

# RECLAMATION

*Managing Water in the West*

Draft FINDING OF NO SIGNIFICANT IMPACT

## **Zebra Mussel Eradication Project for San Justo Reservoir, Hollister Conduit, and San Benito County Water Distribution System**

FONSI-09-010



U.S. Department of the Interior  
Bureau of Reclamation

March 2015

## **Mission Statements**

The mission of the Department of the Interior is to protect and manage the Nation's natural resources and cultural heritage; provide scientific and other information about those resources; and honor its trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

**BUREAU OF RECLAMATION**  
**South-Central California Area Office, Fresno, California**

**FONSI-09-010**

**Zebra Mussel Eradication Project for San  
Justo Reservoir, Hollister Conduit, and  
San Benito County Water Distribution  
System**

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# Introduction

In accordance with section 102(2)(c) of the National Environmental Policy Act (NEPA) of 1969, as amended, the South-Central California Area Office of the Bureau of Reclamation (Reclamation), has determined that an environmental impact statement is not required for the proposed zebra mussel eradication project or eradication project and management program for San Justo Reservoir, the Hollister Conduit, and the San Benito County Water District (San Benito) Distribution System. This Findings of No Significant Impact (FONSI) is supported by Reclamation's Environmental Assessment (EA)-09-010, *Zebra Mussel Eradication Project for San Justo Reservoir, Hollister Conduit, and San Benito County Water Distribution System*, and is hereby incorporated by reference.

## Background

San Justo Reservoir, completed by Reclamation in January 1986, serves as an offstream storage facility for the San Felipe Division of the Central Valley Project (CVP). In January 2008, an angler discovered zebra mussels (*Dreissena polymorpha*) in San Justo Reservoir. The reservoir was subsequently closed to public recreational access. Since then, San Benito's water distribution system was examined for the presence of mussels and live zebra mussels were confirmed present in the San Benito Conduit in January 2009. Additionally, in 2012, live zebra mussels were reported in a pond at the Ridgemark Golf and Country Club Golf Course. The San Benito Conduit and San Justo Reservoir have been in use since zebra mussels were first identified from the reservoir and these storage and conveyance systems continue to be used for water deliveries to San Benito, including to the Ridgemark Golf and Country Club golf course, but not the San Juan Oaks Golf Club golf course.

Zebra mussels are an invasive freshwater mollusk that attach to infrastructure, clog water systems, cause changes in food web dynamics, and deteriorate recreational uses of reservoirs. These mussels commonly attach to boats or other watercraft or contaminate bilge water and are carried to new waterways where they become established (Reclamation 2011a). They can float in the currents of a water body for weeks as microscopic free-floating larval mussels, called veligers, before attaching to substrates at water level down to 180 feet (California Department of Fish and Wildlife (formerly the California Department of Fish and Game 2010). Adults may spawn multiple times in a year and have the potential to produce millions of offspring during a single breeding season (California Department of Fish and Game 2010). It is expected that if zebra mussels spread

statewide, costs for responding to impacts will be in the range of billions of dollars (California Department of Fish and Game 2010).

Reclamation and San Benito need to prevent further spread of zebra mussels and to reduce or eliminate impacts to the San Justo Reservoir, the Hollister Conduit and San Benito's water distribution system. The purpose of the Proposed Action is to eradicate zebra mussels within these systems and take steps to help prevent future infestation and maintain the operation of the facilities.

## **Proposed Action**

Reclamation and San Benito propose to either conduct a zebra mussel eradication project or an eradication project and management program for San Justo Reservoir, the Hollister Conduit, and the San Benito Distribution System by treating these systems with potash, a mined product that consists almost entirely of potassium chloride. Specific details for the proposed treatment are included in Section 2.2 of EA-09-010.

## **Environmental Commitments**

Reclamation and San Benito shall implement the environmental protection measures listed in Table 3 of EA-09-010 to reduce or avoid environmental consequences associated with the Proposed Action. Environmental consequences for resource areas assume the measures specified would be fully implemented.

## **Findings**

Reclamation's finding that implementation of the Proposed Action will result in no significant impact to the quality of the human environment is supported by the following findings:

### **Resources Eliminated from Detailed Analysis**

As described in Table 4 of EA-09-010, Reclamation analyzed the affected environment and determined that the Proposed Action does not have the potential to cause direct, indirect, or cumulative adverse effects to the following resources: cultural resources, Indian Sacred Sites, Indian Trust Assets, or environmental justice.

### **Water Resources**

Implementation of the Proposed Action would treat the reservoir, distribution system, and percolation turnouts with sufficient potassium chloride to reach a minimum concentration of 100 parts per million (ppm) potassium and a maximum dosage of 115 ppm potassium. At 100 ppm, associated chloride concentration within the reservoir would be 91 ppm. The Environmental Protection Agency (EPA) does not have an established drinking water maximum contaminant level (MCL) for potassium but does have a secondary drinking water MCL for chloride

of 250 ppm (EPA 2011a). The average chloride concentration measured in San Justo Reservoir in 2014 was 102 ppm (see Table 5 in EA-09-010); consequently, chloride concentrations during treatment would total approximately 194 ppm and would decrease over time as fresh water from San Luis Reservoir is brought into the system. As concentrations would be substantially below the 250 ppm MCL for chloride, the Proposed Action would not result in exceedance of EPA MCLs. At a maximum treatment dose of 115 ppm, potassium would pose no human health risks from ingestion or contact, nor will it harm any non-bivalve aquatic wildlife, vegetation, or terrestrial wildlife inhabiting or using the reservoir (CH2M HILL, 2011a). The reservoir water will continue to meet the EPA primary and secondary drinking water standards for both potassium and chloride; and a liter of the water will contain a fraction of the National Academy of Sciences recommended daily intake of potassium and chloride (approximately 2% of the recommended adult daily intake of potassium and less than 9% of the *Dietary Reference Intake for Water, Potassium, Chloride and Sulfate*. National Academies Press. 2004). Potash is classified as a natural (nonsynthetic) substance by the federal National Organic Program Act (CFR Title 7, Part 205), and use of water on crops would be fully consistent with the National Organic Program.

The Central Coast Regional Water Quality Control Board (Regional Water Board) Basin Plan objectives for agricultural water specifies that chloride concentrations less than 142 ppm would not cause any problems from root adsorption but chloride concentrations between 142 and 355 ppm could cause moderate problems from root absorption (Regional Water Board 1994). In addition, Regional Water Board objectives specify that chloride concentrations less than 106 ppm would not cause problems for foliar absorption but that chloride concentrations above 106 ppm could cause moderate problems to crops (Regional Water Board 1994). Concentrations would be diluted over time as untreated water from San Luis Reservoir is brought into the system after treatment. Although actual benefits of dilution would increase or decrease depending on the initial draw down of the reservoir prior to treatment, water would only exceed criteria temporarily and would return to near baseline conditions over time.

Implementing the Proposed Action would cause the San Justo Reservoir, Hollister Conduit, and San Benito subsystems to be out of service for the 2- to 3-month treatment period beginning in August or September. Taking San Justo Reservoir out of service for treatment in non-peak demand months (October through May) would likely have no adverse impact on water users, as agricultural and municipal and industrial (M&I) use are both relatively low. There may be temporary impacts to water supply during the beginning of the treatment period as it corresponds to the end of San Benito's peak demand period (June through September); however, San Benito's water users have groundwater resources that would be sufficient to meet demand during the treatment period (Pers. Comm. Dale Roskamp 2011). As treatment is temporary and there are additional

supplies available to water users during the treatment period, no adverse impacts to water supplies are expected.

### **Land Use**

Temporary impacts to agricultural uses may occur during the Proposed Action treatment time. Except during the summer, taking San Justo Reservoir out of service for treatment would likely have no substantial impact on water users, as agricultural and domestic use are both relatively low, and Hollister and San Benito have groundwater sources that are sufficient to meet non-summer domestic demand. During the summer, however, when agricultural and domestic demand are both high, there are daytime periods when the deliveries of water from San Luis Reservoir are insufficient to meet all demands, and the loss of San Justo's regulating supply functions would lead to some restrictions on the use of water. This effect would be short term and would not result in impacts to land use.

Eradication of zebra mussels in San Justo Reservoir and the San Benito distribution system would not result in changes to land use within the Action area or in other areas due to invasion. Treated water, after dilution, would be used in the same manner as untreated water and is not expected to have impacts on crops or cropping patterns as it is below EPA toxic levels and would only be temporarily slightly higher than Regional Water Board threshold levels for chloride. Impacts from elevated chloride would be minimized over time as freshwater is brought into the system, preventing substantial impacts. In addition, use of potash-treated water would be consistent with the National Organic Program as it is classified as a natural (nonsynthetic) substance by the federal National Organic Program Act (CFR Title 7, Part 205).

### **Biological Resources**

The Proposed Action would result in the addition of potassium chloride to San Justo Reservoir, Hollister Conduit, and San Benito's distribution system and would coincide with a lowering of reservoir water levels. Boats/barges would be active on the reservoir and additional vehicular traffic would occur on roads to and from the Reservoir. Staging and supply activities would occur at the paved parking area and boat launch ramp at the reservoir.

Direct effects to aquatic resources in the reservoir and distribution system would occur from the increased concentration of potassium and chloride in water in San Justo Reservoir and the distribution systems, in addition to the drawdown of water in the reservoir. Studies conducted on effects of potassium chloride on non-target organisms have shown that potassium concentrations toxic to zebra mussels (100 ppm) may affect other invertebrates but should not adversely affect fish or amphibians (Fisher et al. 1991, Waller et al. 1996, Aquatic Sciences Inc. 1996, CH2M Hill 2011), which is supported by results from the Millbrook Quarry treatment (Virginia DGIF 2005 and 2011). The only bivalve other than zebra mussels that has been observed in the San Justo Reservoir is the non-native Asian clam (*Corbicula fluminea*), which is also considered a pest species.



Thermal stratification and low oxygen conditions occur at depths below 30 feet beneath the surface in San Justo reservoir during the summer-to-fall period. The proposed application of potash solution is not expected to directly adversely affect aquatic life in the reservoir other than the two non-native bivalves (zebra mussel and Asian clam). However, the lowering of the reservoir and the reduced water oxygen content, coinciding with an increased density of oxygen dependent organisms in the water column, could lead to oxygen debt and increased mortality, similar to winter “die off” of fish in stratified frozen lakes. In addition, the decomposition of dead organisms could further reduce conditions for oxygen dependent organisms. If a major fish die off were to occur in the reservoir as a result of oxygen depletion, putrid smells could temporarily foul the area.

Executive Order 13112 was issued to prevent the introduction of invasive species; provide for their control; and minimize the economic, ecological, and human health impacts that invasive species cause. The Proposed Action would minimize the economic, ecological, and human health impacts relating to the presence of zebra mussels within San Justo Reservoir and the San Benito distribution system. It would also help prevent the spread of zebra mussels from this system. Therefore, the Proposed Action is consistent with Executive Order 13112.

### ***Federally-listed Species***

With the implementation of environmental commitments (Section 2.2.2 in EA-09-010), and based on the nature of the Proposed Action, Reclamation has determined there would be *no effect* to the following proposed or listed species or critical habitat under the Endangered Species Act of 1973, as amended (16 U.S.C. §1531 et seq.): California long toed salamander (*Ambystoma macrodactylum croceum*), Ridgway’s rail (*Rallus obsoletus*), California condor (*Gymnogyps californianus*), Least Bell’s vireo (*Vireo bellii pusillus*), Southwestern willow flycatcher (*Empidonax traillii extimus*), South-Central California steelhead (*Oncorhynchus mykiss*), Vernal pool fairy shrimp (*Branchinecta lynchi*), Giant kangaroo rat (*Dipodomys ingens*), Marsh Sandwort (*Arenaria paludicola*), Monterey spineflower (*Chorizanthe pungens* var. *pungens*), San Benito Evening-Primrose (*Camissonia benitensis*), San Joaquin woolly-threads (*Lembertia congdonii*, previously *Monolopia congdonii*), Santa Cruz tarplant (*Holocarpha macradenia*), Yadon’s piperia (*Piperia yadonii*), and Blunt-nosed leopard lizard (*Gambelia silus*). See Table 6 and Section 3.4 in EA-09-010 for Reclamation’s analysis.

Reclamation has determined that the Proposed Action may affect, but is not likely to adversely affect the California re-legged frog (*Rana draytonii*), California tiger salamander (*Ambystoma californiense*), and the San Joaquin kit fox (*Vulpes macrotis mutica*). Endangered Species Act Section 7 consultation has been initiated with the U.S. Fish and Wildlife Service. The EA will not be finalized until consultation is complete.

**Migratory birds**

No aquatic birds are known to nest at San Justo Reservoir. Drawdown of the reservoir could concentrate the availability of fish in the reservoir for piscivorous birds, although piscivorous birds are not known to nest at the reservoir. Redwing blackbirds (*Agelaius phoeniceus*) and marsh wrens (*Cistothorus palustris*) are suspected of nesting in cattails and bulrushes that occur in patches at the periphery of the reservoir. These areas are subject to fluctuating water levels and lowering the reservoir in August and September, which would not be expected to result in take of these species. Treated water in the reservoir, Hollister Conduit, and the San Benito distribution system would not result in take of migratory birds. There would be no construction or ground disturbance and so migratory birds would not be affected from such actions. Minor removal of rank annual vegetation in a small area at the bifurcation structure may occur to ensure fire safety. A survey for nesting migratory birds would be required at this site prior to initiating vegetation removal. If the survey revealed nesting migratory birds to be present in areas to be disturbed, measures would be implemented to avoid take.

**Socioeconomic Resources**

Eradication of zebra mussels would be beneficial to socioeconomic resources for San Benito and its service area as water supply reliability and infrastructure integrity would be maintained. There could be temporary disruption of water deliveries during treatment of the reservoir which could have minor impacts to agricultural and urban users; however, both agricultural and M&I supplies could be supplemented by groundwater supplies during treatment.

Up to 10,000 AF of San Benito's CVP carry-over water would potentially be unavailable due to curtailed San Justo Reservoir capacity to facilitate a lower-end eradication operating elevation of 430 feet. This translates to between 3,000 and 5,000 acres of arable land within San Benito's CVP service area that could potentially be affected. The effect experienced would increase as water level drops between 455 and 430 feet elevation. At lower elevations groundwater may need to be used by growers. The local supplies of groundwater may be of less desirable quality and may affect crops. Responses could include lower crop yield, re-cropping with lower quality/lower yield crops, and/or fallowing arable land until carry-over transfer capacity to San Justo Reservoir is restored.

**Air Quality**

The Proposed Action would introduce short-term operational air emission sources from barge-mounted diesel generators and truck emissions associated with the delivery of potash slurry to the site. As shown in Table 7 of EA-09-010, operational emissions would not exceed Monterey Bay Unified Air Pollution Control District's *de minimis* thresholds. Consequently, a conformity analysis pursuant to the Clean Air Act is not required.

