Chapter 8

Project Alternatives

CEQA requires that the EIR discuss a reasonable range of alternatives that could avoid or substantially lessen the significant environmental impacts of the proposed project, even if the alternative might impede to some degree attainment of project objectives, or the alternative would be more costly. The discussion of each project alternative should provide sufficient detail to allow meaningful evaluation, analysis, and comparison with the proposed project.

The DBW examined a broad range of potential control methods before developing the proposed project (EDCP and Two-Year Komeen Trials). Section 8.1 of this chapter describes the control methods the DBW considered for the project but ultimately rejected as infeasible. A detailed discussion and analysis of project alternatives is provided in Section 8.2.

8.1 Alternative Control Methods Rejected as Infeasible by the DBW

This section describes control methods the DBW considered for the EDCP but determined were infeasible based on various operational, environmental, economic, and legal factors. A brief description of each method, and the reasons why each method was considered infeasible, are provided.

According to CEQA, feasibility is defined as capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors.

Methods discussed in this subsection are organized into the following five areas:

- Hand Removal Methods
- Cultural Control Methods
- Biological Control Methods
- Mechanical Control Methods
- Chemical Control Methods.

8.1.1 Hand Removal Methods

Hand removal is occasionally used as a weed control method for relatively small areas. Individuals performing hand removal can focus control on the target weed and, in some cases, completely remove the weed at its roots. Hand removal requires physical collection, transport, and disposal of the weed at a disposal facility. This method may result in some degree of disruption to the environmental as a result of individuals walking near the target control area. Uncollected weed fragments may establish themselves at other locations outside the control area.

Reason Infeasible (Operational, Economic)

Hand removal would require significant manpower and resources to have any material impact on the level of *Egeria* infestation in the Delta. It is highly unlikely that individuals conducting hand removal could access many areas in the Delta infested with *Egeria*.

8.1.2 Cultural Control Methods

Cultural control methods refer to modification of physical factors in the environment to discourage weed growth. This section identifies why flow rate manipulation, water level manipulation, reduced light penetration, bottom barriers, and nutrient limitation are infeasible for *Egeria* control in the Delta.

8.1.2.1 Flow Rate Manipulation

Flow rate manipulation refers to increasing or decreasing water flow through a channel for weed control. Typically, water velocity is increased to create enough force to break off and flush weeds downstream.

Reason Infeasible (Operational, Environmental)

Flow rates could not be artificially increased in the Delta to levels required for weed control. Flow rate manipulation could seriously damage surrounding levees, canal structures, and other aquatic organisms that inhabit the Delta.

8.1.2.2 Water Level Manipulation

Water level manipulation refers to raising water levels to drown weeds, or lowering water levels to expose weeds to extreme conditions (e.g., drying out).

Reason Infeasible (Operational, Environmental)

Water level manipulation is generally limited to lakes and reservoirs with adequate water control structures. Delta channels do not have such structures available to control water levels. Manipulation of Delta water levels to create deep or shallow waterways is therefore impossible.

8.1.2.3 Reduced Light Penetration

Reducing light penetration to submerged weeds can suppress their growth by inhibiting photosynthesis. Specially produced dyes applied to waterways can block light from penetrating the water surface and reaching the weed.

Reason Infeasible (Operational)

Dyes are only effective in ponds and areas with limited water flow. With the Delta's high water flow and significant tidal exchange, dyes would be ineffective at most sites.

8.1.2.4 Bottom Barriers

Various materials applied to the bottom of a water body can act as a barrier to prevent weeds from growing. Black plastic is an example of a material used as a bottom barrier. Bottom barriers generally are useful in limited applications around docks.

Reason Infeasible (Operational, Environmental)

The DBW could not use bottom barriers for the extensive area of *Egeria* infestation in the Delta. Barrier tops require frequent maintenance to prevent sediment from accumulating on them. Bottom barriers used on river bottoms can accumulate gases underneath them, causing them to rise to the surface. Barriers dislodged or displaced from their control area can become a significant environmental problem.

8.1.2.5 Nutrient Limitation

Plants require a supply of essential nutrients to grow, including nitrogen, phosphorus, carbon, and others. Limiting at least one of these nutrients can interrupt plant growth. Nutrient limitation is generally possible in closed systems such as a lake or pond.

Reason Infeasible (Operational)

In the large, open Delta system the DBW could not limit nutrients from contacting *Egeria* . Delta waters periodically receive nutrients from numerous sources (e.g., agricultural runoff).

