CALIFORNIA COASTAL COMMISSION

45 FREMONT STREET, SUITE 2000 SAN FRANCISCO, CA 94105-2219 AND TDD (415) 904-5200

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STAFF RECOMMENDATION

ON CONSISTENCY DETERMINATION

Consistency Determination No.	CD-051-02
Staff:	KS-SF
File Date:	7/05/2002
60 th Day:	9/03/2002
75 th Day:	9/18/2002
Extended to:	12/14/2002
Commission Meeting:	12/12/2002

APPLICANT:

PROJECT LOCATION:

PROJECT DESCRIPTION:

National Marine Fisheries Service

Agua Hedionda Lagoon, San Diego County, coastal waters south of Point Conception, and Huntington Harbor, City of Huntington Beach, Orange County (Exhibit No.1)

Implementation of an eradication program, and five year Interim Management Plan, for the invasive green algae, *Caulerpa taxifolia*, including the installation of a floating barrier around infested areas, the placement of impermeable tarps that enclose infested areas on the lagoon bottom, chemical hypochlorite and algaecide treatment of infestations, and the possible capping of the affected area using a sediment cap and geosynthetic liner to control resurgence of the algae. Under some post-treatment conditions, a suction dredge may also be used to extract remaining sediment and algae fragments.

SUBSTANTIVE FILE DOCUMENTS: See page 30.

EXECUTIVE SUMMARY

The National Marine Fisheries Service (NMFS) has submitted a consistency determination for the implementation of an invasive species eradication program for the green algae *Caulerpa taxifolia*. The Commission has previously approved two Emergency Coastal Development Permits, 5-00-403-G (October 2000) and 5-00-463-G (January 2001), authorizing treatment of infested areas in Agua Hedionda Lagoon and Huntington Harbor. The treatment of *Caulerpa* began in these locations in the winter of 2000 and is ongoing. This treatment is based on the NMFS' Interim Management Plan to Facilitate the Agua Hedionda Lagoon *Caulerpa taxifolia* Eradication Program.

This Consistency Determination would provide for a five year Interim Management Plan that would apply to all waters south of Point Conception, where *Caulerpa taxifolia* is identified, and eliminate the need for additional consistency submittals to the Commission when new infestations are located and subsequently treated by the NMFS, although the Commission will be notified by the NMFS when this occurs.

The project consists of surveys to determine the location and magnitude of infestations, chemical treatment of *Caulerpa* with herbicides and chlorine in the form of sodium hypochlorite, the placement of impermeable polyvinyl chloride sheets or tarps, on the Lagoon bottom to isolate and surround the alga, post-application treatment and research, a monitoring and reporting program, and a mitigation plan to remove the materials used in the eradication program pending a site-specific assessment of the impacts of such removal to the marine environment. Associated activities, being implemented by the Southern California *Caulerpa* Action Team (SCCAT), also include public access and recreation restrictions to the shoreline and waters adjacent to the infested areas, and wake prohibitions in various closure zones associated with Agua Hedionda Lagoon.

The primary issues raised are a determination of allowable use for the fill of coastal waters, the selection of the least environmentally damaging alternative, feasible mitigation measures to minimize the potentially adverse effects of the project, impacts to special status plant and wildlife species, and associated limitations on public access necessary to control the spread of *Caulerpa* to other coastal locations.

Section 30233(a) of the Coastal Act imposes a 3-part test for projects involving the diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes, in that the action must meet one of the eight allowable uses within Section 30233(a)(1-8). The purpose of the eradication efforts and the Interim Management Plan proposed by the National Marine Fisheries Service is to protect, restore, and maintain those marine resources which are threatened by *Caulerpa*. Through these eradication and restoration efforts, sensitive species will be protected from invasive aquatic algae that threaten to displace native marine life. Section 30233(a)(7) allows for fill of coastal waters for restoration purposes. Although the placement of structures on the lagoon bottom can potentially affect biological resources, the alga poses a threat of such extreme severity to the productive capability of coastal waters and numerous native marine species, that these structures are necessary to prevent a wide-scale displacement and destruction of marine resources. The project is therefore consistent with the "allowable use test" of Section 30233(a) as a restoration activity.

Under the second test, the Commission must find that there is no feasible less environmentally damaging alternative to the proposed project. The NMFS evaluated mechanical removal, chemical treatment, and the no project alternative to determine that chemical treatment would be the most effective strategy in eliminating the alga. After conducting trials under laboratory conditions, the NMFS replicated herbicide treatments and established controls in an outdoor setting, to observe the effects of sodium hypochlorite treatment at concentrations which proved lethal to the *Caulerpa*. Suction dredging and mechanical removal of *Caulerpa* was also evaluated as a means to reduce the biomass requiring herbicide treatment, and contain fragments of dying plants after such treatment.

Suction dredges and centrifugal pump dredges showed different benefits in their extraction capabilities, but the mechanical limitations of these alternatives were problematic as they released excessive amounts of sediment and potential *Caulerpa* fragments into the marine waters, and could generate as much as 11,000 gallons per minute (GPM) of waste water requiring substantial off site storage and disposal to guarantee that no residual *Caulerpa* tissues were present. The Commission finds that the applicant has examined the feasibility of alternatives that could avoid the filling coastal waters and potentially significant impacts to environmentally sensitive habitat, and that the proposed project is consistent with the alternatives test described in Section 30233(a) of the Coastal Act, as no other feasible less damaging method adequately controls *Caulerpa*.

The third test of Section 30233(a) requires feasible mitigation measures to minimize the adverse environmental effects of fill. The Commission typically requires removal of structures after their useful life. The NMFS has agreed to provide an implementation schedule, detailed monitoring methodology, performance measurements, contingency plans, and an assessment of site specific locations where structures will be removed following the determination that eradication efforts have been successful. It is premature at this time to decide if in-place abandonment of the materials is warranted or desirable. The decision to remove or abandon in place materials needs to be made on a "location-by-location" basis once the Southern California *Caulerpa* Action Team and the NMFS determine the effectiveness of the program.

The NMFS has agreed to submit to the Commission, within six months of determining that eradication efforts are complete, a plan for the disposition of the materials. The plan will include: site specific proposals to remove or abandon the materials, a description of the methods and equipment, and an assessment of why removal is not proposed for designated areas if the NMFS proposes any in-place material abandonment. The Commission will then consider whether the project, based on the proposed plan, remains consistent with the Coastal Act. With this commitment, the project satisfies the mitigation test of Section 30233(a) of the Coastal Act.

Section 30214(a) of the Coastal Act allows for the regulation of the manner and need of continued public access, specifically, the time, place, and manner, and that such access may be limited and appropriate, depending on the fragility of the natural resources in the area. Where it has been found, during efforts to control and remove the invasive species *Caulerpa taxifolia* from these waterways, portions of Agua Hedionda Lagoon and the shoreline area adjacent to Snug Harbor have been closed to the public. Because the NMFS and SCCAT identified fishing and anchoring of vessels as a potential cause of *Caulerpa* spreading to other locations, these activities shall be prohibited in the inner lagoon for an initial period of one year, and will be re-evaluated to further assess the impacts of such closures.

Although not directly by the NMFS, access to coastal waters will be temporarily restricted during monitoring, surveying, and the treatment of infestations. Upon completion of the treatment each area will be re-opened to the public. Within Agua Hedionda lagoon, some areas are still open to passive uses, and through a City of Carlsbad ordinance, other restrictions that apply to vessels are imposed due to the effects of waves and turbidity that could hinder survey efforts and diver safety in treatment areas.

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Alternate public access locations are available approximately $\frac{1}{2}$ mile west of the project that provide a public marina and boat launching facilities. The NMFS and SCCAT have also implemented an outreach program to keep the public informed of such closures, identify concerns of lagoon users, implement watercraft inspections to deter the spread of *Caulerpa*, and to seek assistance and support from the local community for the eradication program through information and education on the potential threat such a species poses to the marine environment. Where future *Caulerpa* infestations are found, similar access restrictions may be necessary.

The proposed project is consistent with Sections 30214 of the Coastal Act in that restrictions to public access in the affected area are of a temporary nature, the NMFS has agreed to restricted passive uses of the waterway contingent upon the success and implementation of the eradication program, and such limitations are justified based on the substantial threat the species now poses to marine ecosystems in southern California.

1.0 Staff Recommendation

The staff recommends that the Commission adopt the following motion:

<u>MOTION</u>: I move that the Commission <u>concur</u> with consistency determination CD-051-02 that the project described therein, is fully consistent, and thus consistent to the maximum extent practicable, with the enforceable policies of the California Coastal Management Program (CCMP).

STAFF RECOMMENDATION:

Staff recommends a **YES** vote on the motion. Passage of this motion will result in a concurrence with the determination and adoption of the following resolution and findings. An affirmative vote of a majority of the Commissioners present is required to pass the motion.

RESOLUTION TO AGREE WITH CONSISTENCY DETERMINATION:

The Commission hereby concurs with the consistency determination by the National Marine Fisheries Service, on the grounds that the project described therein is fully consistent, and thus is consistent to the maximum extent practicable, with the enforceable policies of the CCMP.

2.0 Project Description

The National Marine Fisheries Service (NMFS) has submitted a consistency determination for ongoing activities to eradicate the invasive green alga *Caulerpa taxifolia* in coastal waters from Point Conception south, including areas where the species has already been found, specifically areas of Huntington Harbor and Agua Hedionda Lagoon. The project includes surveys to locate the species, eradication of the alga through chemical treatment and isolation of the algae, monitoring and post eradication activities to facilitate re-colonization of treated areas by native habitat and organisms, and restoration of infested areas to pre-treatment conditions. Limitations to existing public access of Agua Hedionda Lagoon and associated activities are being implemented through a City of Carlsbad ordinance (see Exhibit 3).

2.1 Surveys Inside Agua Hedionda Lagoon

The proposed project includes surveys of Agua Hedionda Lagoon to determine the magnitude of infestation. Phase one of the surveys incorporates diver transects, towed behind a skiff, using variable spacing of five and ten meters in both the inner and outer lagoon and Snug Harbor. Video surveys and side scan sonar will also be used to ensure full coverage. The second phase of surveys in the lagoon applies to areas where infestations have been identified. At this time only Snug Harbor will undergo phase 2 surveys. Additional diagonal transects will be surveyed, and divers will map each identified *Caulerpa* patch. The perimeters of these areas will also be surveyed and mapped to search for adjacent eel grass beds.

2.2 Other Surveillance Efforts

In areas outside the Lagoon, surveys will be similar and include side-scan sonar, diver transects surveys, and videos. Regional surveillance efforts to identify other possible sources of *Caulerpa* not in Agua Hedionda Lagoon will focus on searches of all launching facilities in southern California bays and harbors. Phase one and two surveys will continue for three years following initial eradication efforts.

2.3 Containment, Site Control and Public Access Restrictions

Based on recommendations by the Southern California *Caulerpa* Action Team (SCCAT), the shoreline area adjacent to infested areas of Snug Harbor has been closed to the public during eradication efforts. Because fishing and anchoring of vessels has been identified as a potential cause of *Caulerpa taxifolia* spread to other locations, all fishing and anchoring of vessels within the inner lagoon shall be prohibited for an initial period of one year. This policy will be reevaluated by SCCAT to further access the impacts of such closures (see page 10 for a description of the multi-agency task force SCCAT).

Figure 1.2, <u>Transit Corridors and Use Restrictions in Agua Hedionda Lagoon</u> details the zones affected by closures. Zone 2 will be closed to all recreational use. Zone 3 closures will be limited to periods before 11:00 am that are coordinated with tidal cycles and California Water Sports group uses. Zones 4 and 5 will be closed during survey periods between the hours of 7:00 am and 3:00 pm. Some use of the slalom course shall be permitted provided it does not impede

eradication or survey efforts. Simultaneous closures of zones 4 and 5 will likely be necessary to reduce turbulence and turbidity during surveys. These closures will exclude most powerboat activity during high use summer periods. Zone 6 will remain open to passive uses and the use of the slalom course, although further restrictions could apply if existing uses are in conflict with survey and eradication efforts. Figure 1.2 elaborates on how these closures are to be implemented. Future eradication efforts in other areas may also trigger the need for similar types of restrictions.

2.4 Wake Prohibitions

Large wakes, defined as a wake in excess of 12 inches, measured from the undisturbed water surface to the top of the crest, shall be prohibited for a period of one year within the inner area of Agua Hedionda Lagoon.

2.5 Eradication and Chemical Treatment

The NMFS will cover patches of *Caulerpa* with impermeable plastic tarps that will isolate and enclose them. A buffer of surrounding eelgrass will also be isolated. The 35 mil composite plastic tarps incorporate gas release valves and pump connectors to allow for water withdrawal to ensure the proper concentration and distribution of chemicals or herbicides. Experimental chlorine treatments will be conducted using both a solid puck form of chlorine, and an injected liquid sodium hypochlorite solution. Chemical treatments will be repeated until the level of residual chlorine within the contaminated area is maintained at 150 ppm for a period of not less than 72 hours. The area will be contained until the level of residual chlorine has dropped below 5 ppm. Hypochlorite solution will also be injected into the sediment to a depth of at least 20 centimeters within a three meter radius of a known *Caulerpa* location. Following treatment, sediment cores within treated patches will be examined to search for viable alga fragments, and determine if additional treatments are warranted.

2.6 Post-Application Treatment

At this time, the NMFS believes it is premature to make a determination on what action should be taken following chemical treatment of the alga. There is the obvious concern that chlorine saturation may only be effective in killing plant materials at the surface and viable rhizoids may persist in sediments. While repeated treatments with hypochlorite are likely to reduce the number of viable starts, the NMFS is not certain whether a complete kill will occur. For this reason the NMFS proposes a post application treatment.

Options for such treatment consist of several alternatives, all of which may be used, based on the results of monitoring and spot eradication efforts. The first alternative involves the dredging of selected patches and enclosing the site with silt screens using a suction dredge that will extract sediment and plant material to a depth of 20 cm. The second alternative is the capping of the areas using a geosynthetic liner and a sediment cap for a year or more following treatment. Another option is to conduct monitoring and spot eradication that would control resurgence from residual rhizoids.

2.7 Monitoring and Reporting

Monitoring of treated areas will continue for a period of three years following the last detected occurrence of *Caulerpa* in Agua Hedionda Lagoon. A schedule of post-eradication surveys is included below. In consultation with the Executive Director of the Coastal Commission and the members of the Southern California *Caulerpa* Action Team (SCCAT) or any successor to SCCAT, the NMFS will monitor the eradication project to determine any effects on biological resources within the area, as well as those which are not the target of the eradication efforts. Annual reports will be provided to the Commission that describe the activities undertaken, the condition of *Caulerpa* infestation and control, identification of any new infestation sites, recommendations for future eradication, and actions to minimize and avoid any adverse impacts to biological resources that monitoring may identify. The SCCAT will also provide written notification to the Commission at least 10 days prior to any re-application of chlorine or the placement of additional tarps, identifying the specific location of the proposed activity.

Schedule of Post Eradication Survey Efforts

Survey Area	Year #1	Year #2	Year #3			
Treatment Area	Monthly (May-Oct) Bimonthly (Nov-April)	Biannual (Sept/March)	Biannual (Sept/March)			
Non-Infested Lagoon Basins Lagoon Region Ocean Shoreline	Biannual (Sept/March) Biannual (Sept/March)	Annual (June) Annual (June)	Annual (June) Annual (June)			
Other Waters	To be determined by Long-Term Caulerpa Control Plan					

2.8 Post Project Removal of Structures from Coastal Waters

Removal of the materials used to contain and kill the algae such as rope, piping, plastic tarps, and sandbags avoids the potential adverse impacts of eradication efforts, and is considered a feasible mitigation measure. Removal of these materials would also restore the benthic habitat to its pre-infestation condition, and facilitate re-colonization of the habitat by native organisms.

3. Background

3.1 Caulerpa taxifolia

Caulerpa taxifolia is a green alga native to tropical waters that typically grows to small size and in limited patches. In the late 1970s this species attracted attention as a fast-growing and decorative aquarium species that became popular in the saltwater aquarium trade. A clone of the species was cultured for display at the Stuttgart Aquarium in Germany and provided to aquariums in France and Monaco. Around 1984 this species apparently escaped or was released from an aquarium into Mediterranean waters, and rapidly spread from an initial patch of about one square meter to almost one hectare by 1989. By 1997 it blanketed more than 5,000 hectares the northern Mediterranean seafloor and has recently been reported off northern Africa.

Genetic analysis suggests that all *Caulerpa taxifolia* plants in the Mediterranean are clones of the original, inadvertently released saltwater aquarium plant¹. Native populations of *C. taxifolia* are known to reproduce sexually, however the aquarium strain is apparently an all-male clone (only producing male gametes). The invasive aquarium algae is morphologically identical to native populations of this species². In this case, the species has not undergone any engineered molecular or environmental stimulation, yet it has evolved after repeated selection of the hardiest specimens, a cold-tolerant and rapid growing strain.

In areas where the species has become well established, it has caused ecological and economic devastation by overgrowing and eliminating native seaweeds, sea grasses, reefs, and other communities. In the Mediterranean, it is reported to have harmed tourism and pleasure boating, devastated recreational diving, and had a costly impact on commercial fishing both by altering the distribution of fish as well as creating a considerable impediment to net fisheries.



The dense carpet that this species can form on the sea bottom could inhibit the establishment of juveniles of many reef species, and its establishment offshore could seriously impact commercial fisheries and navigation through quarantine restrictions to prevent the spread of this species. There are no known herbivores that eat *Caulerpa taxifolia* in temperate waters outside its natural range. In tropical waters, where it is found naturally, normal predation occurs. The invasive strain of the species secretes a toxin that is avoided by mollusks, herbivorous fish, and sea urchins.

¹ Noxious Seaweed Found in Southern California Coastal Waters, National Marine Fisheries Service (2001)

² Caulerpa taxifolia reproduction & life cycle. National Introduced Marine Pest Information System (Eds: Hewitt C.L., Martin R.B., Sliwa C., McEnnulty, F.R., Murphy, N.E., Jones T. & Cooper, S.) (2002)

In June 2000, Merkel & Associates biologists were conducting research on transplanted eelgrass beds in Agua Hedionda Lagoon, and discovered *Caulerpa taxifolia* growing in the lagoon. The discovery represented the first known occurrence of *Caulerpa* in the Western Hemisphere. The first confirmed American occurrence of this invasive species in California has caused considerable alarm. The resulting press coverage of the issue led to discovery of a second infestation of *Caulerpa taxifolia* in Huntington Harbor in Orange County (about 75 miles north of Carlsbad) in July 2000. Genetic studies have determined these two infestations to be of the same clone threatening the Mediterranean Sea.