Reclamation or San Benito would either register equipment with engines greater than 50 horsepower under the California Air Resources Board's Statewide

Portable Equipment Registration Program or acquire individual operating permits from Monterey Bay Unified Air Pollution Control District prior to operation in accordance to Monterey Bay Unified Air Pollution Control District's rules. In addition, Reclamation would implement air quality protection measures (Table 2) to further minimize operational emissions. Therefore, the Proposed Action would not have adverse impacts on air quality.

### **Global Climate Change**

The Proposed Action would introduce short-term greenhouse gases emissions primarily through the combustion of diesel fuel. There would also be a small amount of greenhouse gases emissions associated with electricity consumption by the eleven dosing pumps that may be needed to infuse potash into the distribution system. Calculated carbon dioxide emissions are well below the EPA's threshold for annually reporting greenhouse gases emissions (25,000 metric tons per year); therefore, the Proposed Action would result in below *de minimis* impacts to global climate change.

### **Cumulative Impacts**

Cumulative impacts result from incremental impacts of the Proposed Action or No Action alternative when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. To determine whether cumulatively significant impacts are anticipated from the Proposed Action or the No Action alternative, the incremental effect of both alternatives were examined together with impacts from past, present, and reasonably foreseeable future actions in the same geographic area.

### **Water Resources**

Under the Proposed Action, temporary increases in chloride levels within surface and groundwater supplies would occur. However, expected chloride concentrations would not exceed EPA drinking water standards and would be further reduced over time by dilution with fresh water from San Luis Reservoir. There could be temporary impacts to crops from increased chloride levels but these would also be temporary and would be reduced over time as fresh water is brought into the system; therefore, this would be a short-term, temporary effect and no adverse cumulative impacts to water resources are expected.

Crops require set ratios of chemical nutrients and the potassium-ion concentration goal of 100 ppm has the potential to be more than required by growers and their crops (pers. Comm. Dale Roskamp). Consequently, the concentration of potassium related to the eradication project has the potential to cause an imbalance and block uptake of soil calcium and magnesium by plants, potentially affecting crop yields.

However, implementation of specific measures by San Benito would reduce this potential and help to insure that each grower potentially impacted would be able to offset any potential impacts to their crops. All District customers irrigating their lands with CVP “blue-valve” water, with elevated potassium concentrations equal to those received to eradicated dreissenid mussels would be notified by San Benito: (1) in advance of when the eradication is to occur; and (2) will be further notified of potassium concentrations at regular intervals during project execution.

### ***Land Use***

The Proposed Action would likely not have cumulative adverse impacts on agricultural land use or M&I within the San Benito service area as sufficient groundwater is available for use during treatment. Elevated chloride levels may impact some crops initially but these impacts would be minimized over time as fresh water is brought into the system. The Proposed Action is not expected to have any long term impacts on agriculture within the area, except to better insure continued water supplies and promote existing activities. Eradication of mussels would also prevent any cumulative impacts occurring within other areas from invasion of mussels.

However, if the project is implemented such that San Justo Reservoir would not be able to be utilized for storage for one or more years, this may affect agrobusiness interests and land use. Up to 10,000 AF of CVP carry-over water would have the potential to be lost due to curtailed San Justo Reservoir capacity to facilitate a lower-end eradication operating elevation of 430 feet during the eradication. This translates to between 3,000 and 5,000 acres of arable land within San Benito’s CVP service area that could potentially be impacted. Above elevation 460 feet there would be no impacts, between 455 and 460 feet there would be minimal effect. Between elevations 455 and 430, there is greater potential for effect. The potential effect would be that growers may be forced to utilize local groundwater, with lower quality. This could cause growers to have lower crop yields, force them to re-crop with lower quality/ lower-yield crops, and or fallow arable land entirely until carry-over transfer capacity to San Justo Reservoir is restored.

### ***Biological Resources***

Eradication of zebra mussels within San Justo Reservoir, the Hollister Conduit, and the San Benito distribution system would prevent the spread of zebra mussels from the Proposed Action area to other systems. It would also reduce impacts to the biological community present within the reservoir; therefore, the Proposed Action is expected to have beneficial cumulative impacts on biological resources within and outside the Proposed Action area.

### ***Socioeconomic Resources***

Eradication of zebra mussels from the San Justo Reservoir, the Hollister Conduit, and San Benito’s distribution system would prevent the spread of zebra mussels from this system which would be cumulatively beneficial to economic resources both within the Proposed Action area and outside areas.

***Air Quality***

Emissions from the Proposed Action are well below established *de minimis* thresholds and are expected to be temporary in duration. As a result, the Proposed Action is not expected to contribute to cumulative adverse impacts to air quality.

***Global Climate Change***

Greenhouse gases impacts are considered to be cumulative impacts; however, the estimated carbon dioxide emissions from temporary use of barge-mounted diesel generators, delivery trucks, and dosing pumps for the Proposed Action is roughly 278.9 metric tons per year, which is well below the 25,000 metric tons per year threshold for reporting greenhouse gases emissions. As a result, the Proposed Action is not expected to contribute to cumulative adverse impacts to global climate change. CVP water allocations are made dependent on hydrologic conditions and environmental requirements. Since Reclamation operations and allocations are flexible, any changes in hydrologic conditions due to global climate change would be addressed within Reclamation's operation flexibility and therefore water resource changes due to climate change would be the same with or without the Proposed Action.

# RECLAMATION

*Managing Water in the West*

Draft Environmental Assessment

## **Zebra Mussel Eradication Project for San Justo Reservoir, Hollister Conduit, and San Benito County Water Distribution System**

EA-09-010



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# Contents

	Page
<b>Section 1 Introduction .....</b>	<b>1</b>
1.1 Background .....	1
1.1.1 Previous Eradication Projects .....	1
1.1.2 Proposed Eradication at San Justo Reservoir.....	3
1.1.3 Review of Potassium Toxicity Literature .....	4
1.1.4 Pilot Study at San Justo Reservoir .....	6
1.1.5 Dreissenid Mussel Sampling within San Luis Reservoir and O'Neill Forebay .....	7
1.2 Need for the Proposed Action.....	7
<b>Section 2 Alternatives Including the Proposed Action .....</b>	<b>9</b>
2.1 No Action Alternative.....	9
2.2 Proposed Action.....	9
2.2.1 Alternative 1: Zebra Mussel Eradication Treatment.....	9
2.2.2 Alternative 2: Mussel Population Management Program.....	16
2.2.3 Alternatives Considered but Eliminated from Further Analysis.....	17
<b>Section 3 Affected Environment and Environmental Consequences.....</b>	<b>19</b>
3.1 Resources Eliminated from Further Analysis .....	19
3.2 Water Resources .....	19
3.2.1 Affected Environment.....	19
3.2.3 Environmental Consequences .....	22
3.3 Land Use .....	24
3.3.1 Affected Environment.....	24
3.3.2 Environmental Consequences .....	24
3.4 Biological Resources .....	26
3.4.1 Affected Environment.....	26
3.4.2 Environmental Consequences .....	32
3.5 Socioeconomic Resources .....	36
3.5.1 Affected Environment.....	36
3.5.2 Environmental Consequences .....	36
3.6 Air Quality .....	37
3.6.1 Affected Environment.....	37
3.6.2 Environmental Consequences .....	37
3.7 Global Climate .....	38
3.7.1 Affected Environment.....	38
3.7.2 Environmental Consequences .....	39
<b>Section 4 Consultation and Coordination.....</b>	<b>41</b>
4.1 Public Review Period.....	41
4.2 Endangered Species Act (16 U.S.C. § 1531 et seq.).....	41



4.3 Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. § 136 et seq.).....	41
<b>Section 5 Preparers and Reviewers .....</b>	<b>43</b>
5.1 Bureau of Reclamation .....	43
5.2 Burleson Consulting, Inc. ....	43
<b>Section 6 References .....</b>	<b>45</b>
 Figure 1 San Justo Reservoir and San Benito’s Water Distribution System .....	 8
Figure 2 San Justo Reservoir Project Components.....	10
Figure 3 Potential Dosing Points along Hollister Conduit and San Benito Distribution System .....	13
 Table 1 Summary of Toxicity Literature for General Reservoir Organisms .....	 5
Table 2 Calculated Potash Quantities Required to Reach 100 ppm Potassium ...	11
Table 3 Environmental Protection Measures and Commitments .....	16
Table 4 Resources Eliminated from Further Analysis .....	19
Table 5 San Justo Reservoir Water Quality Testing.....	20
Table 6 Federally-listed and Candidate Species and Critical Habitat.....	27
Table 7 Estimated Proposed Action Emissions .....	38
Table 8 Total Proposed Action greenhouse gases Emissions.....	40
 Appendix A Potash Toxicology to Zebra Mussels and other Organisms	
Appendix B MSDS for Potash and Potassium Chloride	
Appendix C Zebra and Quagga Mussel Coordinated Prevention Plan	
Appendix D San Justo Reservoir Eradication Project Monitoring Plan	
Appendix E Reclamation’s Cultural Resources Determination	
Appendix F Reclamation’s Indian Trust Assets Determination	

# Section 1 Introduction

## 1.1 Background

San Justo Reservoir, completed by the Bureau of Reclamation (Reclamation) in January 1986, serves as an offstream storage facility for the San Felipe Division of the Central Valley Project (CVP). In January 2008, an angler discovered zebra mussels (*Dreissena polymorpha*) in San Justo Reservoir. The reservoir was subsequently closed to public recreational access. Since then, San Benito County Water District's (San Benito) water distribution system was examined for the presence of mussels and live zebra mussels were confirmed present in the San Benito Conduit in January 2009. Additionally, in 2012, live zebra mussels were reported in a pond at the Ridgemark Golf and Country Club Golf Course. The San Benito Conduit and San Justo Reservoir have been in use since zebra mussels were first identified from the reservoir and these storage and conveyance systems continue to be used for water deliveries to San Benito, including to the Ridgemark Golf and Country Club golf course, but not the San Juan Oaks Golf Club golf course.

Zebra mussels are an invasive freshwater mollusk that attach to infrastructure, clog water systems, cause changes in food web dynamics, and deteriorate recreational uses of reservoirs. These mussels commonly attach to boats or other watercraft or contaminate bilge water and are carried to new waterways where they become established (Reclamation 2011a). They can float in the currents of a water body for weeks as microscopic free-floating larval mussels, called veligers, before attaching to substrates at water level down to 180 feet (California Department of Fish and Wildlife (formerly the California Department of Fish and Game 2010). Adults may spawn multiple times in a year and have the potential to produce millions of offspring during a single breeding season (California Department of Fish and Game 2010). It is expected that if zebra mussels spread statewide, costs for responding to impacts will be in the range of billions of dollars (California Department of Fish and Game 2010).

### 1.1.1 Previous Eradication Projects

There are three known zebra mussel eradication projects in lacustrine systems in the United States: 1) Millbrook Quarry, Virginia, which was successful, 2) Base Lake at Offutt Air Force Base, Nebraska, which was not successful, and 3) Lake Zorinsky, Nebraska, which was successful. The Millbrook Quarry and at Offutt Air Force Base projects each used chemical treatment for eradication. Control at Lake Zorinsky, Nebraska was affected through reservoir drawdown.

***Millbrook Quarry, Virginia***

Millbrook Quarry, located within Prince William County, Virginia, was previously used as a road stone quarry but has operated as a dive training site since the early 1970s. The quarry is approximately 12 acres in size and 93 feet deep (Virginia Department of Game and Inland Fisheries [Virginia DGIF] 2005 and 2011). In 2002, zebra mussels were confirmed to be present in the quarry which was the first reported presence in Virginia. Baseline data was collected in order to determine the most feasible method of treatment. Several methods were excluded from further analysis due to environmental concerns, technical infeasibility, logistics, or expense and included: treatment with chlorine, treatment with copper sulfate, pH shift, dewatering of the quarry, and increase in salinity. Two options, treatment with the molluscicide Spectrus CT-1300-Clamtrol© and potassium, were initially found to be feasible for eradication, but potassium was chosen as the treatment method to be implemented at the quarry.

Treatment with potassium chloride at the quarry included pumping 174,000 kilograms (kg) of potassium chloride solution into the quarry through a diffuser assembly from a work boat over a three week period in 2006 (Virginia DGIF 2011). The cost to treat the 12-acre Virginia quarry with potassium chloride in 2006 was approximately \$365,000. To ensure lethal concentrations of potassium a target dose of 100 parts per million (ppm) throughout the water column was established. The use of a whole-lake target dose concentration of 100 ppm potassium was used in order to ensure that at least 50 ppm potassium was achieved at the lake margins or deep areas that may have experienced incomplete mixing. Virginia DGIF sampled at various depths and locations during and after treatment and found that concentrations in the quarry ranged from 98 ppm to 115 ppm potassium (Virginia DGIF 2011). Various methods were used to determine zebra mussel eradication after treatment including: remotely operated vehicles, diver observation, bioassay, and direct examination of mussels removed from substrate. None of the sampled or observed mussels were found alive and, after 31 days of exposure to concentrations within the quarry, all mussels used in bioassay were dead (Virginia DGIF 2011). There were no observed non-molluscan aquatic wildlife, vegetation, or terrestrial wildlife harmed during or after treatment at the quarry (Virginia DGIF 2011).

***Offutt Air Force Base, Nebraska***

Offutt Air Force Base, located in Sarpy County, Nebraska, contains a recreational Base Lake that was created during the construction of the main runway at the Base. The Base Lake is approximately 117 acres in size with an average depth of 15 feet (URS 2008). In 2006, zebra mussel shells were observed along the shoreline of the lake and closer examination of rocks and other hard surfaces confirmed the presence of live mussels. Although, potassium chloride was found to be successful at Millbrook Quarry for eradication of zebra mussels, the application of potassium chloride at Lake Offutt was determined to be cost prohibitive due to price increases in potassium and the quantity of potassium chloride that would be required to bring the average concentration of potassium to 100 ppm (approximately 340 tons). Additionally, the logistics of transporting,

storing, and applying 340 tons of potassium chloride made this treatment option infeasible. Consequently, copper sulfate was chosen as the most feasible treatment method for eradication of zebra mussels within Base Lake (URS 2008). Copper sulfate was first applied at Base Lake in the fall of 2008 and a second application was applied in the spring of 2009. Copper sulfate was dispersed from a barge using aquatic herbicide spreaders over a 30-hour period until a concentration of 1 ppm copper was achieved. The inlet channel and ponded areas upstream of the lake were also treated to prevent mussel migration (URS 2008). After application of copper sulfate, bioassays of six live colonies were placed at various locations around the lake and monitored 24 hours, 72 hours, and 168 hours after treatment. By 168 hours 100% mortality was achieved. Water samples were collected in three locations around the lake and examined for veliger larvae. No veliger (live or shells) were found in the water samples. Both treatments, in the fall of 2008 and spring of 2009, were monitored in the same manner and concluded the same results. Copper sulfate did have a negative impact on local fish populations eliminating about 41,500 pounds of various fish species after both treatments (URS 2008).

Monitoring by veliger tows and settling tiles has continued annually since initial treatment. Although boat restrictions have been enforced since treatment, five zebra mussels were found attached to settling tiles within the lake in 2010 indicating that eradication was not successful (Schainost 2011). The military spent about \$482,000 in 2008 and '09 in the unsuccessful effort to eradicate the mussel.