8.1.3 Biological Control Methods

Biological controls refer to the use of biological agents (called bio-control agents) to combat unwanted exotic species. Often these bio-control agents also are exotic. To find a bio-control agent, a researcher travels to the country of origin of the unwanted species. Bio-control agents are tested in quarantine for "host-specificity" and successful candidates then can be released into their new environments.

When effective, biological control methods can offer permanent and self-perpetuating control while minimizing the risk to human health and the environment. Once a bio-control agent is established, additional releases may be unnecessary and additional costs may be avoided. Bio-control agents are sometimes, but not always successful.

8.1.3.1 Insects

A foreign insect species must be extensively tested and proven to be host-specific before it can be released into the United States. Tests are designed to demonstrate that the insect will not feed appreciably on any other species. This ensures an insect will not harm crop plants or other desirable species.

Reason Infeasible (None Available)

There is no known insect currently available for *Egeria* control. Research is currently ongoing to find potential insects that control *Egeria*.

8.1.3.2 Pathogens

Suspensions of fungal spores can be applied to weed populations. Insects, especially stem borers and piercing-sucking types, often provide entry points for native plant pathogens. While neither the insect, nor pathogen, can substantially impact the weed population, together they can help control nuisance situations. Restrictions exist for importing pathogens from abroad. Thus, pathogens are limited to native species.

Reason Infeasible (None Available)

No known pathogen currently exists for *Egeria* control. Research is currently ongoing to find potential pathogens that control *Egeria*.

8.1.3.3 Triploid Grass Carp

The grass carp (*Ctenopharyngodon idella*) is a common bio-control agent used in closed water systems for controlling aquatic weeds similar to *Egeria* (e.g., *hydrilla*). The grass carp success is the primary reason it is controversial. If stocked in high enough quantities in a system, the grass carp can remove virtually all aquatic vegetation.

Triploid grass carp are the only non-indigenous fish that can be legally used for aquatic weed control in most states. Because of the fear that grass carp could escape into other U.S. waters, sterile ("triploid") grass carp are required by these states. Triploid grass carp are specially produced in hatcheries and possess three sets of chromosomes instead of the normal two sets. This abnormal condition causes sterility. Because they cannot reproduce, their number will not increase beyond the initial stocking. However, grass carp cannot be removed from large water bodies and are difficult to contain.

Reason Infeasible (Environmental)

Pursuant to statutory exemption, the California Department of Fish and Game (DFG) regulates introduction of non-indigenous fish species into California waters. The DFG has allowed grass carp in a few closed systems in California, closely monitoring their use. The DFG is opposed to introducing grass carp in the Delta, due to the potential impacts to certain economies and sensitive fisheries.

8.1.4 Mechanical Control Methods

Mechanical control methods remove plants from the water either by cutting or dislodging them from bottom sediments with a cutting bar, chain, or drag line; cutting them above their attachment points in the hydrosoil (mechanical harvesting); or removing them from bottom sediments with a strong vacuum apparatus (suction dredging). The DBW examined these mechanical control methods and found that mechanical harvesting is the only potential mechanical control method possible for *Egeria* control in the Delta that meets the objectives of the EDCP. The remainder of this section describes why cutting without removal and dredging are infeasible.

8.1.4.1 Cutting Without Removal

A cutting bar, chain, or drag line suspended behind a boat is a relatively simple and inexpensive weed control method. The boat and cutting mechanism is easily assembled and maneuvered. A cutting bar, chain, or drag line assembly can quickly clear a passage through aquatic weeds. Hydraulic cutting shears mounted on the front end of a flat-bottomed boat also can achieve an effect very similar to the cutting bar, chain, or drag line. This shearing technique is particularly useful for areas around a dock.

No formal studies to explore the fate of *Egeria* fragments have been conducted for these cutting without removal techniques in the Delta. However, a U.S.D.A. study concluded that *Egeria* fragments were 99 percent viable.

Reason Infeasible (Environmental)

These cutting without removal techniques would significantly spread *Egeria* fragments throughout the Delta. Fragments can float in the water indefinitely and have the potential to form large masses depending on tidal influences and water flows. During heavy water flow, floating *Egeria* could drift downstream and out of the Delta system. *Egeria* fragments also could move to a non-infested area and regenerate.

8.1.4.2 Dredging

Dredging projects require federal permits from the U.S. Army Corps of Engineers, and potentially the U.S. Fish & Wildlife Service, California Department of Fish and Game, the Regional Water Quality Control Board, and other local agencies. Approvals require time to obtain and monitoring

activities have significant associated costs. Further, following dredging, other maintenance control methods are necessary to prevent regrowth. Dredging is expensive, especially if a nearby disposal site is unavailable.