The alga poses a substantial threat to marine ecosystems in southern California, particularly to the extensive eelgrass meadows and other benthic environments that make coastal waters such a rich and productive environment for fish and birds. The eelgrass beds and other coastal resources that could be directly impacted by an invasion of *Caulerpa* are part of a food web that is critical to the survival of numerous native marine species including the commercially and recreationally important spiny lobster, California halibut, and sand basses³.

3.2 Southern California *Caulerpa* Action Team (SCCAT)

The Southern California *Caulerpa* Action Team is a multi-agency public/private task force organized to respond to the threat posed by *Caulerpa*. It is comprised of federal and state resource and regulatory agencies, exotic species experts, and marine scientists. Shortly after the first confirmations of *Caulerpa* in Agua Hedionda Lagoon, the SCCAT researched possible treatment options and formulated and adopted a response plan, the <u>Rapid Response and Eradication Program for the Invasive Green Alga, *Caulerpa taxifolia* at Agua Hedionda Lagoon. An environmental consulting firm that is funded by the organization's state, federal, and private partners, has been responsible for implementing and managing detection, eradication and monitoring efforts⁴.</u>

The Southern California *Caulerpa* Action Team is considered to be an interim organization, serving this purpose, until a formally adopted long-term invasive species control program is prepared and adopted by state and federal agencies. The representatives of the SCCAT include:

California Department of Food and Agriculture (CDFA) U.S. Department of Agriculture (USDA) California Department of Fish and Game (CDFG) National Marine Fisheries Service (NMFS) U.S. Fish and Wildlife Service (USFWS) Regional Water Quality Control Board-San Diego Region (RWQCB-SD) Cabrillo Power I, LLC (Cabrillo) Merkel & Associates, Inc. (M & A) San Diego County Department of Agriculture (SDCDA) Environmental Protection Agency (USEPA) San Francisco Estuary Institute (SFEI) Aquatic Nuisance Species Task Force (ANSTF)



3 Ibid

⁴ Updated Caulerpa Taxifolia Rapid Response and Eradication Program, California Coastal Conservancy Staff Report (2002)

3.3 Management Plan

The Interim Management Plan to Facilitate the Agua Hedionda Lagoon Caulerpa taxifolia Eradication Program is overseen by the members of the Southern California Caulerpa Action Team (SCCAT). The scope of the Management Plan is limited to the inner lagoon portion of the Agua Hedionda Lagoon that is subject to the regulations found in Chapter 11.24 of the Carlsbad Municipal Code⁵.

Other eradication activities conducted under the permitting authority of the U.S Army Corps of Engineers <u>Regional General Permit No. 64</u>, and <u>Nationwide Permit No. 27</u>, apply to all other *Caulerpa* eradication activities, including those of the NMFS, which are substantially similar in nature. Under the conditions of the Corps permit, the eradication methods employed shall be conducted in a manner that is consistent with the Caulerpa Control Policy (NMFS, Version 1.1, adopted July 3, 2002) EXHIBIT 2. The designated federal and state agency contacts for findings and monitoring reports of *Caulerpa* are the National Marine Fisheries Service, Southwest Regional Office and the California Department of Fish and Game, South Coast Region.

3.4 Funding

The Agua Hedionda Lagoon Foundation is seeking funding from the Coastal Conservancy to support the ongoing *Caulerpa taxifolia* eradication efforts at Agua Hedionda Lagoon, Huntington Harbor and at other locations as necessary, consistent with the Updated Rapid Response and Eradication program. This project will enhance the biological and hydrological resources of Agua Hedionda Lagoon, Huntington Harbor, and all of the coastal waters and wetlands of southern California by continuing the containment and eradication of this highly invasive, destructive alga⁶. Funds will be used to continue eradication efforts at Agua Hedionda Lagoon and Huntington Harbor.

The Coastal Conservancy is currently considering the authorization of one million dollars (\$1,000,000) to the Agua Hedionda Lagoon Foundation to continue an updated eradication program. The anticipated source of Conservancy funds is an allocation for the Southern California Wetlands Recovery Project from the FY02-03 appropriation from the California Clean Water, Clean Air, Safe Neighborhood Parks and Coastal Protection Act of 2002 (Prop. 40). In June 2002, the Southern California Wetland Recovery Project (SCWRP) Board of Governors approved a *Caulerpa taxifolia* eradication project as part of the Wetlands Recovery Project 2002-2003 Work Plan.

While the NMFS efforts have reduced the extent of existing *Caulerpa* infestations, intensification of surveys used to locate remaining *Caulerpa* patches are rising, resulting in increased effort and cost. As of this writing, the SCCAT projects a need for \$6 million to achieve total *Caulerpa* eradication in Agua Hedionda Lagoon and Huntington Harbor based on an annual cost of approximately \$1.1 million over the next five years. The \$6 million would cover three additional years of survey/detection activities and treatment and two years of monitoring.

6 Updated Caulerpa Taxifolia Rapid Response and Eradication Program, California Coastal Conservancy (2002)

⁵ Interim Management Plan to Facilitate the Agua Hedionda Lagoon Caulerpa Taxifolia Eradication Program, (2002)

If new occurrences of *Caulerpa* are detected, the five-year timeline will be extended until no new patches are found⁷. The program already has cost more than \$4 million. The majority of total expended funds (\$1.84 million dollars) has been spent on eradicating *Caulerpa* patches at Agua Hedionda Lagoon. In the absence of a statewide invasive eradication program and dedicated funding, the SCCAT increasingly will need to rely on grants to fund its current efforts.

3.5 Legislation

Under existing legislation, Assembly Bill 1334 (Harman)(California Fish and Game Code Section 2300), creates specific prohibitions for the sale and importation of species of the genus *Caulerpa*. Possession of the *Caulerpa* species for purposes other than scientific research is subject to fines and penalties of not less than five hundred dollars (\$500), and no more than ten thousand dollars (\$10,000).

Senate Bill 1573 (Karnette)(California Fish and Game Code Sections 6950-6956) established the *Interagency Aquatic Invasive Species Council* to develop a comprehensive plan for dealing with aquatic invasive species in California. The Fish and Game Code defines "invasive species" to include: a species seeds, eggs, spores, or other biological materials capable of propagating that species, that is not native to the ecosystem, and whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

The Interagency Aquatic Invasive Species Council consists of representatives of the Department of Food and Agriculture, Department of Boating and Waterways, Department of Parks and Recreation, Department of Water Resources, State Water Resources Control Board, California Coastal Commission, State Coastal Conservancy, University of California, and the State Lands Commission. The council will establish protocols for responding to aquatic invasive species infestations, review invasive species management plans and proposed invasive species regulations, and coordinate the development of a comprehensive plan for prevention and containment of such species.

Assembly Bill 1059 (Keeley) amends Section 660 of the Harbors and Navigation Code relating to vessels, to allow for the restriction or prohibition of vessel activity in Agua Hedionda Lagoon indefinitely, if such activity would affect or jeopardize efforts to eradicate *Caulerpa taxifolia* within the waterway. This bill also allows use restrictions of vessels on waters of the state in general until January 1, 2004. Notices of such restrictions are required to be posted at launching areas to notify the public, and operators of vessels that violate such restrictions would be subject to fines of not more than \$250. The legislation also allows the Department Boating and Waterways to restrict recreational boating in any waters of the state at the request of the Director of the Department of Fish and Game.

3.6 Previous Commission Approval

The Coastal Commission has approved Emergency Coastal Development Permits 5-00-403-G and 5-00-463-G in October 2000, and January 2001, authorizing Merkel and Associates to proceed with eradication efforts in Agua Hedionda Lagoon and Huntington Harbor. The treatment of *Caulerpa* began in these locations in the winter of 2000 and is ongoing. The

⁷ Updated Caulerpa Taxifolia Rapid Response and Eradication Program, California Coastal Conservancy (2002)

NMFS' consistency determination in part serves to authorize permanently the activities performed under the authority of these emergency permits.

4. Phased Review

At this stage in the review process, the information submitted to date does not include final plans that detail the removal of structures placed in coastal waters (mitigation measures) because of the emergency nature of the project, and ongoing attempts to prevent additional impacts from the invasive nature of this plant species.

To the extent mitigation measures have been committed to and described, as discussed in the findings below, the Commission is able to find the project consistent with the applicable Coastal Act policies. The NMFS has agreed to measures to assure that the project would be consistent with the resource protection policies of the Coastal Act, including mitigation measures that would be implemented at the completion of the project. The Commission will be apprised of the nature and timing of such mitigation as part of the NMFS annual report on the eradication efforts at Huntington Harbor and Agua Hedionda Lagoon, as well as other areas of southern California where *Caulerpa* is found and treated.

Any changes to the project design or mitigation commitments raising Coastal Act policy concerns not previously identified could independently trigger additional federal consistency review under the provisions of Section 930.45 of the federal consistency regulations (15 CFR Part 930), which provide for re-review based on "changed circumstances" of federal agency activities in which the Commission has previously concurred (*i.e.*, based on a determination that the project is having coastal zone effects that are substantially different than originally proposed and, as a result, the project is no longer consistent to the maximum extent practicable with the applicable coastal management program policies).

5. Status of Local Coastal Program

The standard of review for federal consistency determinations is the policies of Chapter 3 of the Coastal Act, and not the Local Coastal Program (LCP) of the affected area. If the LCP has been certified by the Commission and incorporated into the California Coastal Management Program (CCMP), it can provide guidance in applying Chapter 3 policies in light of local circumstances. If the LCP has not been incorporated into the CCMP, it cannot be used to guide the Commission's decision, but it can be used as background information.

6. Applicant's Consistency Determination

The National Marine Fisheries service has determined the proposed project consistent to the maximum extent practicable with the California Coastal Management Program.

7. Findings and Declarations

The Commission finds and declares as follows:

7.1 Fill of Coastal Waters

The proposed project includes the temporary placement of rope, and pipe in coastal waters for surveying and monitoring, and the placement of tarps secured by sandbags over infested areas. The project would result in an estimated 2.3 acres of temporary fill within Agua Hedionda Lagoon, and approximately 2.1 acres of fill within Huntington Harbor. These calculations of fill in coastal waters represent the area that has been affected only in the two locations now being treated. Additional treatment of infestations in waters south of Point Conception, for which this consistency determination applies, could result in additional fill, and will be reported to the Commission by the NMFS as part of its monitoring and reporting program.

The Coastal Act provides that:

<u>30233(a)</u>: The diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with other applicable provisions of this division, where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects, and shall be limited to the following:

(1) New or expanded port, energy, and coastal-dependent industrial facilities, including commercial fishing facilities.

(2) Maintaining existing, or restoring previously dredged, depths in existing navigational channels

(3) In wetland areas only, entrance channels for new or expanded boating facilities

(4) In open coastal waters, other than wetlands, including streams, estuaries, and lakes, new or expanded boating facilities and the placement of structural pilings for public recreational piers that provide public access and recreational opportunities.

(5) Incidental public service purposes, including but not limited to, burying cables and pipes or inspection of piers and maintenance of existing intake and outfall lines.

(6) Mineral extraction, including sand for restoring beaches, except in environmentally sensitive areas.

(7) Restoration purposes.

(8) Nature study, aquaculture, or similar resource dependent activities.

(c) In addition to the other provisions of this section, diking, filling, or dredging in existing estuaries and wetlands shall maintain or enhance the functional capacity of the wetland or estuary...

7.1.1 Allowable Use Test

Coastal Act Section 30233(a) restricts the Coastal Commission from authorizing a project involving the diking, filling, or dredging of open coastal waters, unless it falls within the scope of one or more of the "allowable uses" enumerated in Coastal Act Section 30233(a). One of the eight allowable uses for fill under Section 30233(a)(7) is for restoration purposes.

The purpose of the eradication efforts and Interim Management Plan proposed by the National Marine Fisheries Service is to protect, restore and maintain those marine resources which are threatened by *Caulerpa*. Through these eradication and restoration efforts, sensitive species will be protected from invasive aquatic algae that threaten to displace native marine life. While the eradication efforts will affect organisms that are under the chlorinated enclosed areas of the lagoon, the biological resources located outside of these areas are not experiencing any adverse effects.

The project would include placing structures on the lagoon bottom, and dispersing chlorine within coastal waters during the eradication of the invasive alga that is threatening California's coastal ecosystems. Although such structures can potentially affect biological resources, the alga poses a threat of such severity to the productive capability of coastal waters and numerous native marine species, that these structures are necessary to prevent a wide-scale displacement and destruction of marine resources and habitat. *Caulerpa* could destroy extensive eelgrass meadows and other benthic environments that are critical parts of a food web affecting the survival of numerous native species.

The project is consistent with Sections 30233 of the Coastal Act in that the eradication program would protect and enhance marine resources, ensuring that the invasive green alga *Caulerpa taxifolia* does not adversely impact California's coastal waters, thereby promoting the sustainability, biological productivity, the overall health of the affected lagoons, and other offshore and near-coastal waters. Thus, the proposal will help restore biological diversity, and would encourage the natural diversity, abundance, and composition of coastal waters. The Commission therefore concludes that the project is consistent with Section 30233(a)(7), and constitutes an allowable use as a restoration activity.

7.1.2 Alternatives

The Commission must further find that there is no feasible less environmentally damaging alternative to the proposed project. The primary alternatives analyzed by the NMFS have been: (1) Mechanical Removal; (2) Chemical Treatment; and (3) The No Project Alternative. The NMFS determined that chemical treatment would be the most effective strategy in eliminating the algae after researching methodologies and treatment options, and conducting trials under laboratory conditions. Replicated herbicide treatments and controls were established in an outdoor laboratory, and tests included a variety of chemical agents tested in light and dark environments. The most significant treatment effect was observed with sodium hypochlorite, at concentrations of 1.5 parts per trillion (ppt) and 3.0 ppt which proved equally lethal under

overnight conditions. A summary of the results for in-vitro chemical control investigations is included in Table 1.1.

To test the efficacy of suction dredging, small portions of eelgrass beds were extracted, to evaluate the potential performance of the dredging equipment, and the effect of mechanical removal on the release of *Caulerpa* fragments in the lagoon. Suction dredges and centrifugal pump dredges showed different benefits in their extraction capabilities, but these alternatives were problematic as they released excessive amounts of sediment and potential *Caulerpa* fragments into the lagoon, and generated as much as 11,000 gallons per minute (GPM) of water to remove viable plant material. To effectively treat and dispose of such a large volume of water has proved to be a significant impediment to dredging alternatives. The NMFS also considered a filtering facility on the lagoon shore that would release water back into the lagoon, steaming or chlorinating the dredged material to kill any residual tissues, and pumping the mud/plant/water slurry to a 12 million gallon storage tank. The Commission agrees with the NMFS that neither of these alternatives would be less damaging or effective and thus finds that the proposed project is the least environmentally damaging alternative.

Mechanical Removal Alternative

The NMFS considered mechanical removal of *Caulerpa* as a means to reduce the biomass requiring herbicide treatment, and to protect against potential discharge of viable fragments that may be liberated by dying plants after herbicide treatment. Tests have included manual collection and alga using divers, and two efforts using different suction dredging techniques (aspirator and centrifugal pumps) to remove plants and sediments.

Diver *Caulerpa* harvesting was determined to be moderately successful at removing experimental volumes of material, however considerable plant breakage occurs where rhizoids are firmly anchored in sediments or are intertwined with eelgrass rhizomes. To test the efficacy of suction dredging, small portion of an eelgrass bed were extracted using two different dredges. Suction dredging has a significant benefit over hand extraction in that smaller fragments of damaged algae are generally vacuumed up around the dredge nozzle and few escape the immediately vicinity of the nozzle. However, the dredging approach also has several drawbacks relative to hand harvesting. The suction nozzle is not as controlled as hand harvesting and many more small fragments would be generated. Some of these fragments would be released far beyond the influence of the suction head, where it would be necessary to collect them.

The two dredges evaluated produced substantially different results. The aspirator type lacked adequate power to extract eel grass and sediments. Plugging, burping, backwash, and the plume associated with these problems caused substantial re-suspension of small fragments and would aid the spread rather than the collection and containment of *Caulerpa*. Although the centrifugal pump dredge proved more powerful, it was incapable of collecting all the plant debris. The greatest impediment to dredging of *Caulerpa* is the need to efficiently treat large volumes of water to remove viable plant material, while at the same time either dispose of clean water or return it to the lagoon.

The NMFS estimated that approximately 11,000 gallons per minute could be generated by the dredging operation, and the total liquid volume may reach several million gallons. Several options considered to address the massive amount of liquid included the establishment of a small filtering facility on the lagoon shore, steaming and/or chlorinating the dredged water to kill any residual tissues, and pumping the material off-site to a 12 million gallon tank.

Chemical Treatment Alternative

Determining an effective dosage of chemicals while minimizing the damage these chemicals might have on the surrounding biological resources is the most difficult aspect of implementing chemical treatment. Because of the inherent tidal flushing in the lagoon, any containment of an infected area requires the isolation of the *Caulerpa* and surrounding native eelgrass beds under liners which trap water for treatment with chemical herbicides, while protecting surrounding areas from collateral damage.



Figure 1.3 Chemical Treatment of Infestations

This approach prevents fragmentation of dying plants from spreading viable fragments to other areas. Several trials were conducted in eelgrass beds to determine the most effective method for placing liners, and minimizing the disturbance to *Caulerpa* patches. Trials used divers and a surface support vessel for the placement of the tarps, and seams between liners and gas release valves were inserted into the liners.

Placing tarps over the *Caulerpa* facilitates the maintenance of a high concentration of herbicide on the target species under the tarp, allowing the surrounding water body to remain uncontaminated by the herbicide. All organisms under the tarp are killed by the treatment. The NMFS determined that this small loss to be acceptable and justifiable, when weighed against the potential greater habitat loss that would result from inaction.