### ***Zorinsky Lake, Nebraska***

Zorinsky Lake is approximately 255 acres and is located in suburban Omaha, Nebraska. In November 2010, zebra mussels were reported from the reservoir. Eradication of zebra mussels was attempted by drawing down the reservoir, subjecting mussels in the drawdown zone to ambient temperatures (below 32 °F during the winter) and desiccation. The reservoir was drawn down approximately 17 feet, exposing mussels over an approximate 7 month period, from December 2010 to July 2011. A survey of eight sites within the upper 10 feet of the reservoir revealed 907 dead mussels. The reservoir was reflooded in July 2011. No live mussels have been reported at the reservoir subsequent to the eradication effort.

### **1.1.2 Proposed Eradication at San Justo Reservoir**

In 2008, Reclamation, California Department of Fish and Wildlife, San Benito, and additional outside technical experts formed a working group to evaluate methods for eradicating zebra mussels within the San Justo Reservoir, the Hollister Conduit, and San Benito's water distribution system. Several methods were considered for the eradication project. Millbrook Quarry was, and continues to be, the best known successful eradication attempt within the United States. Desiccation is being considered in combination with chemical treatment of the San Justo Reservoir because of the added need to eliminate mussels from the San Benito Conduit and associated distribution system. Like Millbrook Quarry,

treatment with potassium chloride (as potash slurry) was found to be the chemical most well suited for eradication of zebra mussels within this system.

As a California public agency, San Benito prepared an Initial Study, pursuant to the California Environmental Quality Act, for the eradication project at San Justo Reservoir. A Notice of Determination was filed in San Benito County on May 31, 2012.

***San Justo Comparison to Millbrook Quarry and Lake Zorinsky***

At the time of treatment, Millbrook Quarry was 95 feet deep and held approximately 614 acre-feet (AF) of water. The quarry required 18 days to add 144 tons of potash (as 174,000 gallons of potash slurry delivered via two tank trucks per day) to reach an average potassium concentration of 104 ppm with a range between 98 ppm and 115 ppm (Virginia DGIF 2005). During treatment (January to February), Millbrook Quarry water temperatures varied between 42.4°F to 56.3°F and 100% zebra mussel mortality was observed between 6 and 31 days for bioassay and 53 days for resident mussels within the quarry.

In contrast, San Justo Reservoir is currently held at a surface elevation of 485 feet with a maximum depth of 96 feet, area of 175 acres, and volume of 7,445 AF. At this volume, it is expected that 978 tons of potassium (delivered to the site in approximately 1.9 million gallons of solution) would be required to reach the target dosage of 100 ppm potassium (Cohen 2008). At 10 truckloads per day it is expected to take between 37 and 51 days (with or without weekends), respectively to complete dosing. Lesser amounts of potash would be required if San Justo Reservoir is drawn down.

Lake Zorinsky is approximately 255 surface acres, greater in size than San Justo Reservoir and Millbrook Quarry. However, like San Justo Reservoir, the bottom substrate is not hard and is mostly silty material. Additionally, its deepest waters lack oxygen during warm summer temperatures. Although the number of mussels inhabiting the bottom of Lake Zorinsky was not known at the time of drawdown, the drawdown was presumably employed because of its relative low cost and ease of rapid implementation. Silty bottoms are not preferred by zebra mussels, which utilize hard substrates for attachment and does poorly in anoxic conditions. San Justo Reservoir has mostly a silty bottom, although some structure (e.g. the outlet works, rocks, and sunken debris) at the bottom of the reservoir could provide attachment substrates for zebra mussels. Additionally, zebra mussels are known to attach/embed in compacted soil in San Justo Reservoir.

**1.1.3 Review of Potassium Toxicity Literature**

Potassium chloride is an inorganic salt. It is not subject to further degradation processes in the environment and has been shown to be one of the most selective chemicals tested against zebra mussels (International Programme on Chemical Safety 2001; Waller et al. 1993). Review of toxicology literature on the effects of elevated potassium concentrations on zebra mussels and other aquatic organisms is similar to the findings from the Millbrook Quarry eradication project. As

shown in Table 1, zebra mussels are generally more sensitive to elevated potassium concentrations with expected mortality occurring at 100 ppm. Results also indicate that increased water temperature during treatment with potassium is likely to significantly increase toxicity in zebra mussels. Bivalve toxicity was increased 10-fold when water temperature was increased from 50 degrees Fahrenheit (°F) to 68°F (Aquatic Sciences 1996).

Table 1 Summary of Toxicity Literature for General Reservoir Organisms

Taxonomic Group	Species	Toxicity	Potassium (ppm)	Literature Source
CRUSTACEANS	Water flea ( <i>Ceriodaphnia dubia</i> )	LC50 Mortality No effect	630 299-596 193	EPA 2009a EPA 2009a Aquatic Sciences 1997
	Scud/Amphipod ( <i>Hyalella azteca</i> )	LC50 (4 day)	134-630	EPA 2009a
	Crayfish ( <i>Orconectes limosus</i> )	LC50 (30 day)	330-450	EPA 2009a
AQUATIC INSECTS	Midge ( <i>Chironomis tentans</i> )	LC50 (4 day)	1,250-6,830	EPA 2009a
WORMS	Sludge worm ( <i>Tubifex tubifex</i> )	LC50 (4 day)	813*	EPA 2009a
	Oligochaete worm ( <i>Nais variabilis</i> )	LC50 (2 day)	65-75*	EPA 2009a
SNAILS	Freshwater snail ( <i>Physa heterostrophia</i> )	LC50	940	Daum et al. 1977
	Ram's horn snail ( <i>Biomphalaria alexandrina</i> )	Lethal	1,000-2,600	EPA 2009a
BIVALVES	Clam ( <i>Corbicula fluminea</i> )	LC50	225	Anderson et al. 1976
	Zebra mussel ( <i>Dreissena polymorpha</i> )	95% mortality LC50 (1 day)	100 138	Aquatic Sciences 1996 Fisher et al. 1991
FISH	Bluegill sunfish ( <i>Lepomis macrochirus</i> )	LC50 (4 day) LC50	951-2,010 2,010	EPA 2009a Daum et al. 1977
	Mosquitofish ( <i>Gambusia affinis</i> )	LC50 (4 day)	435-485	EPA 2009a
	Fathead minnow ( <i>Pimephales promelas</i> )	LC50 (4 day) Lethal No effect Near zero	880 1,191 302 299	EPA 2009a EPA 2009a Aquatic Sciences 1997 EPA 2009a
	Common carp ( <i>Cyprinus carpio</i> )	Lethal	5,910-6,590	EPA 2009a
	Channel catfish ( <i>Ictalurus punctatus</i> )	LC50 (2 day)	720	EPA 2009a
	Rainbow trout ( <i>Oncorhynchus mykiss</i> )	No effect (7 day)	500-1,000	EPA 2009a
AMPHIBIANS	Ornate narrow-mouthed frog ( <i>Microphyla ornata</i> )	LC50 (4 day) Lethal	1,414-2,539 2,000	EPA 2009a EPA 2009a
	Bullfrog ( <i>Rana breviceps</i> )	Mortality	1,000-10,000	Kegley et al. 2010
*Test conditions for worms did not allow normal burial within substrate which may have produced the low toxicity values. EPA = Environmental Protection Agency				

A variety of aquatic species, including certain fish and invertebrates appear to be less susceptible than zebra mussels to the effects of potassium toxicity. In contrast to zebra mussels, no mortality is expected for several common fish species in the 300 to 1,000 ppm potassium range or for planktonic crustaceans at approximately 200 ppm (Table 1). Several invertebrates and fish show LC50<sup>1</sup> endpoints far higher than those for zebra mussels. See Appendix A for a review of zebra mussel toxicology literature.

Derivatives of potassium (e.g. potassium dihydrogen phosphate and potassium chloride) have been shown to kill zebra mussels at relatively low concentration without affecting most nontarget organisms (Fischer et al. 1991). Potassium appears to kill mussels by destroying the integrity of the mussels' gill tissue leading to asphyxiation (Fischer et al. 1991).

Although there is a general lack of significant toxicity information on typical reservoir fish or other invertebrates at target concentrations of 100 ppm potassium, no non-molluscan aquatic wildlife, vegetation, or terrestrial wildlife were harmed during or after treatment at Millbrook Quarry. Virginia DGIF found that turtles, fish, aquatic insects, and snails all "continued to thrive" post treatment (Virginia DGIF 2011).

#### ***Potassium Toxicity to Humans***

Potassium chloride is an essential constituent of the human body for intracellular osmotic pressure and buffering, cell permeability, acid-base balance, muscle contraction and nerve function. Acute oral toxicity of potassium chloride in mammals is low (LC50 = 3,020 milligrams per kg [mg/kg]). In humans, potassium chloride is rapidly excreted in the absence of any pre-existing kidney or circulatory system dysfunction (see Material and Safety Data Sheet in Appendix B).

#### **1.1.4 Pilot Study at San Justo Reservoir**

In 2010, Reclamation and San Benito conducted a shoreline desiccation pilot study at San Justo Reservoir (Chapman & Gruenhagen 2010). The purpose of the study was to investigate mortality of zebra mussels in relation to desiccation time during the cool wet months of winter, when conditions are more favorable to survival of exposed mussels. Survival of different size classes of mussels in "exposed" and in "sheltered" sites was evaluated. The study found that some mussels appeared to be alive after 20 days of desiccation on the shoreline, although most mussels were dead following 40 days desiccation. A small fraction of the mussels observed after 40 days of desiccation still had flesh inside a tightly closed shell and it was unknown whether or not these mussels would have revived once re-submerged. Consequently, given the expected expense of an eradication attempt, Chapman and Gruenhagen (2010) recommended using the longest desiccation (drying) time possible, ideally three months, and timing treatment

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<sup>1</sup> An LC50 value is the lethal concentration of a toxic substance required to kill 50 percent of the members of a test population.

during the warmest period of the year when zebra mussels would be actively feeding and rate of desiccation would be at a maximum.

### **1.1.5 Dreissenid Mussel Sampling within San Luis Reservoir and O'Neill Forebay**

In 2010, the Reclamation Mussel Task Force collected and analyzed 3,326 water samples from 347 water bodies located within the 17 western states for presence of quagga mussels (*D. bugensis*) and zebra mussels (Reclamation 2011b). Tow-net samples from each water body were collected at multiple locations during the 2011 warm season, generally on a monthly basis. Samples were sent to Reclamation's Denver Technical Service Center (Technical Service Center) Mussel Laboratory for testing. Each sample was analyzed to detect the presence of dreissenid mussels using one or more of the following procedures: cross-polarizing light microscopy, imaging-flow cytometry, scanning electron microscopy, as well as polymerase chain reaction testing for mussel DNA (Reclamation 2011b).

Cross polarizing light microscopy of samples from San Luis Reservoir and O'Neill Forebay tested by Reclamation's Technical Service Center were negative for dreissenids, although polymerase chain reaction results were positive (D. Hosler, pers. comm.). Additional examination of the positive samples, using light microscopy, but not cross polarizing light, was conducted by a mussel expert. Based upon that examination, the expert confirmed quagga mussels to be present in samples from San Luis Reservoir (D. Hosler, pers. comm.). However, polymerase chain reaction testing of DNA from these same samples by the State of California (through Scripps Institute) did not confirm Reclamation's Technical Service Center's results and there is inconsistency in the body of results from all samples. At this time, the State of California does not consider the results obtained for San Luis Reservoir and O'Neill Forebay indicative of the presence of quagga mussels (S. Ellis, pers. comm.).

The eradication of zebra mussels from San Justo Reservoir does not preclude future infestation by quagga mussels, or zebra mussels, for that matter. Should quagga mussels be confirmed present in the San Luis Reservoir or in O'Neill Forebay additional planning and environmental analysis may be required before a decision is made to take action regarding mussels in San Justo Reservoir. San Justo Reservoir receives its water from San Luis Reservoir, therefore, quagga mussels, if present, could end up in San Justo Reservoir in the future.

## **1.2 Need for the Proposed Action**

Reclamation and San Benito need to prevent further spread of zebra mussels and to reduce or eliminate impacts to the San Justo Reservoir, the Hollister Conduit and San Benito's water distribution system (Figure 1). The purpose of the Proposed Action is to eradicate zebra mussels within these systems and take steps to help prevent future infestation and maintain the operation of the facilities.



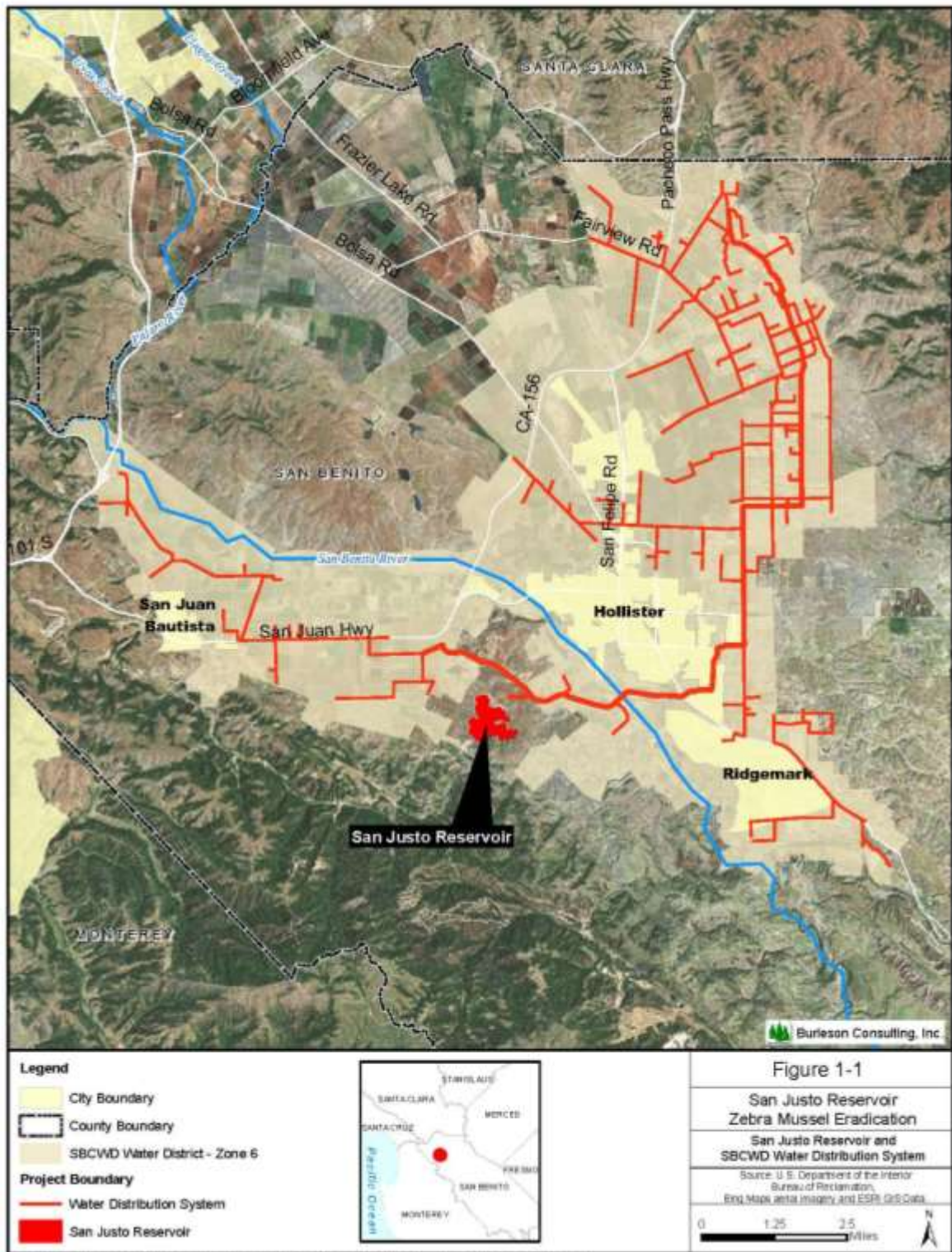


Figure 1 San Justo Reservoir and San Benito's Water Distribution System

## Section 2 Alternatives Including the Proposed Action

This EA considers two possible actions: the No Action Alternative and the Proposed Action. The No Action Alternative reflects future conditions without the Proposed Action and serves as a basis of comparison for determining potential effects to the human environment.