Reason Infeasible (Environmental)

Dredging is infeasible due to its significant potential environmental impacts (e.g., disruption of the native ecosystem, removal of entire populations of plants, aquatic invertebrates, and benthic organisms). Additionally, the elaborate permitting process routinely required, relatively high operation costs and short-lived benefits, also make dredging infeasible for *Egeria* control in the Delta.

8.1.5 Chemical Control Methods

Chemical control methods (i.e., aquatic herbicides) are the most common and versatile management strategy for controlling nuisance aquatic plant populations. Chemical herbicides provide longer lasting control than mechanical methods, involve minimal labor and equipment, provide flexibility and predictability, and ultimately cost less. Aquatic herbicides can be applied to areas unreachable by other methods.

Hundreds of herbicides are registered for use in the United States. Only a limited number of these herbicides effectively control aquatic weeds and also meet the rigid toxicology criteria necessary for registration. Currently, herbicides containing the following eight active ingredients are labeled for use for aquatic sites:

- Acrolein
- Copper
- Dichlobenil
- Diquat
- Endothall
- Fluridone
- Glyphosate
- 2,4-D.

Reason Infeasible (Environmental)

Herbicides with acrolein are highly toxic and only used in irrigation systems under the jurisdiction of the United States Bureau of Reclamation. Herbicides containing dichlobenil and glyphosate are not intended for submerged aquatic vegetation. Endothall and 2,4-D are not effective for *Egeria* control in the Delta. Only herbicides containing copper, diquat, and fluridone are both labeled for and considered effective for *Egeria* control in California.

8.2 Project Alternatives

CEQA requires that an EIR address alternatives to the proposed project that could substantially lessen the significant environmental impacts of the proposed project. These alternatives should meet most project objectives, but do not necessarily have to meet all objectives. A total of seven alternatives are provided, including the "No Project" Alternative and six control methods proposed for the EDCP and the two-year Komeen trials.

Though they may appear similar, the six alternatives with combinations of control methods have different potential efficacy levels and environmental impacts. None of the methods that the DBW determined were infeasible (identified in section 8.1) are included in these seven alternatives.

Table 8-1 below identifies the seven alternatives. In this section, the proposed project and its alternatives are compared with the project objectives (provided in Table 1-2 in Chapter 1). Additionally, environmental impacts associated with these alternatives are compared with the proposed project. For comparative purposes the proposed project is defined as:

Proposed Project: EDCP with Reward, Sonar, and Mechanical Harvesting; and Two-Year Komeen Trials.

Table 8-1

Alternatives to the Proposed *Egeria densa* Control Program and Two-Year Komeen Trials

Alternative	Description
Alternative 1 – No Project	No EDCP and no Two-Year Komeen Trials.
Alternative 2 – EDCP with Reward and Sonar; Two-Year Komeen Trials	The proposed project without Mechanical Harvesting as part of the EDCP.
Alternative 3 – EDCP with Reward, Sonar, and Mechanical Harvesting; No Komeen Trials	The EDCP without Two-Year Komeen Trials.
Alternative 4 – EDCP with Reward and Sonar; No Komeen Trials	The proposed project without Mechanical Harvesting as part of the EDCP and without Two-Year Komeen Trials (*Least Potentially Significant Environmental Impacts*).
Alternative 5 – EDCP with Reward, Sonar, Mechanical Harvesting, and Komeen; No Komeen Trials	The proposed project with Komeen but without Mechanical Harvesting as part of the EDCP, and Two-Year Komeen Trials.
Alternative 6 – EDCP with Reward, Sonar, and Komeen; No Komeen Trials	The proposed project with Komeen but without Mechanical Harvesting as part of the EDCP, and Two-Year Komeen Trials.
Alternative 7 – EDCP with Mechanical Harvesting; No Komeen Trials	The proposed project without use of any Chemical Methods.

The environmentally superior alternative is Alternative 4. This alternative proposes to use the EDCP with Reward and Sonar but without Mechanical Harvesting, and no Two-Year Komeen Trials.

Several alternatives presented do not substantially lessen the significant environmental impacts of the proposed project, but could better meet the project objectives. As an example, Alternative 5 includes Komeen in addition to Reward and Sonar as one of the EDCP control methods. This alternative likely would result in greater *Egeria* efficacy and control method flexibility, but the alternative also has the potential for significant long-term environmental impacts associated with Komeen use in the Delta.

Exhibit 8-1, on the following page, identifies how each of the proposed alternatives meets the project objectives. **Exhibit 8-2**, following Exhibit 8-1, provides a comparison of the potentially significant impacts of the proposed project with each project alternatives at the general resource category level.

