reservoir.

California's Department of Parks and Recreation, Division of Boating and Waterways is adopting regulations to set procedures for the collection and use of the quagga and zebra infestation prevention fee. Collection of the fee, as required by California Harbors and Navigation Code Chapter 5, Division 3, Article 1.3, Sections 675 through 676, will begin with the 2014 recreational vessel registrations payable on December 31, 2013, and thereafter, on a bi-annual basis. The legislation underlying the new regulations was passed in 2012. Hence, starting December 31, 2013, the State of California will collect fees to from boaters who use Project facilities and these fees be used to address quagga and zebra monitoring and prevention in state waters.

Nevada's AIS decal requirement became effective on January 1, 2013, requiring all in and out-of-state motorized watercraft, as well as most paddle-craft, to obtain a decal. Fees from the

program will be used for AIS prevention, education, monitoring and enforcement of laws (NDOW 2013b).

5.0 Conclusions

YCWA's impounded waters are evaluated to have a low vulnerability to invasion by dreissenid mussels. Only New Bullards Bar has a higher possibility of introduction of the species, due to the higher numbers of recreationists (specifically trailered-boaters) on the reservoir. However, water quality data suggests, should adult mussels or veligers be introduced into impounded water, they would not survive.

YCWA already has implemented a dreissenid mussel prevention program in New Bullards Bar that consists of signage, education, monitoring, and boat inspection. These actions further reduce the probability of invasive mussel introduction into the impoundments. YCWA plans to expand the signage and education program to Lake Frances in 2014.

6.0 References

Claudi, R. and K. Prescott. 2011. Examination of Calcium and pH as predictors of Dreissenid Mussel Survival in the California State Water Project. Prepared for the California Department of Water Resources, Division of Operations and Maintenance, Aquatic Nuisance Species Program.

FindLakes.com (n.d.) "Find Lakes" anywhere in the United States. Website: <http://findlakes.com/index.htm>.

Lake Francis Resort. 2013. About Lake Francis. Available online: <<http://www.lakefrancisrv.com/about.html>>. Accessed March 22, 2013. Last updated 2013. Lake Francis Resort. Dobbins, CA.

Lake Tahoe News. 2013. Inspectors keep invasive mussels out of Lake Tahoe. Available online: <<http://www.laketahoenews.net/2013/12/inspectors-keep-invasive-mussels-lake-tahoe/>>. Accessed March 9, 2014. Last updated December 31, 2013.

Nevada Department of Wildlife (NDOW). 2013a. AIS Threats to Nevada's Waters Quagga/Zebra Mussels and New Zealand Mudsnaails Available online: <http://www.ndow.org/Boat/Aquatic_Invasive_Species/> Accessed October 31, 2013.

_____. 2013b. AIS Decal Information. Available online: <http://www.ndow.org/Boat/Aquatic_Invasive_Species/Decal_Information/>. Accessed March 9, 2014. Last updated 2013.

San Benito County. 2013. San Benito County Official County Government Website. Available online: <<http://www.cosb.us/county-departments/parks-recreation/regional-parks/san-justo/>>. Accessed March 25, 2013. Last updated 2013. San Benito County, California.

- Tahoe Resource Conservation District (TRCD). 2013. Fouled Boats 2013. List of 2013 boat inspections provided by M. Tierney, Forest Service, to J. Lynch, HDR via email on November 1, 2013.
- United States Fish and Wildlife Service. 2011. Bay Delta Rapid Response Plan for Dreissenid Mussels. Developed for the California Department of Fish and Game. Sacramento, CA.
- _____. 2009. Draft Quagga-Zebra Mussel Action Plan. United States Fish and Wildlife Service. Washington D.C.
- United States Geological Survey. 2013. Nonindigenous Aquatic Species- zebra mussel (*Dreissena polymorpha*) FactSheet. Available online: <<http://nas.er.usgs.gov/queries/FactSheet.aspx?speciesID=5>>. Accessed May 6, 2013. Last updated: April 19, 2013.
- Yuba County Water Agency. *in press*. Yuba River Development Project, Draft License Application. Yuba County Water Agency. Marysville, CA.
- _____. 2013a. Yuba County Water Agency Website. Available online: <<http://www.ycwa.com/>>. Accessed March 18, 2013. Last updated 2013. Yuba County Water Agency. Marysville, CA.
- _____. 2013b. Technical Memorandum 2-3, Water Quality. Prepared for the Yuba River Development Project Relicensing. Yuba County Water Agency. Marysville, CA.
- _____. 2013c. Technical Memorandum 8-1, Recreational Use and Visitor Survey. Prepared for the Yuba River Development Project Relicensing. Yuba County Water Agency. Marysville, CA.
- _____. 2010. Yuba River Development Project Pre-Application Document. FERC Project No. 2246. November 10, 2010.

**Aquatic Invasive Species
Management Plan**

Attachment B

**Forest Service Manual 2900,
Invasive Species Management**

**Yuba River Development Project
FERC Project No. 2246**

April 2014

©2014, Yuba County Water Agency
All Rights Reserved



**FOREST SERVICE MANUAL
NATIONAL HEADQUARTERS (WO)
WASHINGTON, DC**

FSM 2900 - INVASIVE SPECIES MANAGEMENT

CHAPTER - ZERO CODE

Amendment No.: 2900-2011-1

Effective Date: December 5, 2011

Duration: This amendment is effective until superseded or removed.

Approved: JAMES M. PEÑA
Associate Deputy Chief, NFS

Date Approved: 11/21/2011

Posting Instructions: Amendments are numbered consecutively by title and calendar year. Post by document; remove the entire document and replace it with this amendment. Retain this transmittal as the first page(s) of this document.

New Document	2900_zero_code	28 Pages
Superseded Document(s) by Issuance Number and Effective Date		

Digest:

2900_zero_code - Establishes code and a new manual, FSM 2900, Invasive Species Management, which sets forth National Forest System policy, responsibilities, and direction for the prevention, detection, control, and restoration of effects from aquatic and terrestrial invasive species (including vertebrates, invertebrates, plants, and pathogens). This new chapter replaces FSM 2080 (noxious weed management).

**FSM 2900 – INVASIVE SPECIES MANAGEMENT
CHAPTER – ZERO CODE**

Table of Contents

2901 - AUTHORITY	3
2901.01 - Laws.....	3
2901.02 - Regulations	7
2901.03 - Executive Orders	9
2902 - OBJECTIVES	9
2903 - POLICY.....	10
2904 - RESPONSIBILITY	13
2904.01 - Chief	14
2904.02 - Deputy Chief, National Forest System	14
2904.03 - Deputy Chief, State and Private Forestry	15
2904.04 - Washington Office, Director of Rangeland Management	15
2904.05 - Washington Office, Director of Forest Health Protection	17
2904.06 - Regional Foresters	18
2904.07 - Forest and Grassland Supervisors.....	20
2904.08 - District Rangers	21
2905 - DEFINITIONS	23

**FSM 2900 – INVASIVE SPECIES MANAGEMENT
CHAPTER – ZERO CODE**

2901 - AUTHORITY

The Forest Service authority to manage aquatic and terrestrial invasive species (including vertebrates, invertebrates, plants, and pathogens) on all areas of the National Forest System is derived from laws enacted by Congress that authorize the Secretary of Agriculture (Secretary) to administer the National Forest System and other resources and to issue necessary regulations. Many of these authorities have subsequently been delegated from the Secretary to the Chief of the Forest Service.

2901.01 - Laws

The principal statutes governing or supporting the management of aquatic and terrestrial invasive species on the National Forest System include but are not limited to, the following statutes. Except where specifically stated, these statutes apply to the entire National Forest System.

1. Organic Administration Act of 1897 (16 U.S.C. §§473 *et seq.*). Authorizes the Secretary to establish regulations governing the occupancy and use of national forests and to protect national forests from destruction.
2. Knutson-Vandenberg Act of June 9, 1930 (16 U.S.C. 576, 576a-576b). Section 3 of the Act, codified at 16 U.S.C. 576b. Provides that the Secretary may require any purchaser of national forest timber to make deposits of money in addition to the payments for the timber, to cover the cost to the United States of planting, sowing with tree seeds, and cutting, destroying or otherwise removing undesirable trees or other growth, on the national forest land cut over by the purchaser, in order to improve the future stand of timber, or protecting and improving the future productivity of the renewable resources of the forest land on such sale area.
3. Bankhead-Jones Farm Tenant Act of 1937 (7 U.S.C. §§1010 *et seq.*) Title III of the Act. Authorizes the Secretary to develop a program of land conservation and land utilization in order to correct maladjustments in land use. This statute applies only to national grasslands and land utilization projects.
4. Anderson-Mansfield Reforestation and Revegetation Act of October 11, 1949 (16 U.S.C. 581j (note), 581j, 581k). Requires the agency to accelerate and provide a continuing basis for the needed reforestation and re-vegetation of National Forest System lands and other lands under Forest Service administration or control.
5. Granger-Thye Act of 1950 (16 U.S.C. §§580h). Authorizes the Secretary to use a portion of grazing fees for range improvement projects on National Forest System lands. Specific projects mentioned are artificial re-vegetation, including the collection or purchase of necessary seed and eradication of poisonous plants and noxious weeds, in

**FSM 2900 – INVASIVE SPECIES MANAGEMENT
CHAPTER – ZERO CODE**

order to protect or improve the future productivity of the range. Section 11 of the Act authorizes the use of funds for rangeland improvement projects outside of National Forest System lands under certain circumstances.

6. Sikes Act (Fish and Wildlife Conservation) of September 15, 1960 (16 U.S.C. 670g-670l, 670o, P.L. 86-797), as amended. Section 201. Directs the Secretary of Agriculture to plan, develop, maintain, coordinate, and implement programs for the conservation and rehabilitation of wildlife, fish and game species, including specific habitat improvement or species management [including invasive species management] projects, on lands and waters under the Secretary's jurisdiction. The Act also provides for carrying out wildlife and fish conservation programs on Federal lands and waters including authority for cooperative State-Federal plans and authority to enter into agreements with States to collect fees to fund the programs identified in those plans.

7. Multiple-Use Sustained-Yield Act of 1960 (16 U.S.C. §§528 et seq.). Authorizes the Secretary to: administer National Forest System lands for outdoor recreation, range, timber, watershed, and wildlife and fish purposes; to develop the surface renewable resources for multiple use and sustained yield of several products and services to be obtained from these lands, without impairment of the productivity of the land; and, to cooperate with interested State and local governmental agencies and others in the development and management of the national forests. The Act also recognizes and clarifies Forest Service authority and responsibility to manage wildlife and fish on national forests.

8. The Endangered Species Act (ESA) of 1973 (16 U.S.C. §§1531 et seq.). Provides for the conservation of threatened and endangered species of plants and animals. Section 7 of the Act requires Federal agencies to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of the species' critical habitat. This section also requires Federal agencies to consult with the U.S. Fish and Wildlife Service (for non-marine species) or the National Oceanic and Atmospheric Administration's National Marine Fisheries Service whenever an agency action is likely to affect a threatened or endangered species or result in the destruction or adverse modification of its critical habitat.

9. Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974 as amended by the National Forest Management Act (NFMA) of 1976. Section 6 of the Act codified at 16 U.S.C. §§1600 et seq. Provides for the Secretary to promulgate regulations, under the principles of the Multiple-Use Sustained-Yield Act of 1960, specifying guidelines for land management plans developed to achieve the goals of the Program. The guidelines should provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives.

