

Section VI

Feasibility of Project Alternatives

This section describes control methods the DBW considered for the EDCP but determined were infeasible based on various operational, environmental, economic, and legal factors. The DBW considered alternative methods for controlling *Egeria*, which it determined, were infeasible. These are presented in Subsection A. Based on the remaining available feasible methods for control and feedback provided by regulatory agencies, the DBW constructed a total of seven alternatives. These project alternatives are compared with the proposed project in Subsection B.

A. Infeasible Control Methods

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.

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. Uncollected weed fragments may establish themselves at other locations outside the control area.

The DBW finds that specific economic and operational considerations make hand removal infeasible as an alternative to the methods included in the EDCP. Hand removal would require significant manpower and resources to have

any 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*.

2. Cultural Control Methods

Cultural control methods refer to modification of physical factors in the environment to discourage weed growth. Cultural control methods include flow rate manipulation, water level manipulation, reduced light penetration, bottom barriers, and nutrient limitation. Flow rate manipulation refers to increasing or decreasing water flow through a channel for weed control. 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). Reducing light penetration to submerged weeds can suppress their growth by inhibiting photosynthesis. Various materials applied as bottom barriers to a water body can prevent weeds from growing (e.g., black plastic). Finally, limiting an essential nutrients such as nitrogen, phosphorus, carbon, and others can interrupt plant growth.

The DBW finds that specific environmental and operational considerations make cultural control methods infeasible as alternatives to the methods included in the EDCP. Cultural control methods are generally used in closed systems (i.e., a lake or a pond) whereas the Delta is an open system characterized by high flow and high tidal exchange. Attempting some of these techniques (e.g., manipulating water flows or placing bottom barriers in Delta waters) could pose significant environmental impacts with limited efficacy on *Egeria*.

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. When effective, biological control methods 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. Biological control agents reviewed by the DBW include: insects, pathogens, and the triploid grass carp.

The DBW finds that specific environmental and operational considerations make biological control methods infeasible as alternatives to the methods included in the EDCP. There is no known insect or pathogen currently available for *Egeria* control, though research is currently ongoing to find potential insects or pathogens that control *Egeria*.

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's 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. Because of the fear that grass carp could escape into other waters, sterile ("triploid") grass carp are required. 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.

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.

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 hydrosol (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. Cutting without removal and dredging are two other mechanical methods reviewed by the DBW.

The DBW finds that specific economic and environmental considerations make cutting without removal and dredging infeasible as alternatives to the methods included in the EDCP. Cutting without removal techniques would significantly spread *Egeria* fragments throughout the Delta. Dredging has 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.

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 require minimal labor and equipment, provide flexibility and predictability, and ultimately cost less. 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.

The DBW finds that specific environmental considerations make herbicides containing acrolein, dichlobenil, endothal, glyphosate, and 2,4-D infeasible as alternatives to the methods included in the EDCP. 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.

B. Comparison of Alternatives to EDCP and Two-Year Komeen Trials

CEQA requires that an EIR address alternatives to the proposed project that could substantially lessen the significant environmental impacts of the project. These alternatives should meet most project objectives, but do not necessarily have to meet all objectives. The DBW considered seven alternatives to the proposed project, including the "No Project" Alternative, and six alternatives proposed for the EDCP and the Two-year Komeen Trials. None of the methods that the DBW determined were infeasible (identified in subsection A above) are included for final consideration in these seven alternatives.

These findings compare all alternatives to provide a basis for selection of the proposed EDCP and Two-Year Komeen Trials. In rejecting certain alternatives, the DBW examined project objectives and weighed the ability of the various alternatives to meet the objectives. Listed below are the seven (7) alternatives the DBW considered:

- Alternative 1 No Project Alternative
- Alternative 2 EDCP with Reward and Sonar, and Two-Year Komeen Trials
- Alternative 3 EDCP with Reward, Sonar, and Mechanical Harvesting; no Komeen Trials
- Alternative 4 EDCP with Reward and Sonar; no Komeen Trials
- Alternative 5 EDCP with Reward, Sonar, Komeen, and Mechanical Harvesting; no Komeen Trials
- Alternative 6 EDCP with Reward, Sonar, and Komeen; no Komeen Trials
- Alternative 7 EDCP with Mechanical Harvesting; no Komeen Trials

1. Comparison to No Project Alternative

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*.