In the remainder of this section, each alternative is described, along with its potential impacts, and potential mitigation measures. Because the six alternatives following the "No Project" alternative are combinations of control methods, impacts associates with these alternatives are similar to those described in Chapter 3 (EDCP) and Chapter 4 (Two-Year Komeen Trials). Thus, the discussion of these alternatives has been kept brief.

Comparison of How Alternatives and the Proposed Project Meet Objectives

Comparison of Alternatives and the Proposed Project

Description of Alternative	*Objectives of the Proposed Project*									*Summary*				
	1. Limit Future Growth And Spread Of *Egeria*	2. Improve Boat And Vessel Navigation In The Delta	3. Utilize The Most Efficacious Method With The Least Environmental Impacts	4. Prioritize Sites To Focus EDCP Activities	5. Employ A Combination Of Methods For Flexibility	6. Attempt To Improve The EDCP Over Time	7. Monitor Results To Understand Environmental Impacts	8. Minimize Control Efforts With *Egeria* Efficacy	9. Minimize Methods That Could Cause Adverse Environmental Impacts	N/A	Does Not Meet	Meets	Exceeds	Total
Proposed Project - Reward, Sonar, MH, 2-Yr. Komeen Trials	M	M	M	M	M	E	M	M	M	—	—	8	1	9
Alternative 1 - No Project	DNM	DNM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7	2	—	—	9
Alternative 2 - Reward, Sonar, 2-Yr. Komeen Trials	M	M	M	M	M	E	M	M	DNM	—	1	7	1	9
Alternative 3 - Reward, Sonar, MH, No 2-Yr. Komeen Trials	M	M	M	M	M	M	M	M	M	—	—	9	—	9
Alternative 4 - Reward, Sonar, No 2-Yr. Komeen Trials	M	M	M	M	M	M	M	M	M	—	—	9	—	9
Alternative 5 - Reward, Sonar, MH, Komeen, 2-Yr. Komeen Trials	M	M	DNM	M	E	M	M	M	DNM	—	2	6	1	9
Alternative 6 - Reward, Sonar, Komeen, 2-Yr. Komeen Trials	M	M	DNM	M	E	M	M	M	DNM	—	2	6	1	9
Alternative 7 - MH, 2-Yr. Komeen Trials	DNM	M	DNM	DNM	DNM	M	M	DNM	DNM	—	6	3	—	9

KEY

DNM: Does Not Meet Objective
M: Meets Objective
E: Exceeds Objective
N/A: Not Applicable