**FSM 2900 – INVASIVE SPECIES MANAGEMENT
CHAPTER – ZERO CODE**

Further, within the multiple-use objectives of a land management plan adopted pursuant to this section, provide, where appropriate, to the degree practicable, for steps to be taken to preserve the diversity of tree species similar to that existing in the region controlled by the plan.

10. Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1201, 1201 (note), 1236, 1272, 1305). Section 515. Directs the establishment on the mined areas, and all other lands affected, of a diverse, effective and permanent vegetative cover of the same seasonal variety native to the area of land to be affected and capable of self-regeneration and plant succession at least equal in extent of cover to the natural vegetation on the area; except that introduced species may be used in the re-vegetation process where desirable and necessary to achieve the approved post mining land use plan.

11. Cooperative Forestry Assistance Act of 1978 (16 U.S.C. 2101 (note), 2101-2103, 2103a, 2103b, 2104-2105). Section 3 (16 U.S.C. 2102). Details the assistance that may be given to State foresters or equivalent State officials and State extension directors, in the form of financial, technical, educational, and related assistance. Section 8 (16 U. S. C. 2104) details actions that may be taken directly on the National Forest System, in cooperation with other Federal departments on other Federal lands, and in cooperation with State foresters, or equivalent State officials, subdivisions of States, agencies, institutions, organizations, or individuals on non-federal lands to: enhance the growth and maintenance of trees and forests; promote the stability of forest related industries and employment associated therewith through the protection of forest resources; aid in forest fire prevention and control; conserve forest cover on watersheds, shelterbelts, and windbreaks; protect outdoor recreation opportunities and other forest resources; and extend timber supplies by protecting wood products, stored wood, and wood in use.

12. The North American Wetland Conservation Act 1989 (16 U.S.C. 4401 (note), 4401-4413, 16 U.S.C. 669b (note)). Section 9 (U.S.C. 4408). directs Federal agencies to cooperate with the Director of the U.S. Fish and Wildlife Service to restore, protect, and enhance the wetland ecosystems and other habitats for migratory birds, fish and wildlife within the lands and waters of each agency to the extent consistent with the mission of such agency and existing statutory authorities.

13. Consolidated Appropriations Resolution, 2003. Section 323 of the Act, codified at 16 U.S.C. 2104. Provides authority to the Forest Service to enter into stewardship contracts with public or private entities or persons to perform services to achieve land management goals for the National Forest System lands that meet local and rural community needs. Stewardship agreements may be entered into for other land management goals such as the following: removal of vegetation or other activities to

**FSM 2900 – INVASIVE SPECIES MANAGEMENT
CHAPTER – ZERO CODE**

promote healthy forest stands, reduction of fire hazards; watershed restoration and maintenance; restoration and maintenance of wildlife and fish habitat; prevention and control of invasive species; and reestablishing native plant species.

14. Healthy Forests Restoration Act of 2003 (H.R. 1904), (16 U.S.C. 6501-6502, 6511-18, 6541-42, 6571-78). Provides improved statutory processes for hazardous fuel reduction projects on certain types of at-risk National Forest System and Bureau of Land Management lands and also provides other authorities and direction to help reduce hazardous fuel and restore healthy forest and rangeland conditions on lands of all ownerships.

15. The National Historic Preservation Act of 1966 (16 U.S.C. §§470 et seq.). Requires agency heads to assume responsibility for the preservation of historic properties owned or controlled by the agency and to develop a preservation program for the identification, evaluation, and nomination of historic properties to the National Register. Management activities to protect and preserve historic properties and cultural sites may include actions to prevent and control invasive species threatening or impacting those areas. The Act requires agency heads to evaluate the effects of an undertaking on property that is included or eligible for inclusion in the National Register and to afford the Advisory Council a reasonable opportunity to comment on the undertaking. Defines undertaking to include permitting activities or Federal financial assistance under the jurisdiction of an agency.

16. The Plant Protection Act of 2000 (7 U.S.C. 7701 et seq) as amended by the Noxious Weed Control and Eradication Act of 2004 (P.L. 108-412). Among other provisions, the Plant Protection Act authorizes the Secretary of Agriculture to prohibit or restrict the importation, entry, exportation, or movement in interstate commerce of any plant, plant product, biological control organism, noxious weed, article, or means of conveyance, if the Secretary determines that the prohibition or restriction is necessary to prevent the introduction into the United States or the dissemination of a plant pest or noxious weed within the United States. The Act defines the term “Noxious Weed”.

17. Wyden Amendment (P.L. 109-54, Section 434). Authorizes the Forest Service to enter into cooperative agreements to benefit resources within watersheds on National Forest System lands. Agreements may be with willing Federal, Tribal, State, and local governments, private and non-government entities, and landowners to conduct activities on public or private lands. Under this authority, the Forest Service may enter into agreements to support or conduct invasive species management activities on aquatic and terrestrial areas owned by local and State governments, Tribes, other Federal agencies, and private individuals or organizations, to benefit and protect the National Forest System and other resources within a watershed at risk from invasive species.

**FSM 2900 – INVASIVE SPECIES MANAGEMENT
CHAPTER – ZERO CODE**

18. Clean Water Act of 1977 (33 U.S.C. 1251, 1254, 1323, 1324, 1329, 1342, 1344; 91 Stat. 1566). This act amends the Federal Water Pollution Control Act of 1972. Section 313 is strengthened to stress Federal agency compliance with Federal, State and local substantive and procedural requirements related to the control and abatement of pollution to the same extent as required of nongovernmental entities. Invasive species management to improve watershed condition supports the Act's charge to maintain the ecological integrity of our nation's waters, including the physical, chemical and biological components.

19. National Environmental Policy Act of 1969 (16 U.S.C. 4321). Requires agencies to analyze the physical, social, and economic effects associated with proposed plans and decisions, to consider alternatives to the action proposed, and to document the results of the analysis. The provisions of NEPA and the Council on Environmental Quality implementing regulations apply to invasive species management (FSM 1950; FSH 1909.15).

20. Wilderness Act of 1964 (16 U.S.C. §§1131 et seq.). Authorizes the Secretary to administer certain congressionally designated National Forest System lands as wilderness. Directs the protection and preservation of these wilderness areas in their natural state, primarily affected by nature and not man's actions. Integrated pest management actions [including aquatic and terrestrial invasive species] in Wilderness are authorized to meet provisions of the Act and consistent with Forest Service policy and guidance for Wilderness management.

21. Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), (7 U.S.C. s/s 136 et seq.). Describes pesticide regulations and requirements related to hazardous material use and worker protection standards for employees in the planning and application of pesticides.

2901.02 - Regulations

The authority to manage for invasive species on National Forest System lands and other lands under Forest Service control is delegated from the Secretary of Agriculture to the Under Secretary for Natural Resources and Environment at Title 7, Code of Federal Regulations (CFR), section 2.20 (7 CFR 2.20). This authority has been delegated in turn from the Under Secretary for Natural Resources and Environment to the Chief of the Forest Service at Title 7, Code of Federal Regulations, section 2.60 (7 CFR 2.60). Title 36, Code of Federal Regulations (including Parts 221, 222, 228, 241, 251, 261, 290, 292, 293, 296, and 297) provides additional authorities to manage and regulate invasive species across the National Forest System, including establishing requirements and prohibitions to prevent and control aquatic and terrestrial invasive

**FSM 2900 – INVASIVE SPECIES MANAGEMENT
CHAPTER – ZERO CODE**

species. In addition, Forest Service regulations at 36 CFR 222.8 acknowledge the Agency's obligation to work cooperatively in identifying invasive species (including noxious weeds) problems and initiating control programs in aquatic and terrestrial areas of the National Forest System.

1. Policy on Noxious Weed Management. Departmental Regulation 9500-10 (DR 9500-10) (January 18, 1990)). Establishes U.S. Department of Agriculture (USDA) policy to manage and coordinate noxious weed activities among USDA agencies in order to improve the quality and ecological conditions of crop and rangeland in the United States.
2. Policy on the Management of Wildlife, Fish, and Plant Habitat. Departmental Regulation 9500-4 (DR 9500-4). Guides the management of Wildlife, Fish, and Plant Habitat on public lands.
3. Gypsy Moth Policy (USDA) of 1990. Departmental Regulation 5600-001 (DR 5600-001). This regulation establishes the Departmental Gypsy Moth Policy. It assigns responsibilities to USDA agencies and defines agency roles to avoid unnecessary duplication and to provide maximum coordination of USDA activities dealing with the gypsy moth. The Forest Service plays a significant role in the management of Gypsy Moths in the United States.
4. Departmental Regulation 9500-4. USDA policy on wildlife, fish, and plant habitat management on National Forest System lands and waters. This regulation provides that the Department will promote the concept and use of integrated pest management practices in carrying out its responsibilities for pest control, and will seek to alleviate damage by plant and animal pests to farm crops, livestock, poultry, forage, forest and urban trees, wildlife, and their habitats. Departmental agencies, through management and research programs, will develop or assist in developing new techniques and methodologies for the prevention of damage to agricultural or forestry production. The agencies also will strive to reduce potential depredation through improved management of USDA programs. Pest control techniques and considerations will be incorporated into appropriate management and education programs.
5. Native Plant Materials Policy (FSM 2070). Forest Service manual direction on the use of native plant materials in re-vegetation, rehabilitation, and restoration of both aquatic and terrestrial ecosystems across the National Forest System.
6. Pesticide Use Management and Coordination Policy (FSM 2150). Provides agency policy and guidance on the use of pesticides as part of an integrated pest management approach. Additional guidance provided in the Pesticide Use Management Handbook (FSH 2109).

**FSM 2900 – INVASIVE SPECIES MANAGEMENT
CHAPTER – ZERO CODE**

2901.03 - Executive Orders

1. Executive Order 13112 issued February 3, 1999 (E.O. 13112). Directs Federal agencies to: (1) identify actions that may affect status of an invasive species; (2)(a) prevent introduction of such species; (b) detect and control such species; (c) monitor population of such species; (d) provide for restoration of native species; (e) conduct research on invasive species and develop technologies to prevent introduction of such species; (f) promote public education of such species; and (3) not authorize, fund, or carry out actions likely to cause the introduction or spread of invasive species in the United States or elsewhere unless the benefits of the action clearly outweigh the harm and the agencies take steps to minimize the harm.
2. Executive Order 10046 issued March 24, 1949 (E.O. 10046). Permanently withdrew all public domain lands within Land Utilization Projects (many in the West are now national grasslands) boundaries from all forms of appropriation under the public land laws, except the mining and mineral leasing laws, and reserved them for use, administration, and disposition by the U.S. Department of Agriculture in accordance with provisions of Title III of the Bankhead-Jones Farm Tenant Act.
3. Executive Order 11246 issued September 24, 1965 (E.O. 11246). Requires entities doing business on behalf of the Forest Service to comply with Title VI of the Civil Rights Act and applicable USDA regulations.

2902 - OBJECTIVES

Management activities for aquatic and terrestrial invasive species (including vertebrates, invertebrates, plants, and pathogens) will be based upon an integrated pest management approach on all areas within the National Forest System, and on areas managed outside of the National Forest System under the authority of the Wyden Amendment (P.L. 109-54, Section 434), prioritizing prevention and early detection and rapid response actions as necessary. All National Forest System invasive species management activities will be conducted within the following strategic objectives:

1. Prevention. Take proactive approaches to manage all aquatic and terrestrial areas of the National Forest System in a manner to protect native species and ecosystems from the introduction, establishment, and spread of invasive species. Prevention can also include actions to design public-use facilities to reduce accidental spread of invasive species, and actions to educate and raise awareness with internal and external audiences about the invasive species threat and respective management solutions.
2. Early Detection and Rapid Response (EDRR). Inventory and survey susceptible aquatic and terrestrial areas of the National Forest System so as to quickly detect invasive species infestations, and subsequently implement immediate and specific actions to eradicate those infestations before they become established and/or spread. Coordinate

**FSM 2900 – INVASIVE SPECIES MANAGEMENT
CHAPTER – ZERO CODE**

detection and response activities with internal and external partners to achieve an effective EDRR approach across all aquatic and terrestrial areas of the National Forest System. EDRR actions are grouped into three main categories: early detection, rapid assessment, and rapid response. EDRR systems will be consistent with guidance from the National Invasive Species Council, such as the ‘Guidelines for Early Detection and Rapid Response’.