During eradication development and implementation at Agua Hedionda Lagoon, and during eradication at Huntington Harbor, water samples were collected from under the tarp, immediately adjacent to the tarp, and from the water column in the vicinity of the tarp. Free chlorine was undetectable outside the tarps in all cases, while concentrations remained adequate under the tarp to treat the *Caulerpa*. Chlorine demand under the tarp is high due to the large amount of organic material. Any chlorine that is not consumed through reactions with *Caulerpa* is quickly consumed by the substrate, which has a high organic content. Measurements have indicated that once the treatment pucks have fully dissolved, chlorine is undetectable under the tarps within 24 hours.



In the event that the security of a tarp would be compromised in some way, any release of water from underneath would be immediately diluted by the surrounding water column. When considering the volume of water in the immediate area of the tarp in relation to the volume under the tarp, it is clear that any escaped chlorine wound be diluted to an undetectable level and cause no threat to marine life.

In addition to taking physical measurements, divers working on the project have not observed any ill effects on plants or animals of chlorine treatment beyond the tarped areas. This is true even though some fish are attracted to the structure provided by the tarps.

The non-native yellowfin goby (Acanthogobius flavimanus), which is the most abundant species in the lagoon, quickly colonize the margins of the tarps and fastening-sand bags in large numbers during treatment. If conditions were inhospitable, these fish would move elsewhere or be found

expired. Neither of these conditions has been observed by the NMFS.

No Action Alternative

Under the no action alternative, the *Caulerpa* infestation would continue unabated. Considering the invasive nature of *Caulerpa*, the algae would continue to spread within Seagate Lagoons, Huntington Harbor, and Agua Hedionda Lagoon within any other areas suitable to the growth of algae. The *Caulerpa* would displace native vegetation, sensitive eel grass habitat, and have long term significant impacts on fish and other aquatic ecosystems.

Treatment	Concentration	4 Days	New Growth	8 Days	New Growth	12 Days	New Growth	24 Days	New Growth
Control		None	No	None	Yes	None	Yes	None	Yes
Diquot	0.75 ppm 1.5 ppm	None None	No No	(a) (a)	Yes Yes	(a) (a)	Yes Yes	Recovered Recovered	Yes Yes
Hydrothol #181	1.0 ppm 2.5 ppm	None None	No No	None None	Yes Yes	(a) (a)	Yes	Recovered Recovered	Yes Yes
Cutrine (Copper)	0.5 ppm 1.0 ppm 5.0 ppm 10.0 ppm	None None (c) (c)	No No No	None (b) (b) (b)	Yes Yes Yes Yes	None (a) (b) (b)	Yes Yes Yes Yes	None Recovered	Yes Yes
Simazine	1.0 ppm	None	No	None	Yes	None	Yes		
Bleach (5%-Cl)	1500 ppm 3000 ppm	(d) (d)	No No	Dead Dead		Dead Dead		Dead Dead	
Light Exclusion		None	No	(b)	Yes	(b)	Yes	(C)	Yes

 Table 1.1

 Summary of results for *in vitro* chemical control investigations

(a) Slight loss of turgor in fronds

(b) Slight die-off at tips

(c) Slight bleaching of fronds

(d) Full bleaching of thallus, dead

7.1.3 Feasible Mitigation Measures

The final requirement of Coastal Act Section 30233(a) is that the filling of coastal waters may be permitted if feasible mitigation measures have been provided to minimize any adverse environmental effects. The applicant has further agreed to implement mitigation measures as described in this staff report. The Commission typically requires the removal of structures (*e.g.*, pipelines, cables, and other oil and gas infrastructure) after their useful life. The purposes of this requirement include: (a) removal of debris from coastal waters; (b) preventing harm to marine species (*e.g.*, entanglements, ingestion); (c) removing a navigational hazard; (d) removing a hazard to offshore and near shore recreational beach and ocean users; and (e) eliminating interference with commercial fishing. Exceptions include circumstances where the environmental impacts of removal outweigh the benefits of removal. For instance, in the past the Commission has determined that buried pipelines located in water depths greater than 15 feet that do not pose a hazard to navigation, commercial fishing, or other ocean users, be abandoned in place.

In this case, the express purpose of the placement of tarps, rope, and sandbags is to prevent an adverse environmental impact, the spreading of Caulerpa. The tarps provide localized treatment and ensure protection of other biological resources. However, once eradication efforts are complete, and if these materials are left in place, they could potentially degrade the marine environment. The persistence of structures could displace soft bottom habitat and associated organisms. Free-floating fragments of plastic tarp could be mistaken by marine mammals and

birds as food and ingested, and could end up on beaches as debris. Removal of the materials after eradication efforts are complete will eliminate these potential adverse impacts and allow for the restoration of the benthic habitat to its pre-infestation condition. The NMFS has agreed to submit to the Commission, within six months of determining an eradication effort to be complete, a proposed plan for the disposition of the Caulerpa eradication materials. The Commission therefore finds the project consistent with Section 30233(a) of the Coastal Act.

The NMFS has provided an implementation schedule, detailed monitoring methodology, performance measurements, contingency plans, and a reporting process which will contain a quantitative analysis of attainment of performance standards for the project.

Removal of the plastic tarps and other materials also raises environmental concerns. Caulerpa treatments are currently taking place in high depositional environments (e.g., Agua Hedionda Lagoon). Accordingly, these materials may be buried deeply after some time. Infaunal organisms and eelgrass may colonize surface sediments. Removal of the materials will kill the organisms that have colonized. Removal will also cause suspension of fine sediments that may have negative affects on adjacent communities (e.g., smothering). In addition, NMFS does not know at this time when it is safe to remove the materials so that Caulerpa is not exposed and spread.

Post Project Removal of Structures from Coastal Waters

The Commission agrees with the NMFS that it is premature during this stage of the eradication process to determine if in-place abandonment of the tarps and other materials is warranted or desirable. The decision to remove or abandon in place the materials needs to be made on a "location-by-location" basis once the effectiveness of eradication efforts is determined by the SCCAT. In its consistency determination, NMFS has agreed to submit to the Commission, within six months of determining an eradication effort to be complete, a proposed plan for disposition of the Caulerpa eradication materials. The plan will include: (a) a site-specific (location-by-location) proposal to remove or abandon in place the plastic tarps, rope, and sandbags; (b) a detailed description of the method(s) and equipment proposed to remove materials; and (c) a site-specific assessment of why removal is not proposed if NMFS proposes any in-place material abandonment. After reviewing this plan (see phased review discussion on page 10) the Commission will hold a public hearing and determine whether the project, based on the proposed plan, is still consistent to the maximum extent practicable with the enforceable policies of California's Coastal Management Program.

Monitoring

The intent of the proposed monitoring is to assess the success of the eradication efforts, and provide recommendations to SCCAT and the Commission for future management of *Caulerpa* infestations. Under the terms and conditions of the monitoring program, the NMFS, in consultation with Commission staff and the members of the Southern California *Caulerpa* Action Team, or any successor to SCCAT, will monitor the results of the eradication program and the effect of the eradication upon biological resources within the project area, including those resources within the project area which are not the target of the eradication efforts.

The NMFS will provide a written report to the Commission staff and the members of SCCAT documenting the results of the monitoring on an annual basis during the term of the permit. The report will identify:

- (a) activities undertaken since the last report;
- (b) the condition of the Caulerpa in the treatment area;
- (c) identification of any new Caulerpa infestations;
- (d) any impacts the project has had on biological resources within the project(s) area; and
- (e) recommendations for future action regarding the eradication of Caulerpa, and actions to minimize or avoid any significant adverse impacts upon biological resources that monitoring may identify.

In conclusion, the NMFS has incorporated avoidance and monitoring measures to avoid adversely affecting federally listed and other sensitive species. These measures were developed in consultation with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service. The NMFS has agreed to measures to assure that the project would be consistent with the resource protection policies of the Coastal Act, including mitigation measures that would be implemented at the completion of the project. With these measures, the Commission finds the project consistent with Sections 30230, 30233, and 30240 of the Coastal Act.

7.2 Marine Resources, Water Quality, and Environmentally Sensitive Habitat Areas

The Coastal Act provides that:

<u>30230:</u> Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy population of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.

<u>30231:</u> The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.

<u>30240</u>: (a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.

(b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.

7.2.1 Agua Hedionda Lagoon

Agua Hedionda Lagoon is a 226-acre enclosed bay. The lagoon consists of a 51-acre outer lagoon basin, a 19 acre middle lagoon basin, and a 156 acre inner lagoon basin. Additional non-tidal wetlands and uplands surround most of the bay. The system receives freshwater flows from Agua Hedionda Creek and Marcario Canyon at the far eastern end of the lagoon, Encina Creek in the outer lagoon basin, and a variety of small watershed surface drainages along the southern lagoon boundary and municipal storm drains along the northern margin of the lagoon. The influence of freshwater on the tidal portions of the lagoon system is very slight⁸.

Prior to the 1950s, the lagoon was a shallow slough, usually closed to the ocean. The system was highly dynamic, featuring sandbars and mudflats that shifted around from year to year, as dictated by storm events or high tides which occasionally breached the closed mouth allowing tidal exchange. Sediment input from the surrounding watershed filled the basin, keeping it shallow and forming a berm at the mouth. Heavy floods opened the mouth in 1927 and it remained open for over five years, making the lagoon a popular site for boating, swimming and fishing. Reconstruction of the highway bridge over the lagoon mouth resulting in its re-closure until it was reopened by local residents in 1948. It remained open until dredging began in 1952⁹.

7.2.2 Encina Power Plant

The Encina Power Plant is located on the south side of the lagoon and is cooled by water drawn from Agua Hedionda Lagoon and returned to the ocean. In order to provide the storage capacity and circulation for adequate cooling, the lagoon has been dredged annually or semi-annually since 1954. This dredging transformed the lagoon from a shallow, brackish coastal lagoon, only periodically open to the ocean, to a marine system with depths ranging from 8 to 30 feet, and daily tidal exchange ensured by the permanent opening of the lagoon mouth. Since the initiation of regular dredging, significant management efforts have been undertaken to encourage and improve the marine system which exists at the lagoon today. The jetties maintaining the inlet to the lagoon were extended into deeper oceanic water, increasing circulation and bringing nutrient rich flows into the west basin.

7.2.3 Huntington Harbor

Huntington Harbor is a highly developed waterbody that supports predominantly waterside residential neighborhoods with many of the houses including private dock facilities for large pleasure boats. The Shorelines of Huntington Harbor are almost exclusively vertical bulkheads and intermittent eelgrass habitat occurs along the fringes of some of the outermost channel environments. The harbor is dredged to depths that range from 15 feet to 30 feet, while two flow-through marine ponds that are infested with Caulerpa occur at depths of approximately 6 feet. The ponds are human-made non-tidal waters. The water level is maintained by pumps that fill the east pond, which drains into the west pond, and then into Huntington Harbor. At the present time, only areas around pond drains appear to have been inoculated with *Caulerpa*. The ponds are enclosed on all sides, surrounded by residential condominiums. There are no boats in the ponds with the exception of several pedal-boats.

 ⁸ Eradication Program for the Invasive Green Algae, Caulerpa taxifolia, Merkel and Associates (2002)
 9 Ibid

Like the bulkheads of the harbor, the walls of the ponds are concrete, with residential patios forming the "banks" of the ponds. Water in the ponds is circulated with the harbor using a pump that generally restrict the immigration of large fish from the outer harbor. However, the pond supports an abundance of large fish that were transplanted by local residents and which are fed as semi-domesticated animals. The ponds also support an abundance of gobies and rays that have entered from the harbor and which dominate the fish community.

Despite the harbor's well established and maintained connection to the Pacific Ocean, it is a poorly flushed environment that has degraded water quality in the innermost portion of the system. Freshwater inputs are limited to local watershed drainage through storm drains and the system is strongly marine in nature with occasional freshwater lenses being observed seasonally with persistent non-seasonal urban flows.

With the exception of eelgrass and some widgeon grass (*Ruppia maritima*), no other vascular plant habitats exist within Huntington Harbor. However, Huntington Harbor shares its mouth with the extensive marshes of the Seal Beach National Wildlife Refuge located to the north.

Wildlife use within the harbor is limited to a low abundance of waterfowl, wading birds and gulls, as well as terns and pelicans that forage in the open canals and along the docks, beaches, and narrow shallows of the harbor. No nesting by marine birds occurs at the harbor. Listed species that make use of the site include California least tern and California brown pelican. Marine resources include encrusting cryptic communities and soft bottom benthic communities that are typical of harbor environments within the Southern California Bight. While eelgrass is limited to the harbor environment, widgeon grass occurs both in the ponds and in the harbor. As with most harbor environments, many exotic species occur within Huntington Harbor including yellow-fin goby, and a host of invertebrates¹⁰.

7.2.4 Sensitive Plant and Wildlife Species

Several sensitive species currently occupy or frequent Agua Hedionda Lagoon. Among these are state and/or federally listed species including the light-footed clapper rail, California least tern, California brown pelican, least Bell's vireo, and Belding's savannah sparrow.

Fringing mudflats within the easternmost portion of the lagoon provide foraging opportunities for shorebirds, while expanded tidal flow resulting from the dredging allowed greater tidal flushing of salt flats of the east basin, expanding the distribution of pickleweed (*Salicornia virginica*), the preferred habitat of the state endangered Belding's savannah sparrow, a species that is relatively abundant in the easternmost portion of the lagoon. California cordgrass was introduced into the system in February 1999. There is a narrow fringe of brackish marsh in the east basin with a main creek channel and numerous tidal channels cut into the mud. The lagoon is fed by the Agua Hedionda Creek which is flanked by dense riparian woodland.

The federally endangered light-footed clapper rail (*Rallus longirostris obsoletus*) occurs in brackish marsh at the eastern end of the lagoon. No California least tern (*Sterna antillarum browni*) nesting occurs at the lagoon, however, birds from colonies at Batiquitos Lagoon do forage within the lagoon on a regular basis. Other terns foraging at the lagoon may come from

10 Eradication Program for the Invasive Green Algae, Caulerpa taxifolia, Merkel and Associates (2002)

colonies on Camp Pendleton. California brown pelicans use Agua Hedionda Lagoon for both roosting and foraging. Numerous pelicans are typically observed roosting and loafing on portions of the aquaculture facilities. Although roosting habitat at Agua Hedionda Lagoon is not adjacent to a nesting colony and is not expected to be considered a major roosting site, its presence is noteworthy.

Least Bell's vireos were present along Agua Hedionda Creek in 1999. The Belding's savannah sparrow is limited to salt marshes and coastal estuaries above mean high tide. Their typical habitat is saline emergent wetland dominated by pickleweed; however, the sparrow also found within areas of salt grass (*Distichlis spicata*). This species may forage throughout the marsh but is generally dependent upon pickleweed of the far East Basin of Agua Hedionda Lagoon for nesting. This habitat is best developed in the vicinity of the mouth of Agua Hedionda Creek.

Eelgrass did not historically exist in the lagoon prior to dredging. With the restoration of the tidal prism at the lagoon and maintenance of the lagoon mouth, eelgrass became established and flourished in each basin. Extensive eelgrass restoration has been done to compensate for impacts caused by regular maintenance dredging and approximately 30 acres of high quality eelgrass habitat now occurs within Agua Hedionda Lagoon. Eelgrass communities perform a variety of physical and biological roles within coastal nearshore environments.

Eelgrass improves water quality and clarity and prevents erosion. Its extensive rhizome mats stabilize sediments, while eelgrass leaves baffle waves and currents. Its ability to trap fine particulates and dead leaf matter, thus increasing sediment nutrients, makes eelgrass a highly productive benthic ecosystem. As a result, eelgrass beds provide the basis for an important marine food web¹¹. Eelgrass beds support a community of detritivores within the sediment, as well as epiphytes on leaf blades. The abundance of food, as well as the refuge provided by the canopy, makes eelgrass a thriving nursery for numerous invertebrate and fish species including the commercially and recreationally important spiny lobster (*Panulirus interruptus*), California halibut (*Paralichthys californicus*), and sand basses (*Paralabrax spp*.).

7.2.5 USFWS Section 7 Consultation

The National Marine Fisheries Service has been involved in informal Section 7 consultation with the U.S. Fish and Wildlife Service throughout the study process for listed species. In accordance with Section 7 of the Endangered Species Act, the USFWS determined that the project as proposed, is not likely to adversely affect any federally threatened or endangered species.

The U.S. Fish and Wildlife Service commented on the adopted emergency action in their letter to the Commission dated September 26, 2002. Under the Endangered Species Act (ESA) this is referred to as "Informal Consultation". Soon after this initial consultation, the USFWS became a responsible agency, advising consultants and providing oversight of the Caulerpa eradication and surveillance program in Agua Hedionda Lagoon. Because the USFWS is obligated to evaluate their own activities for potential effects to Federally listed species, they conducted an additional "Internal Consultation" under ESA Section 7 and concluded that no adverse affect upon any listed species would result from the emergency action, and that no formal consultation pursuant to Section 7 of the Endangered Species Act would be necessary.

¹¹ Eradication Program for the Invasive Green Algae, Caulerpa taxifolia, Merkel and Associates (2002)

7.2.6 State and Federal Endangered Species and Sensitive Species/Habitats

Special status plant and wildlife species, and their associated habitats, are legally protected under the Federal Endangered Species Act of 1973 and the California Endangered Species Act of 1984. Under both state and federal legislation, the California Department of Fish and Game, U.S. Fish and Wildlife Service and National Marine Fisheries Service are responsible for the management and protection of special status species. Any project that could potentially affect a special status plant or wildlife species, or its habitat, requires review and/or consultation with the previously mentioned agencies.

7.2.7 California Department of Fish and Game

Under the existing California Endangered Species Act (Section 2081 of the Fish and Game Code) the CDFG may authorize, by permit, the take of endangered species. To obtain a California Incidental Take Permit the applicant must show that the impacts will not jeopardize the continued existence of the species, the impacts of the "taking" are minimized and fully mitigated to the extent that it is "roughly proportional" to the impact of the taking on the species, the proposed mitigation shall be capable of successful implementation, and that the applicant provide adequate funding to implement necessary mitigation measures including monitoring compliance of the effectiveness of those measures.