EXHIBIT 8-1

Comparison of Environmental Impacts of Each Alternative With Proposed Project

EXHIBIT 8-2
Page 1 of 2

No.	Resource Categories	Proposed Project		Alternatives						
		EDCP Impacts	2-Year Komeen Trials	#1	#2	#3	#4	#5	#6	#7
1.	**Hydrology and Water Quality**	**USI**	**USI, UPSI**	**USI**	**USI**	**USI**	**USI**	**USI, UPSI**	**USI, UPSI**	**USI**
	Water Quality									
	Toxicity	USI	USI	NI	USI	USI	USI	USI	USI	NI
	Dissolved Oxygen	ASI	LSI	LSI	LSI	ASI	ASI	LSI	LSI	ASI
	Sediments	LSI	UPSI	LSI	UPSI	LSI	LSI	UPSI	UPSI	NI
	Turbidity	USI	LSI	LSI	USI	USI	LSI	USI	USI	USI
	Floating Material	ASI	LSI	USI	USI	USI	LSI	USI	USI	USI
	Water Quality	*USI*	*USI, UPSI*	*USI*	*USI, UPSI*	*USI*	*USI*	*USI, UPSI*	*USI, UPSI*	*USI*
	Drinking Water									
	Chemical Constituents	ASI	ASI	NI	ASI	ASI	ASI	ASI	ASI	NI
	THM Formulation	ASI	ASI	NI	ASI	ASI	ASI	ASI	ASI	NI
	Turbidity	ASI	LSI	LSI	ASI	ASI	LSI	ASI	ASI	USI
	Drinking Water	*ASI*	*ASI*	*LSI*	*ASI*	*ASI*	*ASI*	*ASI*	*ASI*	*USI*
2.	**Biological Resources**	**USI**	**UPSI**	**USI**	**USI, UPSI**	**USI**	**USI**	**USI, UPSI**	**USI, UPSI**	**USI**
	Plants									
	Aquatic Plants and Algae	LSI	LSI	LSI	LSI	LSI	LSI	LSI	LSI	LSI
	Intertidal Wetland Plant Comm.	USI	USI	LSI	USI	USI	USI	USI	USI	USI
	Terrestrial	NI	NI	NI	NI	NI	NI	NI	NI	NI
	Plants	*USI*	*USI*	*LSI*	*USI*	*USI*	*USI*	*USI*	*USI*	*USI*
	Invertebrates									
	Aquatic	USI	USI	LSI	USI	USI	USI	USI	USI	USI
	Insects	ASI	ASI	LSI	ASI	ASI	ASI	ASI	ASI	ASI
	Invertebrates	*USI*	*USI*	*LSI*	*USI*	*USI*	*USI*	*USI*	*USI*	*USI*
	Fish									
	Fish	USI	UPSI	LSI	UPSI	USI	USI	UPSI	UPSI	USI
	Habitat	LSI	LSI	LSI	LSI	LSI	LSI	LSI	LSI	ASI
	Prey Base	USI	USI	USI	USI	USI	USI	USI	USI	USI
	Fish	*USI*	*UPSI*	*USI*	*USI, UPSI*	*USI*	*USI*	*USI, UPSI*	*USI, UPSI*	*USI*
	Wildlife									
	Reptiles and Amphibians	USI	USI	NI	USI	USI	USI	USI	USI	USI
	Birds	USI	USI	NI	USI	USI	USI	USI	USI	USI
	Mammals	LSI	LSI	NI	LSI	LSI	LSI	LSI	LSI	LSI
	Wildlife	*USI*	*USI*	*NI*	*USI*	*USI*	*USI*	*USI*	*USI*	*USI*
3.	**Agricultural Resources**	**ASI**	**ASI**	**USI**	**ASI**	**ASI**	**ASI**	**ASI**	**ASI**	**USI**
	Agricultural Operations, Irrigation	ASI	ASI	USI	ASI	ASI	ASI	ASI	ASI	USI
4.	**Utilities and Service Systems**	**ASI**	**ASI**	**USI**	**ASI**	**ASI**	**ASI**	**ASI**	**ASI**	**USI**
	Public Water Supply Operations	ASI	ASI	USI	ASI	ASI	ASI	ASI	ASI	USI
5.	**Hazards and Hazardous Materials**	**ASI**	**ASI**	**NI**	**ASI**	**ASI**	**ASI**	**ASI**	**ASI**	**NI**
	Human Health	ASI	ASI	NI	ASI	ASI	ASI	ASI	ASI	NI
	Catastrophic Spills	ASI	ASI	NI	ASI	ASI	ASI	ASI	ASI	NI

Comparison of Environmental Impacts of Each Alternative With Proposed Project

No.	Resource Categories	Proposed Project		Alternatives						
		EDCP Impacts	2-Year Komeen Trials	#1	#2	#3	#4	#5	#6	#7
6.	Transportation and Traffic	LSI	LSI	ASI	LSI	LSI	LSI	LSI	LSI	LSI
7.	Recreation	LSI	LSI	ASI	LSI	LSI	LSI	LSI	LSI	ASI
8.	Air Quality	LSI	LSI	NI	LSI	LSI	LSI	LSI	LSI	LSI
9.	Mineral Resources	LSI	LSI	NI	LSI	LSI	LSI	LSI	LSI	LSI
10.	Noise	LSI	LSI	NI	LSI	LSI	LSI	LSI	LSI	LSI
11.	Geology and Soils	LSI	LSI	NI	LSI	LSI	LSI	LSI	LSI	LSI
12.	Land Use and Planning	NI	NI	NI	NI	NI	NI	NI	NI	NI
13.	Public Services	NI	NI	NI	NI	NI	NI	NI	NI	NI
14.	Population and Housing	NI	NI	NI	NI	NI	NI	NI	NI	NI
15.	Cultural Resources	NI	NI	NI	NI	NI	NI	NI	NI	NI
16.	Aesthetics	NI	NI	NI	NI	NI	NI	NI	NI	NI

Legend

LSI: Less Than Significant Impact
ASI: Avoidable Significant Impact
USI: Unavoidable Significant Impact
UPSI: Unavoidable Potentially Significant Impact
NI: No Impact

Alternatives

#1 - No Project
#2 - Reward, Sonar, 2-Yr. Komeen Trials
#3 - Reward, Sonar, MH, No 2-Yr. Komeen Trials
#4 - Reward, Sonar, No 2-Yr. Komeen Trials
#5 - Reward, Sonar, Komeen, MH, No 2-Yr. Komeen Trials
#6 - Reward, Sonar, Komeen, No 2-Yr. Komeen Trials
#7 - MH, No 2-Yr. Komeen Trials

8.2.1 Alternative 1 - No Project

The purpose of the "No Project" alternative under CEQA is to allow decision-makers to weigh impacts of approving a proposed project with impacts of not approving a proposed project. The "No Project" should provide a projection for what would reasonably occur in the foreseeable future if the project were not approved.