### 2.1 No Action Alternative

Reclamation and San Benito would not conduct a zebra mussel eradication project for San Justo Reservoir, the Hollister Conduit, and the San Benito subsystems. Zebra mussels would continue to be present within these systems. Damage from zebra mussel infestation could lead to system failure and substantial repair costs as well as increasing the potential for spread. Further spread of zebra mussels would be environmentally and economically damaging.

### 2.2 Proposed Action

Reclamation and San Benito propose to either conduct a zebra mussel eradication project or an eradication project and management program for San Justo Reservoir, the Hollister Conduit, and the San Benito Distribution System by treating these systems with potash, a mined product that consists almost entirely of potassium chloride.

#### 2.2.1 Alternative 1: Zebra Mussel Eradication Treatment

##### ***San Justo Reservoir Treatment***

Prior to treatment, San Justo Reservoir would be drawn down to a surface elevation between 430 and 470 feet. Lower water levels would require application of less potash, reducing cost for this material. The water released from the reservoir would be sent through the existing San Benito water delivery system for use by San Benito County water users. Once the desired drawdown elevation is reached in the reservoir, the inlet/outlet valve connecting the reservoir to the water distribution system would be closed to isolate the reservoir.

Treatment of the reservoir would consist of infusing the remaining water with a potash solution pumped from land-based storage tanks to floating supply lines attached to work boats in the reservoir outfitted with diffuser assemblies. Potash also may be pumped to barges, which could also supply work boats. Potash would either be brought in as a ready-to-use solution or a dry mix that would

require mixing onsite prior to treatment. All land-based storage tanks would be placed on existing pavement with temporary spill containment infrastructure (Figure 2).



Figure 2 San Justo Reservoir Project Components

Approximately 255,358 to 1,224,506 kg (depending on reservoir elevation) of potash would be needed to achieve the desired minimum concentration of 100 ppm potassium ion and maximum concentration of 115 ppm of potassium ion in the reservoir (Table 2). Injection and monitoring would be done within different zones and at different depths within the reservoir to ensure the entire water column reaches the desired minimum concentration for a minimum of 30 days. Sampling would be conducted during the treatment period to verify that

concentrations of potassium chloride in the water were maintained at approximately 100 ppm. If concentrations of potassium drop below 95 ppm, water sampling would be increased to daily collection and testing. If concentrations of potassium ion did not return to 100 ppm within 2 days, then additional potassium chloride would be added to reach the target concentration requirement of 100 ppm and the length of treatment time increased commensurately for the period of days for which 100 ppm was not maintained. Additionally, if during the period of treatment, the concentration was not maintained for 95% of days in the treatment period, additional potassium muriate would be added to ensure that 95% of the treatment days would have had the treatment concentration of 100 ppm potassium ion (minimum) to 115 ppm (maximum) for a minimum of 30 days. However, the reservoir shoreline desiccation portion of the eradication will be the timeframe driver, requiring 60 to 90 days.

Table 2 Calculated Potash Quantities Required to Reach 100 ppm Potassium per Reservoir Water Surface Elevation

Reservoir Elevation (feet)	Reservoir Volume (AF)	Muriate of Potash* (kg)
430	1,055	255,358
431	1,117	270,364
432	1,181	285,855
433	1,247	301,830
434	1,314	318,047
435	1,383	334,748
436	1,454	351,934
437	1,526	369,361
438	1,600	387,272
439	1,676	405,668
440	1,754	424,547
441	1,834	443,911
442	1,916	463,758
443	1,999	483,848
444	2,084	504,422
445	2,171	525,480
446	2,260	547,022
447	2,351	569,048
448	2,445	591,800
449	2,540	614,795
450	2,638	638,515
451	2,738	662,719
452	2,840	687,408
453	2,945	712,823
454	3,053	738,964
455	3,162	765,347
456	3,273	792,214
457	3,386	819,565
458	3,501	847,400
459	3,619	875,961
460	3,739	905,007

Reservoir Elevation (feet)	Reservoir Volume (AF)	Muriate of Potash* (kg)
461	3,862	934,778
462	3,986	964,792
463	4,113	995,531
464	4,242	1,026,755
465	4,373	1,058,463
466	4,506	1,090,655
467	4,641	1,123,331
468	4,778	1,156,491
469	4,917	1,190,136
470	5,059	1,224,506
*Muriate of Potash contains about 98% potassium chloride		

### ***Water Distribution System Treatment***

If the reservoir has not been lowered below the point where pressure would move water into the water distribution system (hydraulic gradeline of the reservoir, approximately 462 feet) and the reservoir has reached the minimum 100 ppm potassium concentration, a second drawdown of the reservoir would occur to 455 feet. This would send treated water from the reservoir into the closed water distribution system to treat the system. Potassium concentrations would be tested at the endpoints of the water distribution system to ensure treated water at 100 ppm potassium has moved through the entire system. If portions of the system indicate concentrations of less than 100 ppm, chemical feed systems would be established to deliver additional potash solution to reach the minimum potassium concentration of 100 ppm throughout the entire pipeline system (Figure 3).

If the reservoir is drawn down below 462 AF, then the chemical feed systems mentioned above would be established for treatment of the water distribution system in the same locations (Figure 3). Chemical feed systems would consist of potash solution storage tanks and chemical feed pumps with temporary spill containment placed within previously disturbed access rights-of-way. It is possible that some treated water would be bled off from the water distribution system in order to ensure movement of treated water throughout the system. Any treated water would be used primarily for agriculture, as potash is used commonly as a fertilizer. Water bled away would be done in a manner so that it would not reach a waterway, or would provide habitat capable of supporting mussels.

### ***Treatment Time Period***

Treatment of San Justo Reservoir and the water distribution system would be done over two to three months beginning in late summer (August or September) once potassium reaches the minimum 100 ppm concentration (a minimum of 30 days at this minimum concentration would occur in all potentially infested waters, e.g., the reservoir and delivery system). Earliest start time would be August 2015 but could occur late summer in following years, depending on funding and permitting requirements.



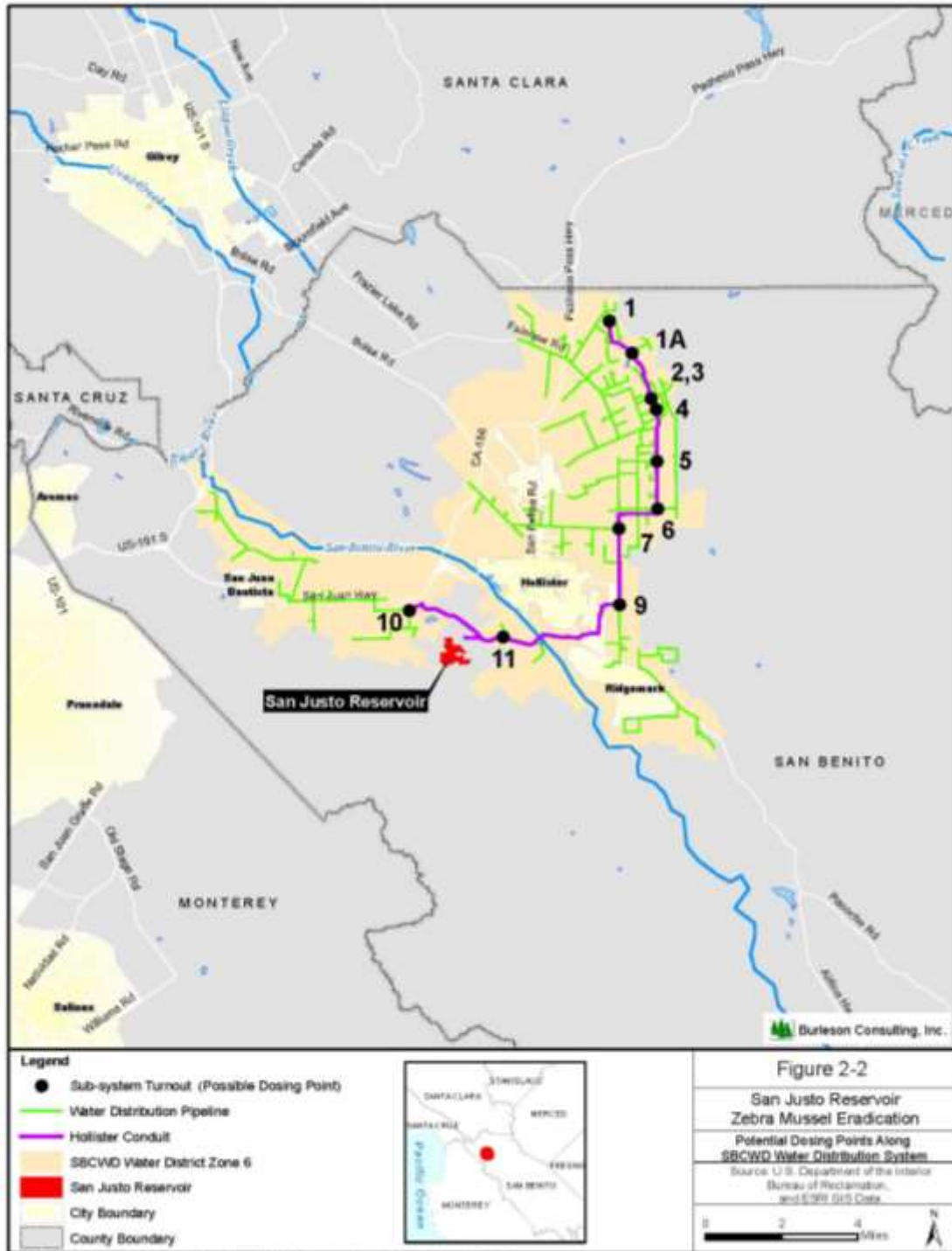


Figure 3 Potential Dosing Points along Hollister Conduit and San Benito Distribution System

### ***Equipment and Staging***

Staging areas for treatment and monitoring of the reservoir would be located within the existing paved parking area at the reservoir (Figure 2). Any staging needed for treatment of the water distribution system would be within existing,

previously disturbed, access roads. No ground disturbing activities would occur under the Proposed Action.

Equipment needed for the Proposed Action would include transfer trailer rigs, spill containment infrastructure, loading transfer equipment, tanks with mixing equipment, liquid/slurry pump systems from tanks to workboats, workboats, supply barges, diffuser system with hoses, mixing equipment, electrical generators, and gasoline/diesel pumps as needed.

***Equipment Decontamination***

Equipment used during the eradication program that comes into contact with water from the reservoir or distribution system would be required to undergo decontamination consistent with the Bay Area Consortium's *Zebra and Quagga Mussel Coordinated Prevention Plan* (see Appendix C). No equipment would be moved from site without undergoing decontamination and inspection.

***Potassium Concentration Monitoring during Treatment***

Potassium concentrations would be monitored at various locations in San Justo Reservoir and at various points along the water distribution system before, during, and after "charging" with potash. Monitoring would continue throughout the treatment period to ensure that potassium levels remain at or above the minimum 100 ppm treatment level. See Appendix D for a complete description of the Monitoring Program.

***Monitoring during Treatment for Eradication***

Reclamation and San Benito would conduct a monitoring program during treatment of San Justo Reservoir and the water distribution system to confirm zebra mussel mortality and eradication. See Appendix E for a complete description of the Monitoring Program.

Monitoring of San Justo Reservoir would include:

- San Justo Reservoir shoreline surveys
- Substrate sampling with settling plates for settling zebra mussels
- Vertical and horizontal plankton tows for veligers
- Zebra mussel bioassay
- Visual inspection of the reservoir by divers or underwater remotely operated vehicles

Monitoring of the Hollister Conduit and San Benito water distribution system would include:

- Biobox monitoring at various locations along the system, including at system discharge points
- Bioassays of sentinel mussels

- Visual inspection at locations of known or suspected zebra mussel infestation to determine their presence and behavioral response assays for evaluating mortality or suspected mortality
- Visual inspection of the water distribution system using remotely operated vehicles at select locations when safe access is possible

### ***Long-Term Monitoring Post-Treatment***

For the Millbrook Quarry eradication project, which was conducted in a relatively homogenous habitat that is considerably smaller than San Justo Reservoir, complete mussel mortality (100%) was achieved after 30 days treatment with a minimum 98 ppm potassium ion concentration at a water temperature of 39°F (Virginia DGIF 2005 and 2011). As described previously, potassium toxicity rates on zebra mussels have been shown to increase with increased temperature as well as exposure time (Fisher et al. 1991, Waller et al. 1996, Aquatic Sciences Inc. 1996). San Justo Reservoir's water temperatures historically go no lower than 53°F and the associated water distribution system is similar to that of the reservoir. It is expected that treatment of San Justo Reservoir, the Hollister Conduit, and San Benito's subsystems with a minimum 100 ppm potassium concentration at approximately 50°F over a two to three month period should achieve complete mortality of all zebra mussels present in the system, if even concentrations are maintained throughout.

Eradication of zebra mussels in the reservoir and the water distribution system would be confirmed by long-term monitoring as described in Appendix D. Long-term (2 to 3 years minimum) monitoring would be similar to that described for treatment monitoring including:

- San Justo Reservoir shoreline surveys
- Substrate sampling with settling plates for settling zebra mussels
- Vertical and horizontal plankton tows for veligers
- Zebra mussel bioassay
- Visual inspection of the reservoir by divers or underwater remotely operated vehicles

Once mortality of zebra mussels in the reservoir and the water distribution system is confirmed through bio-assay checks of mussels and the treatment period has ended, the inlet/outlet valve would be opened and the reservoir refilled with water from San Luis Reservoir to its seasonal operating elevation. A portion of the treated water in the water distribution system would be sent into the reservoir as this water is brought into the system. The remaining water would be delivered primarily to agricultural water users.

Reclamation and San Benito would prepare a zebra mussel re-infestation prevention program that would be consistent with the Bay Area Consortium's *Zebra and Quagga Mussel Coordinated Prevention Plan* (Appendix D).