7.2.8 Re-colonization of Treatment Areas

Despite ongoing treatments of the *Caulerpa* under the chlorinated tarped conditions, the tarps have become cloaked in benthic algae and are not distinguishable from native bottom environments. During the periods when algae has died back or is absent from the bottom, the tarps are either visible, or buried in fine sediments, though this is dependent on the time they have been attached. Gravel bags that mark the tarp edges and prevent ballooning, and control stakes provide hard substrates that are colonized with sparse to dense aggregations of tunicates (*Styela*) and young Japanese oysters (*Crassosterea gigas*). Also found associated with the tarps are slipper limpets (*Crepidula onyx*) and bay blennies. Gobies (including abundant introduced yellowfin gobies) and round stingrays are abundant over the bottom. Sediments over the tarps are pocked with shallow infaunal burrows and trails of the bubble snail (*Bulla gouldiana*) and covered-lip nassa (*Nassarius tegula*).

Overall, the bottom on older tarps has accumulated enough fine sediment to support a two to three inch sediment layer in some locations. The tarps, like the surrounding areas generally support no vascular vegetation, however scattered occurrences of widgeon grass (*Ruppia maritima*) occur in the ponds, with some very limited occurrence on tarps.

In Agua Hedionda, the diversity of environments occurring on tarps is higher than at Huntington Harbor, as is the general diversity of the native system. Further, because of the initial use of liquid chlorine treatments, the cages under some of the tarps create greater vertical relief of some of the tarps, and even some older tarps retain sediment free sloped and near vertical surfaces as tall as 8-inches. These surfaces have been colonized by tunicates, slipper limpets, oysters, and seasonally abundant juvenile scallops (*Leptopecten latiauratus*). Also, encrusting communities dominated by bryozoans (*Bugula neritina, Thalamoporella californica, and Crisulipora*)

occidentalis), hydroids (Obelia sp.) and serpulid worms are poor to moderately developed on the exposed surfaces.

Invertebrate egg-masses are commonly attached to the more vertical hard structures including stakes and suspended survey grids. Tarp and gravel bag edges, fill and inspection vents, folds in the tarps, and stakes have become well colonized not only by sessile invertebrates, but also by a number of mobile organisms. Nearly all well defined crevices, pipe ends, or other crannies has been colonized by either territorial octopus or bay blennies. Survey lines support abundant caprellid amphipods. While not strictly associated with the structures, gravel bags, vertical relief over tarped cages, and various markers are typically patrolled by spotted and barred sandbass, and uncommonly these structures attract small schools of surfperch.

Where sediment has accumulated over the tarps, the community supports a variety of common bay species including a poorly developed infaunal community dominated by amphipods and polychaetes. The hydroid (*Corymorphapalma*) is very common on accreted sediments, while other enidarians such as the sea pen (*Stylatula elongata*) and burrowing anemone (Harenactisattenuata) are represented more sparsely and only in thicker sediment deposits. Mollusks found on the soft bottom of silted tarps include the ubiquitous bubble snail, the predatory navanax (*Navanax inermis*), covered-lip nassa, and the spotty occurrence of sea hares (*Aplysiacalifornica*). Flatfish including halibut, turbot, and round stingrays are common on the tarped areas.

Vegetation growing on tarps is typified by stands of the red alga (*Gracillaria sp.*) and scattered occurrences of eelgrass. Many small eelgrass seedlings first emerged on tarps during the summer of 2002, although some eelgrass patches were noted as early as the summer of 2001. Eelgrass patches that have persisted since 2001 have continued to expand creating scattered islands of eelgrass on the otherwise relatively clear bottom. These eelgrass islands support giant kelpfish and shiner surfperch as regular species. Some tarp edges are being recolonized by vegetative eelgrass expansion, however this is generally the exception rather than the rule. The presence of a continuous perimeter of gravel bags creates an effective barrier to colonization by vegetative eelgrass growth. Seedling recruitment appears to be the mechanism that is destined to fill out the eelgrass beds over the sediment-laden tarps.

Like Huntington Harbor, the well-sedimented tarp environments resemble the native bottom visually with burrows and hummocky topography that has been created by deposition and bioturbation. Within the shallow areas that would otherwise support eelgrass, the tarps presently support what would be considered very sparse eelgrass coverage. These areas resemble the conditions of natural recovery of a site following dredging or placement of fills. While such conditions will likely take longer to vegetate than would a restored eelgrass site, it is anticipated that these areas will ultimately recover to vegetated conditions, if the light environments are adequate. However, at the present time, the generally limited amount of eelgrass in these areas is desirable in that it improves the efficacy of Caulerpa surveys in high risk areas of the lagoon.

In conclusion, the NMFS has incorporated avoidance and monitoring measures to avoid adversely affecting federally listed and other sensitive species. These measures were developed in consultation with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service. With these measures, the Commission finds the project consistent with Sections 30230, 30233, and 30240 of the Coastal Act.

7.3 Public Access and Recreation Resources

The Coastal Act provides that:

<u>Section 30210:</u> In carrying out the requirement of Section 4 of Article X of the California Constitution, maximum access, which shall be conspicuously posted, and recreational opportunities shall be provided for all the people consistent with public safety needs and the need to protect public rights, rights of private property owners, and natural resource areas from overuse.

<u>Section 30214(a)</u>: The public access policies of this article shall be implemented in a manner that takes into account the need to regulate the time, place, and manner of public access depending on the facts and circumstances in each case including, but not limited to, the following:

(3) The appropriateness of limiting public access to the right to pass and repass depending on such factors as the fragility of the natural resources in the area and the proximity of the access area to adjacent residential uses.

7.3.1 Seagate Lagoon

Seagate Lagoon is a small privately owned waterway that branches off from Huntington Harbor. The residential community consists of single and multi-family dwellings. The lagoons are bulkheaded and surrounded by these structures and connected via culverts to Huntington Harbor; however, there is no direct access exists between the lagoons and Huntington Harbor. Boating within the lagoon is not open to the public, and consists of small watercraft launched from private property. Larger vessels are berthed at private docks within the area, and there are no public docking or launching facilities on the waterway.

Although access to the water in the project area would be temporarily restricted during monitoring, surveying, and the treatment of areas with known infestations of *Caulerpa*, upon completion of the project these area would be reopened to the public. Alternate public access near the Huntington Harbor location is available nearby at Sunset Aquatic Park and includes a public marina and boat launch facility approximately ¹/₂ mile west of the project.



Figure 1.3 – Transit Corridors and Use Restrictions in Agua Hedionda Lagoon

7.3.2 Agua Hedionda Lagoon

Agua Hedionda Lagoon is currently used for recreational purposes and is one of three enclosed marine water bodies in San Diego County that support recreational use. Water-skiing, boating, clamming, and fishing are all popular activities in the middle and east basins. There are two private boat launch facilities where the public may rent jet skis and other water sport equipment for use in a portion of the east basin. In the middle basin, a small YMCA boathouse on the western shore is used extensively for youth recreational purposes. Researchers and naturalists use the lagoon for scientific investigations, bird watching, nature study, and aqua cultural research. The Agua Hedionda Lagoon Foundation is an active, tax-exempt, publicly supported organization that sponsors many activities in connection with the conservation, preservation, and use of the lagoon.

In the west basin, the property owner provides areas for recreational fishing, which are popular among shore anglers. The rock jetties for the Encina Power Plant, associated with the inlet to the lagoon and Encina Power Plant's discharge canal, are popular fishing areas. Residential development has occurred primarily on the north side of the lagoon. It includes a private marina and two private boat launch facilities used by 260 homeowners and others for water-skiing and other water recreation.

The shoreline area adjacent to infested areas of Snug Harbor has been closed to the public during eradication efforts. Because fishing and anchoring of vessels is a potential cause of *Caulerpa taxifolia* spread to other locations, all fishing and anchoring of vessels within the inner lagoon

shall be prohibited for an initial period of one year. This policy will be reevaluated by SCCAT to further access the impacts of such closures.

At Agua Hedionda Lagoon, the shoreline area adjacent to Snug Harbor has been closed to the public during eradication efforts, and zone 2 of the Lagoon (see Figure 1-3) is closed to all recreational uses. However, other zones within the Lagoon remain open to passive uses, and zone 3 allows for limited uses that do not impede survey efforts. The rationale behind restricting public access in these locations is that some of these activities, such as fishing and the anchoring of vessels, has been identified as a cause of *Caulerpa* spreading to new locations. Other restrictions are imposed due to the effects of waves and turbidity that can hinder eradication and survey efforts as well as diver safety during these operations.

Section 30214(a) of the Coastal Act allows for the regulation of the manner and need of continued public access, specifically, the time, place, and manner, and that such access may be limited and appropriate, depending on the fragility of the natural resources in the area. Where it has been found, during efforts to control and remove the invasive species *Caulerpa taxifolia* from these waterways, portions of Agua Hedionda Lagoon and the shoreline area adjacent to Snug Harbor have been closed to the public. Because the NMFS and SCCAT identified fishing and anchoring of vessels as a potential cause of *Caulerpa* spreading to other locations, these activities shall be prohibited in the inner lagoon for an initial period of one year, and will be re-evaluated to further assess the impacts of such closures.

Although not directly by the NMFS, access to coastal waters will be temporarily restricted during monitoring, surveying, and the treatment of infestations. Upon completion of the treatment each area will be re-opened to the public. Within Agua Hedionda lagoon, some areas are still open to passive uses, and through a City of Carlsbad ordinance, other restrictions that apply to vessels are imposed due to the effects of waves and turbidity that could hinder survey efforts and diver safety in treatment areas.

Alternate public access locations are available approximately ½ mile west of the project that provide a public marina and boat launching facilities. The NMFS and SCCAT have also implemented an outreach program to keep the public informed of such closures, identify concerns of lagoon users, implement watercraft inspections to deter the spread of *Caulerpa*, and to seek assistance and support from the local community for the eradication program through information and education on the potential threat such a species poses to the marine environment. Where future *Caulerpa* infestations are found, similar access restrictions may be necessary.

The proposed project is consistent with Sections 30214 of the Coastal Act in that restrictions to public access in the affected area are of a temporary nature, the NMFS has agreed to restricted passive uses of the waterway contingent upon the success and implementation of the eradication program, and such limitations are justified based on the substantial threat the species now poses to marine ecosystems in southern California.

The Coastal Act allows for the regulation of the manner and need of continued public access, specifically, the time, place, and manner, and that such access may be limited and appropriate, depending on the fragility of the natural resources in the area. Section 30214(a)(3) of the Coastal Act is clear that limitations of public access are appropriate, if such limitations are necessary to protect fragile natural resources. The Commission therefore finds that the project is consistent with Section 30210 and 30214 of the Coastal Act.

VIII. Substantive File Documents

Rapid Response and Eradication Program for the Invasive Green Alga, *Caulerpa taxifolia* at Agua Hedionda Lagoon, Carlsbad, California

Keith Merkel and Rachel Woodfield, Merkel and Associates, 2000.

Invasive Species, California Tries to Rub Out the Monster of the Lagoon Science Magazine, 2002.

Interim Management Plan to Facilitate the Agua Hedionda Lagoon Caulerpa taxifolia Eradication Program

Agua Hedionda Lagoon User Representatives, Southern California *Caulerpa* Action Team, and the City of Carlsbad, 2002.

Caulerpa Control Protocol

National Marine Fisheries Service and the California Department of Fish and Game, 2002.

Permits/Notices

Nationwide Permit (NWP) No 27 Authorization

U.S. Army Corps of Engineers, 2000.

Proposed Regional General Permit No. 64

U.S. Army Corps of Engineers, 2001.

CEQA Notice of Exemption

California Regional Water Quality Control Board, 2000.

Concurrence with the California Coastal Commission Emergency Permit CDP 5-00-463-G for the Eradication of *Caulerpa taxifolia* in Huntington Harbor

California State Lands Commission, 2000.

Letters

Endangered Species Act Considerations of the Caulerpa Eradication and Surveillance Program in Southern California

Section 7 Internal Consultation U.S. Fish and Wildlife Service, 2002.

Emergency Permit No. 5-00-463G

California Coastal Commission, 2001.

Correspondence

- Merkel, Keith. 2002. Recolonization of Covered Areas in Agua Hedionda Lagoon and Huntington Harbor. Electronic mail to Kathleen Stycket, California Coastal Commission, October 7, 2002.
- Merkel, Keith. 2002. Existing Conditions Description and Area Calculations for Huntington Harbor and Agua Hedionda Lagoon. Electronic mail to Kathleen Stycket, California Coastal Commission, September 25, 2002.

VIV. List of Exhibits

Exhibit	Description
1	Project Location Map
2	<i>Caulerpa</i> Control Protocol, National Marine Fisheries Service/California Department of Fish and Game (2002)
3	Carlsbad Municipal Code Section 11.24
4	Interim Management Plan to Facilitate the Agua Hedionda Lagoon <i>Caulerpa taxifolia</i> Eradication Program, Agua Hedionda Lagoon User Representatives and the Southern California <i>Caulerpa</i> Action Team/City of Carlsbad, (2002)
5	Rapid Response and Eradication Program for the Invasive Green Alga, <i>Caulerpa taxifolia</i> at Agua Hedionda Lagoon, Carlsbad, California (SCCAT 2000)
6	Endangered Species Act Considerations of the <i>Caulerpa</i> Eradication and Surveillance Program in Southern California, U.S Fish and Wildlife Service (2002)
7	Emergency Permit No. 5-00-403-G, California Coastal Commission (2000)
8	Emergency Permit No. 5-00-463-G, California Coastal Commission (2001)
9	Correspondence to Ron Ball, Carlsbad City Attorney, Re: Ordinance Implementing Interim Management Plan to Facilitate the Agua Hedionda Lagoon <i>Caulerpa taxifolia</i> Eradication Program, California Coastal Commission (2002)



PROJECT LOCATION MAP CD-051-02

Agua Hedionda Lagoon



Huntington Harbor



Regional Location Map



EXHIBIT NO. 1

APPLICATION NO. CD-051-02 California Coastal Commission

CAULERPA CONTROL PROTOCOL (Version 1.1, adopted July 3, 2002)

A. Background Information:

Caulerpa taxifolia is a green alga native to tropical waters that typically grows in limited patches. A particularly tolerant clone of this species has already proven to be highly invasive in the Mediterranean Sea and efforts to control its spread have been unsuccessful. In areas where the species has become well established, it has caused ecological and economic devastation by overgrowing and eliminating native seaweeds, seagrasses, reefs, and other communities. In the Mediterranean, it is reported to have harmed tourism and pleasure boating, devastated recreational diving, and had a significant impact on commercial fishing both by altering the distribution of fish as well as creating a considerable impediment to net fisheries.

This alga poses a substantial threat to marine ecosystems Southern California, particularly to the extensive eelgrass meadows and other benthic environments that make coastal waters such a rich and productive environment for fish and birds. The eelgrass beds and other coastal resources that could be directly impacted by an invasion of *Caulerpa* are part of a food web that is critical to the survival of numerous native marine species including the commercially and recreationally important spiny lobster, California halibut, and sand basses.

Currently, *Caulerpa taxifolia* has been detected in two locations in southern California. In order to minimize the spread and introduction of this species and other potentially invasive species of this genus to other systems, the following provisions have been established.

B. Definitions:

<u>Area of Potential Effect (APE)</u> – the area surrounding an authorized project site that could be affected by activities related to the implementation of the project work. This includes the project footprint, areas where equipment is stored, areas where vessel prop-wash could occur in association with work, or in-water disposal areas used by the project. It does not include EPA designated deep-ocean disposal sites.

High Growth Period - May 1 to September 30.

<u>Infected System</u> – any bay, harbor, estuary, or lagoon in which *Caulerpa* has been identified shall be deemed an infected system regardless of where the infestation occurs geographically within the system. Following eradication and subsequent verification surveillance for two years, an infected system may be re-designated

> EXHIBIT NO. 2 APPLICATION NO. CD-051-02

California Coastal Commission

as a Caulerpa Free System by the National Marine Fisheries Service (NMFS) and California Department of Fish and Game (CDFG).

<u>NMFS/CDFG Contacts</u> – the designated federal and state agency contacts for submittal of survey reports and reports of *Caulerpa* findings. All submitted material must be provided to these agencies at the following addresses:

National Marine Fisheries	Service
Southwest Regional Office	
501 West Ocean Boulevard,	Suite 4200

Long Beach, CA 90802 Attn: Robert Hoffman

ph.: (562) 980-4043 fx.: (562) 980-4092 e-mail: Bob.Hoffman@noaa.gov

Calif. Dept. of Fish & Game South Coast Region 4949 Viewridge Drive San Diego, CA 92124 Attn: William Paznokas

ph.: (858) 467-4218 fx.: (858) 467-4299 e-mail: wpaznokas@dfg.ca.gov

<u>Survey Area</u> – the area over which surveys are conducted, typically synonymous with the Area of Potential Effect.

<u>Survey Level</u> – the level of intensity of the survey within the survey area. Survey levels are defined as either:

- 1) Surveillance General survey coverage providing a systematic sub-sampling of an area over which at least 20% of the bottom is inspected and widespread occurrences of *Caulerpa* would be expected to be identified if present.
- 2) High Intensity Surveillance High level of survey using a systematic survey approach involving direct visual observations using divers or towed cameras. Under a high intensity surveillance, a one meter or less separation between adjacent survey lines is conducted, however, survey efforts generally progress at a constant speed. This survey method generally provides for an estimated 50+% visual cover of the bottom depending upon visibility and other complicating factors.
- Eradication Area Surveys Under this survey level, visual searches using divers are conducted systematically to ensure 95+% viewing of the study area. Divers move at a rate appropriate to the site conditions to ensure that all areas are comprehensively searched irrespective of site conditions which may complicate surveys.

C. Reporting Requirements:

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- 1. Surveys conducted in accordance with requirements outlined in this document shall be submitted to the NMFS/CDFG Contacts within 15 days of completion of each survey. Surveys shall be submitted on the attached survey form or in a suitable reproduction of the form fields.
- 2. If *Caulerpa* is identified at a permitted project site during a survey or at any other time prior, during, or within 120 days after completion of authorized activities, the NMFS/CDFG Contacts shall be contacted within 24 hours of first noting the occurrence.
- 3. For survey actions requiring input or coordination with NMFS/CDFG Contacts, please provide information in a timely fashion and allow at least 5 working days for agency coordination and feedback.