In this case, the "No Project" alternative is intended to provide decision-makers with information adequate to make a difficult decision that could carry with it long-term potential environmental impacts in the Delta. Should the DBW implement an *Egeria* control program in the Delta that uses aquatic herbicides and mechanical harvesting operations? Or alternatively, should *Egeria* be left to grow and spread uncontrolled in Delta waterways, with potential negative long-term environmental impacts?

Under the "No Project" alternative, no action would be taken to control *Egeria* in the Delta. No attempt would be made to stop the further spread and growth of *Egeria* to non-infested Delta waterways. To take no action would be contrary to the Legislative mandate. Assembly Bill 2193 requires the DBW to undertake an aggressive program for the effective control of *Egeria*.

8.2.1.1 Potential Environmental Impacts of the "No Project" Alternative

As indicated in Exhibit 8-2, the "No Project" alternative also could result in short-term unavoidable significant impacts to hydrology and water quality. The "No Project" alternative would not meet the key project objectives (in Exhibit 8-1) for limiting growth and spread of *Egeria* and improving vessel navigation in the Delta.

Under the "No Project" alternative *Egeria* could continue to grow and spread beyond current areas and become more dense in currently infested areas. It is difficult to estimate the rate of growth because *Egeria* growth has not been measured historically in the Delta and its growth is dependent upon the interaction of many complex factors. *Egeria* likely was introduced nearly 40 years ago and has grown to cover approximately 3,900 water body surface acres in the Delta, an approximate rate of growth of 100 acres per year. Conservative estimates predict that the quantity of surface acres infested with *Egeria* could increase at this linear rate of 100 acres per year.

It is possible that *Egeria* has reached carrying capacity in the Delta, as it has infested many of the shallow water areas where growth conditions are ideal. In this case, the proposed EDCP would provide benefits for navigation, but would be less important for controlling the future rate of spread and growth of *Egeria* in the Delta.

However, it is also possible that *Egeria* could continue to grow at an exponential rate under ideal growing conditions. Should this be the case, and should nothing be done to control its growth now, California would face a bigger problem in the future should it be forced to control a much greater amount of *Egeria* infestation using a greater quantity of aquatic herbicides. If this were the case, current use of the EDCP is a way to potentially minimize and avoid such an outcome.

Without a coordinated effort by the DBW to treat *Egeria* to minimize environmental impacts, with the best available control methods, the potential exists for private citizens to utilize their own *Egeria* control methods. These ad hoc treatments result in: 1) potentially inappropriate selection of control methods that may not be efficacious; 2) improper application rates for aquatic herbicides; and 3) associated significant adverse impacts to fish, wildlife, and water quality. Further, these ad hoc treatments actually may result in a larger cumulative loading of aquatic herbicides than from a more systematic, coordinated, and focused control effort. *Egeria* could be more difficult to control in the future if allowed to spread and grow, resulting in the potential for increased herbicide usage in the future.

Impacts of the "No Project" alternative are organized into general resource categories. Where a category is not listed there would be no impact to that category from the "No Project" alternative.

***Egeria densa* Impairs Beneficial Uses of Delta Waters**

8.2.1.1.1 Hydrology and Water Quality

The following temporary unavoidable significant impacts could occur under the "No Project" alternative, including:

- Dense mats of *Egeria* could continue to block sunlight and reduce the amount of open water, leading to increased accretion of organic material and increased sedimentation
- *Egeria* could continue to capture and settle out heavy metals and other particulate matter into Delta sediments.

These impacts are balanced with the possibility that leaving *Egeria* beds could decrease turbidity levels in selected Delta waters. *Egeria* beds slow water flow, which causes sediments to drop out of the water column.

8.2.1.1.2 Biological Resources

The "No Project" alternative would have temporary unavoidable significant impacts to various biological resources. This conclusion is based on the impacts summarized below:

Plants

- *Egeria* could continue to thrive and compete as a nonnative species without any natural predators.
- Native vegetation (such as pondweeds) has declined due to the presence of *Egeria*. *Egeria* could continue to displace native vegetation, threatening the long-term viability of these species in the Delta. By displacing pondweeds, *Egeria* also may reduce the habitat value for waterfowl that eat pondweeds.
- Under ideal conditions (e.g., low salinity levels and drought conditions), *Egeria* could potentially spread to infest and impact sensitive plant species in the Suisun Marsh.