### ***Environmental Commitments***

Reclamation and San Benito would implement the following environmental protection measures to reduce or avoid environmental consequences associated with the Proposed Action (Table 3). Environmental consequences for resource areas assume the measures specified would be fully implemented.

**Table 3 Environmental Protection Measures and Commitments**

<b>Resource</b>	<b>Protection Measure</b>
Water Resources	Hazardous materials would not be drained onto the ground, San Justo Reservoir, or into drainage areas. All waste, including trash and litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials, would be removed to a disposal facility permitted to accept such materials.
Water Resources	Construction materials would not be stockpiled or deposited near San Justo Reservoir where they could be washed away by high water or storm runoff or can encroach, in any way, upon the watercourse.
Water Resources	Fueling, cleaning, and maintenance of equipment would not be allowed except in designated areas located as far from the San Justo Reservoir as possible. Secondary containment would be utilized as appropriate to minimize chance for spill.
Biological Resources	If seepage to the pond west of the dam and adjacent to the reservoir is reduced during drawdown and treatment, supplemental water, meeting Title 22 drinking water standards, would be brought in to ensure pond levels do not draw below baseline conditions, if drawdown is determined to be detrimental to California red-legged frog in consultation with U.S. Fish and Wildlife Service (Service). This would continue until baseline seepage to the pond is returned. In order to prevent potential impacts to frogs, the supplemental water source would not exceed 5 ppb copper concentration and would be tested in advance of initiation of eradication efforts.
Biological Resources	Measures would be established related to restrictions on use of pesticides, vehicle speed limits, control of trash and hazardous materials, and placement of storage tanks.
Biological Resources	Grasslands or trees subjected to disturbance would be surveyed for nesting migratory birds prior to any disturbance and take of migratory birds in those areas would be avoided.
Biological Resources	If ground disturbing activities would be required, prior to conducting such work, standardized surveys for San Joaquin kit fox (Service 2011) would be conducted by a qualified biologist, and avoidance measures would be implemented to avoid any effects to kit fox.
Air Quality	The following measures would be implemented to reduce fugitive dust emissions: <ul style="list-style-type: none"> <li>• Idling times would be minimized by either shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California Airborne Toxics Control Measure Title 13, Section 2485 of California Code of Regulations).</li> <li>• Use alternative fuel or catalyst-equipped diesel construction equipment.</li> </ul>

### ***Permits Required***

San Benito is in the process of applying for a Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) permit for the use of potash for eradication of zebra mussels. Reclamation and San Benito would also apply for a FIFRA permit for long-term management of San Justo Reservoir and the distribution systems with potash should eradication prove unsuccessful.

### **2.2.2 Alternative 2: Mussel Population Management Program**

Since there is a potential for reintroduction of zebra mussels or new infestations of other invasive mussels or incomplete eradication, a Mussel Population

Management Program would be implemented along with the eradication actions included in Alternative 1. The Mussel Population Management Program would include provision for a treatment regimen based upon either periodic scheduled treatments or treatments based on observed mussel populations and distribution, as required to maintain the efficient function of the San Justo Reservoir, the Hollister Conduit, and the San Benito Distribution Systems. The treatment would be conducted as a scaled back version of the eradication process, but with periodic dosing. Potash would continue to be used as a control agent and the existing structures placed into the water delivery system for the eradication process would be used to introduce the treatments. If other suitable materials became available for use, further environmental review prior to implementation could be required. Specific details of the plan would be developed in cooperation with the California Department of Fish and Wildlife and San Benito.

### **2.2.3 Alternatives Considered but Eliminated from Further Analysis**

Reclamation and San Benito considered alternative methods for treatment of San Justo Reservoir and the distribution systems. However, each method was eliminated from further analysis based on its inability to meet the purpose and need of the Proposed Action as well as its impacts on biological species, limited evidence of efficacy, availability, and cost.

#### ***Copper sulfate***

At Offutt Air Force Base Copper sulfate was applied twice, but was not found to be successful in eradicating zebra mussels. In addition, this method was highly toxic to non-target organisms. Consequently, this method was eliminated from further analysis as it would not meet the need of the Proposed Action and would be environmentally damaging.

#### ***Complete Reservoir Drawdown and Treatment of Dead Pool***

Complete drawdown of the reservoir to dead pool and subsequent treatment of water within the dead pool (elevation 410 feet) with potassium chloride was considered but eliminated as an eradication method as maintaining a sufficient volume of water is necessary for San Benito to provide agricultural, municipal, and industrial water to its customers. Additionally, this method would not provide treated water through the distribution system to aid in eradication. Consequently, this method was eliminated from further consideration as complete drawdown would cause economic hardship to the communities dependent on this water supply and would cause desiccation of non-target organisms within the reservoir.

#### ***Pseudomonas-derived Biocide***

A zebra mussel-specific biocide compound that is produced by a strain of *Pseudomonas fluorescens* bacteria has been developed by the New York State Museum and Marrone Organic Innovations, Inc. At present, the product is not commercially available, the effectiveness of the method for eradication is less than 100 percent, and information on the toxicity to non-target organisms is being developed. In addition, sufficient quantities of the product to treat San Justo

Reservoir and the distribution system is not currently available even if it could be used for eradication; therefore, this method has been eliminated from further analysis as it would not meet the need of the Proposed Action.

***Potassium Chloride BioBullets***

Potassium chloride BioBullets are a recently developed delivery system for biocide treatment of filter-feeding organisms. BioBullets encapsulate a biocide in an edible material in consumable-sized particles. At present, the product is costly, there is little information on the potential effects to non-target organisms, and the effectiveness on different life stages of zebra mussels are unknown.

Consequently, this method was eliminated from further analysis as it would not meet the need of the Proposed Action.

***A Mussel Population Management Program***

A Mussel Population Management Program only alternative was determined to not meet the purpose and need of the project to eliminate the existing potential spread of zebra mussels from the San Justo Reservoir.

## Section 3 Affected Environment and Environmental Consequences

This section identifies the potentially affected environment and the environmental consequences involved with the Proposed Action and the No Action alternative, in addition to environmental trends and conditions that currently exist.

### 3.1 Resources Eliminated from Further Analysis

Reclamation analyzed the affected environment and determined that the Proposed Action did not have the potential to cause direct, indirect, or cumulative adverse effects to the resources listed in Table 4.

Table 4 Resources Eliminated from Further Analysis

Resource	Reason Eliminated
Cultural Resources	Reclamation has determined that the Proposed Action has no potential to cause effects to historic properties pursuant to 36 CFR Part 800.3(a)(1) as the Proposed Action of eradicating zebra mussels would not alter or change any characteristics of San Justo Reservoir, Hollister Conduit, or the San Benito subsystems and the action would not involve ground-disturbing activities. See Appendix E for Reclamation's determination.
Indian Sacred Sites	The Proposed Action would not limit access to or ceremonial use of Indian sacred sites on Federal lands by Indian religious practitioners or significantly adversely affect the physical integrity of such sacred sites.
Indian Trust Assets	The Proposed Action would not impact Indian Trust Assets as there are none in the Proposed Action area. See Appendix F for Reclamation's determination.
Environmental Justice	The Proposed Action would not cause dislocation, changes in employment, or increase flood, drought, or disease nor would it disproportionately impact economically disadvantaged or minority populations. The Proposed Action may support and maintain jobs that low-income and disadvantaged populations rely upon through increased irrigation water supply reliability. Therefore, there may be a slight beneficial impact to minority or disadvantaged populations as a result of the Proposed Action.

### 3.2 Water Resources

#### 3.2.1 Affected Environment

San Justo dam and dike are the primary features of San Justo Reservoir. The dam is a zoned earth and rockfill dam, 151 feet high, with a crest 1,116 feet long. The dike is a zoned earth structure, 79 feet high, with a crest 1,296 feet long. The emergency spillway, located on the northeastern rim of the reservoir, is an open-cut channel lined with grass to protect against weathering and erosion. The outlet works, also located on the northeastern side of the reservoir, include a 1,500-foot-

long tunnel, 688 feet of buried 60-inch-diameter pipe, and a 23.1-foot-diameter shaft about 135 feet deep that terminates at a gate (Reclamation 2010).

The reservoir's original capacity was 9,785 AF; however, due to seepage issues at the reservoir, San Benito has voluntarily reduced the operating level of the reservoir by approximately 15 feet to decrease seepage. Current volume of the reservoir is 7,445 AF. To control seepage, Reclamation installed a 40-millimeter-thick, high-density, polyethylene membrane liner in the reservoir which was covered with earthfill and other materials to protect it against damage. In addition, Reclamation has installed an extensive network of observation and interceptor wells around the reservoir to monitor and manage groundwater levels.

### **Water Quality**

Primary Maximum Contaminant Levels (MCLs) and Secondary MCLs have been established as water quality standards for some constituents by the U.S. Environmental Protection Agency (EPA) and the California Department of Public Health. Primary MCLs are enforceable drinking water standards for public systems. Secondary MCLs are non-enforceable guidelines regulating contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water. EPA recommends secondary standards to water systems but does not require systems to comply. However, states may choose to adopt them as enforceable standards (EPA 2015). Water quality testing results for San Justo Reservoir in 2014 is shown in Table 5.

Table 5 San Justo Reservoir Water Quality Testing

Analyte	Units	EPA MCL	DPH MCL	5/14/14	3/24/14	2/13/14	DLR
Alkalinity	mg/L	NA	NA	108	106	NT	<1
Aluminum	µg/L	200*	1000	ND	ND	NT	50
Antimony	µg/L	6	6	NT	NT	ND	2
Arsenic	µg/L	10	10	ND	ND	NT	2
Barium	µg/L	2000	1000	ND	ND	NT	100
Beryllium	µg/L	4	4	ND	ND	NT	4
Boron	µg/L	NA	NA	117	225	NT	40
Cadmium	µg/L	5	5	ND	ND	NT	1
Calcium	mg/L	NA	NA	24.5	24.4	NT	0.5
Chloride	mg/L	250*	NA	102	96	NT	1
Chromium, total	µg/L	100	50	ND	ND	NT	10
Copper	µg/L	1300	1300	ND	ND	NT	50
Cyanide	mg/L	0.2	1.5	ND	ND	NT	0.02
Fluoride	mg/L	4	2	0.2	0.2	NT	0.1
Iron	µg/L	300*	NA	180	ND	NT	100
Lead	µg/L	15	15	ND	ND	NT	5
Manganese	µg/L	50*	NA	74	ND	NT	20

Analyte	Units	EPA MCL	DPH MCL	5/14/14	3/24/14	2/13/14	DLR
Mercury	µg/L	2	2	ND	ND	NT	1
Nickel	µg/L	NA	100	ND	ND	NT	10
Nitrate	mg/L	10	45	4	4	NT	1
Nitrite	mg/L	1	1	ND	ND	NT	0.02
pH	units	6.5-8.5*	NA	7.55	8.01	NT	0.01
Selenium	µg/L	50	50	ND	ND	NT	5
Silver	µg/L	100*	NA	ND	ND	NT	10
Specific Conductance	µmhos/cm2	NA	NA	616	591	NT	2
Sulfate	mg/L	250*	NA	27	46	NT	1
Thallium	µg/L	2	2	NT	NT	ND	1
Total Dissolved Solids	mg/L	500*	NA	340	292	NT	2
Zinc	µg/L	5000*	NA	ND	ND	NT	50
Source: California Department of Public Health 2015, EPA 2015, Bolsa Analytical 2014. *Secondary MCL criteria are actually "Action Levels" under the lead and copper rule (22 CCR § 64672.3). mg/L = milligram per liter DPH = California Department of Public Health NA = Not available ND = Not detected NT = Not tested							

As shown in Table 5, no measured constituents in San Justo Reservoir exceeded either EPA or the California Department of Public Health primary MCLs for drinking water; however, the concentration of manganese exceeded the drinking water secondary MCL in May 2014 although it was non-detect in March 2014.

### ***San Benito County Water District***

San Benito operates and maintains both the Hollister Conduit and San Justo Reservoir, and participates in the operation and maintenance of pumping and conveyance facilities from San Luis Reservoir through a joint operating agreement with Santa Clara Valley Water District. The Pacheco Bifurcation Structure is an intertie between San Benito and Santa Clara systems. CVP water is delivered into Zone 6 of San Benito through a pressurized distribution system that extends from San Justo Reservoir to the district distribution system. Zone 6 is the only portion of San Benito that is authorized to receive CVP water. Ten turnouts along the Hollister Conduit connect to San Benito's distribution system which provides CVP water service to 23,700 acres (both agricultural and urban) in northern San Benito County. The turnouts include flow control structures and, in some cases, booster pump stations (Figure 3). There are also four percolation turnouts through which water can be released into Pacheco Creek, Tres Pinos Creek, or the San Benito River for groundwater recharge. These turnouts are controlled from locked structures. They are currently locked out and tagged out and isolated from use and from the supervisory control and data acquisition system controlling the pipeline. The same would apply for the eradication. One

turnout is currently “mothballed” and non-functioning (Pacheco) and another (Ridgemark) is completely abandoned and has been so since prior to the zebra mussel infestation being discovered.

**Groundwater** San Benito is located within the Hollister Area Sub-basin of the Gilroy-Hollister Valley Groundwater Basin (California Department of Water Resources [DWR] 2004). Historically, groundwater was the primary source of water for communities within this sub-basin which has led to overdraft in the area. In the late 1980s, CVP water was brought in as a supplemental source of water to correct for groundwater overdraft and to augment existing groundwater and local surface water supplies. Since importation of CVP water, groundwater levels have generally risen (DWR 2004, Pers. Comm. Dale Roskamp 2011).

**CVP Contract** San Benito has a San Felipe CVP contract for up to 43,800 AF from San Luis Reservoir (Contract No. 8-07-20-W0130). The majority of CVP water is delivered for agricultural purposes but some is also delivered for municipal and industrial (M&I) purposes. In Water Year 2010 (March 1, 2010 through February 28, 2011), San Benito delivered 10,061 AF for agriculture and 2,197 AF for M&I (San Benito 2010).

### **3.2.3 Environmental Consequences**

#### ***No Action***

Continued infestation of the reservoir and San Benito’s distribution system could reduce flow or clog parts of the Hollister Conduit and San Benito subsystems resulting in lost water resources for agricultural and M&I users. Lost resources would likely be made up by additional groundwater pumping, potentially leading to further groundwater overdraft within an already impacted area. Furthermore, continued infestation would fail to eliminate the increased chance with time, of further spread of zebra mussels to other systems potentially causing significant damage to water resources and water systems.