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 key project objectives for limiting growth and spread of *Egeria* and improving vessel navigation in the Delta.

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*.

The DBW has fully considered the No Project alternative discussed in the EIR. The DBW finds that the No Project alternative fails to meet the project objectives and would result in adverse consequences for water quality, species of special concern and their habitat, navigation, agriculture, and other beneficial uses of the Delta. For these reasons, the DBW rejects the No Project alternative.

2. Comparison to Alternative 2 - EDCP with 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 under this alternative.

Without Mechanical Harvesting, the DBW would lose some flexibility with treatment methods. Approximately 50 acres are proposed to be controlled using Mechanical Harvesting. The harvester is ideal for gaining immediate control of an area and where staging and disposal facilities are readily accessible.

Without Mechanical Harvesting, the DBW would not cause short-term unavoidable impacts associated with increases in turbidity. This alternative would not have the potential to remove sensitive aquatic invertebrates and fish species that may be present in stands of *Egeria* (i.e., from harvesting). 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.

The DBW has fully considered Alternative 2 discussed in the EIR. The DBW finds that while Alternative 2 would substantially meet most of the project objectives, Alternative 2 provides less operational flexibility as compared to the proposed EDCP and Two-Year Komeen Trials.

3. Comparison to Alternative 3 - EDCP with Reward, Sonar, and Mechanical Harvesting; no 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 benefits of the results from the two-year Komeen trials, the DBW would not obtain research information that potentially could allow it to incorporate another more efficacious method into the EDCP.

Of all methods considered by the DBW, Komeen has the greatest potential efficacy for *Egeria* control in Delta waters. However, due to the uncertain environmental impacts associated with this method, research trials were designed to assess its potential long-term environmental impacts.

Though this alternative would create less environmental impacts and would substantially meet most of the project objectives for *Egeria* control, the DBW finds that Alternative 3 would not allow the DBW to obtain necessary data regarding use and impacts of the most efficacious method for *Egeria* control in the Delta.

4. Comparison to Alternative 4 - EDCP with Reward and Sonar; no Komeen Trials

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. This alternative includes only Reward and Sonar for the EDCP.

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.

Of all methods considered by the DBW, Komeen has the greatest potential efficacy for *Egeria* control in Delta waters. However, due to the uncertain environmental impacts associated with this method, research trials were designed to assess its potential long-term environmental impacts.

Though this alternative would create less environmental impacts and would substantially meet most of the project objectives for *Egeria* control, the DBW finds that Alternative 4 provides less operational flexibility and would not allow the DBW to obtain necessary data regarding use and impacts of the most efficacious method for *Egeria* control in the Delta, Komeen.

5. Comparison to Alternative 5 - EDCP with Reward, Sonar, Komeen, and Mechanical Harvesting; no 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. Incorporating Komeen use as part of the EDCP, without further study, has the potential for significant unavoidable impacts as described in Chapter 4 of the EIR.

Though this alternative likely would meet the project objectives for greater *Egeria* efficacy and control method flexibility, this alternative also has the potential for significant long-term environmental impacts associated with Komeen use in the Delta. Without further study on the specific impacts of Komeen use in the Delta, the DBW finds this alternative infeasible. For these reasons, the DBW rejects the Alternative 5.

6. Comparison to Alternative 6 - EDCP with Reward, Sonar, and Komeen; no 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 impact flexibility, but would not have a large impact on overall program efficacy. Thus, this alternative provides the DBW with more overall flexibility than the proposed project.