3. Control and Management. Conducting integrated invasive species management activities on priority aquatic and terrestrial areas of the National Forest System will be consistent with guidance from the National Invasive Species Council, such as the ‘Control and Management Guidelines’, to contain, reduce, and remove established infestations of aquatic and terrestrial invasive species, and to limit the adverse effects of those infestations on native species, human health, and other National Forest System resources.

4. Restoration. Pro-actively manage aquatic and terrestrial areas of the National Forest System to increase the ability of those areas to be self-sustaining and resistant (resilience) to the establishment of invasive species. Where necessary, implement restoration, rehabilitation, and/or revegetation activities following invasive species treatments to prevent or reduce the likelihood of the reoccurrence or spread of aquatic or terrestrial invasive species.

5. Organizational Collaboration. Cooperate with other Federal agencies, State agencies, local governments, tribes, academic institutions, and the private sector to increase public awareness of the invasive species threat, and promote a better understanding of integrated activities necessary to effectively manage aquatic and terrestrial invasive species throughout the National Forest System. Coordinate National Forest System invasive species management activities with other Forest Service programs and external partners to reduce, minimize, or eliminate the potential for introduction, establishment, spread, and impact of aquatic and terrestrial invasive species. Coordinate and integrate invasive species research and technical assistance activities conducted by Forest Service Research and Development, and State and Private Forestry programs with National Forest System programs to increase the management effectiveness against aquatic and terrestrial invasive species infestations impacting or threatening the National Forest System.

2903 - POLICY

The following describes Forest Service’s policy for the management of aquatic and terrestrial invasive species (including vertebrates, invertebrates, plants, and pathogens), based on an integrated pest management approach, throughout the National Forest System:

**FSM 2900 – INVASIVE SPECIES MANAGEMENT
CHAPTER – ZERO CODE**

1. Initiate, coordinate, and sustain actions to prevent, control, and eliminate priority infestations of invasive species in aquatic and terrestrial areas of the National Forest System using an integrated pest management approach, and collaborate with stakeholders to implement cooperative invasive species management activities in accordance with law and policy.
2. When applicable, invasive species management actions and standards should be incorporated into resource management plans at the forest level, and in programmatic environmental planning and assessment documents at the regional or national levels.
3. Determine the vectors, environmental factors, and pathways that favor the establishment and spread of invasive species in aquatic and terrestrial areas the National Forest System, and design management practices to reduce or mitigate the risk for introduction or spread of invasive species in those areas.
4. Determine the risk of introducing, establishing, or spreading invasive species associated with any proposed action, as an integral component of project planning and analysis, and where necessary provide for alternatives or mitigation measures to reduce or eliminate that risk prior to project approval.
5. Ensure that all Forest Service management activities are designed to minimize or eliminate the possibility of establishment or spread of invasive species on the National Forest System, or to adjacent areas. Integrate visitor use strategies with invasive species management activities on aquatic and terrestrial areas of the National Forest System. At no time are invasive species to be promoted or used in site restoration or re-vegetation work, watershed rehabilitation projects, planted for bio-fuels production, or other management activities on national forests and grasslands.
6. Use contract and permit clauses to require that the activities of contractors and permittees are conducted to prevent and control the introduction, establishment, and spread of aquatic and terrestrial invasive species. For example, where determined to be appropriate, use agreement clauses to require contractors or permittees to meet Forest Service-approved vehicle and equipment cleaning requirements/standards prior to using the vehicle or equipment in the National Forest System.
7. Make every effort to prevent the accidental spread of invasive species carried by contaminated vehicles, equipment, personnel, or materials (including plants, wood, plant/wood products, water, soil, rock, sand, gravel, mulch, seeds, grain, hay, straw, or other materials).
 - a. Establish and implement standards and requirements for vehicle and equipment cleaning to prevent the accidental spread of aquatic and terrestrial invasive species on the National Forest System or to adjacent areas.

**FSM 2900 – INVASIVE SPECIES MANAGEMENT
CHAPTER – ZERO CODE**

- b. Make every effort to ensure that all materials used on the National Forest System are free of invasive species and/or noxious weeds (including free of reproductive/propagative material such as seeds, roots, stems, flowers, leaves, larva, eggs, veligers, and so forth).
8. Where States have legislative authority to certify materials as weed-free (or invasive-free) and have an active State program to make those State-certified materials available to the public, forest officers shall develop rules restricting the possession, use, and transport of those materials unless proof exists that they have been State-certified as weed-free (or invasive-free), as provided in 36 CFR 261 and Departmental Regulation 1512-1.
9. Monitor all management activities for potential spread or establishment of invasive species in aquatic and terrestrial areas of the National Forest System.
10. Manage invasive species in aquatic and terrestrial areas of the National Forest System using an integrated pest management approach to achieve the goals and objectives identified in Forest Land and Resource Management plans, and other Forest Service planning documents, and other plans developed in cooperation with external partners for the management of natural or cultural resources.
11. Integrate invasive species management funding broadly across a variety of National Forest System programs, while associating the funding with the specific aquatic or terrestrial invasive species that is being prioritized for management, as well as the purpose and need of the project or program objective.
12. Develop and utilize site-based and species-based risk assessments to prioritize the management of invasive species infestations in aquatic and terrestrial areas of the National Forest System. Where appropriate, use a structured decisionmaking process and adaptive management or similar strategies to help identify and prioritize invasive species management approaches and actions.
13. Comply with the Forest Service performance accountability system requirements for invasive species management to ensure efficient use of limited resources at all levels of the Agency and to provide information for adapting management actions to meet changing program needs and priorities. When appropriate, utilize a structured decisionmaking process to address invasive species management problems in changing conditions, uncertainty, or when information is limited.
14. Establish and maintain a national record keeping database system for the collection and reporting of information related to invasive species infestations and management activities, including invasive species management performance, associated with the

**FSM 2900 – INVASIVE SPECIES MANAGEMENT
CHAPTER – ZERO CODE**

National Forest System. Require all information associated with the National Forest System invasive species management (including inventories, surveys, and treatments) to be collected, recorded, and reported consistent with national program protocols, rules, and standards.

15. Where appropriate, integrate invasive species management activities, such as inventory, survey, treatment, prevention, monitoring, and so forth, into the National Forest System management programs. Use inventory and treatment information to help set priorities and select integrated management actions to address new or expanding invasive species infestations in aquatic and terrestrial areas of the National Forest System.

16. Assist and promote cooperative efforts with internal and external partners, including private, State, tribal, and local entities, research organizations, and international groups to collaboratively address priority invasive species issues affecting the National Forest System.

17. Coordinate as needed with Forest Service Research and Development and State and Private Forestry programs, other agencies included under the National Invasive Species Council, and external partners to identify priority/high-risk invasive species that threaten aquatic and terrestrial areas of the National Forest System. Encourage applied research to develop techniques and technology to reduce invasive species impacts to the National Forest System.

18. As appropriate, collaborate and coordinate with adjacent landowners and other stakeholders to improve invasive species management effectiveness across the landscape. Encourage cooperative partnerships to address invasive species threats within a broad geographical area.

2904 - RESPONSIBILITY

The Chief delegates the authority and responsibility for the overall administration of the National Forest System invasive species management program in conformance with applicable Federal law, regulation, and policy, to the Deputy Chief, National Forest System (NFS). This delegated authority is reserved to the Deputy Chief, NFS, except for the delegations to the Director of Rangeland Management, regional foresters, forest/grassland supervisors, and/or district rangers. National Forest System invasive species management responsibilities and activities are integrated and coordinated with parallel and overlapping invasive species program activities conducted under the policies of the Deputy Chief, State and Private Forestry (FSM 3000-3900) and the Deputy Chief, Research and Development (FSM 4000-4900).

**FSM 2900 – INVASIVE SPECIES MANAGEMENT
CHAPTER – ZERO CODE**

2904.01 - Chief

The responsibility of the Chief is to:

1. Retain overall authority over and responsibility for establishing national policy for the management of invasive species threatening aquatic and terrestrial areas of the National Forest System.
2. Promote cooperation and coordination between other Federal agencies, State agencies, Tribes, and local governments, and other public and private sector partners for the management of terrestrial and aquatic invasive species.
3. Provide coordination across all Forest Service program areas to ensure program activities are integrated and overall management effectiveness against aquatic and terrestrial invasive species is maximized.

2904.02 - Deputy Chief, National Forest System

The responsibility of the Deputy Chief for the National Forest System is to:

1. Ensure overall coordination and oversight of National Forest System invasive species management activities and associated program budget and performance integration, and coordination with the Deputy Chief, State and Private Forestry, and the Deputy Chief, Research and Development.
2. Issue national policy, direction, guidelines, protocols, and standards for the integrated management of invasive species on all aquatic and terrestrial areas of the National Forest System. Integrate invasive species management direction across programs within the National Forest System.
3. Promote coordination across all National Forest System program areas within the Deputy area to ensure program activities are integrated and overall management effectiveness against aquatic and terrestrial invasive species is maximized. Facilitate multi-disciplinary, cross-programmatic teams to coordinate National Forest System invasive species management activities with other Forest Service programs.
4. Represent the Chief on national committees, coalitions, teams, and ad hoc groups concerned with invasive species management and research relevant to, or affecting, the National Forest System, when necessary. Coordinate NFS participation and representation as needed with Deputy Chief, State and Private Forestry and the Deputy Chief, Research and Development.

**FSM 2900 – INVASIVE SPECIES MANAGEMENT
CHAPTER – ZERO CODE**

5. Ensure that invasive species management activities and funding are integrated broadly across all National Forest System programs to meet requirements in law, policy, strategic plan objectives, and to increase overall management effectiveness against terrestrial and aquatic invasive species threatening the National Forest System.
6. Promote the development and use of a national recordkeeping database system for the collection and reporting of National Forest System information related to invasive species infestations and management activities, and associated program performance and accountability. Ensure national standards, protocols, and program requirements for record keeping and reporting are met across the National Forest System.
7. Promote cooperation and coordination between the National Forest System invasive species management program and other Federal agencies, State agencies, tribes, local governments, and other public and private sector partners for the management of aquatic and terrestrial invasive species across the landscape.

2904.03 - Deputy Chief, State and Private Forestry

The responsibility of the Deputy Chief for State and Private Forestry is to:

1. Approve funding requests recommended by the Director of Forest Health Protection for eradication, prevention, suppression, and restoration projects related to invasive forest insects and pathogens on the National Forest System, in coordination with the Deputy Chief, National Forest System.
2. Promote coordination between programs within State and Private Forestry and other Forest Service programs to ensure program activities are integrated and overall effectiveness against aquatic and terrestrial invasive species is maximized across the National Forest System.
3. Facilitate participation by State and Private Forestry programs on multi-disciplinary, cross-programmatic teams at the local, regional, and national levels to improve invasive species research and management activities across the agency.