#### ***Proposed Action***

Implementation of the Proposed Action would treat the reservoir, distribution system, and percolation turnouts with sufficient potassium chloride to reach a minimum concentration of 100 ppm potassium and a maximum dosage of 115 ppm potassium. At 100 ppm, associated chloride concentration within the reservoir would be 91 ppm. EPA does not have an established drinking water MCL for potassium but does have a secondary drinking water MCL for chloride of 250 ppm (EPA 2011a). The average chloride concentration measured in San Justo Reservoir in 2014 was 102 ppm (Table 5); consequently, chloride concentrations during treatment would total approximately 194 ppm and would decrease over time as fresh water from San Luis Reservoir is brought into the system. As concentrations would be substantially below the 250 ppm MCL for chloride, the Proposed Action would not result in exceedance of EPA MCLs. At a maximum treatment dose of 115 ppm, potassium would pose no human health risks from ingestion or contact, nor will it harm any non-bivalve aquatic wildlife,

vegetation, or terrestrial wildlife inhabiting or using the reservoir (CH2M HILL, 2011a). The reservoir water will continue to meet the EPA primary and secondary drinking water standards for both potassium and chloride; and a liter of the water will contain a fraction of the National Academy of Sciences recommended daily intake of potassium and chloride (approximately 2% of the recommended adult daily intake of potassium and less than 9% of the *Dietary Reference Intake for Water, Potassium, Chloride and Sulfate* (National Academies Press 2004). Potash is classified as a natural (nonsynthetic) substance by the federal National Organic Program Act (CFR Title 7, Part 205), and use of water on crops would be fully consistent with the National Organic Program.

The Central Coast Regional Water Quality Control Board (Regional Water Board) Basin Plan objectives for agricultural water specifies that chloride concentrations less than 142 ppm would not cause any problems from root adsorption but chloride concentrations between 142 and 355 ppm could cause moderate problems from root absorption (Regional Water Board 1994). In addition, Regional Water Board objectives specify that chloride concentrations less than 106 ppm would not cause problems for foliar absorption but that chloride concentrations above 106 ppm could cause moderate problems to crops (Regional Water Board 1994). Concentrations would be diluted over time as untreated water from San Luis Reservoir is brought into the system after treatment. Although actual benefits of dilution would increase or decrease depending on the initial draw down of the reservoir prior to treatment, water would only exceed criteria temporarily and would return to near baseline conditions over time.

Implementing the Proposed Action would cause the San Justo Reservoir, Hollister Conduit, and San Benito subsystems to be out of service for the 2- to 3-month treatment period beginning in August or September. Taking San Justo Reservoir out of service for treatment in non-peak demand months (October through May) would likely have no adverse impact on water users, as agricultural and M&I use are both relatively low. There may be temporary impacts to water supply during the beginning of the treatment period as it corresponds to the end of San Benito's peak demand period (June through September); however, San Benito's water users have groundwater resources that would be sufficient to meet demand during the treatment period (Pers. Comm. Dale Roskamp 2011). As treatment is temporary and there are additional supplies available to water users during the treatment period, no adverse impacts to water supplies are expected.

### ***Cumulative Impacts***

Under the Proposed Action, temporary increases in chloride levels within surface and groundwater supplies would occur. However, expected chloride concentrations would not exceed EPA drinking water standards and would be further reduced over time by dilution with fresh water from San Luis Reservoir. There could be temporary impacts to crops from increased chloride levels but these would also be temporary and would be reduced over time as fresh water is brought into the system; therefore, this would be a short-term, temporary effect and no adverse cumulative impacts to water resources are expected.



Crops require set ratios of chemical nutrients and the potassium-ion concentration goal of 100 ppm has the potential to be more than required by growers and their crops (pers. Comm. Dale Rosskamp). Consequently, the concentration of potassium related to the eradication project has the potential to cause an imbalance and block uptake of soil calcium and magnesium by plants, potentially affecting crop yields.

However, implementation of specific measures by San Benito would reduce this potential and help to insure that each grower potentially impacted would be able to offset any potential impacts to their crops. All District customers irrigating their lands with CVP “blue-valve” water, with elevated potassium concentrations equal to those received to eradicated dreissenid mussels would be notified by San Benito: (1) in advance of when the eradication is to occur: and (2) will be further notified of potassium concentrations at regular intervals during project execution.

### **3.3 Land Use**

#### **3.3.1 Affected Environment**

The Proposed Action area is located in northern San Benito County within the inland agricultural region near the north end of California’s Central Coast Region. The majority of the Proposed Action area is zoned agriculture, interspersed residential, rural, manufacturing/industrial, and commercial areas (San Benito County 2011). Agriculture in the Proposed Action area includes irrigated row crops, orchards, and rangeland grazing. San Justo Reservoir is primarily zoned Park/Recreational and is surrounded by agriculture-zoned land (San Benito County 2011).

#### **3.3.2 Environmental Consequences**

##### ***No Action***

Continued infestation of the reservoir and San Benito’s distribution system could adversely affect land use should system failure occur resulting in lost water resources for agricultural and M&I users. The loss of San Justo’s regulating and supply functions could lead to some restrictions on the daytime use of water in the service area that may ultimately result in changes to agricultural uses. In addition, spread of zebra mussels to other water systems would adversely impact recreational water use, as systems are shut down in order to prevent further spread of zebra mussels. Agriculture could also be impacted if water distribution systems become impaired due to clogging or blockage from mussels preventing water deliveries.

##### ***Proposed Action***

Temporary impacts to agricultural uses may occur during the Proposed Action treatment time. Except during the summer, taking San Justo Reservoir out of service for treatment would likely have no substantial impact on water users, as

agricultural and domestic use are both relatively low, and Hollister and San Benito have groundwater sources that are sufficient to meet non-summer domestic demand. During the summer, however, when agricultural and domestic demand are both high, there are daytime periods when the deliveries of water from San Luis Reservoir are insufficient to meet all demands, and the loss of San Justo's regulating supply functions would lead to some restrictions on the use of water. This effect would be short term and would not result in impacts to land use.

Eradication of zebra mussels in San Justo Reservoir and the San Benito distribution system would not result in changes to land use within the Action area or in other areas due to invasion. Treated water, after dilution, would be used in the same manner as untreated water and is not expected to have impacts on crops or cropping patterns as it is below EPA toxic levels and would only be temporarily slightly higher than Regional Water Board threshold levels for chloride. Impacts from elevated chloride would be minimized over time as freshwater is brought into the system, preventing substantial impacts. In addition, use of potash-treated water would be consistent with the National Organic Program as it is classified as a natural (nonsynthetic) substance by the federal National Organic Program Act (CFR Title 7, Part 205).

### ***Cumulative Impacts***

The Proposed Action would likely not have cumulative adverse impacts on agricultural land use or M&I within the San Benito service area as sufficient groundwater is available for use during treatment. Elevated chloride levels may impact some crops initially but these impacts would be minimized over time as fresh water is brought into the system. The Proposed Action is not expected to have any long term impacts on agriculture within the area, except to better insure continued water supplies and promote existing activities. Eradication of mussels would also prevent any cumulative impacts occurring within other areas from invasion of mussels.

However, if the project is implemented such that San Justo Reservoir would not be able to be utilized for storage for one or more years, this may affect agrobusiness interests and land use. Up to 10,000 AF of CVP carry-over water would have the potential to be lost due to curtailed San Justo Reservoir capacity to facilitate a lower-end eradication operating elevation of 430 feet during the eradication. This translates to between 3,000 and 5,000 acres of arable land within San Benito's CVP service area that could potentially be impacted. Above elevation 460 feet there would be no impacts, between 455 and 460 feet there would be minimal effect. Between elevations 455 and 430, there is greater potential for effect. The potential effect would be that growers may be forced to utilize local groundwater, with lower quality. This could cause growers to have lower crop yields, force them to re-crop with lower quality/ lower-yield crops, and or fallow arable land entirely until carry-over transfer capacity to San Justo Reservoir is restored.

## 3.4 Biological Resources

### 3.4.1 Affected Environment

San Justo Reservoir is located two miles southwest of the City of Hollister within the Hollister 7.5-minute U.S. Geological Survey quadrangle. The Hollister Conduit and San Benito Zone 6 distribution system is located within the Hollister, Tres Pinos, Three Sisters, San Felipe, Chittenden, and San Juan Bautista 7.5-minute U.S. Geological Survey quadrangles.

The topography surrounding San Justo Reservoir is comprised of steep open hill faces on all sides except for the southwest side which has a 1,116 foot long rock and earthen dam and the northern portion with an approximately 1,296 foot-long earthen dike (Reclamation 2011). Below each of these reservoir containments, land slopes to lower elevations terminating at a pond and ephemeral creek on the southwest side of the reservoir and into a privately owned moderately sized (1,700-foot by 850-foot) pond located north of the reservoir. The northern pond is outside the Proposed Action area. On the northeast side of the reservoir lies an irrigated recreational area with an onsite residence trailer, picnic tables and shelters, a concession stand, a concrete paved boat ramp, and associated roadways and parking lots. The surrounding habitat is principally introduced annual grassland.

The southern pond (colloquially known as the frog pond), located about 785 feet southwest of the service road to the dam, is known to be occupied by California red-legged frogs (this pond is referred to as the “frog pond”). Water is pumped to the pond through a small pipe that connects to a sump that collects seepage water from the dam. At the southwestern end of the pond, the water runs over an earthen berm. The overflow is a shallow steady flow to the ephemeral creek that runs dry 500 feet from the pond. However, during the summer months, outflow from the pond can be minimal, likely due to reduced inflow and higher evapotranspiration from pond vegetation (primarily cattails, *Typha* sp., and duckweed, *Lemna* sp.) during the summer.

#### **Special Status Species**

A species list for San Benito County was received from the U.S. Fish and Wildlife Service (Service) Ventura Office (Document No. 81440-2009-SL-0399) on August 20, 2009. An unofficial updated list, including species from San Benito County, was downloaded from the Ventura Fish and Wildlife site (<http://ecos.fws.gov/ipac/wizard/trustResourceList!prepare.action>; accessed March 25, 2013); (Table 6). The updated list for San Benito County contained 17 federally listed or candidate species, as well as critical habitat for three of these species under the jurisdiction of the Service. The California Natural Diversity Database (CNDDB) was also queried for Federal- and state-listed species as well as California Native Plant Society special-status plants located within five miles of the Proposed Action area (California Department of Fish and

Game 2013). Out of the 15 California Native Plant Society special-status plant species identified by the CNDDDB, three are federally listed species (Table 6).

Table 6 Federally-listed and Candidate Species and Critical Habitat

Species	Status <sup>1</sup>	Effects <sup>2</sup>	Occurrence in the Project Vicinity <sup>3</sup> and Summary for ESA Determination
AMPHIBIANS			
California red-legged frog ( <i>Rana draytonii</i> )	T	NLAA	<b>Present.</b> California red-legged frog breeding adults, juveniles, and larvae, occur in the vicinity of San Justo Reservoir, at the “frog pond.” Adults also have been recorded in the ephemeral creek west of the “frog pond” near the reservoir. Potential for adults to move overland in adjacent uplands is minimal during the dry season. Occurrence in the reservoir is unknown but improbable. Project activities would avoid the “frog pond” area, unless water levels there decline in tandem with reservoir water levels and additional water needs to be supplied to the pond, in which case, the water delivered to the “frog pond” would be wholly beneficial.
California red-legged frog ( <i>Rana draytonii</i> )	X	NLAA	<b>Present.</b> Critical habitat overlaps the Action Area at a compound for the bifurcation structure at beginning of San Benito Conduit. The compound is surrounded by local roads and State Highway 152. Possible burrows at the site would be avoided. Potential for mowing and removal of rank annual vegetation at the end of the summer or into fall to reduce fire hazard would enable access to the conduit and would affect a small area of habitat unlikely to be inhabited or used by California red-legged frog. The temporary affect to this very small area is not likely to affect its suitability or use by California red-legged frog.
California tiger salamander ( <i>Ambystoma californiense</i> ) Central DPS	T	NLAA	<b>Present.</b> Potential for California tiger salamander adults, juveniles, or larvae to occur in aquatic habitat at or adjacent to the “frog pond”, but not likely during the project. Delivery of water to the “frog pond” would not occur during periods of likely use. The reservoir is not suitable habitat. Potential for adults/juveniles to occur in adjacent uplands. Project activities would occur in summer and fall when the species is likely in burrows in uplands. No construction or ground disturbance would occur in uplands. California tiger salamander movement across roads used for project access could occur but is unlikely during the project. Consequently California tiger salamanders are not likely to be affected.
California tiger salamander ( <i>Ambystoma californiense</i> ) Central DPS	X	NE	<b>Absent.</b> Critical habitat does not occur in the Action Area.
California long toed salamander ( <i>Ambystoma macrodactylum croceum</i> )	E	NE	<b>Absent.</b> Species does not occur in the Action area.

Species	Status <sup>1</sup>	Effects <sup>2</sup>	Occurrence in the Project Vicinity <sup>3</sup> and Summary for ESA Determination
BIRDS			
Ridgway's rail ( <i>Rallus obsoletus</i> )	E	NE	<b>Absent.</b> Restricted almost entirely to the marshes of San Francisco estuary, where the only known breeding populations occur. Species does not occur in the Action Area.
California condor ( <i>Gymnogyps californianus</i> )	E	NE	<b>Unlikely.</b> No CNDDDB recorded occurrences in Action Area. Nesting occurs at Pinnacles National Monument, approximately 30 miles south of Action Area. Project activities at the reservoir, on roadways, and possibly at the "frog pond", and a small area of upland at the bifurcation structure at the San Benito Conduit, do not provide habitat for this species.
Least Bell's vireo ( <i>Vireo bellii pusillus</i> )	E	NE	<b>Possible.</b> Suitable nesting and foraging habitat occurs within riparian lowlands at the ephemeral creek adjacent to the "frog pond", near the bifurcation structure at the San Benito Conduit, and along the distribution system. Project activities would not affect nesting or foraging should they occur at these areas or nearby.
Southwestern willow flycatcher ( <i>Empidonax traillii extimus</i> )	E	NE	<b>Unlikely.</b> Nesting occurs in mosaic riparian habitat usually including willows ( <i>Salix</i> spp.). Riparian habitat is present adjacent to the ephemeral creek near the "frog pond", but there are not records from the Action Area. Breeding primarily occurs further south in California and breeding and foraging would not be affected by project activities.
FISH			
South-Central California steelhead ( <i>Oncorhynchus mykiss</i> )	T	NE	<b>Possible.</b> The Proposed Action would not affect waters potentially inhabited by individuals of this distinct population segment, which could include the San Benito River.
South-Central California steelhead ( <i>Oncorhynchus mykiss</i> )	X	NE	<b>Absent.</b> Critical habitat is located nearby, but does not occur in the Action Area.
INVERTEBRATES			
Vernal pool fairy shrimp ( <i>Branchinecta lynchi</i> )	T	NE	<b>Absent.</b> No CNDDDB occurrence documented within 5 miles of the Proposed project site. No suitable habitat (seasonal wetlands or vernal pools) present at the site.
Vernal pool fairy shrimp ( <i>Branchinecta lynchi</i> )	X	NE	<b>Absent.</b> No Critical Habitat present in the action area.
MAMMALS			
Giant kangaroo rat ( <i>Dipodomys ingens</i> )	E	NE	<b>Absent.</b> No CNDDDB occurrences documented within 5 miles of the Proposed Action Area. A subpopulation extant in the Panoche Region occurs in western Fresno and Eastern San Benito Counties. The species range is outside of the Proposed Action Area.
San Joaquin kit fox ( <i>Vulpes macrotis mutica</i> )	E	NLAA	<b>Possible.</b> Ground squirrels in the uplands surrounding the reservoir provide a potential prey base and their burrows provide potential denning opportunities for kit fox. Numerous burrows that are