D. Surveys within Caulerpa Free System:

- 1. Prior to initiation of any permitted activities, a pre-construction survey of the project APE shall be conducted to determine the presence or absence of *Caulerpa taxifolia*. Survey work shall be completed not earlier than 90 days prior to planned construction and not later than 30 days prior to construction.
- 2. The results of that survey shall be transmitted to NMFS and CDFG at least 15 days prior to initiation of proposed work and shall include submittal of the completed survey reporting form (see attached).
- 3. In the event that *Caulerpa* is detected within the area of potential effects, then no work shall be conducted until such time as the infestation has been isolated, treated and the risk of spread is eliminated in accordance with section F.
- 4. Exemptions Individual, privately owned boat docks and related structures are exempt from provisions 1-3 of this section when such facilities are found in *Caulerpa* Free Systems and permitted activities are limited to structural repairs, replacement, modification, and pile driving and do not include dredging or other significant bottom disturbing activities.

E. Surveys within Infected Systems:

The following survey conditions shall apply to in-water projects within systems where *Caulerpa taxifolia* has been identified.

1. Prior to initiation of any permitted activities within an infected system, two surveys, initiated not less than 60 days apart, shall be conducted within the project Area of Potential Effect during the high growth period for *Caulerpa taxifolia* in southern California (1 May through 30 September). The first survey may be

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conducted using High Intensity Surveillance techniques, however, the second survey must be conducted using Eradication Area Surveys.

- 2. At least one survey must be conducted within 45 days of initiation of dredging. This survey could be the second survey conducted during the high growth period or may be a subsequent survey conducted prior to initiation of dredging. Thus, a total of up to three pre-project surveys may be required depending on the timing of the dredging. This survey shall be conducted at a High Intensity Surveillance or Eradication Area Survey level as warranted dependent upon site circumstances and proximity to infestations as determined by the NMFS/CDFG Contacts. To determine appropriate survey level, please contact the NMFS/CDFG Contacts with project specific information.
- 3. If bottom disturbing project activities extend for over 90 calendar days, those areas that would experience further bottom disturbance in subsequent periods of activity must be surveyed using High Intensity Surveillance techniques within 15 days following the first 90 days. This process shall be repeated for areas remaining to be effected following each subsequent 90 day period during which bottom disturbing activities are occurring.
- 4. If dredged material is to be removed from the APE and placed elsewhere in the marine environment, then no sooner than 60 days after completion of the dredged area and disposal site, during the next high growth period, the applicant shall conduct a Surveillance level survey of any disposal areas except where material is disposed of within an existing EPA designated deep ocean disposal site. The specific survey requirements will be determined by NMFS and CDFG on a case by case basis.

F. If Caulerpa is Found:

1. If *Caulerpa* is found, then the NMFS/CDFG Contacts shall be notified within 24 hours of the discovery.

- 2. All *Caulerpa* assessment and treatment shall be conducted under the auspices of the CDFG and NMFS as the state and federal lead agencies for implementation of *Caulerpa* eradication in California.
- 3. Within 96 hours of notification, the extent of the *Caulerpa* infestation within the project APE shall be fully documented. Immediately thereafter, the infested areas shall be securely contained using PVC liners and treated with surface applications of slow release chlorine pucks in an even distribution under the lined area and a 5% or higher sodium hypochlorite solution injected under the liners to the kill the *Caulerpa taxifolia*. Hypochlorite solution must also be injected into the sediment to a depth of at least 20 centimeters within a 3-meter radius of the known *Caulerpa* location. Sediment injection shall be done through a pressurized

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chlorination system with injections being spaced no farther apart than 20 centimeters and consisting of not less than 500 milliliters of solution per injection point. Subsequent injections may be made if practical and warranted based on the consistency of the sediment and total organic load under the liners. This eradication technique is subject to change at the discretion of NMFS and CDFG.

- 4. If it is determined that the liner contained and treated material is in no danger of being released by the activities permitted within the APE, then the liners shall be left in place until the ultimate disposition of the treatment site may be determined and measures may be taken in accordance with best available eradication practices available at the time. However, if it is determined that liner contained and treated *Caulerpa* has the potential to be released by activities within the APE, then the following measures shall be implemented prior to conducting permitted work:
 - a) Not earlier than two weeks following treatment, a minimum of six sediment cores are to be taken to a depth of 20 cm from within the treated patches to search for viable alga fragments. Cores shall be examined and tested for viability at an authorized off-site facility. The precise procedures for the number of cores and testing of viability shall be determine on a case-by-case basis in consultation with NMFS and CDFG. If materials are found to continue to support viable alga, additional sampling shall be conducted two weeks later and additional treatment may be implemented.
 - b) When tested core materials are determined to be free of viable fragments, then surface sediments from within the treated site are to be extracted to a depth of 25 cm treated and disposed of as follows:
 - 1) Within 30 days following confirmation of no viability in tested cores, the treatment area shall be surrounded by a containment screen of no greater porosity than 0.5 mm and the liner cover shall be removed.
 - 2) The surface sediments within the containment area shall be removed to a depth of 25 centimeters using a diver-assisted suction dredge.
 - 3) Material, including return water, shall be pumped into a chlorination tank and maintained at a concentration of 0.5% chlorine for a period of not less that 6 hours prior to upland disposal of treated material or other authorized disposal alternatives.
- 5. If dredged material is to be removed from the APE and placed elsewhere in the marine environment, then no sooner than 60 days after completion of the dredged area and disposal site, during the next high growth period, the applicant shall conduct a Surveillance level survey of any disposal areas except where material is disposed of within an existing EPA designated deep ocean disposal site. The

specific survey requirements will be determined by NMFS and CDFG on a case by case basis.

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6. This policy does not vacate any additional restrictions on the handling, transport, or disposal of *Caulerpa* that may apply at the time of permit issuance or in the future. It is incumbent upon the permittee to comply with any other applicable State or Federal regulations, restrictions or changes to the Protocol that may be in effect at the time of initiation of authorized activities.

Caulerpa Survey Reporting Form (Version 1.0, September 18, 2001)

This form is required to be submitted for any surveys conducted for the invasive exotic alga *Caulerpa* taxifolia that are required to be conducted under federal or state permits and authorizations issued by the U.S. Army Corps of Engineers or Regional Water Quality Control Boards (Regions 8 & 9). The form has been designed to assist in controlling the costs of reporting while ensuring that the required information necessary to identify and control any potential impacts of the authorized actions on the spread of *Caulerpa*. Surveys required to be conducted for this species are subject to modification through publication of revisions to the *Caulerpa* survey policy. It is incumbent upon the authorized permittee to ensure that survey work is following the latest protocols. For further information on these protocols, please contact: Robert Hoffman, National Marine Fisheries Service, (562) 980-4043, or William Paznokas, California Department of Fish & Game, (858) 467-4218).

Site Name:	
(common reference)	
Survey Contact:	
(name, phone, e-mail)	
Permit Reference:	
(ACOE Permit No.,	
RWQCB Order or Cert. No.)	
Hydrographic System:	
(bay, estuary, lagoon, or	
harbor)	
Specific Location:	
(UTM, Lat./Long., datum,	
accuracy level, attach	
electronic survey area map if	
possible)	
to an an an and the second	
Was Caulerpa Detected:	
Was Caulerpa Detected: (if Caulerpa is found, please	Yes, Caulerpa was found at this site and
Was <i>Caulerpa</i> Detected: (if <i>Caulerpa</i> is found, please immediately contact the	Yes, Caulerpa was found at this site and
Was Caulerpa Detected: (if Caulerpa is found, please immediately contact the permitting agency project	Yes, Caulerpa was found at this site and
Was Caulerpa Detected: (if Caulerpa is found, please immediately contact the permitting agency project staff and NMFS or CDFG	Yes, Caulerpa was found at this site and has been contacted on date.
Was Caulerpa Detected: (if Caulerpa is found, please immediately contact the permitting agency project staff and NMFS or CDFG personnel identified above)	Yes, Caulerpa was found at this site and has been contacted on date.
Was Caulerpa Detected: (if Caulerpa is found, please immediately contact the permitting agency project staff and NMFS or CDFG personnel identified above)	Yes, Caulerpa was found at this site and has been contacted ondate. No, Caulerpa was not found at this site.
Was Caulerpa Detected: (if Caulerpa is found, please immediately contact the permitting agency project staff and NMFS or CDFG personnel identified above)	Yes, Caulerpa was found at this site and has been contacted ondate. No, Caulerpa was not found at this site.
Was Caulerpa Detected: (if Caulerpa is found, please immediately contact the permitting agency project staff and NMFS or CDFG personnel identified above)	Yes, Caulerpa was found at this site and has been contacted ondate. No, Caulerpa was not found at this site.
Was Caulerpa Detected: (if Caulerpa is found, please immediately contact the permitting agency project staff and NMFS or CDFG personnel identified above) Description of Permitted	Yes, Caulerpa was found at this site and has been contacted ondate. No, Caulerpa was not found at this site.
Was Caulerpa Detected: (if Caulerpa is found, please immediately contact the permitting agency project staff and NMFS or CDFG personnel identified above) Description of Permitted Work:	Yes, Caulerpa was found at this site and has been contacted ondate. No, Caulerpa was not found at this site.
Was Caulerpa Detected: (if Caulerpa is found, please immediately contact the permitting agency project staff and NMFS or CDFG personnel identified above) Description of Permitted Work: (describe briefly the work to	Yes, Caulerpa was found at this site and has been contacted ondate. No, Caulerpa was not found at this site.
Was Caulerpa Detected: (if Caulerpa is found, please immediately contact the permitting agency project staff and NMFS or CDFG personnel identified above) Description of Permitted Work: (describe briefly the work to be conducted at the site	Yes, Caulerpa was found at this site and has been contacted ondate. No, Caulerpa was not found at this site.
Was Caulerpa Detected: (if Caulerpa is found, please immediately contact the permitting agency project staff and NMFS or CDFG personnel identified above) Description of Permitted Work: (describe briefly the work to be conducted at the site under the permits identified	Yes, Caulerpa was found at this site and has been contacted ondate. No, Caulerpa was not found at this site.
Was Caulerpa Detected: (if Caulerpa is found, please immediately contact the permitting agency project staff and NMFS or CDFG personnel identified above) Description of Permitted Work: (describe briefly the work to be conducted at the site under the permits identified above)	Yes, Caulerpa was found at this site and has been contacted ondate. No, Caulerpa was not found at this site.
Was Caulerpa Detected: (if Caulerpa is found, please immediately contact the permitting agency project staff and NMFS or CDFG personnel identified above) Description of Permitted Work: (describe briefly the work to be conducted at the site under the permits identified above)	Yes, Caulerpa was found at this site and has been contacted ondate. No, Caulerpa was not found at this site.

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Description of Site:	Depth range:		Í
(describe the physical and	Substrate type:		
biological conditions within the	Temperature:		
survey area at the time of the	Salinity:		
survey and provide insight into variability, if known. Please provide units for all numerical information)	Dominant flora:		
	Dominant fauna:		
	Exotic species encountered:	v	
	Other site description notes:		
Description of Survey	Survey date and		
Effort:	time period:		
(nlease describe the surveys	Horizontal		
conducted including type of	visibility in water:		
survey (SCUBA, remote video, etc.) and survey methods employed, date of	Survey type and methods:	· ·	
work, and survey density (estimated percentage of the bottom actually viewed).			
Describe any limitations	الا المراجع ال المراجع المراجع	 A second state of the second stat	
survey efforts	Survey personnel	a see an in the second seco	
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	Survey density:		
	Survey limitations:		
Other Information: (use this space to provide any additional information or references to attached materials such as maps, reports, etc.)			

Caulerpa Survey Reporting Form (version 1.0, 9/18/01)

PROPOSED REVISIONS TO CHAPTER 11.24 OF THE CARLSBAD MUNICIPAL CODE

11.24.010 Definitions.

For the purposes of this chapter the definitions set forth in the State Harbors and Navigation Code, Vehicle Code and California Administrative Code, as amended to date, and as follows, shall apply:

(a) "Personal watercraft area" means that portion north of the red marker buoys at the northwest end of the inner lagoon.

(b) "Powerboat area" means the middle area of the inner lagoon, between the personal watercraft and passive use area.

(c) "Passive use area" means the eastern end of the inner lagoon east of the red marker buoys.

(d) "Slalom course area" means that portion of the inner lagoon located parallel to the southeastern shoreline within both the powerboat and passive use areas, one thousand eight hundred fifty feet long and no more than one hundred fifty feet north of the slalom course and one hundred fifty feet west of the passive use area, as defined by marker buoys.

11.24.015 Special use area--Agua Hedionda Lagoon.

Of the entire Agua Hedionda Lagoon, consisting of three sections known as outer lagoon, inner lagoon and middle lagoon, only the inner lagoon is declared to be a "special use area" defined in California Harbors and Navigation Code Section 651 authorized for local rules by Section 600(a) as authorized by California Harbors and Navigator Code Section 660. Use of the inner lagoon is subject to the provisions of this chapter and any regulations adopted by resolution of the city council.

11.24.020 Lagoon use permits.

It is unlawful to operate any type of vessel on the inner lagoon without first obtaining a city annual or temporary lagoon use permit issued by the city manager or designee, or a daily lagoon use permit issued by Snug Harbor Marina office. The vessel operator shall display the city's annual permit decal in the specified location at all times or possess and show upon request a valid city temporary or daily lagoon use permit. The following requirements shall be met to obtain a lagoon use permit:

(1) Permit application and hold harmless indemnity agreement shall be filled out and signed by a responsible adult;

(2) The current permit fee as established by the city council by resolution must be paid;

(3) The fee is nonrefundable and nontransferable;

(4) Those vessels that are required by California Department of Motor Vehicles to obtain vessel registration shall provide a copy of valid vessel registration;
(5) Lagoon use permits are not required for dredging, research, patrolling or maintenance by the lagoon owner and/or its representative.

11.24.055 Fishing.

Fishing from the shoreline or from a passive vessel shall be limited to the passive use area; fishing from a powerboat shall be limited to the powerboat area. It is unlawful to cast fishing lines into any transit corridor or in the traffic pattern of any vessel.

11.24.056 No fishing or anchoring in posted areas.

(a) Notwithstanding any other provision of this chapter, no person may fish or anchor a boat in any area of the inner lagoon that has been posted with a sign prohibiting these activities.

(b) The city manager may post or authorize the posting of a sign prohibiting fishing and anchoring in an area of the inner lagoon if the city manager finds, based on available biological data, that prohibiting these activities in the area is necessary to prevent the spread of destructive algae inside and outside of the lagoon.

(c) Nothing in this section precludes a person from anchoring in an emergency situation in order to prevent personal injury or property damage.

(d) This section shall be operative until September 30, 2003, at which time it shall be automatically repealed unless extended by further action of the city council.

11.24.130 Compliance with chapter and orders.

It is unlawful for any person to violate any provision of this chapter, including to refuse to follow or comply with the regulations adopted pursuant to Section 11.24.135 or with any lawful sign, order, warning signals or other lawful direction of a police officer, a community services officer or a lifeguard except for the purpose of making a rescue, or for any person without lawful authority to deface, injure, knock down or remove any sign or warning placed for the purpose of enforcing the provisions of this chapter.

Operators of vessels on the lagoon shall, upon approach of a marked enforcement vessel displaying a blue light, immediately yield the right-of-way to said enforcement vessel and, upon direction by the operator of the enforcement vessel, come to a stop.

11.24.137 Enforcement by police department--Authority of community services officers.

Except for the issuance of Lagoon use permits by the city manager or designee pursuant to Section 11.24.020, the police department shall enforce this chapter, including violation of any regulations adopted by the city council pursuant to Section 11.24.135, along with any violation of the California Harbors and Navigation Code, Penal Code, Vehicle Code, or implementing regulations thereof, pertaining to the inner lagoon. The community service officer IIIs who are assigned by the chief of police or designee to enforce the above referenced laws, are charged with enforcement of those laws and regulations, and are authorized and empowered to act pursuant to Penal Code Sections 836.5 and 853.6 to arrest or issue a citation to any person without a warrant, whenever such officer has reasonable cause to believe that the person to be arrested or cited has committed a violation of such laws or regulations which the officer has the duty to enforce and the violation was committed in the officer's presence.

INTERIM MANAGEMENT PLAN

TO FACILITATE THE AGUA HEDIONDA LAGOON CAULERPA TAXIFOLIA ERADICATION PROGRAM

June 4, 2002

Prepared by:

Agua Hedionda Lagoon User Representatives (AHLUR)

the

Southern California Caulerpa Action Team (SCCAT)

and the

City of Carlsbad Police Department Planning Department

> EXHIBIT NO. 4 APPLICATION NO. CD-051-02

California Coastal Commission

INTERIM MANAGEMENT PLAN TO FACILITATE THE AGUA HEDIONDA LAGOON CAULERPA TAXIFOLIA ERADICATION PROGRAM

PURPOSE AND OVERVIEW

The purpose of this Interim Management Plan for Agua Hedionda Lagoon ("Management Plan") is to facilitate the successful implementation of the Rapid Response and Eradication Program for the invasive green alga, *Caulerpa taxifolia* overseen by the Southern California *Caulerpa* Action Team ("SCCAT"). The Management Plan provides a regulatory framework for a cooperative relationship between lagoon users and those overseeing and implementing the eradication efforts. It includes elimination of some recreational uses altogether as well as time and place regulation of other recreational activities until *Caulerpa* can be eradicated from the lagoon system. The Management Plan is being undertaken as a pilot effort in an attempt to minimize impacts to lagoon users while continuing to accomplish the work necessary to eradicate *Caulerpa* from the lagoon.

The overriding purpose of this Management Plan is to facilitate the safe and efficient eradication of *Caulerpa taxifolia* in an expeditious manner and thereby minimize the risk of spread of this species to the outer coast. Thus, the regulations contained within it are designed to accommodate *Caulerpa taxifolia* surveys and eradication efforts first and, secondarily, recreational use of the lagoon. Safe implementation of the program is construed to mean that the program is safe for the public lagoon users as well as for the eradication implementation team.

Management Plan implementation is to be overseen by SCCAT members with the cooperation of recreational lagoon users and the concurrence of the City of Carlsbad. Participation of recreational lagoon users is an essential element of this plan, particularly businesses and waterfront property owners who control or regulate access to the lagoon. Successful implementation will depend on educating all lagoon users and self-policing by recreational users. Also, adequate notice of survey and eradication efforts by SCCAT is an essential component of the Plan.