2904.04 - Washington Office, Director of Rangeland Management

The responsibility of the Washington Office, Director of Rangeland Management is to:

1. Establish and support a National Invasive Species Program Coordinator to oversee all National Forest System invasive species management activities, including: invasive species program budget and performance integration; oversight and development of policies and regulations; development and oversight of invasive species management program requirements and standards; interagency and interdepartmental coordination; development and expansion of partnerships; promoting collaboration with other Forest

**FSM 2900 – INVASIVE SPECIES MANAGEMENT
CHAPTER – ZERO CODE**

Service programs; reviewing invasive species management programs at the regional and field levels, providing technical and scientific support on invasive species issues; promoting and supporting technology development and research accomplished in the Forest Service State and Private Forestry and Research and Development programs, and sources outside the agency; and the development and review of plans, strategies, policies, and proposals relevant to the management of aquatic and terrestrial invasive species.

2. Coordinate national invasive species management activities across all programs and offices within the National Forest System, including but not limited to coordination with Washington Office staff directors, regional office staff directors, and other programs and offices across the National Forest System.
3. Collaborate with Forest Service State and Private Forestry programs, International programs, Research and Development, and other Forest Service programs conducting invasive species management activities and associated projects and partnerships.
4. Coordinate with other Federal agencies, the National Invasive Species Council, and national and international invasive species organizations, State government organizations, tribal government organizations, and other stakeholders in the establishment, application, and use of collaborative, proactive and integrated approaches for the management of invasive species affecting, or potentially affecting, the National Forest System.
5. Provide for National Forest System representation on internal interdisciplinary Forest Service teams, such as the Washington Office, National Invasive Species Issue Team (WO-ISIT), to facilitate cross-deputy area, cross-programmatic, and multi-disciplinary collaboration on invasive species management issues relevant to, or affecting the National Forest System.
6. Represent the Forest Service Chief or National Forest System Deputy Chief on external national committees, coalitions, teams, and ad hoc groups concerned with invasive species management and research relevant to, or affecting, the National Forest System, when necessary.
7. Coordinate with other Forest Service invasive species programs managed under the Deputy Chief, State and Private Forestry, International Programs, and the Deputy Chief, Research and Development to ensure the full spectrum of Forest Service invasive species management and research issues are represented on national or regional committees, coalitions, teams, and ad hoc groups.
8. Develop, review, establish, and implement national-level agreements or memorandums of understanding with other Federal agencies, national-level State organizations, national non-government organizations, tribal governments, and other partners concerning invasive species issues affecting the National Forest System.

**FSM 2900 – INVASIVE SPECIES MANAGEMENT
CHAPTER – ZERO CODE**

9. Ensure that invasive species management activities, funding, and performance are integrated across all National Forest System programs to meet requirements in law, policy, the objectives in strategic plans, and to increase overall management effectiveness against terrestrial and aquatic invasive species threatening the National Forest System.
10. Provide oversight and guidance on the development and use of a national record keeping database system for the collection and reporting of National Forest System information related to invasive species infestations and management activities, and associated program performance and accountability.
11. Develop and issue national standards, protocols, business rules, and related invasive species program record keeping and reporting requirements associated with National Forest System invasive species management.
12. Monitor compliance with applicable law, policy, and other program requirements and guidance associated with the management of aquatic and terrestrial invasive species across the National Forest System. When requested, compile, summarize, and report National Forest System invasive species management performance results, financial information, and other National Forest System invasive species program records.
13. Maintain contact with the Forest Service research organizations, and other external research and development organizations to review invasive species research programs, identify additional research needs, set priorities, and help coordinate research efforts for management of invasive species affecting national forests and grasslands.
14. Coordinate with Forest Service regions, forests, and other program areas to establish and issue nationwide standards and requirements for invasive species management training for Agency personnel, including but not limited to training associated with pesticide use, integrated pest management planning, record keeping, invasive species identification and ecology, and inventory and monitoring activities. Ensure that training is developed and implemented consistent with national program objectives, policy, and law.

2904.05 - Washington Office, Director of Forest Health Protection

The responsibility of the Director, Forest Health Protection for State and Private Forestry is to:

1. Administer the functions of section 8 of the Cooperative Forestry Assistance Act as amended, codified at 16 U.S.C. 2104, in support of the management of invasive forest insects and forest pathogens conducted on the National Forest System.

**FSM 2900 – INVASIVE SPECIES MANAGEMENT
CHAPTER – ZERO CODE**

2. Provide leadership, technical advice, and guidance to national forests and grasslands on the management of invasive forest insects and forest pathogens, including activities to survey and detect, evaluate, prevent, and suppress forest invasive insects and pathogens, and the restoration of lands damaged by those invasive species.
3. Provide leadership, technical advice, and guidance on the use of chemical and biological pesticides to prevent or control aquatic and terrestrial invasive species on national forests and grasslands.
4. Review and recommend to the Deputy Chief for State and Private Forestry all funding requests submitted by National Forests and Grasslands for eradication, prevention, suppression, and restoration projects related to invasive forest insects and forest pathogens, in accordance with FSM 3400 and other relevant guidance.

2904.06 - Regional Foresters

The responsibility of regional foresters is to:

1. Appoint at least one coordinator for all National Forest System invasive species management activities within the region and formally establish a multi-disciplinary regional Invasive Species Issue Team to collaborate on invasive species issues across Forest Service program areas within the region.
2. Provide National Forest System representation on the Regional Invasive Species Issue Team, and other agency or interagency committees, task forces, coalitions, teams, and ad hoc groups concerned with invasive species management relevant to, or affecting, the national forests or national grasslands within that region.
3. Ensure Forest Land and Resource Management plans, Regional Environmental Management System plans, and other regional resource and programmatic plans include objectives, desired conditions, guidelines, and specific elements and activities to address the management of aquatic and terrestrial invasive species, including but not limited to inventory, monitoring, prevention, and control of invasive vertebrates, invertebrates, plants, and pathogens.
4. Collect, maintain, and report regional information related to National Forest System invasive species management activities (including inventory, prevention, treatment, cost, needs assessments, and treatment efficacy information), and associated program performance and accountability information, in compliance with national protocols, rules, and requirements.

**FSM 2900 – INVASIVE SPECIES MANAGEMENT
CHAPTER – ZERO CODE**

5. Develop, establish, and implement regional-level agreements or memorandums of understanding with other Federal and State agencies, non-government organizations, tribal governments, and other partner organizations to address invasive species issues at a forest or regional level. Foster collaborative efforts such as “cooperative weed management areas”, “cooperative invasive species management zones”, and similar collaborative partnerships.
6. Collaborate with internal and external partners to develop and implement National Forest System invasive species management training, consistent with national requirements, including training programs associated with record keeping, integrated pest management techniques, restoration, and other invasive species program training.
7. Collaborate with internal and external partners to develop public information and education programs to improve awareness and understanding of invasive species, their biology, impacts, and management. Projects should utilize expertise from the broad array of Forest Service program areas as appropriate.
8. Cooperate with State governments and Tribes to implement and enforce applicable regulations, plans, and guidance on invasive species management on national forests and grasslands across the region, including but not limited to:
 - a. State regulations related to prevention and control of aquatic and terrestrial invasive species (and noxious weeds);
 - b. State regulations associated with utilizing, storing, transporting, or certifying invasive species-free (and/or noxious weed-free) straw, hay, mulch, gravel, forage, seed, or other materials; or
 - c. Statewide aquatic nuisance species management plans, fish and wildlife management plans, early detection and rapid response plans, or other statewide or regionwide invasive species management plans within the respective Forest Service region.
9. Issue orders, rules, or other regulations under the authority of 36 CFR (Parts 221, 222, 228, 241, 251, 261, 290, 292, 293, 296, and 297), Departmental Regulation 1512-1, and consistent with national or regional Forest Service policy, to prevent and control the introduction and spread of aquatic and terrestrial invasive species (including noxious weeds) on the National Forest System, when necessary.

**FSM 2900 – INVASIVE SPECIES MANAGEMENT
CHAPTER – ZERO CODE**

2904.07 - Forest and Grassland Supervisors

The responsibility of forest and grassland supervisors is to:

1. Appoint forest staff to coordinate the forest or grassland invasive species management program in accordance with law and policy, and other national and regional requirements.
2. Develop and implement a forest or grassland invasive species management program that is consistent with this chapter, annual program requirements, and the objectives, desired conditions, and guidelines identified in Forest Land and Resource Management plans, Environmental Management System plans, and the Forest Service and Departmental strategic plans.
3. Ensure all Forest Land and Resource Management plans, Forest Environmental Management System plans, and other resource and project-level plans are updated to include objectives, desired conditions, guidelines, specific elements and activities to manage aquatic and terrestrial invasive species, including but not limited to prevention, control, inventory and monitoring of invasive vertebrates, invertebrates, plants, and pathogens.
4. Establish agreements and memorandums of understanding with other Federal and State agencies, non-government organizations, tribal governments, and other partner organizations to address invasive species issues as appropriate. Foster collaborative efforts such as “cooperative weed management areas”, “cooperative invasive species management zones”, and similar collaborative partnerships to address invasive species.
5. Collect, maintain, and report information related to invasive species infestations, impacts, and management activities (including inventories, surveys, assessments, treatments, and treatment efficacy) occurring on the national forest or grassland and associated program performance and accountability information, in compliance with national invasive species program protocols, criteria, rules, and requirements.
6. Identify and record the spatial extent of site-specific invasive species treatment activities, and monitoring invasive species treatments to determine efficacy and evaluate impacts to effected resources. Collect and maintain treatment records and associated spatial information in the national database of record in compliance with national invasive species program protocols, rules, and requirements.
7. Provide opportunities for staff training for invasive species identification and management, consistent with national and regional requirements, including training associated with invasive species record keeping, integrated pest management techniques, invasive species inventory and treatment monitoring, and other invasive species program training.

**FSM 2900 – INVASIVE SPECIES MANAGEMENT
CHAPTER – ZERO CODE**

8. Collaborate with internal and external partners to develop public information and educational materials/ programs to increase the awareness and understanding of aquatic and terrestrial invasive species, their biology, impacts, and management.
9. Cooperate with State governments and Tribes to implement and enforce applicable regulations, plans, and guidance on invasive species management across the national forest or grassland, including but not limited to:
 - a. State regulations related to prevention and control of aquatic and terrestrial invasive species (and noxious weeds);
 - b. State regulations associated with utilizing, storing, transporting, or certifying invasive species-free (and/or noxious weed-free) straw, hay, mulch, gravel, forage, seed, or other materials;
 - c. Statewide aquatic nuisance species management plans, fish and wildlife management plans, early detection and rapid response plans, or other statewide or regionwide invasive species management plans affecting the respective Forest or Grassland.
10. Issue orders, rules, or other regulations under the authority of 36 CFR (Parts 221, 222, 228, 241, 251, 261, 290, 292, 293, 296, and 297), Departmental Regulation 1512-1, and consistent with national and regional policy, to prevent and control the introduction and spread of aquatic and terrestrial invasive species (including noxious weeds) on the forest or grassland, when necessary.
11. Coordinate and cooperate with State and county agencies, Tribes, non-government organizations, and adjacent landowners in invasive species prevention, early detection and rapid response, control and containment, restoration and rehabilitation, and inventory and monitoring activities.
12. Ensure that contracts and permits contain clauses and specifications requiring the implementation of measures to prevent, control, and/or contain aquatic or terrestrial invasive species (including noxious weeds). Oversee contract and permit administration to ensure compliance with the provisions.