Species	Status <sup>1</sup>	Effects <sup>2</sup>	Occurrence in the Project Vicinity <sup>3</sup> and Summary for ESA Determination
			large enough to be utilized by kit fox have been found around the reservoir. If present, activities at the reservoir and additional vehicular traffic may result in minor disturbance.
PLANTS			
Marsh Sandwort ( <i>Arenaria paludicola</i> )	E	NE	<b>Absent.</b> No CNDDDB occurrences documented within twenty miles of the Proposed Action Area. This species does not occur in the Proposed Action Area.
Monterey spineflower ( <i>Chorizanthe pungens</i> var. <i>pungens</i> )	T	NE	<b>Absent.</b> The Proposed Action area does not provide suitable habitat (marine deposits, sand dunes etc.) This species does not occur in the Proposed Action Area.
San Benito Evening-Primrose ( <i>Camissonia benitensis</i> )	T	NE	<b>Absent.</b> The Proposed Action area does not provide suitable habitat including serpentine soils.
San Joaquin woolly-threads ( <i>Lembertia congdonii</i> , previously <i>Monolopia congdonii</i> )	E	NE	<b>Unlikely.</b> Only 12 populations remain from San Joaquin Valley and adjoining foothills from vicinity of Pacheco Pass southeasterly to Caliente Creek, southeast of Bakersfield (Service 1990). San Joaquin woolly-threads have a low probability of occurrence in the valley and foothill grasslands of the upland lands surrounding the reservoir. No ground disturbance would occur in uplands where this plant could occur.
Santa Cruz tarplant ( <i>Holocarpha macradenia</i> )	T	NE	<b>Absent.</b> No CNDDDB occurrences documented within five miles of the Proposed Action Area. This species does not occur in the Proposed Action Area.
Yadon's piperia ( <i>Piperia yadonii</i> )	E	NE	<b>Absent.</b> The Proposed Action Area does not provide suitable habitat (maritime chaparral, Monterey Pine, and Monterey cypress woodlands). This species does not occur in the Action Area.
REPTILES			
Blunt-nosed leopard lizard ( <i>Gambelia silus</i> )	E	NE	<b>Absent.</b> No CNDDDB occurrences documented within 5 miles of the Proposed Action site. Suitable habitat is not present at the Proposed Action Area.
<sup>1</sup> Status= Listing of Federally special status species E: Listed as Endangered T: Listed as Threatened X: Critical Habitat <sup>2</sup> Effects = Effect determination NE: No Effect NLAA: May affect, not likely to adversely affect <sup>3</sup> In the vicinity of San Justo Reservoir, Hollister Conduit, and San Benito Distribution System - Definition Of Occurrence Indicators Present: Species known to occur in area Possible: Species recorded in area but habitat suboptimal or lacking entirely Unlikely: Species recorded in area but habitat suboptimal or lacking entirely. Protocol-level surveys did not find evidence to support presence Absent: Species not recorded in project vicinity and/or habitat requirements not met			

Two plant and five animal species were considered to have at least some potential to occur within the region or have been recorded historically in the vicinity of the Proposed Action area and are described below.

**San Joaquin Woolly Threads** San Joaquin woolly threads (*Monolopia* (= *Lembertia*) *congdonii*) required habitat is alkali sink or sandy soils in Shadscale Scrub and Valley Grassland. The species is known from San Benito County and elsewhere in the Central Valley, and about one-half of the historical occurrences are extirpated. San Joaquin woolly threads are federally listed as endangered. Although the closest occurrence of this species reported by CNDDB exists in Fresno County, about 60 miles east of the Proposed Action Area, the Service (2009) lists the species as occurring within San Benito County. Within the Proposed Action area San Joaquin woolly threads has a low probability of occurrence in valley and foothill grasslands of the upland lands surrounding the reservoir.

**Two-Fork Clover** Two-fork clover (*Trifolium amoenum*), federally listed as endangered, is typically found on heavy soils at elevations less than 328 feet in Coastal Bluff Scrub. The historic range of two-fork clover was from the western extreme of the Sacramento Valley in Solano County, west and north to Marin and Sonoma counties. Presently there is only a single extant population in northern Marin County. Nearby historical populations have been recorded and suitable habitat exists on site. The closest recorded occurrence is within the city limits of Gilroy, 8.7 miles north of the Proposed Action site in 1903, and is possibly extirpated (California Department of Fish and Game 2011). Within the Proposed Action area two-fork clover has a low probability of occurrence in the sunny open sites of valley and foothill grasslands in the upland lands surrounding the reservoir.

**California Tiger Salamander** California tiger salamander (*Ambystoma californiense*) is known to occur on surrounding lands within one mile to the west of the reservoir in the permanent golf course ponds. In addition, there are over 40 additional occurrences reported within a five-mile radius of the San Justo Reservoir, the Hollister Conduit, and San Benito's water distribution system. Access to the Proposed Action Area from the known locations is present overland as dispersal barriers are absent. The uplands around water bodies, such as the ephemeral creek and ponds that lie in the golf course to the southwest of the reservoir, provide suitable upland aestivation habitat for California tiger salamander. Although California tiger salamander could attempt to breed in the reservoir, the habitat is very poor for breeding because of an abundance of predators, such as warm water fishes and bullfrogs, which are known to occupy the reservoir and would prey upon California tiger salamander.

**California Red-Legged Frog** California red-legged frog (*Rana draytonii*) is federally listed as threatened. The Proposed Action area does not fall within federally designated California red-legged frog Critical Habitat. The closest unit

is Critical Habitat Unit SNB-1 in San Benito County (Service 2010), located about 300 feet southwest of the “frog pond”. Critical Habitat Unit STC-2 is located north of the San Benito primarily within Santa Clara County (Service 2010).

Numerous California red-legged frog occurrence records have been documented within one mile of San Justo Reservoir, the Hollister Conduit, and the additional San Benito conveyance subsystems (CNDDDB 2013). The species has been recorded from the “frog pond” as recently as July 2011, although its relative abundance at this site may have declined in recent years (Reclamation 2011c).

The Proposed Action Area could potentially include the “frog pond” and the ephemeral creek west of there. Uplands below the dam also may be used by this species. Other areas in the vicinity, but outside the Proposed Action Area, where breeding could potentially occur include the pond at the Pacific Scientific Energetic Materials Company and ponds within the San Juan Oaks Golf Club, golf course, off Union Road. Areas in between these ponds could serve as dispersal habitat. Although the reservoir may provide breeding habitat for California red-legged frog at the fringes where cattails and bulrush (*Scirpus* sp.) provide cover, numerous predators in the reservoir, including warm water fishes (especially large-mouth bass, *Micropterus salmoides*) and bullfrogs (*Rana catesbeiana*) greatly reduce any chance for colonizing this habitat or successfully breeding there.

**California condor** Nesting habitat for the California condor (*Gymnogyps californianus*) does not exist in the Proposed Action Area. The lands surrounding San Justo Reservoir, the Hollister Conduit, and San Benito subsystems include open grasslands that could provide foraging habitat for this species and are within the potential foraging range of California condors that roost and nest in the Big Sur area of Monterey County and at Pinnacles National Monument. However, it would be uncommon for condors from those areas to occur at San Justo Reservoir or in the Proposed Action Area. Areas within the Proposed Action Area would not be expected to provide nesting, roosting or foraging opportunities for this species.

**Least Bell’s vireo** The Least Bell’s vireo (*Vireo bellii pusillus*), federally listed endangered, has suitable nesting and foraging habitat present within the riparian areas around the San Justo Reservoir, Hollister Conduit, and San Benito subsystems. Although there is potential for this species to occur in the Proposed Action Area, the species is uncommon in the region and project activities would avoid the riparian habitat, and surrounding upland habitat where this species could forage.

**San Joaquin Kit Fox** The San Joaquin kit fox (*Vulpes macrotis mutica*), federally listed as endangered and state listed as threatened. Although upland habitat in the vicinity of the reservoir is suitable for this species, this species has



not been seen at the reservoir. Suitable habitat surrounding the San Justo Reservoir, Hollister Conduit, and San Benito subsystems includes open grassland with abundant ground squirrel activity and associated burrows. The ground squirrels provide a potential prey base and their burrows provide potential denning opportunities for kit fox. San Joaquin kit fox is considered to have a moderate potential to occur in the vicinity. Records of occurrence for the species include lands east of Hollister, and approximately 2 to 3 miles west of San Justo Reservoir.

### ***Migratory Birds***

Large trees along riparian areas adjacent to the Proposed Action Area (e.g., cottonwood, sycamore, valley oak, and willow) and also those within the grasslands surrounding the San Justo Reservoir, Hollister Conduit, and San Benito subsystems provide suitable nesting and foraging habitat for raptors, passerines, and non-passerine land birds protected under the Federal Migratory Bird Treaty Act. Additionally, grassland nesting birds may occur where suitable habitat is present.

## **3.4.2 Environmental Consequences**

### ***No Action***

Continued infestation of the reservoir and San Benito's distribution system could result in system failure and require significant responses. Supply of water to the "frog pond" could be compromised. This could adversely affect California red-legged frogs as San Justo reservoir provides water to the "frog pond" that contains this species. California tiger salamander could also be adversely affected because they have potential to use the "frog pond".

### ***Proposed Action***

The Proposed Action would result in the addition of potassium chloride to San Justo Reservoir, Hollister Conduit, and San Benito's distribution system and would coincide with a lowering of reservoir water levels. Boats/barges would be active on the reservoir and additional vehicular traffic would occur on roads to and from the Reservoir. Staging and supply activities would occur at the paved parking area and boat launch ramp at the reservoir.

Direct effects to aquatic resources in the reservoir and distribution system would occur from the increased concentration of potassium and chloride in water in San Justo Reservoir and the distribution systems, in addition to the drawdown of water in the reservoir. Studies conducted on effects of potassium chloride on non-target organisms have shown that potassium concentrations toxic to zebra mussels (100 ppm) may affect other invertebrates but should not adversely affect fish or amphibians (Fisher et al. 1991, Waller et al. 1996, Aquatic Sciences Inc. 1996, CH2M Hill 2011), which is supported by results from the Millbrook Quarry treatment (Virginia DGIF 2005 and 2011). The only bivalve other than zebra mussels that has been observed in the San Justo Reservoir is the non-native Asian clam (*Corbicula fluminea*), which is also considered a pest species.

Thermal stratification and low oxygen conditions occur at depths below 30 feet beneath the surface in San Justo reservoir during the summer-to-fall period. The proposed application of potash solution is not expected to directly adversely affect aquatic life in the reservoir other than the two non-native bivalves (zebra mussel and Asian clam). However, the lowering of the reservoir and the reduced water oxygen content, coinciding with an increased density of oxygen dependent organisms in the water column, could lead to oxygen debt and increased mortality, similar to winter “die off” of fish in stratified frozen lakes. In addition, the decomposition of dead organisms could further reduce conditions for oxygen dependent organisms. If a major fish die off were to occur in the reservoir as a result of oxygen depletion, putrid smells could temporarily foul the area.

Executive Order 13112 was issued to prevent the introduction of invasive species; provide for their control; and minimize the economic, ecological, and human health impacts that invasive species cause. The Proposed Action would minimize the economic, ecological, and human health impacts relating to the presence of zebra mussels within San Justo Reservoir and the San Benito distribution system. It would also help prevent the spread of zebra mussels from this system. Therefore, the Proposed Action is consistent with Executive Order 13112.

**Migratory birds** No aquatic birds are known to nest at San Justo Reservoir. Drawdown of the reservoir could concentrate the availability of fish in the reservoir for piscivorous birds, although piscivorous birds are not known to nest at the reservoir. Redwing blackbirds (*Agelaius phoeniceus*) and marsh wrens (*Cistothorus palustris*) are suspected of nesting in cattails and bulrushes that occur in patches at the periphery of the reservoir. These areas are subject to fluctuating water levels and lowering the reservoir in August and September, which would not be expected to result in take of these species. Treated water in the reservoir, Hollister Conduit, and the San Benito distribution system would not result in take of migratory birds. There would be no construction or ground disturbance and so migratory birds would not be affected from such actions. Minor removal of rank annual vegetation in a small area at the bifurcation structure may occur to ensure fire safety. A survey for nesting migratory birds would be required at this site prior to initiating vegetation removal. If the survey revealed nesting migratory birds to be present in areas to be disturbed, measures would be implemented to avoid take.

**Federally-listed Species** Reclamation has initiated Endangered Species Act Section 7 consultation with the Service on potential affects to California re-legged frog, California tiger salamander, and the San Joaquin kit fox. The EA will not be finalized until consultation is complete.

The blunt-nosed leopard lizard, yellow-billed cuckoo, giant kangaroo rat, San Joaquin Valley woodrat, conservancy fairy shrimp, longhorn fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp, Southern California steelhead,

San Benito evening-primrose, Valley elderberry longhorn beetle, or critical habitat for special status species do not occur within the Proposed Action Area and would not be affected.

There are no listed species in the reservoir and the reservoir is not critical habitat. The Proposed Action includes minimal activities outside the reservoir proper, and they include primarily transport of materials on roads to delivery sites or the staging area at the paved parking lot and boat launch ramp at the reservoir. The Proposed Action does not include construction or ground disturbance in uplands surrounding the reservoir, Hollister Conduit, or the San Benito distribution system.

**San Joaquin Woolly Threads** The closest occurrence of San Joaquin woolly threads reported by CNDDDB is about 60 miles east of the Proposed Action Area. This has a low probability of occurrence in valley and foothill grasslands of the upland lands surrounding the reservoir, and because no construction or ground disturbance would occur in uplands surrounding the reservoir, this species would not be affected by the Proposed Action.

**Two-Fork Clover** The closest extant occurrence of Two-fork clover is in northern Marin County. This species has a low probability of occurrence in uplands around the reservoir and because no construction or ground disturbance would occur in uplands surrounding the reservoir, this species would not be affected by the Proposed Action.

**California Tiger Salamander** California tiger salamander has the potential to occur at the “frog pond”, although it would be unlikely to be present in the pond during the project. The reservoir is not suitable habitat but this species has the potential to occur in uplands surrounding the reservoir and along the distributions system and San Benito Conduit. California tiger salamander is active above ground in uplands in the late fall through spring, when it moves to aquatic breeding sites. As such, California tiger salamander may disperse across roads used for project access. However, because no construction or ground disturbance would occur in uplands, and it is improbable that California tiger salamander would be encountered by vehicles on roadways, effects from these project activities to California tiger salamander are discountable and California tiger salamander is therefore not likely to be adversely affected by the Proposed Action.

**California Red-Legged Frog** California red-legged frog occur in the “frog pond” that receives seepage water from San Justo dam. Other than by seepage, the pond is not connected to the reservoir. During reservoir drawdown, treatment, and reservoir refilling, the seepage water received by the pond would, if necessary, be augmented by clean, Title 22 water delivered by truck. Deliveries would match the average flow rate from seepage and maintain the pond at its normal depth. Seepage to the pond may have elevated potassium chloride levels,

however, Title 22 water added to the pond during treatment would reduce potassium chloride concentrations. The potassium chloride concentrations in the seepage would expectedly return to levels closer to background rates after the reservoir is refilled with fresh water delivered to the reservoir from San Luis Reservoir. The effects of potassium chloride on different life stages of the frog, *Microhyla ornata*, indicate that eggs and larvae are more susceptible than adults and some impacts may occur near concentrations of 141 ppm (Padhye and Ghate 1992). While concentrations in the reservoir would be less than this amount (i.e. 100ppm) during the project, and concentrations in the pond would likely lower still because of adherence to soil particles when moving through the soil, and effects from the potential addition of tank water, there could be an effect to adult California red-legged frog, although this would be expected to be minor as only adults might be exposed and at levels expectedly much lower than where larvae and eggs might be affected.