Although the Plan anticipates voluntary compliance, recreational use limitations established by the Plan are to be incorporated into the Agua Hedionda Lagoon Regulations found in Chapter 11.24 of the Carlsbad Municipal Code ("CMC") and will be subject to enforcement by the Carlsbad Police Department, as well as other law enforcement personnel, including, but not limited to, California Department of Fish & Game wardens.

SCOPE AND DEFINITIONS

The scope of this Management Plan is limited to the inner lagoon portion of the Agua Hedionda Lagoon that is subject to the regulations found in Chapter 11.24 of the Carlsbad Municipal Code.

This Management Plan is specifically designed to address an interim condition of the lagoon and is not intended to establish a permanent change in lagoon uses. Longterm lagoon uses are subject to actions of the underlying private land owner, the City of Carlsbad, and various state and federal resource and regulatory agencies acting within the context and constricts of their individual regulatory authorities. Nothing in this Management Plan shall be construed as either expanding or contracting the separate authorities of these parties and nothing in this plan shall be construed as dictating future options for lagoon management.

The definitions in Section 11.24.010 of the Carlsbad Municipal Code apply to this Management Plan. Other definitions applicable to this plan are outlined as follows:

Agua Hedionda Lagoon User Representatives (AHLUR) – The following representatives:

- Wayne Brechtel, Bristol Cove Property Owners Association
- Jim Courtney, Carlsbad Boat Club
- Gene Huber, North Shore Property Owners
- Mike Marsdon/Floyd Packard, Recreational Boating
- Richard Mahler, Bristol Cove Boat & Ski Club
- Diane Richards, Passive Users
- Greg Rusing, California Water Sports

Designated representatives may be changed by providing written notice to the City of Carlsbad and the SCCAT Steering Committee.

Eradication Activities – All activities including survey and treatment being undertaken within Agua Hedionda Lagoon to eliminate the presence of Caulerpa.

- Eradication Team or Eradication Contractor Any person or entity under contract with the City of Carlsbad or authorized by the City of Carlsbad to conduct *Caulerpa taxifolia*, eradication work within Agua Hedionda Lagoon.
- SCCAT Southern California Caulerpa Action Team, a multiple agency and organization group established to respond to the California infestations of *Caulerpa taxifolia*, including, among others, representatives from the Regional Water Quality Control Board, California Department of Fish and Game, National Marine Fisheries Service, Agua Hedionda Lagoon Foundation and Cabrillo Power I, LLC. The City of Carlsbad's City Manager or a designee is invited to attend all

SCCAT and SCCAT Steering Committee meetings to serve as a liaison between the City and these groups.

SCCAT Steering Committee – The decision-making managing board of SCCAT consists of the following:

• Robert Hoffman, National Marine Fisheries Service (lead Federal agency)



Agua Hedionda Lagoon Inner Lagoon Survey Zones.

Figure 2. Agua Hedionda Lagoon Inner Lagoon Survey Schedule .

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<u>Transit Zones</u>: Transit zones shall be no wake 5 mph zones within 200 feet of any eradication efforts. Transit zones shall stay open during closure periods, unless it is determined that portions must be closed to accommodate survey or eradication efforts. In such instances, the duration of any transit zone closure shall be limited to the extent possible and alternative transit shall be accommodated around the closure area.

<u>Slalom Course</u>: The slalom course shall remain open under the current governing regulations. However, when eradication work is to occur within the course area, this work shall take precedence over other uses, and boats will not be run through the course while eradication activities are within 200 feet of the course. Course users are expected to experience intermittent delays while the area is surveyed.

Weekends and Holidays: With the exception of Zone 2, which is closed entirely to recreational use, closures shall not occur unless it is determined that special circumstances require work during weekends and holidays. In such instances, closures shall be limited to the extent possible.

Impact of Closures: Except where expressly stated otherwise, closure of a zone shall prohibit all recreational activities. Non-closure of a zone shall not prohibit ongoing eradication work. Recreational use of a closed zone may be allowed on individual days, if such use would not impede survey or eradication work. There is no obligation to allow use of a closed zone, and any authorization granted will never extend beyond the day it was granted.

<u>Implementation</u>: Closures shall be scheduled by the eradication contractor, at least one week in advance whenever possible, and notice shall be provided as follows:

- 1. Weekly Postings: At the beginning of each week, a schedule of closure dates and times, going out at least four weeks, shall be posted at lagoon launch facilities, selected public access points and on a designated internet website. A copy will also be placed on file in the City Clerk's office. The postings shall include a zone map with closure information, the date the schedule was last updated and a call-in telephone number for more current information.
- 2. **Daily Updates:** Daily updates of closure information will be provided on a recorded telephone message that can be accessed by using the designated call-in number.

This Plan provides a flexible approach to allow extension of closures when necessary and reduction in closures when circumstances allow. For this reason, a daily check of the dial-in recording is considered to be the best source for current information.

Closure Markers: During closure periods, individual Zones shall be marked with a centrally located closure marker.

AREA CLOSURES FOR CAULERPA TREATMENT

It is anticipated that *Caulerpa* infestation areas are likely to be found during the completion of summer season surveys. To minimize spread of *Caulerpa*, it is imperative that material be contained and treated in the most expeditious fashion practical. This may require up to several days to accomplish containment and treatment of identified patches, and work will generally commence upon identification and assessment of any material located. While treatment is being accomplished in a given area, one or more affected zones may be closed to recreational uses, or smaller treatment areas may be buoyed off to protect the treatment area and eradication team staff working within the site. Treatment areas shall be fully marked and monumented during completion of work. Closures for treatment may occur at any time and will be noticed on the dial-in recording. Efforts will be made to efficiently and expeditiously treat any identified *Caulerpa*.

PROHIBITION OF LARGE WAKES

Creation of large wakes within the inner lagoon shall be prohibited for a preliminary period of one (1) year. For purposes of this section, large wakes are defined as wakes in excess of 12 inches when measured from the undisturbed water surface to the top of crest.

Implementation: CMC Amendment, effective until June 1, 2003. Prior to any scheduled expiration of the large wake prohibition, the Lagoon Management Committee shall report back to the Carlsbad City Council and make recommendations regarding whether it should be extended and/or modified.

Enforcement: Large wake generation prohibitions shall be enforced by the Carlsbad Police Department and other law enforcement personnel, not limited to California Department of Fish & Game wardens.

SAFETY

To help ensure the safety of the public using the lagoon and the eradication team, the following actions are to be taken: 1) eradication efforts are to be coordinated with the public through internet and call-in notification processes described elsewhere; 2) eradication work areas are to be well marked while activities are underway; 3) areas supporting small floats are to be denoted by larger floats delimiting the area, and no small floats are to be left in the water over a weekend; 4) lines placed on the bottom to guide surveys or mark treatment areas shall be well anchored near the bottom and shall be of a non-floating material; and, 5) except as required in transit lanes, boaters are to keep 200 feet from eradication vessels flying a dive flag or operating a survey beacon denoting limited maneuverability. Within transit lanes, boats passing within 200 feet of an eradication operation shall maintain a speed of 5 mph.



This Plan does not alter the City of Carlsbad's authority to regulate the lagoon for safety purposes. If at anytime the City deems that the Plan is either not being safely implemented or cannot be safely implemented, the City shall take whatever actions it deems prudent and are required to ensure protection of all lagoon users.

INSPECTION OF VESSELS AND EQUIPMENT

While *Caulerpa taxifolia* is negatively buoyant and thus tends to sink, there is a slight potential that material may be inadvertently picked up on boats, trailers, water skies, wakeboards, or other equipment and transferred out of the lagoon and potentially to other waterbodies. To curb the risk of Caulerpa spread, lagoon users shall inspect their personal boats and equipment for any fragments of Caulerpa whenever they are pulled from the water. In the event that any plant material is found on equipment or vessels, the material shall be removed, be placed in a sealed container and be disposed of pursuant to posted directions or, in the alternative, shall be turned over to a representative of the Eradication Team or Eradication Contractor, along with any information that may be helpful in determining the source of material within the lagoon, such as areas in which the vessel or equipment had been last used. As a condition of obtaining a Lagoon Use Permit, equipment and vessels leaving the lagoon shall be subject to inspection for the presence of Caulerpa by the Carlsbad Police Department and other law enforcement personnel, not limited to California Department of Fish & Game wardens.

OVERALL PLAN ENFORCEMENT

This Plan is intended to be adopted through amendments to the Carlsbad Municipal Code and shall be enforceable by the Carlsbad Police Department, as well as other law enforcement personnel, not limited to California Department of Fish & Game wardens. Penalties for violations may entail fines and/or denial, suspension or revocation of lagoon permits.

It is to the benefit of all lagoon users to self-police their activities and voluntarily comply with this Management Plan in order to best protect the safety of the general public and members of the *Caulerpa* eradication team, and to most effectively facilitate the efficient implementation of the *Caulerpa* eradication program.

PLAN APPROVAL:

This Plan shall be subject to adoption by the City of Carlsbad by resolution of the City Council. The the Agua Hedionda Lagoon Ordinance, found in Chapter 11.24 of the Carlsbad Municipal Code, shall be amended where necessary to ensure the closure and use regulations of this Plan are enforceable.

PLAN AMENDMENTS

This Plan has been prepared to address concerns for efficiency of eradication efforts, as well as safety concerns for both public lagoon users and eradication teams. The Plan is a pilot effort to coordinate activities to the extent practical. However, it has no precedent within the lagoon and, as such, should be considered a trial attempt. Recognizing this fact, it is assumed that there may be occasions where there is a need to revisit elements of the Plan and make amendments. Such needs have been contemplated in the drafting of this Plan. To ensure that Plan flexibility is provided and readily accommodated, the following approval and amendment process is incorporated.

Plan amendments shall require approval of the City of Carlsbad by resolution of the City Council. Prior to consideration of any Plan amendments, written notice of the proposed amendments shall be provided to the SCCAT Steering Committee, Agua Hedionda Lagoon User Representatives, City of Carlsbad's City Manager, Planning Director, Police Chief, and Recreation Director, or their designated representatives. Whenever possible, at least 30 days notice shall be provided, and the parties shall meet to discuss and work in good faith towards a consensus recommendation to the City Council. If a consensus is not reached, the City Council shall be informed of the differing viewpoints.

ANNUAL REVIEW AND REPORT TO THE CITY COUNCIL

The Lagoon Management Committee shall report back to the Carlsbad City Council annually, beginning no later than January 2003, regarding the Management Plan's effectiveness and shall make recommendations regarding extension and/or modification of Plan elements as required by the Plan or as the Committee or its members deem appropriate.

RAPID RESPONSE AND ERADICATION PROGRAM FOR THE INVASIVE GREEN ALGA, *CAULERPA TAXIFOLIA* AT AGUA HEDIONDA LAGÓON, CARLSBAD, CALIFORNIA

Prepared for:



Southern California Caulerpa Action Team

- Regional Water Quality Control Board San Diego Region (RWQCB-SD)
- California Department of Food and Agriculture (CDFA)
- U.S. Department of Agriculture (USDA)
- California Department of Fish and Game (CDFG)
- National Marine Fisheries Service (NOAA-NMFS)
- U.S. Fish and Wildlife Service (USFWS)
- Cabrillo Power I, LLC (Cabrillo)
- Merkel & Associates, Inc. (M&A)
- San Diego County Department of Agriculture (SDCDA)
- Environmental Protection Agency (USEPA)
- San Francisco Estuary Institute (SFEI)
- Aquatic Nuisance Species Task Force (ANSTF)

Prepared by:

July 12, 2000

Keith Merkel, Merkel & Associates, Inc. Rachel Woodfield, Merkel & Associates, Inc.

EXHIBIT NO. 5 APPLICATION NO. CD-051-02

California Coastal Commission

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RAPID RESPONSE AND ERADICATION PROGRAM FOR THE INVASIVE GREEN ALGA, *CAULERPA TAXIFOLIA* AT AGUA HEDIONDA LAGOON, CARLSBAD, CALIFORNIA

INTRODUCTION

Caulerpa taxifolia (Mediterranean form), an extremely invasive green alga that is presently destroying the ecosystems of the northern Mediterranean Sea was banned from importation into the United States under the federal Noxious Weed Act. While the devastation this species could bring to the United States' shorelines has been previously noted both in the scientific journals and popular press, it has previously not previously been identified in the waters of the Western Hemisphere. However, on June 12, 2000 an apparently localized infestation of *C. taxifolia* was identified in Agua Hedionda Lagoon in Carlsbad, California in San Diego County (Figure 1).

With the identification of the Agua Hedionda Lagoon infestation, a number of actions have been put in motion to eradicate this local infestation and prepare for potentially more expansive occurrences that may already exist in other coastal waters. Included among the first elements to controlling the infestation, an action committee has been established from those entities with relevant authorities, expertise, resources, and/or vested rights and interests in the lagoon and its resources. The Southern California *Caulerpa* Action Team (SCCAT) is the group assembled to address the present infestation issues. It is a public/private partnership established with the sole purpose of completing activities related to the eradication of *Caulerpa* in an efficient and well-devised manner.

On August 3, 1999 the Aquatic Nuisance Species Task Force received a Prevention Program for the Mediterranean Strain of *Caulerpa taxifolia* prepared by Sandra Keppner and Russell Caplen, ANSTF members. This prevention program includes applicable guidance for the preparation of an eradication program. This guidance, along with an outline of an action plan prepared by Nate Dechoretz, CDFA, SCCAT technical program supervisor, form the basis for the plan that has been prepared and presented herein.

This document serves as the guidance document for the implementation of a rapid response and eradication program for the known Agua Hedionda Lagoon infestation. This plan further provides direction for immediate actions in the form of surveillance in other waters and limited public outreach. It does not address the needs to develop a long-term comprehensive control plan for *Caulerpa taxifolia* that will now be required given the knowledge that this species is now present in the southern California region.

Figure 1. Locator map for of Agua Hedionda Lagoon.



PLAN PURPOSE AND GOALS

This document addresses numerous elements essential to effective eradication of the present incipient occurrence of *Caulerpa*. The major components of this plan are:

- 1. Leadership and Organization
- 2. Coordination, Cooperation and Partnership
- 3. Survey and Detection
- 4. Eradication Implementation
- 5. Monitoring and Restoration
- 6. Public Outreach and Information
- 7. Applicable Regulatory Elements
- 8. Resources and Funding

Each of these components is expounded upon in the sections that follow. This plan is designed to aid in governing all aspects of the eradication effort from communications to eradication, to follow-up requirements. It is also designed to be a living document that may be amended to address program changes or new issues as they arise. Plan amendments are to be made through a formal process described herein and will be distributed to the SCCAT within 48 hours of any significant changes.

The principal goal of this plan is to provide a guide for the implementation of a rapid, multiple element action program to eradicate *Caulerpa taxifolia* from Agua Hedionda Lagoon and protect against the spread of this noxious weed to other areas of the coastline.

The program has the following objectives:

- 1. Establish the specific roles of SCCAT members and other agencies and organizations relative to the activities being undertaken through this plan;
- 2. Establish processes for coordination and communications between SCCAT members and partners;
- 3. Identify the actual extent of infestation both within and outside of the lagoon;
- 4. Determine the best course of action for control of *Caulerpa* using existing data, and completing further testing;
- 5. Outline a program for eradication that employs the selected defensible methods that are best suited to the specific conditions of Agua Hedionda Lagoon and level of infestation present;
- 6. Characterize the extent and permanence of anticipated collateral damage to lagoon resources that are contemplated with the proposed eradication methods and discuss these in the context of the level of risk of less aggressive controls or a non-action alternative;
- 7. Identify the post-eradication monitoring and restoration requirements;
- 8. Outline the specific public outreach and information dissemination activities to be completed by the SCCAT and the methods to be used in such communications;
- 9. Outline the applicable regulatory programs that affect the eradication and control efforts and identify means of compliance with programs;
- 10. Identify the short-term and long-term resources available to implement the eradication and surveillance efforts, and;
- 11. Identify any gaps in the control program and means to fill any voids in the program in advance of the need.

LEADERSHIP AND ORGANIZATION

The SCCAT is comprised of a number of federal, state, and local agencies as well as private organizations. Many of the SCCAT members have independent and overlapping authorities, jurisdictions, and expertise that may be either complementary or dysfunctional under varying circumstances. To ensure that the SCCAT functions effectively and efficiently this section of the plan establishes the roles and responsibilities of the SCCAT members relative to the key actions to be taken under the plan. The individuals and organizations represented on the SCCAT are indicated in the organizational chart presented in Figure 1. The technical advisory direction of the eradication effort rests with the California Department of Food and Agriculture (CDFA), however, the lead agency for the eradication efforts has been identified as the Regional Water Quality Control Board, San Diego Region (RWQCB-SD). Key roles in the program are:

• Technical Program Supervisor - Nate Dechoretz, CDFA, Integrated Pest Control

This program is being conducted under the technical advisory direction of the California Department of Food and Agriculture (CDFA). The CDFA, through its technical program supervisor provides guidance to the various aspects of the program playing both the key advisory role in the immediate action program for the Agua Hedionda Lagoon incipient infestation as well as the preparation of a long-term regional control program for the species (not addressed in this action plan). CDFA has been requested to serve in this role due to this agency's direct relevant experience in implementing eradication efforts for agricultural pest species.

• Lead Agency Manager - Greig Peters, RWQCB-SD

As the lead agency representative for the implementation of the immediate action program, the Regional Board has the authority to direct contractor activities in the eradication efforts. Because of the overall greater experience of CDFA in addressing exotic pest infestations, the RWQCB will seek and use, to the greatest extent practicable, the advise and counsel of the technical program supervisor. However, the lead agency manager shall ultimately be responsible for directing the onsite eradication efforts under the auspices of the Clean Water Act and the Porter-Cologne Act.

• Technical Advisory Team – Chair: Lars Anderson, USDA, Invasive and Exotic Weed Research The technical advisory team is to serve as an advisory body to assist the program supervisor by providing constructive and pertinent information useful in making informed decisions on the eradication program approach. The advisory team is comprised of experts in pest species research and control methods, *Caulerpa taxifolia* infestations, invasive species education, the human uses, the physical, chemical, and biological environment of the infested waterbody, natural resource management issues, and cost concerns relative to the eradication program. To provide a focused conduit for information assimilation, a chair for this committee has been designated. All information and recommendations from the advisory team shall be provided through the chair, who will serve to assimilate information for the program supervisor and will also be responsible for dissemination of information to technical advisory team members.