2904.08 - District Rangers

The responsibility of district rangers is to:

1. Appoint staff to coordinate invasive species management activities in accordance with law and policy.

**FSM 2900 – INVASIVE SPECIES MANAGEMENT
CHAPTER – ZERO CODE**

2. Maintain working relationships with the State or local invasive species or noxious weed management committees, districts or boards, and other invasive species stakeholder organizations.
3. Establish, as appropriate, agreements and memorandums of understanding with other Federal and State agencies, non-government organizations, Tribes, and other partner organizations to address invasive species issues. Foster collaborative efforts such as “cooperative weed management areas”, “cooperative invasive species management areas”, and similar collaborative partnerships to address invasive species across the landscape.
4. Prevent the introduction and establishment, as well as providing for the containment and suppression, of aquatic and terrestrial invasive species, and coordinating with State and local agencies, Tribes, and landowners in the prevention, control, and restoration efforts associated with the management of invasive species. Outbreaks and newly detected infestations should be reported promptly.
5. Collect, maintain, and report information related to invasive species infestations, impacts, and management activities (including inventories, surveys, assessments, treatments, and treatment efficacy) occurring on the national forest or grassland and associated program performance and accountability information, in compliance with national invasive species program protocols, criteria, rules, and requirements.
6. Identify and record the spatial extent of site-specific invasive species treatment activities, and monitoring invasive species treatments to determine efficacy and evaluate impacts to effected resources. Collect and maintain treatment records and associated spatial information in the national database of record in compliance with national invasive species program protocols, rules, and requirements.
7. Implement the elements, activities, and measures associated with invasive species management in Forest Land and Resource Management plans, Forest Environmental Management System plans, and other resource management and project-level plans.
8. Determine the risk of invasive species introduction or spread as part of the project planning and analysis process for proposed actions, especially for ground disturbing and site altering activities, and public use activities.
9. Ensure that staff are properly trained on invasive species management consistent with national and regional, and State requirements, including training programs associated with invasive species record keeping, integrated pest management techniques, invasive species inventory and treatment monitoring, and other invasive species related training.

**FSM 2900 – INVASIVE SPECIES MANAGEMENT
CHAPTER – ZERO CODE**

10. Collaborate with internal and external partners to develop public information and educational materials/ programs to increase the awareness and understanding of aquatic and terrestrial invasive species, their biology, impacts, and management.
11. Cooperate with State governments and Tribes to implement and enforce applicable regulations, plans, and guidance on invasive species management across the forest or grassland, including but not limited to:
 - a. State regulations related to prevention and control of aquatic and terrestrial invasive species (and noxious weeds);
 - b. State regulations associated with utilizing, storing, transporting, or certifying invasive species-free (and/or noxious weed-free) straw, hay, mulch, gravel, forage, seed, or other materials;
 - c. Statewide aquatic nuisance species management plans, fish and wildlife management plans, early detection and rapid response plans, or other statewide or regionwide invasive species management plans affecting the respective forest or grassland.
12. Issue orders, rules, or other regulations under the authority of 36 CFR (Parts 221, 222, 228, 241, 251, 261, 290, 292, 293, 296, and 297), Departmental Regulation 1512-1, and consistent with national or regional policy, to prevent and control the introduction and spread of aquatic and terrestrial invasive species (including noxious weeds), when necessary.
13. Coordinate and cooperate with State and county agencies, Tribes, non-government organizations, and adjacent landowners in invasive species prevention, early detection and rapid response, control and containment, restoration and rehabilitation, and inventory and monitoring activities.
14. Ensure that contracts and permits contain clauses and specifications requiring the implementation of measures to prevent, control, and/or contain aquatic or terrestrial invasive species (including noxious weeds) and restoration measures to offset associated impacts. Oversee contract and permit administration to ensure compliance with the invasive species provisions.

2905 - DEFINITIONS

Adaptive Management. A system of management practices based on clearly identified intended outcomes and monitoring to determine if management actions are meeting those outcomes; and, if not, to facilitate management changes that will best ensure that those outcomes are met or reevaluated. Adaptive management stems from the recognition that knowledge about natural resource systems is sometimes uncertain.

**FSM 2900 – INVASIVE SPECIES MANAGEMENT
CHAPTER – ZERO CODE**

Control. With respect to invasive species (plant, pathogen, vertebrate, or invertebrate species), control is defined as any activity or action taken to reduce the population, contain, limit the spread, or reduce the effects of an invasive species. Control activities are generally directed at established free-living infestations, and may not necessarily be intended to eradicate the targeted infestation in all cases.

Early Detection. The process of finding, identifying, and quantifying new, small, or previously unknown infestations of aquatic or terrestrial invasive species prior to (or in the initial stages of) its establishment as free-living expanding population. Early detection of an invasive species is typically coupled with integrated activities to rapidly assess and respond with quick and immediate actions to eradicate, control, or contain it.

Eradication. With respect to invasive species (plant, pathogen, vertebrate, or invertebrate species), eradication is defined as the removal or elimination of the last remaining individual invasive species in the target infestation on a given site. It is determined to be complete when the target species is absent from the site for a continuous time period (that is, several years after the last individual was observed). Eradication of an infestation of invasive species is relative to the time-frame provided for the treatment procedures. Considering the need for multiple treatments over time, certain populations can be eradicated using proper integrated management techniques.

Integrated Pest Management (IPM). A pest (in this context an invasive species) control strategy based on the determination of an economic, human health, or environmental threshold that indicates when a pest population is approaching the level at which control measures are necessary to prevent a decline in the desired conditions (economic or environmental factors). In principle, IPM is an ecologically-based holistic strategy that relies on natural mortality factors, such as natural enemies, weather, and environmental management, and seeks control tactics that disrupt these factors as little as possible. Integrated pest management techniques are defined within four broad categories: 1) Biological, 2) Cultural, 3) Mechanical/Physical, and 4) Chemical techniques.

Invasive Species. Executive Order 13112 defines an invasive species as “an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health.” The Forest Service relies on Executive Order 13112 to provide the basis for labeling certain organisms as invasive. Based on this definition, the labeling of a species as “invasive” requires closely examining both the origin and effects of the species. The key is that the species must cause, or be likely to cause, harm and be exotic to the ecosystem it has infested before we can consider labeling it as “invasive”. Thus, native pests are not considered “invasive”, even though they may cause harm. Invasive species infest both aquatic and terrestrial areas and can be identified within any of the following four taxonomic categories: Plants, Vertebrates, Invertebrates, and Pathogens. Additional information on this definition can be found in Executive Order 13112.

FSM 2900 – INVASIVE SPECIES MANAGEMENT CHAPTER – ZERO CODE

Invasive Species Management. Activities to prevent, control, contain, eradicate, survey, detect, identify, inventory, and monitor invasive species; includes rehabilitation and restoration of affected sites and educational activities related to invasive species. Management actions are based upon species-specific or site-specific plans (including forest plans, IPM plans, watershed restoration plans, and so forth), and support the accomplishment of plan goals and objectives and achieve successful restoration or protection of priority areas identified in the respective plan(s).

Inventory. Invasive species inventories are generally defined as the observance and collection of information related to the occurrence, population or infestation of the detected species across the landscape or with respect to a more narrowly-defined area or site. Inventory attributes and purposes will vary, but are typically designed to meet specific management objectives which need information about the extent of an invasive species infestation. Inventories are typically conducted to quantify the extent of, and other attributes related to, infestations identified during survey activities.

Memorandum of Understanding. A written agreement between the Forest Service and local, State, or Federal entities, or private organizations, entered into when there is no exchange of funds from one organization to another.

Monitoring. For the purposes of invasive species program performance and accountability, the term “monitoring” refers to the observance and recording of information related to the responses to treating an invasive species infestation, and reported as treatment efficacy. By monitoring the treatment results over time, a measure of overall programmatic treatment efficacy can be determined and an adaptive management process can be used in subsequent treatment activities.

Noxious Weed. The term “Noxious Weed” is defined for the Federal Government in the Plant Protection Act of 2000 and in some individual State statutes. For purposes of this chapter, the term has the same meaning as found in the Plant Protection Act of 2000 as follows: The term “noxious weed” means any plant or plant product that can directly or indirectly injure or cause damage to crops (including nursery stock or plant products), livestock, poultry, or other interests of agriculture, irrigation, navigation, the natural resources of the United States, the public health, or the environment. The term typically describes species of plants that have been determined to be undesirable or injurious in some capacity. Federal noxious weeds are regulated by USDA-Animal and Plant Health Inspection Service under the Plant Protection Act of 2000, which superseded the Federal Noxious Weed Act of 1974. State statutes for noxious weeds vary widely, with some States lacking any laws defining or regulating noxious weeds. Depending on the individual State law, some plants listed by a State statute as “noxious” may be native plants which that State has determined to be undesirable. When the species are native, they are not considered invasive species by the Federal Government. However, in most cases, State noxious weed lists include only exotic (non-native) species.

FSM 2900 – INVASIVE SPECIES MANAGEMENT CHAPTER – ZERO CODE

Prevention. Prevention measures for invasive species management programs include a wide range of actions and activities to reduce or eliminate the chance of an invasive species entering or becoming established in a particular area. Preventative activities can include projects for education and awareness as well as more traditional prevention activities such as vehicle/equipment cleaning, boat inspections, or native plant restoration plantings. Restoration activities typically prevent invasive species infestations by improving site resilience, and reducing or eliminating the conditions on a site that may facilitate or promote invasive species establishment.

Priority Area Treated. Program or project plans (primarily at the district or forest level) will identify priority areas on which to focus integrated management actions to directly prevent, control, or eradicate a priority/high-risk aquatic or terrestrial invasive species. Priority areas identified for invasive species treatments may include any specifically-delineated project area. Examples include, but are not limited to: a fuels treatment area, a developed recreation area, a transportation corridor, a facility, a sensitive habitat for rare species, a wetland, a river, a lake, a stream, an irrigation ditch, a grazing allotment, a stock pond, a fire camp, wildlife winter range, a burned area, a fire-break, a timber sale area, a wilderness area, a Research Natural Area, an energy transmission right of way, and so forth). The size of the priority area treated will typically be measured in acres. For linear features (such as a stream/river, trail, roadway, power-line, ditch, and so forth) the area size can be calculated from the length and average width. In some cases, a smaller portion of a delineated project area infested by invasive species may be prioritized for treatment over the larger infestation. Guidance on determining and establishing priorities for invasive species management is provided in the Forest Service Invasive Species Management Handbook (FSH 2900).

Rapid Response. With respect to invasive species (plant, pathogen, vertebrate, or invertebrate species), rapid responses are defined as the quick and immediate actions taken to eradicate, control, or contain infestations that must be completed within a relatively short time to maximize the biological and economic effectiveness against the targeted invasive species. Depending on the risk of the targeted invasive species, rapid response actions may be supported by an emergency situation determination and emergency considerations would include the geographic extent of the infestation, distance from other known infestations, mobility and rate of spread of the invasive species, threat level and potential impacts, and available treatments.

Restored. With respect to performance specifically, the invasive species program is driven by an outcome-based performance measure centered on 'restoration'. An area treated (see "treatment" definition) against invasive species has been 'restored' when the targeted invasive species defined in the project plan was controlled or eradicated directly as a result of the treatment activity. In some instances, actions taken across particular areas to prevent the establishment and spread of specific invasive species are also included in this treatment definition. 'Restored' acres are a subset of 'treated' acres,

**FSM 2900 – INVASIVE SPECIES MANAGEMENT
CHAPTER – ZERO CODE**

which are tracked annually to determine the effectiveness of treatments. Preventing, controlling, or eradicating invasive species assists in the recovery of the area's resilience and the capacity of a system to adapt to change if the environment where the system exists has been degraded, damaged, or destroyed (in this case by invasive species); and helps to reestablish ecosystem functions by modifying or managing composition and processes necessary to make terrestrial and aquatic ecosystems sustainable, and resilient, under current and future conditions (as described in FSM 2020). In most cases, this is a performance measure defined in the project plan, and project managers have the flexibility to set the parameters for determining when the treated areas have been restored. Absence of an individual invasive species organism, whether through eradication or prevention efforts, is most often the criteria used to determine when acres have been restored. Monitoring treatment efficacy is critical to reporting invasive species management performance.