**California condor** California condor nesting habitat does not exist in the immediate vicinity of the project area. However, uplands surrounding the reservoir include open grasslands that may provide scavenging habitat.

Any activity at the “frog pond” would be irregular, minimal and likely timed after the bird nesting season. Consequently the Proposed Action would not adversely affect this species.

**Least Bell’s vireo** Although there is potential for Least Bell’s vireo to occur in the Proposed Action Area, the species is uncommon in the region and because project activities would avoid riparian habitat and surrounding upland habitat where this species could forage, there would be no construction or ground disturbance in uplands so there would be no effect to this species from the Proposed Action.

**San Joaquin Kit Fox** The upland habitat surrounding the reservoir is suitable for San Joaquin kit fox denning and foraging as there are numerous burrows and abundant beecheyi ground squirrels for prey. However, based on recent records, it is not likely San Joaquin kit fox would be present in the Proposed Action Area. Project activities occur primarily on the reservoir itself, which is not habitat for San Joaquin kit fox. The Proposed Action does not include construction or ground disturbance in uplands surrounding the reservoir, Hollister Conduit, or the San Benito distribution system which could potentially affect San Joaquin kit fox and the treated water would not affect San Joaquin kit fox, because San Joaquin kit fox acquire water from their prey and don’t generally require free water. There would be a temporary generalized increase in activity at the reservoir primarily from vehicular traffic, but the added traffic would add a minor amount of disturbance to the relatively high background levels of traffic on nearby Union Road which services the reservoir, or on the nearby State Highway 156. The San Joaquin kit fox is unlikely to be present and any effect due to the Proposed Action

would be minor; consequently, the Proposed Action is not likely to adversely affect San Joaquin kit fox.

### ***Cumulative Impacts***

Eradication of zebra mussels within San Justo Reservoir, the Hollister Conduit, and the San Benito distribution system would prevent the spread of zebra mussels from the Proposed Action area to other systems. It would also reduce impacts to the biological community present within the reservoir; therefore, the Proposed Action is expected to have beneficial cumulative impacts on biological resources within and outside the Proposed Action area.

## **3.5 Socioeconomic Resources**

### **3.5.1 Affected Environment**

The San Justo Reservoir is located about 1.7 miles west of the city of Hollister in San Benito County, California. The Hollister Conduit and the San Benito subsystems run beneath the City of Hollister. The City of Hollister had an estimated 2013 population of 36,589 (U.S. Census Bureau 2014). The median household income between 2009 and 2013 was \$62,412 and per capita income in 2013 was \$22,306. Between 2009 and 2013, 13.3 percent of the population was below the poverty line (U.S. Census Bureau 2014).

### **3.5.2 Environmental Consequences**

#### ***No Action***

Continued infestation of the reservoir and San Benito's distribution system could adversely affect agricultural production and local employment should system failure occur. In addition the cost of repairing water supply infrastructure or purchasing more costly water supplies would adversely affect San Benito and their customers.

#### ***Proposed Action***

Eradication of zebra mussels would be beneficial to socioeconomic resources for San Benito and its service area as water supply reliability and infrastructure integrity would be maintained. There could be temporary disruption of water deliveries during treatment of the reservoir which could have minor impacts to agricultural and urban users; however, both agricultural and M&I supplies could be supplemented by groundwater supplies during treatment.

Up to 10,000 AF of San Benito's CVP carry-over water would potentially be unavailable due to curtailed San Justo Reservoir capacity to facilitate a lower-end eradication operating elevation of 430 feet. This translates to between 3,000 and 5,000 acres of arable land within San Benito's CVP service area that could potentially be affected. The effect experienced would increase as water level drops between 455 and 430 feet elevation. At lower elevations groundwater may need to be used by growers. The local supplies of groundwater may be of less

desirable quality and may affect crops. Responses could include lower crop yield, re-cropping with lower quality/lower yield crops, and/or fallowing arable land until carry-over transfer capacity to San Justo Reservoir is restored.

### ***Cumulative Impacts***

Eradication of zebra mussels from the San Justo Reservoir, the Hollister Conduit, and San Benito's distribution system would prevent the spread of zebra mussels from this system which would be cumulatively beneficial to economic resources both within the Proposed Action area and outside areas.

## **3.6 Air Quality**

### **3.6.1 Affected Environment**

The Proposed Action area lies within the North Central Coast Air Basin under the jurisdiction of the Monterey Bay Unified Air Pollution Control District. The pollutants of greatest concern are carbon monoxide (CO), ozone (O<sub>3</sub>), O<sub>3</sub> precursors such as volatile organic compounds (VOC), reactive organic gases (ROG) or nitrogen oxides (NO<sub>x</sub>), inhalable particulate between 2.5 and 10 microns in diameter (PM<sub>10</sub>), and particulate matter less than 2.5 microns in diameter (PM<sub>2.5</sub>). There are no standards for NO<sub>x</sub>; however, NO<sub>x</sub> contributes to the standards for nitrogen dioxide (NO<sub>2</sub>) and is an O<sub>3</sub> precursor.

The North Central Coast Air Basin is in attainment for all Federal standards but is in nonattainment for State standards for O<sub>3</sub> and PM<sub>10</sub> (California Air Resources Board 2014).

### **3.6.2 Environmental Consequences**

#### ***No Action***

Under the No Action Alternative, there would be no impacts to air quality since conditions would remain the same as existing conditions.

#### ***Proposed Action***

The Proposed Action would introduce short-term operational air emission sources from barge-mounted diesel generators and truck emissions associated with the delivery of potash slurry to the site. Emissions were estimated for the Proposed Action based on maximum preliminary design estimates which assumed that one 40-kilowatt, 53.6 horsepower, diesel engine generator would need to be operated on each of five barges. Operation of the engines would be for eight hours per day, up to 100 days per year in order to deliver the requisite amount of potash to treat the highest reservoir elevation (worst-case scenario) of 485-feet. Under this scenario, a 240-mile round trip (Fresno to Hollister) for a total of 374 deliveries using a 5,000 gallon tanker truck would be needed. Based on these assumptions and EPA Tier III emission factors for the barge engines, total emissions can be found in Table 7.

Table 7 Estimated Proposed Action Emissions

Source	NOx (tons)	CO (tons)	VOC (tons)	PM10 (tons)
Barge-mounted diesel generators	0.83 <sup>†</sup>	0.88	-- <sup>†</sup>	0.05
Delivery trucks	1.46	0.51	0.1	0.06
<b>Total</b>	<b>2.3</b>	<b>1.4</b>	<b>0.1</b>	<b>0.1</b>
Monterey Bay Unified Air Pollution Control District's <i>de minimis</i> thresholds (tons per year)	100	100	100	100
<sup>†</sup> Includes non-methane hydrocarbons, which also includes ROG/VOC.				

As shown in Table 7, operational emissions would not exceed Monterey Bay Unified Air Pollution Control District's *de minimis* thresholds. Consequently, a conformity analysis pursuant to the Clean Air Act is not required.

Reclamation or San Benito would either register equipment with engines greater than 50 horsepower under the California Air Resources Board's Statewide Portable Equipment Registration Program or acquire individual operating permits from Monterey Bay Unified Air Pollution Control District prior to operation in accordance to Monterey Bay Unified Air Pollution Control District's rules. In addition, Reclamation would implement air quality protection measures (Table 2) to further minimize operational emissions. Therefore, the Proposed Action would not have adverse impacts on air quality.

### ***Cumulative Impacts***

Emissions from the Proposed Action are well below established *de minimis* thresholds and are expected to be temporary in duration. As a result, the Proposed Action is not expected to contribute to cumulative adverse impacts to air quality.

## **3.7 Global Climate**

### **3.7.1 Affected Environment**

Climate change refers to significant change in measures of climate (e.g., temperature, precipitation, or wind) lasting for decades or longer. Many environmental changes can contribute to climate change [changes in sun's intensity, changes in ocean circulation, deforestation, urbanization, burning fossil fuels, etc.] (EPA 2015a).

Gases that trap heat in the atmosphere are often called greenhouse gases. Some greenhouse gases, such as carbon dioxide (CO<sub>2</sub>), occur naturally and are emitted to the atmosphere through natural processes and human activities. Other greenhouse gases (e.g., fluorinated gases) are created and emitted solely through human activities. The principal greenhouse gases that enter the atmosphere because of human activities are: CO<sub>2</sub>, methane (CH<sub>4</sub>), nitrous oxide, and fluorinated gasses (EPA 2015a).

During the past century humans have substantially added to the amount of greenhouse gases in the atmosphere by burning fossil fuels such as coal, natural

gas, oil and gasoline to power our cars, factories, utilities and appliances. The added gases, primarily CO<sub>2</sub> and CH<sub>4</sub>, are enhancing the natural greenhouse effect, and likely contributing to an increase in global average temperature and related climate changes. At present, there are uncertainties associated with the science of climate change (EPA 2015b).

Climate change has only recently been widely recognized as an imminent threat to the global climate, economy, and population. As a result, the national, state, and local climate change regulatory setting is complex and evolving.

In 2006, the State of California issued the California Global Warming Solutions Act of 2006, widely known as Assembly Bill 32, which requires California Air Resources Board to develop and enforce regulations for the reporting and verification of statewide greenhouse gases emissions. CARB is further directed to set a greenhouse gases emission limit, based on 1990 levels, to be achieved by 2020.

In addition, the EPA has issued regulatory actions under the Clean Air Act as well as other statutory authorities to address climate change issues (EPA 2015c). In 2009, the EPA issued a rule (40 CFR Part 98) for mandatory reporting of greenhouse gases by large source emitters and suppliers that emit 25,000 metric tons or more of greenhouse gases [as CO<sub>2</sub> equivalents per year] (EPA 2009). The rule is intended to collect accurate and timely emissions data to guide future policy decisions on climate change and has undergone and is still undergoing revisions (EPA 2015c).

### **3.7.2 Environmental Consequences**

#### ***No Action***

Under the No Action Alternative, trends affecting climate change would continue as conditions would remain the same as existing conditions.

#### ***Proposed Action***

The Proposed Action would introduce short-term greenhouse gases emissions primarily through the combustion of diesel fuel. There would also be a small amount of greenhouse gases emissions associated with electricity consumption by the eleven dosing pumps that may be needed to infuse potash into the distribution system.

Greenhouse gases emissions were estimated using the CARB-approved emissions modeling software (EMFAC 2007) for diesel delivery trucks as well as the EPA emission factors for diesel generators. Calculations are based on the same assumptions previously discussed in the Air Quality section. Greenhouse gases emissions associated with the operation of the dosing pump electric motors were calculated using the “current emissions” Pacific Gas and Electric emission factor (equal to the average of their 2005 to 2009 greenhouse gases emission factors, or 0.559 pound per kilowatt hour). Total estimated Proposed Action CO<sub>2</sub> emissions



are presented in Table 8. To be consistent with accepted greenhouse gases convention, quantities are also presented in units of metric tons.

Table 8 Total Proposed Action greenhouse gases Emissions

Source	CO <sub>2</sub> (tons)	CO <sub>2</sub> (metric tons)
Barge-mounted diesel generators	139.6	126.8
Delivery Trucks	159.9	145.2
Dosing Pumps	7.6	6.9
<b>Total</b>	<b>307.1</b>	<b>278.9</b>

Calculated CO<sub>2</sub> emissions are well below the EPA's threshold for annually reporting greenhouse gases emissions (25,000 metric tons per year); therefore, the Proposed Action would result in below *de minimis* impacts to global climate change.

### ***Cumulative Impacts***

Greenhouse gases impacts are considered to be cumulative impacts; however, the estimated CO<sub>2</sub> emissions from temporary use of barge-mounted diesel generators, delivery trucks, and dosing pumps for the Proposed Action is roughly 278.9 metric tons per year, which is well below the 25,000 metric tons per year threshold for reporting greenhouse gases emissions. As a result, the Proposed Action is not expected to contribute to cumulative adverse impacts to global climate change.

CVP water allocations are made dependent on hydrologic conditions and environmental requirements. Since Reclamation operations and allocations are flexible, any changes in hydrologic conditions due to global climate change would be addressed within Reclamation's operation flexibility and therefore water resource changes due to climate change would be the same with or without the Proposed Action.

## **Section 4 Consultation and Coordination**

### **4.1 Public Review Period**

Reclamation intends to provide the public with an opportunity to comment on the Draft Finding of No Significant Impact and Draft EA during a 30 day public review period.

### **4.2 Endangered Species Act (16 U.S.C. § 1531 et seq.)**

Section 7 of the Endangered Species Act requires Federal agencies, in consultation with the Secretary of the Interior and/or Commerce, to ensure that their actions do not jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of the critical habitat of these species.

No anadromous fishes or their critical habitat occur in the affected area; therefore, no consultation with the National Marine Fisheries Service is needed. California red-legged frogs and potentially California tiger salamander exist in a pond at the base of the San Justo Reservoir dam that receives seepage water from the dam. Other than the seepage water, the pond has no direct connection to the reservoir. Reclamation has initiated Section 7 consultation with the Service on the California red-legged frog, California tiger salamander, and San Joaquin kit fox. Reclamation will not finalize the draft EA until consultation with the Service has been completed.

### **4.3 Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. § 136 et seq.)**

FIFRA (7 U.S.C. § 136 et seq.) provides for federal regulation of pesticide distribution, sale, and use. All pesticides distributed or sold in the United States must be registered (licensed) by EPA. Before EPA may register a pesticide under FIFRA, the applicant must show, among other things that using the pesticide according to specifications “will not generally cause unreasonable adverse effects on the environment.”

FIFRA defines the term “unreasonable adverse effects on the environment” to mean: “(1) any unreasonable risk to man or the environment, taking into account the economic, social, and environmental costs and benefits of the use of any

pesticide, or (2) a human dietary risk from residues that result from a use of a pesticide in or on any food inconsistent with the standard under section 408 of the Federal Food, Drug, and Cosmetic Act.” Commonly consumed food commodities, animal feed items, and edible fats and oils as described in 40 CFR 180.950(a), (b), and (c) may be used as inert ingredients in FIFRA Section 25(b) pesticide products applied to food use sites (e.g., food crops, animals used for food) and in FIFRA Section 25(b) pesticide products applied to nonfood use sites (e.g., ornamental plants, highway right-of ways, rodent control). Potassium chloride is listed as acceptable for use as an inert ingredient under 40 CFR 180.950(e) in FIFRA Section 25(b) products applied to food use and/or nonfood use sites.

San Benito is in the process of obtaining a FIFRA permit for the use of potassium chloride as an eradication method for zebra mussels within the Proposed Action area.

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