Invertebrates - Aquatic

- Increased sedimentation resulting from the presence of *Egeria* could alter the population of benthic species and their predators.

Fish

- Some native fish species could be negatively impacted because *Egeria* lowers habitat values by decreasing ambient dissolved oxygen levels, and displacing native vegetation (which may provide a better habitat).

- Dense beds of *Egeria* could impede fish migration.
- Under ideal conditions (e.g., low salinity levels and drought conditions), *Egeria* could spread to infest and impact sensitive fish species in the Suisun Marsh.
- Under the "No Project" alternative *Egeria* could potentially increase spawning grounds and habitat for non-native fish species.

Wildlife

- *Egeria* could impede migratory birds from landing, foraging, and occupying heavily infested areas (e.g., Frank's Tract).
- Under ideal conditions (e.g., low salinity levels and drought conditions), *Egeria* could spread to infest and impact sensitive wildlife species in the Suisun Marsh.

8.2.1.1.3 Agricultural Resources

The "No Project" alternative would have temporary unavoidable significant impacts. Agricultural intakes could continue to be clogged by floating *Egeria*.

8.2.1.1.4 Utilities and Service Systems

The "No Project" alternative would have temporary unavoidable significant impacts to utilities and service systems for the following reasons:

- The approximately 1,800 irrigation intakes throughout the Delta could continue to be repeatedly clogged by *Egeria*, resulting in inefficient pumping operations, increased pumping costs, and possible mechanical failure of pumps.

Additionally, *Egeria* growth could protect some levees, berms, and channel islands from erosion by providing a matt of material to absorb water flow.

8.2.1.1.5 Aesthetics

Where the proposed project may have some beneficial impacts to Delta aesthetics, the "No Project" alternative could continue to negatively impact aesthetics of Delta waters.

8.2.1.1.6 Land Use and Planning

Though the "No Project" alternative would have a less than significant impact to land use and planning, Delta businesses (including Marina operators, restaurants, others) could continue to incur economic losses if boaters refuse to moor their vessels in infested marinas or if boaters no longer can fish, water ski, or swim in the area due to *Egeria* infestation.

8.2.1.1.7 Recreation

The "No Project" alternative would have an avoidable significant impact to recreation for the following reasons:

- Boaters could continue to have difficulty keeping their engines running through certain infested areas, resulting in frequent restarting of failing engines and a corresponding increase in water and air pollution
- Boaters could be unable to access certain recreational locations
- Boaters could be unable to launch vessels from some of the launching locations currently available
- Extensive fishing for the numerous game fish in the Delta could likely decline.

VILLAGE WEST MARINA, STOCKTON

8.2.1.1.8 Transportation and Traffic

The "No Project" alternative would have an avoidable significant impact to transportation and traffic for the following reasons:

- *Egeria* could restrict access by emergency response units and policing vessels to selected areas of the Delta
- Boaters could continue to be unable to travel through critical water bodies within the Delta and could select alternative longer routes
- Boaters who opt to travel through water bodies infested with *Egeria* could continue to cause extensive *Egeria* fragmentation, further restricting these areas to future travel and spreading *Egeria* to other locations in the Delta.

8.2.1.2 Mitigation Measures for the "No Project" Alternative

There are generally no mitigation measures for this alternative. Delta marinas and businesses could continue to treat areas using their own methods to mitigate some impacts. However, these efforts likely would not stop *Egeria* from growing and spreading. Delta boaters could utilize non-infested areas for travel. Those recreating and fishing in the Delta could chose to recreate and fish at areas not infested with *Egeria*. Without using any control methods, there is nothing that the DBW could do to mitigate the impacts noted above.

8.2.2 Alternative 2 - Reward and Sonar, and Two-Year Komeen Trials

Alternative 2 includes Reward and Sonar as part of the EDCP, but does not include Mechanical Harvesting. The DBW would conduct Two-Year Komeen Research Trials. Without Mechanical Harvesting, the DBW would lose some flexibility with treatment methods, however, only approximately 50 acres are proposed to be controlled using Mechanical Harvesting.

With this alternative, there would be unavoidable impacts to hydrology and water quality, though these would be associated with chemical use only. By using Reward and Sonar for the EDCP without Mechanical Harvesting, this alternative has no short-term unavoidable impacts to water quality resulting from *Egeria* fragmentation associated with Mechanical Harvesting.