Resilience. The capacity of an ecosystem to absorb disturbance and reorganize while undergoing change, so as to still retain essentially the same function, structure, identity, and feedbacks. By working toward the goals of diverse native ecosystems that are connected and can absorb disturbance, it is expected that over time, management would create ecological conditions that support the abundance and distribution of native species within a geographic area to provide for native plant and animal diversity.

State Agency. A State Department of Agriculture, State Department of Natural Resources, other State agency, or subdivision thereof, responsible for the administration or implementation of State laws pertaining to invasive species, noxious weeds, exotic species, or other pest/undesirable species.

Structured Decision Making (SDM). A general term for carefully-organized analysis of problems in order to reach decisions that are focused clearly on achieving fundamental objectives. Based in decision theory and risk analysis, SDM encompasses a simple set of concepts and helpful steps, rather than a rigidly-prescribed approach for problem solving. Key SDM concepts include making decisions based on clearly articulated fundamental objectives, dealing explicitly with uncertainty, and responding transparently to legal mandates and public preferences or values in decision making; thus, SDM integrates science and policy explicitly. Every decision consists of several primary elements, management objectives, decision options, and predictions of decision outcomes. By analyzing each component separately and thoughtfully within a comprehensive decision framework, it is possible to improve the quality of decision making. The core SDM concepts and steps to better decision making are useful across all types of decisions: from individuals making minor decisions to complex public sector decisions involving multiple decision makers, scientists and other stakeholders.

**FSM 2900 – INVASIVE SPECIES MANAGEMENT
CHAPTER – ZERO CODE**

Survey. An invasive species survey is a process of systematically searching a geographic area for a particular (targeted) invasive species, or a group of invasive species, to determine if the species exists in that area. It is important to know where and when surveys have occurred, even if the object of the survey (target species) was not located. Information on the absence of an invasive species can be as valuable as information on the presence of the species, and can be used as a foundation to an early detection system. Unlike inventories, surveys typically do not collect additional detailed attributes of the infestation or the associated site.

Targeted Invasive Species. An individual invasive species or population of invasive species, which has been prioritized at the project-level for management action based upon risk assessments, project objectives, economic considerations, and other priority-setting decision support tools.

Treatment. Any activity or action taken to directly prevent, control, or eradicate a targeted invasive species. Treatment of an invasive species infestation may not necessarily result in the elimination of the infestation, and multiple treatments on the same site or population are sometimes required to affect a change in the status of the infestation. Treatment activities typically fall within any of the four general categories of integrated management techniques: Biological treatments, Cultural treatments, Mechanical treatments, or Chemical treatments. For example, the use of domestic goats to control invasive plants would be considered a biological treatment; the use of a pesticide to control invasive fishes would be characterized as a chemical treatment; planting of native seeds used to prevent invasive species infestations and restore a degraded site would be considered a cultural treatment technique; developing an aquatic species barrier to prevent invasive species from spreading throughout a watershed would be considered a physical treatment; cleaning, scraping, or otherwise removing invasive species attached to equipment, structures, or vehicles would be considered a mechanical treatment designed to directly control and prevent the spread of those species.

**Aquatic Invasive Species
Management Plan**

Attachment C

Executive Order 13112 (1999)

Yuba River Development Project
FERC Project No. 2246

April 2014

©2014, Yuba County Water Agency
All Rights Reserved

Presidential Documents

Executive Order 13112 of February 3, 1999

Invasive Species

By the authority vested in me as President by the Constitution and the laws of the United States of America, including the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 *et seq.*), Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, as amended (16 U.S.C. 4701 *et seq.*), Lacey Act, as amended (18 U.S.C. 42), Federal Plant Pest Act (7 U.S.C. 150aa *et seq.*), Federal Noxious Weed Act of 1974, as amended (7 U.S.C. 2801 *et seq.*), Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*), and other pertinent statutes, to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause, it is ordered as follows:

Section 1. Definitions.

(a) "Alien species" means, with respect to a particular ecosystem, any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem.

(b) "Control" means, as appropriate, eradicating, suppressing, reducing, or managing invasive species populations, preventing spread of invasive species from areas where they are present, and taking steps such as restoration of native species and habitats to reduce the effects of invasive species and to prevent further invasions.

(c) "Ecosystem" means the complex of a community of organisms and its environment.

(d) "Federal agency" means an executive department or agency, but does not include independent establishments as defined by 5 U.S.C. 104.

(e) "Introduction" means the intentional or unintentional escape, release, dissemination, or placement of a species into an ecosystem as a result of human activity.

(f) "Invasive species" means an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health.

(g) "Native species" means, with respect to a particular ecosystem, a species that, other than as a result of an introduction, historically occurred or currently occurs in that ecosystem.

(h) "Species" means a group of organisms all of which have a high degree of physical and genetic similarity, generally interbreed only among themselves, and show persistent differences from members of allied groups of organisms.

(i) "Stakeholders" means, but is not limited to, State, tribal, and local government agencies, academic institutions, the scientific community, non-governmental entities including environmental, agricultural, and conservation organizations, trade groups, commercial interests, and private landowners.

(j) "United States" means the 50 States, the District of Columbia, Puerto Rico, Guam, and all possessions, territories, and the territorial sea of the United States.

Sec. 2. Federal Agency Duties. (a) Each Federal agency whose actions may affect the status of invasive species shall, to the extent practicable and permitted by law,

(1) identify such actions;

(2) subject to the availability of appropriations, and within Administration budgetary limits, use relevant programs and authorities to: (i) prevent the introduction of invasive species; (ii) detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner; (iii) monitor invasive species populations accurately and reliably; (iv) provide for restoration of native species and habitat conditions in ecosystems that have been invaded; (v) conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species; and (vi) promote public education on invasive species and the means to address them; and

(3) not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless, pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions.

(b) Federal agencies shall pursue the duties set forth in this section in consultation with the Invasive Species Council, consistent with the Invasive Species Management Plan and in cooperation with stakeholders, as appropriate, and, as approved by the Department of State, when Federal agencies are working with international organizations and foreign nations.

Sec. 3. Invasive Species Council. (a) An Invasive Species Council (Council) is hereby established whose members shall include the Secretary of State, the Secretary of the Treasury, the Secretary of Defense, the Secretary of the Interior, the Secretary of Agriculture, the Secretary of Commerce, the Secretary of Transportation, and the Administrator of the Environmental Protection Agency. The Council shall be Co-Chaired by the Secretary of the Interior, the Secretary of Agriculture, and the Secretary of Commerce. The Council may invite additional Federal agency representatives to be members, including representatives from subcabinet bureaus or offices with significant responsibilities concerning invasive species, and may prescribe special procedures for their participation. The Secretary of the Interior shall, with concurrence of the Co-Chairs, appoint an Executive Director of the Council and shall provide the staff and administrative support for the Council.

(b) The Secretary of the Interior shall establish an advisory committee under the Federal Advisory Committee Act, 5 U.S.C. App., to provide information and advice for consideration by the Council, and shall, after consultation with other members of the Council, appoint members of the advisory committee representing stakeholders. Among other things, the advisory committee shall recommend plans and actions at local, tribal, State, regional, and ecosystem-based levels to achieve the goals and objectives of the Management Plan in section 5 of this order. The advisory committee shall act in cooperation with stakeholders and existing organizations addressing invasive species. The Department of the Interior shall provide the administrative and financial support for the advisory committee.

Sec. 4. Duties of the Invasive Species Council. The Invasive Species Council shall provide national leadership regarding invasive species, and shall:

(a) oversee the implementation of this order and see that the Federal agency activities concerning invasive species are coordinated, complementary, cost-efficient, and effective, relying to the extent feasible and appropriate on existing organizations addressing invasive species, such as the Aquatic Nuisance Species Task Force, the Federal Interagency Committee for the Management of Noxious and Exotic Weeds, and the Committee on Environment and Natural Resources;

(b) encourage planning and action at local, tribal, State, regional, and ecosystem-based levels to achieve the goals and objectives of the Management Plan in section 5 of this order, in cooperation with stakeholders and existing organizations addressing invasive species;

(c) develop recommendations for international cooperation in addressing invasive species;

(d) develop, in consultation with the Council on Environmental Quality, guidance to Federal agencies pursuant to the National Environmental Policy Act on prevention and control of invasive species, including the procurement, use, and maintenance of native species as they affect invasive species;

(e) facilitate development of a coordinated network among Federal agencies to document, evaluate, and monitor impacts from invasive species on the economy, the environment, and human health;

(f) facilitate establishment of a coordinated, up-to-date information-sharing system that utilizes, to the greatest extent practicable, the Internet; this system shall facilitate access to and exchange of information concerning invasive species, including, but not limited to, information on distribution and abundance of invasive species; life histories of such species and invasive characteristics; economic, environmental, and human health impacts; management techniques, and laws and programs for management, research, and public education; and

(g) prepare and issue a national Invasive Species Management Plan as set forth in section 5 of this order.

Sec. 5. *Invasive Species Management Plan.* (a) Within 18 months after issuance of this order, the Council shall prepare and issue the first edition of a National Invasive Species Management Plan (Management Plan), which shall detail and recommend performance-oriented goals and objectives and specific measures of success for Federal agency efforts concerning invasive species. The Management Plan shall recommend specific objectives and measures for carrying out each of the Federal agency duties established in section 2(a) of this order and shall set forth steps to be taken by the Council to carry out the duties assigned to it under section 4 of this order. The Management Plan shall be developed through a public process and in consultation with Federal agencies and stakeholders.

(b) The first edition of the Management Plan shall include a review of existing and prospective approaches and authorities for preventing the introduction and spread of invasive species, including those for identifying pathways by which invasive species are introduced and for minimizing the risk of introductions via those pathways, and shall identify research needs and recommend measures to minimize the risk that introductions will occur. Such recommended measures shall provide for a science-based process to evaluate risks associated with introduction and spread of invasive species and a coordinated and systematic risk-based process to identify, monitor, and interdict pathways that may be involved in the introduction of invasive species. If recommended measures are not authorized by current law, the Council shall develop and recommend to the President through its Co-Chairs legislative proposals for necessary changes in authority.

(c) The Council shall update the Management Plan biennially and shall concurrently evaluate and report on success in achieving the goals and objectives set forth in the Management Plan. The Management Plan shall identify the personnel, other resources, and additional levels of coordination needed to achieve the Management Plan's identified goals and objectives, and the Council shall provide each edition of the Management Plan and each report on it to the Office of Management and Budget. Within 18 months after measures have been recommended by the Council in any edition of the Management Plan, each Federal agency whose action is required to implement such measures shall either take the action recommended or shall provide the Council with an explanation of why the action is not feasible. The Council shall assess the effectiveness of this order no

less than once each 5 years after the order is issued and shall report to the Office of Management and Budget on whether the order should be revised.

Sec. 6. *Judicial Review and Administration.* (a) This order is intended only to improve the internal management of the executive branch and is not intended to create any right, benefit, or trust responsibility, substantive or procedural, enforceable at law or equity by a party against the United States, its agencies, its officers, or any other person.

(b) Executive Order 11987 of May 24, 1977, is hereby revoked.

(c) The requirements of this order do not affect the obligations of Federal agencies under 16 U.S.C. 4713 with respect to ballast water programs.