Figure 2. SCCAT Organization Chart For Immediate Action Program





• Media Relations Committee – Chair: Robert Hoffman, National Marine Fisheries Service The media relations committee is responsible for coordination of all outside communications to be broadcast to the general public or focused constituent groups. This group is responsible for preparation of any update material and dissemination of materials as directed by the program supervisor. All information or statements to the public, media, or constituent groups regarding the efforts of the SCCAT shall be confirmed with the media relations chair prior to general release. As an additional effort of this group, a public information effort is to be developed to enlist the aid of target groups (recreational divers, boaters, and fishermen) in identifying any other outbreaks and controlling the spread.

• Eradication and Survey Contractor – Program Manager: Rachel Woodfield, Merkel & Assoc. Merkel & Associates, Inc. is serving as the contractor for completion of the required eradication and survey work and is also providing technical and other support services to the SCCAT and its various committees, as required through the completion of the immediate action plan. M&A will be conducting or coordinating all elements of the field operations both inside and immediately outside of Agua Hedionda Lagoon. M&A has been offered agency staff and equipment resources to supplement its own resources. These agency resources will be useful in expanding the rate of work completion and controlling private party costs. As such these agency resources are very welcome. However, it must be noted that while M&A will coordinate the efforts of non-staff labor and equipment, no legal employee/employer nor contractor/subcontractor relationship exists between M&A and assisting agencies. M&A shall not insure, nor an any way be held liable for the actions or safety of agency staff and equipment. M&A will determine where and when support resources would be best applied and will instruct agency staff on methods and participate with agency staff in completing tasks, however, work by agency staff shall be deemed to be under the direction of the particular agencies and their representatives.

All field operation are to be completed under the direction of the program manager. The program manager shall designate task managers to assist in completing all of the require field works

• Immediate Action Contract Management - Chair: Ernest Soczka, Cabrillo Power I, LLC

At the present time, all work is being completed under contracts to Cabrillo Power I, LLC. To date, work has been fully funded by Cabrillo Power I, LLC and as such, authorization for any work effort must be given by Cabrillo. While Cabrillo Power I, LLC has been generous enough to willingly fund all control activities thus far, it is envisioned that some of these expenses may be reimbursed by state, federal, or local governmental funding sources in the future. It is further anticipated that Cabrillo Power I, LLC will transition out of the lead contract manager position as the immediate action program at Agua Hedionda Lagoon is completed and the focus moves towards a long-term control program development.

Program Financing Sources – Chair: Greig Peters, RWQCB-SD

In order to adequately fund the completion of a comprehensive eradication and surveillance program for *C. taxifolia* in Agua Hedionda Lagoon, it is preliminarily anticipated that immediate action work may range between \$800,000 and \$1,300,000, depending upon the full magnitude of the infestation, the degree of success of initial eradication efforts, and the specific approach applied in the work. Costs do not fully contemplate the public agency and private party staff time also committed to the effort. While Cabrillo Power I, LLC has initiated efforts, it is fully intended that, at least some major portion of the total program cost will be borne by governmental funding sources. The program

financing committee has been established to aid in identifying and acquiring money, agency staff, or other resources that can be used in the effort to help defer costs.

• Political/Lagoon User Liaison - Chair: Ernest Soczka, Cabrillo Power I, LLC

The successful eradication of *Caulerpa* from Agua Hedionda Lagoon will require some levels of disruption to uses on the lagoon. These range from relatively minor watercraft inspection efforts to ensure that the species is not inadvertently spread to other waterbodies, to closures of various portions of the lagoon while eradication efforts are underway. Through this effort, it is essential that the impacts of the eradication efforts on the public and lagoon user groups be fully considered. It is also imperative that the users and controlling political bodies be coordinated with so that the program needs are identified, and reasonable alternatives to high impact actions may be fully explored. This group is charged with assisting the SCCAT in identifying program concerns of the lagoon users and working with the lagoon groups, controlling public and private entities, and SCCAT to seek resolution to conflicts which arise during the eradication efforts. It is also the mission of this group to seek to foster assistance and support from the lagoon users in effectively implementing the eradication through education, self-inspection of boats, and maintenance of safety around the work efforts.

• Enforcement Support Coordination - Chair: Bill Paznokas, CDFG

Site containment and enforcement is being facilitated by a multiple agency support effort. The CDFG wardens are handling the principal site control with other support coming from the Carlsbad Police Department and CDFA. Tools available to control access include the issuance of a Hold Notice by the CDFA, police authorities of the Carlsbad PD and CDFG wardens to enforce various statutes for protection of public health and safety, and ecological resources within the state.

• Resource Management Sponsor Representatives - Chair: Jack Fancher, USFWS

Sponsoring resource management agencies include the USFWS, NMFS, CDFG, and RWQCB. This group represents resource and regulatory agencies that are generally charged with natural resource management of ecological and water quality resources within the lagoon and other areas potentially effected by the spread of *Caulerpa*. This group is charged with conducting rapid response evaluations of potential collateral damage concerns associated with proposed eradication efforts and offering recommendations to minimize the extent of damage in the context of the needs for successful eradication. To the extent necessary, this group shall provide written, verbal, or other forms of program impact and risk evaluation to permitting or oversight agencies in order to expedite any regulatory or funding program requirements.

COORDINATION, COOPERATION AND PARTNERSHIP

The immediate action program being undertaken at Agua Hedionda Lagoon is an effort initiated by a private user and resource steward for Agua Hedionda Lagoon, Cabrillo Power I, LLC. The initiation of this effort within the privately owned lagoon has allowed immediate actions to be taken without the delays inherent in assembling large governmental eradication efforts. However, it is recognized that the expertise with eradication of pest species rests within governmental agencies charged with this mission. For this reason, Cabrillo Power I, LLC has joined forces with various governmental agencies in a partnership to eradicate *Caulerpa taxifolia* from Agua Hedionda Lagoon in a swift and effective manner. The partnership has been organized to be directed by the State Department of

Food and Agriculture and integrates expertise from numerous individuals and organizations necessary to address the program needs.

The Southern California *Caulerpa* Action Team is presently contemplated to be assembled for the specific purpose of directing and implementing work necessary to eradicate *Caulerpa* from Agua Hedionda Lagoon. The SCCAT is considered to be an interim organization to serve as an action committee only until such time as a formally adopted long-term control program may be prepared and adopted by state and federal agencies charged with this role.

This document serves to outline the areas of responsibility and cooperative roles of the SCCAT members. It is understood that the SCCAT will function under the guidance of this document and the overarching authorities of their individual agencies. It is further understood that the SCCAT will be coordinated with prior to individual agency actions as a courtesy, and to ensure that actions taken by individual agencies do not impair the overall eradication objectives. Given this simple understanding and the intended interim nature of the team, it is not believed that a formal memorandum of understanding or cooperative agreement would be justified, nor an effective use of agency and private party resources.

The agency and private party representatives of the SCCAT include:

- California Department of Food and Agriculture (CDFA)
- U.S. Department of Agriculture (USDA)
- California Department of Fish and Game (CDFG)
- National Marine Fisheries Service (NOAA-NMFS)
- U.S. Fish and Wildlife Service (USFWS)
- Regional Water Quality Control Board San Diego Region (RWQCB-SD)
- Cabrillo Power I, LLC (Cabrillo)
- Merkel & Associates, Inc. (M&A)
- San Diego County Department of Agriculture (SDCDA)
- Environmental Protection Agency (USEPA)
- San Francisco Estuary Institute (SFEI)
- Aquatic Nuisance Species Task Force (ANSTF)

PUBLIC OUTREACH AND INFORMATION

MEDIA RELATIONS

Media relations for the SCCAT is under the control of a media relations committee that shall take its lead from the committee chair who will work directly with the program supervisor. As a matter of policy, the SCCAT shall seek to keep the interested public informed as to activities underway, studies being conducted, or issues that arise during the course of the program. Public information dissemination will be a critical component to insuring the implementation of an effective surveillance and control program for *Caulerpa*.

Conflicting information, premature statements, speculation, or sensationalism will result in wastes of time and resources responding to alarm and confusion and will ultimately only damage opportunities to effectively use the media as an effective tool to aid in the control and eradication program.

SCCAT members and their representatives are instructed to be helpful to the media or public, provide any information that has already been published through the media relations committee, but do not provide further information or offer speculation relative to the program or other activities. Please direct inquiries back to the media relations committee.

Ultimately, specific questions may come back to members of the SCCAT via the media relations committee chair and you may be asked to further pursue discussions within your specific areas of expertise and role on the SCCAT.

PUBLIC OUTREACH PROGRAM

In the short-term, public outreach will be managed through the media outlets, coordination with constituent group representatives, and the political/lagoon liaison committee. A public internet web page for the SCCAT efforts will be established on the NOAA web site and a public information number will be provided both on the web site and to SCCAT members for the purpose of giving the public a location where they can obtain information.

As the immediate eradication efforts get underway, more attention will be given to expanding the outreach program using local user group direct mailers and preparation of brochures targeting focused groups that may assist in expanding effective surveillance and controlling spread if the species has already escaped from the lagoon. Target audience outlets for information such as dive shops, boat clubs, and boater registration mailers will likely be used for this effort.

SURVEY AND DETECTION

SURVEY PROGRAM

Inside Lagoon Survey Efforts

Lagoon surveys are being completed in two phases. Phase 1 surveys are designed to provide a reconnaissance-level review of all portions of the lagoon as a rapid assessment tool to determine the magnitude of infestation. Phase 2 surveys concentrate on lagoon regions that are identified as having *Caulerpa* during the initial survey work and are comprehensive survey and mapping efforts.

Phase 1 surveys within the lagoon are principally being completed using tightly spaced diver transects with divers being towed along straight parallel transects by a small skiff navigating a course using dGPS. An initial survey is to be completed using transect spacing of 5 meter centers in Snug Harbor, 10 meter centers in the Outer Lagoon, and 10 meter spacing in the Middle Lagoon. Inner Lagoon surveys are to be accomplished using combinations of diver transects, video surveys, and side-scan sonar. The ability to ensure full coverage of survey efforts is dependent upon water clarity. For this reason, survey intensity will be adjusted as needed to obtain adequate reliability.

Phase 2 comprehensive surveys are to be completed in areas where infestations have been identified. At present, the only area where phase two surveys are proposed is Snug Harbor. Because of the potential for fragmenting plants, no physical gridlines are to be placed on the bottom. In this area, additional diagonal transect surveys oriented approximately 45 to 60 degrees from parallel to the initial phase survey transects will be surveyed. These surveys are to be completed at the same 5 meter spacing as the initial surveys. At each identified *Caulerpa* patch, divers will survey and map the perimeters of each patch and will search the adjacent eelgrass beds for any satellite patches. Additional diver searches are to be completed in defined areas with divers working areas as teams to cover broad swaths of the bottom.

Outside Lagoon Survey Efforts

Surveys are to be completed outside of the lagoon with the assumption that any *Caulerpa* that has been freed in the lagoon could be transmitted out of the lagoon either by tidal action, or through the power plant cooling system. The power plant cooling water system has a mechanical travelling screen that captures and rejects most drift debris prior to it being passed through the plant to the ocean discharge. Any rejected material is disposed of in an upland landfill.

Outside of Agua Hedionda Lagoon, surveys are to be conducted by a combination of video surveys, side-scan sonar, and diver transects surveys. Where no vegetation is present, side-scan sonar will allow large areas to be effectively surveyed. Any features could then be spot surveyed with divers or video to determine if the material is drift kelp, rocks, old lobster pots, or *Caulerpa* patches.

Regional Surveillance Efforts

Regionally, several efforts are to be conducted to identify other potential occurrences of *Caulerpa* away from Agua Hedionda Lagoon. These include focused searches around all launching facilities in southern California bays and harbors, searches of specific areas that have been visited by boats licensed for use in Agua Hedionda Lagoon. This information is to be collected through direct mail and phone contacts with registered boaters identified by City of Carlsbad records.

In addition to the specific survey efforts of the SCCAT, the SCCAT is to prepare information advisories for public dissemination through outlets such as dive shops, boat ramps and clubs, internet web sites, bait and tackle shops, newspapers, focused journals, etc.

Find Confirmation and Mapping Program

The SCCAT shall develop and implement a program for completing confirmations of reported finds of *Caulerpa* and maintaining maps of any confirmed finds. This is to be accomplished by providing a designated contact and call number in all prepared literature and making use of SCCAT agency staff to confirm finds. All confirmed finds will be mapped and treated in a manner described for the Agua Hedionda patches, until such time as a final program is developed.

SURVEY RESULTS

With approximately 50% of the lagoon having been surveyed in phase 1 surveys, *Caulerpa taxifolia* infestations are known from approximately 20 distinct patches ranging from less than one square meter to over 500 m². All of the identified clumps of *Caulerpa* are located within eelgrass beds in Snug Harbor along the northern shoreline of the Inner Lagoon. Phase 2 surveys have delimited the specific locations and extent of these patches (Figure 3).

Surveys are to continue in all areas of the lagoon and areas outside of the lagoon until the entire survey areas have been covered with phase 1 surveys. Phase 1 and phase 2 surveys will be completed regularly for a period of three years following initial eradication efforts.







ENFORCEMENT AND COMPLIANCE

MATERIAL CONTAINMENT

The CDFA has issued a Hold Notice for *Caulerpa taxifolia* at Agua Hedionda Lagoon. This notice prohibits the removal of any of this alga from the system except as related to the active efforts of the current eradication program. For this reason, at the present time no authorization exists for removal of any kind for other purposes, even if it relates to research, herbarium collections, or other legitimate uses. As the eradication program is developed, research associated with the present control and ecological damage will continue and enough live material will be retained by the SCCAT to meet long-term control research needs. This material will be collected and held by Merkel & Associates until such time as CDFA determine the appropriate distribution of materials under the auspices of a formal research program.

Vessels leaving the lagoon via boat ramps are being inspected to ensure that they are not carrying any fragments of plants in their bilges, or on motors, hulls, or water sports equipment. Information is to be collected as to where vessels used in Agua Hedionda are also launched. This information will aid in focusing regional survey efforts.

SITE CONTROL

The current site control needs are being coordinated by the SCCAT Enforcement Support Coordination Chair drawing on resources of the CDFG, CDFA, and Carlsbad Police Department. The shoreline work area adjacent to infested areas of Snug Harbor has been closed down except for the eradication team efforts. All shoreline areas of Snug Harbor have been closed to fishing to avoid snagging and spreading the alga to other areas both within and outside of Snug Harbor. Water uses including jet skiing and boating have been excluded from Snug Harbor except along the western shoreline where a 5 mph controlled speed exists for transiting through the area to get to other use areas. This corridor does not support any *Caulerpa* and is essential to maintaining viable lagoon use by commercial operations in the northern portion of Snug Harbor.

The SCCAT has opted to work cooperatively with lagoon user groups to attempt to accommodate ongoing uses to the greatest extent practical by realigning activities within the various areas of the lagoon rather than applying more exclusionary authorities. This has been done for several reasons. First, it presently appears that the infestation is relatively localized and general public activities may be excluded from the affected area while work is being completed. Second, maintaining good relations with lagoon user groups is believed to be an essential element to achieving long-term eradication and completing the necessary work over the next several years. Finally, it is waterbody users that are likely to play the greatest role in future surveillance for this species throughout southern California and it is the experience in Agua Hedionda that will determine how cooperative people are in the future.

While the program being employed is designed to protect as much of the lagoon use as practical, it should be noted that the level of disruption to the lagoon users is subject to change if circumstances warrant. Factors to be considered that could effect the program include identification of additional infestations elsewhere in the lagoon, inadequate safety of eradication team members, or chronic enforcement difficulties with the limited controlled areas.

ENVIRONMENTAL REGULATIONS

Under this immediate action program, environmental regulatory elements are to be coordinated by Merkel & Associates. Regulations addressed include those under the federal and state Endangered

Species Acts (ESA, CESA), Clean Water Act (CWA), Rivers and Harbors Act (RHA), and California Coastal Act (CCA). To be efficient in this effort agencies on the SCCAT will need to assist in facilitating the regulatory processes to the greatest extent practical.

HERBICIDE APPLICATION REGULATIONS

Merkel & Associates, Inc. will seek to obtain a Pesticide Research Authorization for *in situ* trials involving treatments showing promise under laboratory conditions. For long-term treatment program needs herbicide application authorizations are to be facilitated by the California Department of Food and Agriculture. This may require coordination with the California Department of Pesticide Regulation to seek area specific authorizations.

PRE-TREATMENT CONTROL METHOD INVESTIGATIONS

To aid in the design of an effective eradication strategy for this immediate action program, information has been collected from eradicative efforts in the Mediterranean Sea and has been blended with expertise on the infested system and other aquatic pest eradication methods. Investigations that have been undertaken include those examining treatment options as well as trials to perfect methods for implementing treatments. These efforts have been documented for later use to support development of eradication methods for a larger-scale program.

HERBICIDE TREATMENT STUDIES

To evaluate the potential herbicide control agents that may be used in the eradication efforts, several replicated herbicide treatments and controls were established in an outdoor laboratory setting. Tests included various chemical agents tested in light and dark environments and at graduated concentrations ranging from label recommended application rates to mega-doses at many times the recommended application rates.

Of the tested herbicides and other biocide treatments, few met with any substantive results. Test results are summarized in Table 1. Over short durations, mega-doses (5.0 and 10.0 ppm) of Cutrine were successful in generating some die-back in plants, however this was not sustained. Diquot, Hydrothol 181, and Simazine resulted in no significant response over the first 4 days and only a slight loss of turgor in later periods of the test. Better results were observed in tests of light exclusion than were seen in most herbicide treatments. The most significant treatment effect was observed with sodium hypochlorite (chlorine bleach) treatments. Concentrations of 1.5 ppt and 3.0 ppt of hypochlorite solution both proved equally lethal overnight with full bleaching of tissues being observed well before the 4 day report period.

Reports on the Mediterranean infestations have suggested that copper sulfate may be effective in treatments. However, no information has been located that provides an indication of treatment concentrations that have been applied. Cutrine used in the present study would effect the alga in similar ways as copper sulfate, suggesting that effective doses may be very high.