Though this alternative likely would meet the project objectives for greater *Egeria* efficacy and control method flexibility, this alternative also has the potential for significant long-term environmental impacts associated with Komeen use in the Delta. Without further study on the specific impacts of Komeen use in the Delta, the DBW finds this alternative infeasible. For these reasons, the DBW rejects the Alternative 6.

7. Comparison to Alternative 7 - EDCP with Mechanical Harvesting; no 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. Additionally, operational constraints of harvesting include:

- ❑ Harvested *Egeria* will produce fragments of plant material that, if not collected and disposed of properly, would greatly contribute to the spread of *Egeria*. Despite the efforts of harvesting contractors to collect all viable plant fragments, due to the volume of plant material generated, many fragments would float away before collection could occur.
- ❑ In larger bodies of water, harvesting logistics may be overwhelming. It would be difficult to capture the large amount of harvested *Egeria* and haul it to an appropriate disposal facility.
- ❑ In deep waters, the harvester may not reach all of the *Egeria*.
- ❑ Using mechanical harvesting while *Egeria* is still actively growing could enhance its growth rate. In many cases, *Egeria* also will grow back to levels present prior to harvesting.
- ❑ Finding disposal sites for *Egeria* is difficult due to its high water content (approximately 93 percent). This moisture content is considered too excessive for a Class III landfill, thus DBW must find alternative sites for disposal. The DBW proposes to dispose of harvested *Egeria* on fallow agricultural land in the Delta.
- ❑ Disposal of harvested weeds is labor intensive and, if harvesting were done on a large scale, would require a significant amount of acreage. Results from the DBW research trials indicate that between 3/4 to 3 1/3 tons (wet weight) of *Egeria* would be produced per acre harvested. Harvested *Egeria* must then be moved to a disposal site. The plant material is then manually spread to a depth of no more than one foot and left to dry for approximately 30 days. Once dry, harvested *Egeria* is then disked into the soil.

For these reasons, it is not feasible to mechanically harvest substantially more than approximately 50 acres per year (the area proposed under the EDCP). This alternative likely would not meet many of the project objectives. The DBW finds that this alternative has many operational constraints that would limit its effectiveness at any scale within the Delta.

Note: the DBW was asked by a commenter to consider an additional alternative, EDCP with Sonar only. Field trials conducted at various locations in the Delta indicate that Sonar can be effective at controlling *Egeria* in the Delta under certain environmental conditions (Anderson and others 1998). The DBW has identified various sites in the Delta where Sonar may be used effectively (see Chapter I of the EIR.) However, it is true that Sonar cannot be used in as many locations in the Delta as can Reward, due to the moderate to high flows at most locations. For this reason, the DBW proposes to treat only 20 percent of the total treatment area under the EDCP with Sonar each year. The DBW finds that while Sonar is less likely to adversely impact desirable foliage or aquatic organisms, this Sonar-only alternative would not meet many of the project objectives because it would be ineffective at many locations in the Delta.

8. Conclusion

In summary, the DBW rejects alternatives 1, 5, and 6. The DBW finds that while alternatives 2, 3, 4, and 7 may meet some or many of the project alternatives, they either do not provide the maximum flexibility of methods for treating *Egeria* in the Delta, or they do not provide the DBW the opportunity to conduct much needed Komeen research trials.

The DBW has proposed mitigation measures to avoid or minimize adverse environmental impacts described in Section IV of this document (as described in the CEQA Guidelines, Section 15091, titled Findings). The DBW finds all feasible mitigation measures are included in the proposed EDCP and Two-Year Komeen Trials and that this alternative best meets the project objectives with the least environmental impacts. However, the DBW finds that the proposed EDCP and Two-Year Komeen Trials still could result in significant and unavoidable impacts even with proposed mitigation measures. Thus, the DBW has prepared a Statement of Overriding Considerations (Section VIII).