(d) The requirements of section 2(a)(3) of this order shall not apply to any action of the Department of State or Department of Defense if the Secretary of State or the Secretary of Defense finds that exemption from such requirements is necessary for foreign policy or national security reasons.



THE WHITE HOUSE,
February 3, 1999.

**Aquatic Invasive Species
Management Plan**

Attachment D

**Zebra/Quagga Mussel Surface Survey Protocol,
California Department of Fish and Wildlife
(Cal Fish and Wildlife 2013)**

**Yuba River Development Project
FERC Project No. 2246**

April 2014

©2014, Yuba County Water Agency
All Rights Reserved



Zebra/Quagga Mussel Surface Survey Protocol*

California Department of Fish and Wildlife

*This protocol was adapted from the California Department of Water Resources *Zebra/Quagga Mussel Surface Survey Protocol*.

Description of Zebra and Quagga Mussels

The zebra mussel, *Dreissena polymorpha*, and the quagga mussel, *Dreissena bugensis*, are small mussels found only in freshwater. They look very similar to each other. They commonly have alternating light and dark brown stripes, but can also be solid light brown or dark brown. They have 2 smooth shells that are shaped a little bit like the letter “D”. These mussels are usually less than 2 inches in length. In new populations, most mussels are young and therefore very small (under ¼ inch long).

Quagga Mussel <i>Dreissena bugensis</i>	Zebra Mussel <i>Dreissena polymorpha</i>
	
<ul style="list-style-type: none">• Shell: D-shaped and triangular; thin, fragile; smooth or shallowly ridged; solid light to dark brown or dark concentric rings; paler near hinge• Attaches to hard and soft surfaces	<ul style="list-style-type: none">• Shell: D-shaped and triangular; thin, fragile; smooth or shallowly ridged; solid light to dark brown or striped• Attaches to hard surfaces



Color variation in zebra and quagga mussels

Quagga and zebra mussels are freshwater mussels that can physically attach onto hard substrates. Like the mussels found clinging to the rocks along the California coastline, zebra and quagga mussels attach onto hard surfaces (e.g. pipes, screens, rock, logs, boats, etc.). They form colonies made up of many individuals attached onto an object and even onto each other. Small newly settled mussels feel like gritty sandpaper when attached to a smooth surface. Larger mussels will feel coarser (like a small pebble or sunflower seed) or be visually apparent.

Other Organisms Mistaken for Zebra/Quagga Mussels

Asian clam, Corbicula fluminea

People often mistake the very common Asian clam (also introduced) for zebra or quagga mussels. The Asian clam is widespread and abundant in California. It is brown and has ridges in concentric rings on its shells. The shells of older clams or of dead clams are white at the hinge (where the two shells join together). These clams do not attach onto surfaces. They live in mud or sand.



Snails and Freshwater Limpets

Small snails and freshwater limpets cling to hard substrates and can be mistaken for small juvenile mussels. They are similar in color and size to small zebra and quagga mussels. Snails have a spiral shape. Limpets have one shell and are flat. Zebra and quagga mussels attach on the edge of their shell and stick up and away from the surface.



Visual and Tactile Search for Zebra and Quagga Mussels

Gently run fingers over smooth surfaces, checking for gritty feeling or small “seed-like” or “pebble-like” objects. Areas likely to harbor mussels, if they are present, include:

- Dock floatation, buoys, mooring line, cables, rocks, concrete, logs/drift wood, vegetation, and anything that has been in the water for a long time.

- Pull up and inspect any substrate that is under water.
- Trap lines and any line or cable hanging in water.

Visually inspect all hard and soft substrates. Fan areas covered with silt to expose mussels.

Inspect dark areas (dark substrates and low light/shaded areas). Do not disturb private vessels or property.

Prime Areas to Search

Quagga and zebra mussels prefer dark substrates and low light/dark areas. They prefer concrete over other substrates. Search areas at or near boat ramps, gas dock, dock near marina store, other docks in high traffic areas, all concrete structures, and low flow areas.

Minimum Sample Size

The minimum number of linear feet to be searched per substrate is defined below. You can stop before meeting the minimum linear feet if quagga/zebra mussels are found in 3 or more locations within the survey location, or if all available substrate has been searched.

- Boat ramp bottom – 100ft if the ramp is at a marina, 200ft if the ramp is the only structure at the survey location.
- Shoreline - 100ft if at a marina, 200ft if at a survey location with only a boat ramp
- Dock - 200ft
- Mooring/dock lines (portion hanging in water) - 200ft
- Anchor/dock cable or chain (portion under water) - 100ft
- Concrete structures - 100ft
- Logs and woody debris – 100ft
- All accessible buoys

Make a notation in “Comments” section if minimum sample size requirements could not be met.

If Mussels are Found

Record the lat/long (in decimal degrees and use WSG 84) of the mussels’ location(s) and mark/describe location(s) on the back of the datasheet. Record the type of substrate(s) the mussel(s) was found on (for example, concrete, plastic, rope, chain, buoy, etc).

Make counts of mussels at up to 3 locations within the survey site. If more locations are found, make a note in the “Comments” section.

At each of the 3 mussel locations, take density estimates using one or both methods:

- Petri dish: place Petri dish over surface. Count all mussels within circle.
- Ruler: place ruler adjacent to mussels. Count all mussels within one inch of ruler.
- If you cannot see the mussels, count the mussels using touch. If entire ruler cannot be placed on surface, record length of ruler used.
- Collect 5 density estimates per mussel location.

Collect specimens (4-5). Place in Ziploc bag with label. Label should include location, lat/long, date, and name of collector. Seal and keep dry or put in freezer. Do not put water in the bag.

If other species of clams or mussels are found, collect specimens (1-2) and place in bag with collection label. Seal and keep dry or put in freezer. Do not put water in the bag.

Data Recording and Reporting

Datasheets are available at:

<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=4949>

If mussels are found, immediately contact the appropriate CDFW regional mussel contact.

Every time a survey is made the data must be recorded on a datasheet before leaving the field. Absence information is as important to document as presence, so complete and submit a datasheet even if no mussels were found. Send datasheets to the appropriate CDFW regional contact. All data will be entered into a data reporting system and the datasheets will be retained on-site.

CDFW Regional Office Contacts for Quagga Mussel Monitoring

Region 1 – Northern Region

Counties: Del Norte, Humboldt, Lassen, Mendocino, Modoc, Shasta, Siskiyou, Tehama, and Trinity
601 Locust Street, Redding, CA 96001
L. Breck McAlexander
Louis.McAlexander@wildlife.ca.gov
Office: (530) 225-2317
Fax: (530) 225-2381

Region 2 – North Central Region

Counties: Alpine, Amador, Butte, Calaveras, Colusa, El Dorado, Glenn, Lake, Nevada, Placer, Plumas, Sacramento, San Joaquin, Sierra, Sutter, Yolo and Yuba
1701 Nimbus Road, Rancho Cordova, CA 95670
Jason Julienne
Jason.Julienne@wildlife.ca.gov
Office: (916) 358-2895
Fax: (916) 358-2912

Region 3 – Bay Delta Region

Counties: Alameda, Contra Costa, Marin, Napa, Sacramento, San Mateo, Santa Clara, Santa Cruz, San Francisco, San Joaquin, Solano, Sonoma, and Yolo
7329 Silverado Trail, Napa, CA 94558
Catherine Mandella
Catherine.Mandella@wildlife.ca.gov
Mobile: (831) 588-1463
Fax: (707) 944-5563

Region 4 – Central Region

Counties: Fresno, Kern, Kings, Madera, Mariposa, Merced, Monterey, San Benito, San Luis Obispo, Stanislaus, Tulare and Tuolumne
1234 E. Shaw Avenue, Fresno, CA 93710
Kelley Aubushon
Kelley.Aubushon@wildlife.ca.gov
Office: (559) 243-4017 X-285
Fax: (559) 243-4004

Region 5 – South Coast Region

Counties: San Diego, Orange
3883 Ruffin Road, San Diego, CA 92123
Russell Black
Duane.Black@wildlife.ca.gov
Office: (858) 467-4262
Fax: (858) 467-4299

Counties: Los Angeles, Santa Barbara and Ventura
4665 Lampson Avenue, Los Alamitos, CA 90720
Eloise Tavares
Eloise.Tavares@wildlife.ca.gov
Office: (562) 342-7155
Fax: (562) 342-7153

Region 6 – Inland Deserts Region

Counties: Imperial, Inyo, Mono, Riverside and San Bernardino
P.O. Box 2160, Blythe, CA 92226
David Vigil
David.Vigil@wildlife.ca.gov
Office: (760) 922-4928
Fax: (760) 922-5638

**Aquatic Invasive Species
Management Plan**

Attachment E

**Zebra/Quagga Mussel Artificial Substrate Monitoring
Protocol, California Department of Fish and Wildlife
(Cal Fish and Wildlife 2013)**

**Yuba River Development Project
FERC Project No. 2246**

April 2014

©2014, Yuba County Water Agency
All Rights Reserved


Zebra and Quagga Mussel Artificial Substrate Monitoring Protocol*

California Department of Fish and Wildlife

*This protocol was adapted from the California Department of Water Resources *Monitoring Instructions for Zebra/Quagga Mussel Plate Samplers*, April 2, 2008.

Description of Zebra and Quagga Mussels

The zebra mussel, *Dreissena polymorpha*, and the quagga mussel, *Dreissena bugensis*, are small mussels found only in freshwater. They look very similar to each other. They commonly have alternating light and dark brown stripes, but can also be solid light brown or dark brown. They have 2 smooth shells that are shaped a little bit like the letter “D”. These mussels are usually less than 2 inches in length. In new populations, most mussels are young and therefore very small (under ¼ -inch long).

Quagga Mussel <i>Dreissena bugensis</i>	Zebra Mussel <i>Dreissena polymorpha</i>
	
<ul style="list-style-type: none">• Shell: D-shaped and triangular; thin, fragile; smooth or shallowly ridged; solid light to dark brown or dark concentric rings; paler near hinge• Attaches to hard and soft surfaces	<ul style="list-style-type: none">• Shell: D-shaped and triangular; thin, fragile; smooth or shallowly ridged; solid light to dark brown or striped• Attaches to hard surfaces



Color variation in zebra and quagga mussels

Quagga and zebra mussels are freshwater mussels that can physically attach onto hard substrates. Like the mussels found clinging to the rocks along the California coastline, zebra and quagga mussels attach onto hard surfaces (e.g. pipes, screens, rock, logs, boats, etc.). They form colonies made up of many individuals attached onto an object and even onto each other. Small newly settled mussels feel like gritty sandpaper when attached to a smooth surface. Larger mussels will feel coarser (like a small pebble or sunflower seed) or be visually apparent.

Other Organisms Mistaken for Zebra/Quagga Mussels

Asian clam, Corbicula fluminea

People often mistake the very common Asian clam (also introduced) for zebra or quagga mussels. The Asian clam is widespread and abundant in California. It is brown and has ridges in concentric rings on its shells. The shells of older clams or of dead clams are white at the hinge (where the two shells join together). These clams do not attach onto surfaces. They live in mud or sand.



Snails and Freshwater Limpets

Small snails and freshwater limpets cling to hard substrates and can be mistaken for small juvenile mussels. They are similar in color and size to small zebra and quagga mussels. Snails have a spiral shape. Limpets have one shell and are flat. Zebra and quagga mussels attach on the edge of their shell and stick up and away from the surface.