Without Mechanical Harvesting, the DBW would not cause short-term unavoidable impacts associated with increases in turbidity. Without using Mechanical Harvesting, the DBW would not have the potential to remove sensitive aquatic invertebrates and fish species that may be present in stands of *Egeria*. Further, sensitive intertidal plant species would not be impacted by fragments that float to the waters edge and interfere with or cover these often tiny sensitive intertidal plants.

Impacts and proposed mitigation measures for Reward and Sonar are fully described in Chapter 3.

8.2.3 Alternative 3 - Reward, Sonar, and Mechanical Harvesting, without Two-Year Komeen Trials

Like the proposed project, Alternative 3 includes Reward, Sonar, and Mechanical Harvesting as part of the EDCP, but does not include the Two-Year Komeen Research Trials. Without the Komeen trials, the DBW would not obtain research information that potentially could allow it to incorporate another more efficacious method into the EDCP. However, as indicated in Chapter 4, even as a Two-Year trial, Komeen use carries unavoidable significant impacts. None of the impacts specified in Chapter 4 would apply to this alternative.

Impacts and proposed mitigation measures for Reward, Sonar, and Mechanical Harvesting are described in Chapter 3.

Without Komeen use, this alternative does not exceed the Basin Plan concentration limit for copper use of 10 ppb. Additionally, with this alternative there are no unknown environmental impacts associated with the long-term fate of copper in Delta sediments and the potential for copper to later be re-released back into the water column in a more toxic ionic form.

8.2.4 Alternative 4 - Reward and Sonar, without Two-Year Komeen Trials

This alternative includes only Reward and Sonar for the EDCP and does not include Mechanical Harvesting. Additionally, the DBW would not conduct the Two-Year Komeen Trials under this alternative. This is the alternative with the least environmental impacts. With Reward and Sonar only, the EDCP would be relatively similar to that proposed in this EIR. However, the DBW would not have Mechanical Harvesting for use in emergency situations. This alternative also does not allow the DBW to study the potential impacts of Komeen in the two-year trials.

Impacts and proposed mitigation measures for Reward and Sonar on the Delta are described in detail in Chapter 3.

8.2.5 Alternative 5 - Reward, Sonar, Komeen, Mechanical Harvesting, without Two-Year Komeen Trials

This alternative includes Reward, Sonar, Komeen, and Mechanical Harvesting as part of the EDCP, but does not include the Two-Year Komeen Trials. By including Komeen in the EDCP, the DBW would have another control method for use in controlling *Egeria* in the Delta. Thus, this alternative provides more flexibility than the proposed EDCP. Under this alternative, the DBW would use Komeen to control approximately 75 percent of the treatment acreage with the balance of the acreage a mixture of Reward, Sonar, and Mechanical Harvesting.

Impacts and proposed mitigation measures for Reward, Sonar, and Mechanical Harvesting are described in detail in Chapter 3. Incorporating Komeen use as part of the EDCP, without further study, has the potential for significant unavoidable impacts as described in Chapter 4.

8.2.6 Alternative 6 - Reward, Sonar, Komeen, without Two-Year Komeen Trials

This alternative replaces Mechanical Harvesting with Komeen as part of the EDCP and does not include the Two-Year Komeen Trials. Under this alternative, the DBW would use Komeen to control approximately 75 percent of the acreage with the balance of the acreage controlled using a mixture of Reward and Sonar. The loss of Mechanical Harvesting as an EDCP method would not significantly impact flexibility, nor would it have a large impact on overall program efficacy. Thus, this alternative provides more flexibility than the proposed project.

Impacts and potential mitigation measures for Reward and Sonar are included in Chapter 3. However, incorporating Komeen use as part of the EDCP without further study has the potential for unavoidable significant impacts discussed in Chapter 4.

8.2.7 Alternative 7 - Mechanical Harvesting without Two-Year Komeen Trials

Under this alternative, the DBW would use Mechanical Harvesting alone to control *Egeria* in the Delta. This alternative would not meet many of the objectives for control of *Egeria* in the Delta because many sites do not have conditions that would allow mechanical harvesters access. The DBW would likely only be able to control a maximum of 250 acres per year with Mechanical Harvesting alone. Even at this level, the DBW would likely have difficulty finding adequate areas to dispose of harvested *Egeria*. This alternative would not result in any impacts resulting from herbicide use.

Impacts and proposed mitigation measures for Mechanical Harvesting are described in Chapter 3. This alternative also does not allow the DBW to research the impacts of Komeen on Delta waters.