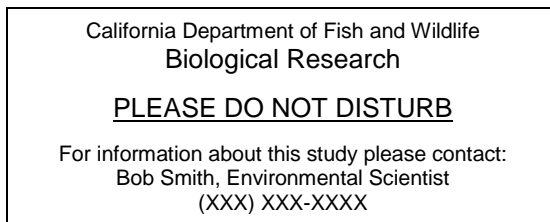
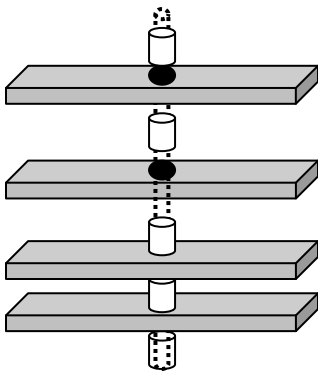
Artificial Substrate Construction and Assembly

To construct the artificial substrate you will need the following materials cut to size:

- (4) 6" x 6" x 0.25" black/grey PVC with 1" hole through center
- (5) 1.5" x 1.375" (35mm) exterior diameter PVC or ABS tube
- (1) 8.5" x 0.8125" (21 mm) exterior diameter PVC or ABS tube

~25 ft plastic coated cable or rope
Some form of attachment to keep plates from floating up
Weight
Laminated label with your contact information

To assemble the substrate, run the cable or rope through the 8.5" tube and secure at one end. From the loose end of the rope string on the remaining pieces, alternating between the short segments of tube and the plates, beginning and ending with the short tubes (see figure). Secure the top tube to the rope to prevent the pieces from floating up. If necessary, attach a weight to the bottom of the assembly. Attach the label to the cable where the cable is secured to the structure.



Example of a label



Selection of Monitoring Site

Zebra and quagga mussels are transported between waterbodies by watercraft (boats, wave runners, etc), water diversions, and the natural downstream flow of a river system. Monitoring sites are selected with these factors in mind. Prime sites are areas with high boat traffic and downstream of source water. If you are sampling at a waterbody that allows boating, select a site that has a lot of boat traffic. Examples are boat ramps, gas docks or dockside marina stores. Then find a location with low flow and protection from vandalism. Marinas often offer all of these features. Within a marina, find a location with restricted public access. Avoid placing the artificial substrate at unsupervised boat ramps because of tampering by the general public and entanglement with the dock cabling system when the water level changes or the ramp is moved. If these types of structures are not available, find a site downstream of the boat traffic that offers as much protection from vandalism as possible. Examples include water quality monitoring

stations or towers and government agency boathouses. Always ask for permission before attaching artificial substrates to structures. Again, find a location that offers protection from vandalism and has low flow.

Deployment and Inspection of the Artificial Substrate

Depending on water clarity and depth, the artificial substrate should be set below the euphotic zone (below the depth of light penetration) or 6 feet, whichever is deeper, and at least two feet above the bottom. One to two substrates are deployed per site. If the site is shallower than 2 m, then raise the substrate about 0.5 m (2 ft) off of the bottom. Record the actual sampling depth. At sites that are deep and have little vertical mixing, a second substrate is installed at a depth of approximately 15 meters (50 feet) below the surface (or 1 meter off the bottom if the depth is less than 15 meters).

A visual and tactile examination of the artificial substrate is conducted every month for attached zebra and quagga mussels. When mussels first attach they are very small (invisible to the naked eye) and are very delicate (shells are thin and easily crushed). A single mussel may feel like a grain of sand. If many mussels cover a surface, the surface feels gritty like sandpaper. In approximately 1 to 2 months a mussel grows large enough (1/4 inch) to be seen upon close inspection, but the shell is still very delicate. At this size it feels like a small pebble or sunflower seed.

To check an artificial substrate, first carefully lift it out of the water and place it in a large plastic tub (the tub will capture any mussels that fall off). Avoid knocking the substrate as you pull it out of the water because you may dislodge or crush any attached mussels. First visually inspect each plate (top, bottom, and sides), the spacers, the cable and the weight. After looking closely, attempt to gently push any attached organism that might be a mussel. Freshwater limpets and snails easily move or slide across the plate. Zebra and quagga mussels stick in place or are more securely attached. In all cases, if in doubt, bag it.

If no mussels are detected, lower the substrate back into the water and check again in a month. Zebra and quagga mussels are more likely to attach to a substrate that has some algal growth, however if the substrate becomes too heavily coated it may be unsuitable for mussel settlement. As necessary, gently remove heavy accumulations of algae to maintain suitable conditions for settlement.

Specimen Collection

If you suspect you have found a mussel immediately contact the appropriate CDFW regional mussel contact (list attached). To aid identification, first take a close-up digital photograph of each specimen. Next, collect the specimen(s) and place in a vial with 70% ethanol. Label the vial with location, date, and name of collector. If ethanol is not available, place the sample in a rigid container (to prevent crushing) without water, label, and refrigerate. E-mail the photos to the CDFW contact and they will try to

identify the specimens from the photographs, and may request the actual specimen(s) to make a positive identification.

If the entire artificial substrate needs to be retained for laboratory processing, place the entire unit in a large Ziplock bag or small garbage bag and keep it in a cooler with ice while in the field. Store the substrate in the freezer until ready to mail. Mail it “overnight delivery” on ice.

Replacement of Artificial Substrate

Replace a missing or broken artificial substrate with a new one. If the substrate is repeatedly lost or damaged look for a new deployment site that offers more protection. Report any incidents and the action(s) taken.

To prevent any possibility of contamination between monitoring sites (should mussels be present and not yet detected), never take a substrate from one site and place it at a different site (even within a single waterbody).

Data Recording and Reporting

Every time an artificial substrate is checked the data must be recorded on a datasheet before leaving the field. Absence data is as important to document as presence, so complete and submit a datasheet even if no mussels were found. Send datasheets to the appropriate CDFW regional contact. All data will be entered into a data reporting system and the datasheets will be retained on-site.

Artificial Substrate Datasheet
California Department of Fish and Wildlife
 (One datasheet for each artificial substrate)

Collection Information		
Date:		
Waterbody:		
Substrate location (GPS or site description):		
Substrate depth (meters):		
Collector(s):	Affiliation:	
Contact information (email or phone # if not CDFW):		
Substrate		
Substrate (circle one):	Present	Missing
Condition (circle one):	Intact	Damaged
Comments:		
Mussels		
Mussels (circle one):	Present Absent	Species (circle one): Quagga Zebra Unknown
Where (circle all that apply):	Total # of mussels on each part of substrate	
Plate surface	_____	
Plate edge	_____	
Spacers	_____	
Rope (depth _____)	_____	
Other (_____)	_____	
Plate dimensions (units): ____ x ____ (___)	Plate area (multiply plate dimensions):	
Plates:	Number of mussels	Density (# of mussels ÷ area)
Side 1 (top side of top plate)		
Side 2 (bottom side of top plate)		
Side 3 (top side of second plate)		
Side 4 (bottom side of second plate)		
Side 5 (top side of third plate)		
Side 6 (bottom side of third plate)		
Side 7 (top side of bottom plate)		
Side 8 (bottom side of bottom plate)		
Additional Information		
Other organisms present:		
Comments:		

Return completed datasheets to the appropriate California Department of Fish and Wildlife Regional office.

CDFW Regional Office Contacts for Quagga Mussel Monitoring

Region 1 – Northern Region

Counties: Del Norte, Humboldt, Lassen, Mendocino, Modoc, Shasta, Siskiyou, Tehama, and Trinity
601 Locust Street, Redding, CA 96001

L. Breck McAlexander

Louis.McAlexander@wildlife.ca.gov

Office: (530) 225-2317

Fax: (530) 225-2381

Region 2 – North Central Region

Counties: Alpine, Amador, Butte, Calaveras, Colusa, El Dorado, Glenn, Lake, Nevada, Placer, Plumas, Sacramento, San Joaquin, Sierra, Sutter, Yolo and Yuba
1701 Nimbus Road, Rancho Cordova, CA 95670

Jason Julienne

Jason.Julienne@wildlife.ca.gov

Office: (916) 358-2895

Fax: (916) 358-2912

Region 3 – Bay Delta Region

Counties: Alameda, Contra Costa, Marin, Napa, Sacramento, San Mateo, Santa Clara, Santa Cruz, San Francisco, San Joaquin, Solano, Sonoma, and Yolo
7329 Silverado Trail, Napa, CA 94558

Catherine Mandella

Catherine.Mandella@wildlife.ca.gov

Mobile: (831) 588-1463

Fax: (707) 944-5563

Region 4 – Central Region

Counties: Fresno, Kern, Kings, Madera, Mariposa, Merced, Monterey, San Benito, San Luis Obispo, Stanislaus, Tulare and Tuolumne

1234 E. Shaw Avenue, Fresno, CA 93710

Kelley Aubushon

Kelley.Aubushon@wildlife.ca.gov

Office: (559) 243-4017 X-285

Fax: (559) 243-4004

Region 5 – South Coast Region

Counties: San Diego, Orange

3883 Ruffin Road, San Diego, CA 92123

Russell Black

Duane.Black@wildlife.ca.gov

Office: (858) 467-4262

Fax: (858) 467-4299

Counties: Los Angeles, Santa Barbara and Ventura

4665 Lampson Avenue, Los Alamitos, CA 90720

Eloise Tavares

Eloise.Tavares@wildlife.ca.gov

Office: (562) 342-7155

Fax: (562) 342-7153

Region 6 – Inland Deserts Region

Counties: Imperial, Inyo, Mono, Riverside and San Bernardino

P.O. Box 2160, Blythe, CA 92226

David Vigil

David.Vigil@wildlife.ca.gov

Office: (760) 922-4928

Fax: (760) 922-5638

**Aquatic Invasive Species
Management Plan**

Attachment F

California Fish and Wildlife Code § 2302

**Yuba River Development Project
FERC Project No. 2246**

April 2014

©2014, Yuba County Water Agency
All Rights Reserved

2302. (a) Any person, or federal, state, or local agency, district, or authority that owns or manages a reservoir, as defined in Section 6004.5 of the Water Code, where recreational, boating, or fishing activities are permitted, except a privately owned reservoir that is not open to the public, shall do both of the following:

(1) Assess the vulnerability of the reservoir for the introduction of nonnative dreissenid mussel species.

(2) Develop and implement a program designed to prevent the introduction of nonnative dreissenid mussel species.

(b) The program shall include, at a minimum, all of the following:

(1) Public education.

(2) Monitoring.

(3) Management of those recreational, boating, or fishing activities that are permitted.

(c) Any person, or federal, state, or local agency, district, or authority, that owns or manages a reservoir, as defined in Section 6004.5 of the Water Code, where recreational, boating, or fishing activities of any kind are not permitted, except a privately owned reservoir that is not open to the public, shall, based on its available resources and staffing, include visual monitoring for the presence of mussels as part of its routine field activities.

(d) Any entity that owns or manages a reservoir, as defined in Section 6004.5 of the Water Code, except a privately owned reservoir that is not open to the public for recreational, boating, or fishing activities, may refuse the planting of fish in that reservoir by the department unless the department can demonstrate that the fish are not known to be infected with nonnative dreissenid mussels.

(e) Except as specifically set forth in this section, this section applies both to reservoirs that are owned or managed by governmental entities and reservoirs that are owned or managed by private persons or entities.

(f) Violation of this section is not subject to the sanctions set forth in Section 12000. In lieu of any other penalty provided by law, a person who violates this section shall, instead, be subject to a civil penalty, in an amount not to exceed one thousand dollars (\$1,000) per violation, that is imposed administratively by the department. To the extent that sufficient funds and personnel are available to do so, the department may adopt regulations establishing procedures to implement this subdivision and enforce this section.

(g) This section shall not apply to a reservoir in which nonnative dreissenid mussels have been detected.