Table 1. Summary of results for *in vitro* chemical control investigations

Treatment	Conc.	4	New	8	New	12	New	24	New				
		DAYS	growth	DAYS	growth	DAYS	growth	DAYS	growth				
			?		?		?		?				
Control (no treatment)		none	N	none	Y	none	Y,	none	Y				
Diquot	0.75 ppm	none	N	*	Y	*	Y	recover ed	Y				
	1.5 ppm	none	N	*	Y	*	Y	recover ed	Y				
Hydrothol 181	1.0 ppm	none	N	none	Y	*	Y	recover ed	Y				
	2.5 ppm	none	N	none	Y	*	Y	recover ed	Y.				
Cutrine (Copper)	0.5 ppm	none	N	none	Y	none	Y	none	Y				
,	1.0 ppm	none	N	**	Y	*	Y	recover ed	Y				
	5.0 ppm	***	N	**	Y	**	Y						
	10.0 ppm	***	N	**	Y	**	Y	1					
Simazine	1.0 ppm	none	N	none	Y	none	Y						
Bleach (5% Cl)	1,500 ppm	****	N	dead		dead		dead					
	3,000 ppm	****	N	dead		dead		dead					
Light Exclusion		none	N	**	Y	**	Y	***	Y				

RESPONSE

* slight loss of turgor in fronds ** slight die-off at tips *** slight bleaching of fronds

**** full bleaching of thallus, dead

MECHANICAL EXTRACTION TESTS

The mechanical removal of *Caulerpa* has been contemplated as a means to reduce the biomass requiring herbicide treatment and protect against potential discharge of viable fragments that may be liberated by dying plants after herbicide treatment. Tests have included manual collection of alga using divers and two efforts using different suction dredging technologies (aspirator and centrifugal pumps) to remove plants and sediments.

Diver *Caulerpa* harvesting was determined to be moderately successful at removing experimental volumes of material, however considerable plant breakage occurs where rhizoids are firmly anchored in sediments or are intertwined with eelgrass rhizomes. In a large-scale removal operation, a clear potential for freeing small plant fragments from rhizoids or fronds would exist by hand extraction.

To test the efficacy of suction dredging small portions of an eelgrass bed were extracted by marine contractors using two different dredge types. Dredging was directed by Merkel & Associates to excavate all plant materials and sediments to a depth of 10 inches, a depth adequate to extract the rhizoides of any *Caulerpa*. The test was deemed to be a reasonable way of evaluating the performance of dredge equipment in mixed beds of algae and eelgrass as well as sediments underlying monotypic *Caulerpa* patches. *Caulerpa*, being more significantly more fragile than eelgrass was expected to be aspirated relatively efficiently by pumps when present in pure stands.

Suction dredging operations have a significant benefit over hand extraction in that smaller fragments of damaged algae are generally vacuumed up around the dredge nozzle and few escape the immediate vicinity of the nozzle. However, the dredging approach also has several drawbacks relative to hand harvesting. First, the suction nozzle is not as controlled as hand harvesting and many more very small fragments would be generated by suction dredge harvesting than by hand extraction as long rhizoids are stripped through the intertwining mass of rhizoids and fronds. Some of these fragments would be released far beyond the influence of the suction head and it would be necessary to collect these particles as the dredge moves into the areas where fragments are broken off and, hopefully, settle.

The two dredges evaluated were substantially different in their effectiveness. The aspirator type dredge lacked adequate power to efficiently extract eelgrass and sediments. When the dredge plugged, it would frequently backwash a large plume of sediment, water, and eelgrass into the dredge area. This burping would cause substantial resuspension of small fragments and could aid to spread rather than collect *Caulerpa*. The second dredge was a centrifugal pump type dredge that was substantially more powerful than the aspirator and never burped during the period of testing. The dredge did plug up on occasion and required cleaning of the intake nozzle. The efficiency of this dredge was substantially higher than that of the aspirator type pump. However, this dredge was also not fully capable of collecting all plant debris and video tapes of the nozzle illustrates that portions of plant matter frequently floated away from the dredge. The divers were able to remain relatively stationary while working and generated less turbidity than anticipated. However, levels of turbidity around the work area still exceeded any level that would allow a secondary diver to collect freed plant fragments and prevent their escape from the area or resettlement on the bottom.

Perhaps the largest impediment to dredging of the *Caulerpa* is the need to efficiently treat very large volumes of water to remove potentially viable plant material and either dispose of clean water or return it to the lagoon. It is estimated that as much as 11,000 gallons per minute may be generated by the dredging operation and the total liquid volume may top several million gallons. Various options for handling this water have been contemplated. These include: 1) the establishment of a small
filtering facility on the lagoon shore and releasing water back to the lagoon or sewering the clarified water; 2) steaming or chlorinating the dredged water to kill any residual tissues, or; 3) pumping the mud/plant/water slurry to the empty power plant 12 million gallon oil tank. This would require significant post-dredging cleaning cost to restore the tank conditions and dispose of hydrocarbon contaminated waters and sediments.

LINER CONTAINMENT TRIALS

Perhaps the most difficult issue to address in the eradication effort is how to effectively apply chemical control agents at effective dosages while minimizing collateral damage in surrounding areas. Because the area is tidal, water flushes through the infested region twice daily replenishing the area with new oceanic water at high tides and eastern bay waters at low tides. To address this issue, a containment program has been developed to effectively isolate the *Caulerpa* patches and surrounding native eelgrass beds under liners which trap adequate volumes of water for treatment with chemical herbicides while protecting surrounding areas from collateral damage. Further, this approach prevents fragmentation of dying plants from spreading viable fragments to surrounding areas.

The 35mil PVC liners have been fitted with gas release valves. Several trials have been conducted in eelgrass beds to practice placing the liner to determine the most efficient manner for placing liners to avoid disturbing *Caulerpa* patches when ultimately placed for isolation purposes. Trials dictated a technique for placing the liner materials using divers and a surface support boat. Seams between liners and gas release valves were inserted both prior to liner deployment and with liners in place on the bottom. While labor intensive, the placement of liners by divers and boat crews has been demonstrated to be achievable when placed with care.

ERADICATION IMPLEMENTATION

CONTAINMENT

All identified *Caulerpa* patches have been isolated by realigning lagoon uses to areas away from infestations and covering patches with materials that prevent the spread of plant fragments away from the infested locations.

The realignment of lagoon uses has effectively meant: 1) isolation of the area by buoy lines; 2) exclusion of boat and jet ski traffic from the waters in the infestation area, and; 3) rearranging watercraft uses elsewhere in the lagoon to accommodate all uses. This effort has been completed under the direction of the Carlsbad Police Department and is illustrated in Figure 4.

CHEMICAL CONTROL TREATMENT

Patches are to be covered with impermeable PVC liners that enclose the patches, a buffer of surrounding eelgrass beds, and an adequate volume of water to ensure full distribution of chemical control agents (Figure 5).

Prior to treatment of contained plots, all pretreatment notifications are to be made as dictated by regulatory requirements. Detailed records are to be kept with respect to the applications made to allow preparation of required reports and to facilitate future design of eradication efforts for this species.

For the purpose of the immediate response eradication program, a treatment of chlorine is to be used. This treatment is anticipated to result in a rapid and complete kill of all surface plant material however, it may not be successful in penetrating the sediments and reaching all rhizoids. To address regrowth, the liner is proposed to remain in place and subsequent treatments are to be conducted over the subsequent two months. While hypochlorite treatments are anticipated to be effective under the contained conditions present at Agua Hedionda Lagoon, investigations on control chemicals will continue since no highly efficient algaecide has yet been identified and future control areas may not be as well defined or readily confinable for treatment.

Experimental chlorine treatments are to be conducted using both a solid puck form of chlorine and an injected liquid solution. The treatments will be repeated until such time as a residual chlorine within the contained area is maintained at 150 ppm for a period of not less than 72 hours. The same sustained residual chlorine concentration as the initial treatment will be used in the subsequent monthly treatments.

Containment of the treated area is not to be removed until chlorine residual has dropped below 5 ppm, however the desired target is <0.1 ppm residual chlorine.

POST-APPLICATION TREATMENT

The determination as to what the most appropriate course of action to follow after chemical controls are effected remains unclear. There is concern that chlorine will only be effective at killing plant materials at the surface and thus viable rhizoids may persist in the sediments. Repeated treatments with hypochlorite would be expected to reduce the number of viable starts, however it is not safe to assume that a complete kill will occur. For this reason, some post application treatment is warranted.

Dredging of the patches would entail enclosing the site with silt-screens and operating a suction type dredge to extract sediment and plant material to a depth of approximately 20 cm. This material would be pumped to storage areas on shore where material could be treated or extracted for upland disposal. The remaining water would need to be returned to the lagoon or otherwise disposed. There is a concern that this approach may be logistically or cost prohibited due to the difficulty in handling approximately 11 million gallons of water contaminate with algal fragments and the potential for releasing viable material to the water column either at the dredging site or when water is discarded.

A second alternative treatment under consideration is a capping program using a geosynthetic liner and a sediment cap for a year or more following treatment. This alternative has proven successful in other areas and is being further explored.

A final option for post-application treatment is to conduct intensive monitoring and spot eradication treatments as needed to control resurgence from residual rhizoids. This option would provide significant information on efficacy of initial treatments. While such data may be very valuable in the long-term control efforts, it would be less desirable than a capping program relative to local eradication.

In any case, extensive monitoring of the treatment area is proposed to continue the search and eradication efforts.

POST-ERADICATION MONITORING AND RESTORATION

POST-TREATMENT MONITORING PROGRAM

Monitoring following the immediate action eradication efforts is to continue for a period of three years following the last detected occurrence of *Caulerpa* in the lagoon. This program is to include a combination of Phase 1 and Phase 2 surveys as described above. The use of these surveys is to both monitor the status of treatment areas as well as completing surveillance for potential additional outbreaks.

Survey schedules to be followed are outlined in Table 2. Additional surveys and spot eradication efforts conducted on a biweekly basis would be required in treatment areas if no subsequent post-application treatment is to be used following removal of PVC liners.

SURVEY AREA	YEAR 1	YEAR 2	YEAR 3	
Treatment Area	Monthly (May-Oct)	Biannual (Sept, Mar)	Biannual (Sept, Mar)	
	Bimonthly (Nov-Apr)			
Non-infested Lagoon Basins	Biannual (Sept, Mar)	Annual (June)	Annual (June)	
Lagoon-region Ocean Shoreline	Biannual (Sept, Mar)	Annual (June)	Annual (June)	
Other Waterbodies	As Determined By Long-term Caulerpa Control Plan			

Table 2. Schedule of post-eradication survey efforts

The monitoring program outlined provides an adequate period of time to ensure that any residual patches can expand to a size required to be readily detectable by survey methods. However, if any additional incidents are detected, it will be necessary to reinitiate eradication and survey efforts as if the program were just beginning.

RESTORATION OF TREATMENT AREAS

The eradication program is anticipated to result in collateral damage to eelgrass habitat and benthic communities within the immediate vicinity of targeted alga. This damage will effectively result in a temporary loss of habitat that extends to the size of the treatment containment limits. The resultant cleared areas are considered a benefit to conducting effective surveillance during monitoring years. For this reason, no directed actions are proposed to restore native eelgrass to these areas. However, given the prolific rate of eelgrass expansion into small areas within existing established beds, no restoration of these small treatment areas is anticipated to be necessary to ultimately recover from treatment damage.

ADDITIONAL RESEARCH AND DOCUMENTATION EFFORTS

While the present program is clearly focused on the direct and immediate eradication of this invasive species from Agua Hedionda Lagoon, the high potential that southern California and the Western Hemisphere as a whole will be facing this species in months or years to come dictates that as much information as is practical be collected from the infestation prior to its eradication. For this reason, data collection has been on-going coincident with survey and eradication efforts. While information has not yet been worked up, data collection has included work on growth parameters of the species, ecological impact on benthic communities, epiphytic communities, and environmental characteristics of the infestation area.



Eradication program documentation is also being completed using video, still cameras, detailed notes, and archival of other records so that a future retrospective may be prepared to aid in application of information learned during the present efforts.

Following completion of more pressing eradication efforts, data will be analyzed and reports will be prepared for use by others in characterizing the threat and confronting the problems of controlling this species.

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SCHEDULE OF ACTIVITIES

The numerous elements of the eradication program are to occur over a brief time period through parallel tracking of the work efforts. This allows the program to be completed with minimum delay while ensuring adequate attention is given to the individual element requirements. A rough schedule of activities being undertaken is provided in Table 3. The schedule is principally contingent upon timing related to herbicide authorization and rates at which effective surveys may be completed. Survey effectiveness is largely dependent upon water clarity and tidal conditions. Long-term monitoring assumes that initial eradication efforts are successful. Subsequent identification of more *Caulerpa* would reset the monitoring schedule such that the three year monitoring period is driven by the last identified infestation.

ACTION	START	END
Caulerpa taxifolia located in Agua Hedionda Lagoon		June 12
Caulerpa taxifolia ident. confirmed (Mediterranean strain suspected)	June 12	June 15
Initiate eradication and control method planning and research	June 17	July 30
Restrict access into first known patch of Caulerpa	June 19	June 20
Phase 1 (recon-level) surveys of lagoon	June 19	July 15
Identify immediate action program funding sources	June 19	July 30
Ecological impact study data collection efforts	June 26	July 15
Physical containment of Caulerpa patches	July 1	July 15
Environmental leaders and environmental reporters notifications	July 5	July 5
Surveys of off-shore reefs, ebb-tide delta, and power plant discharge	July 5	July 30
Phase 2 (comprehensive) surveys of infested areas	July 5	July 30
Realign uses in lagoon to eliminate all access to infested area	July 6	July 8
PVC liner placement for chemical treatment	July 10	July 22
Permitting and exemptions	July 6	July 19
Chemical treatment of patches	July 19	August 30
Long-term regional control program development	July 15	Oct. 30
Under liner examination and testing of chemical residuals	July 19	Sept. 30
PVC liner removals	Sept. 30	Oct. 30
Post-application treatment activities	Sept. 30	Oct. 30
Long-term surveillance and monitoring	Oct30,'00	Oct30,'03

Table 3. Schedule of immediate action eradication program.

RESOURCE AND FUNDING

Cabrillo Power I, LLC, has committed to financing of the initial activities under the immediate action program. This commitment has been made as a good corporate citizen and management steward interested in seeing the health of Agua Hedionda Lagoon maintained both as a resource to the community and as a resource to the Encina power plant operated by Cabrillo Power I, LLC. While the power plant has pushed forward to insure that appropriate actions were not impaired by the lack of adequate initial funding, it is the desire of Cabrillo Power I, LLC to ultimately be a minority financing partner in the overall effort. The plant has committed resources in the form of contract services and a significant amount of staff time and expertise to keep the eradication efforts moving forward, however, this commitment will not carry the program through fruition considering the high cost of conducting surveys and the required meticulous underwater work. To effectively keep the program active, it will be necessary to supplement and hopefully reimburse some of the funds allocated by Cabrillo with other public agency funds.

To date such public relief has been provided in the form of agency staff and equipment support donated by the SCCAT member agencies and City of Carlsbad. Lagoon user groups and property owners surrounding the lagoon have also accommodated eradication efforts by providing free access to use shoreline staging areas and to assist in implementing containment and surveillance efforts to inspect watercrafts leaving the lagoon.

To address financing needs for the program, other sources of funds are being sought to implement both the immediate action program as well as the longer-term official *Caulerpa* control program. The long-term program needs are not discussed in this document as they are the subject of other work efforts. The immediate action-financing program is being addressed by a committee of the SCCAT that is chaired by Mr. Greig Peters, RWQCB-SD. It is anticipated that some funding will be available through the RWQCB Clean-up and Abatement Funds. Additional monies are expected to be available through NMFS-NOAA. Other agencies have indicated the possibility for funding to be available, however the full potential has not yet been fully explored.

The full extent of program costs will not be known until such time as all surveys are completed and control efforts are fully defined. However, it is presently estimated that the cost of the entire immediate action program is likely to range between \$800,000 and \$1.3 million depending upon post-chemical treatment actions taken to address residual living plant material.

As presently predicted, existing allocated resources for the program implementation are likely to be exhausted in early to mid-September. As the eradication efforts are intensified the anticipated resource consumption rate will be refined.



United States Department of the Interior

FISH AND WILDLIFE SERVICE Ecological Services Carlsbad Fish and Wildlife Office 2730 Loker Avenue West Carlsbad, California 92008



September 26, 2002

Mr. Peter Douglas California Coastal Commission 45 Fremont Street, Suite 2000 San Francisco, California 94105-2219

Attn: Kathleen Stycket, Consistency Determination Section

Re: Endangered Species Act Considerations of the *Caulerpa* Eradication and Surveillance Program in Southern California

Dear Mr. Douglas:

In middle 2000, the "killer algae", Caulerpa taxifolia, was discovered at Agua Hedionda Lagoon. The U.S. Fish and Wildlife Service (Service) joined the Southern California Caulerpa Action Team (SCCAT) of 10 agencies which quickly formed to respond to this ecological emergency. Consequently, the Service participated during the evaluation of the circumstances of the threat posed by this invasive plant, alternative response actions and potential impacts, as well as formulation, and adoption of the emergency action plan. As the Service representative, and avowing a personal knowledge of the distribution and presence of listed Threatened or Endangered species in the project area and having a close familiarity with the proposed plan, I advised the other agencies that no adverse affects upon listed species would result from the adopted "emergency" action. This is referred to as "informal consultation" under Endangered Species Act (ESA) section 7. Soon thereafter, the Service actually became an action agency by contracting directly with the Merkel and Associates to continue the Caulerpa eradication and surveillance program at Agua Hedionda. We must evaluate our own activities for their potential to affect Federally listed species. This is called "internal consultation" under ESA section 7. We did so and our conclusion was that no adverse affect upon any listed species would result from our funding of the Agua Hedionda Caulerpa eradication activity and no formal consultation, pursuant to section 7 of the ESA would be necessary. Later, National Marine Fisheries Service (NMFS) transferred some of their Caulerpa eradication funds to the Service for continuing the same work using the same contractor and in full compliance with the Endangered Species Act.

After discovery of *Caulerpa* at Huntington Harbour, the Service again evaluated the presence and habitat utilization of listed species in that area, the project description, and we again concluded there would be no adverse affect upon any listed species. This conclusion was stated for the Corps, Coastal Commission, and several SCCAT agencies. Similarly, when the Corps published the draft Regional General Permit with NMFS as a co-applicant, the Service had no objection,

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since we had already advised the Corps and NMFS of our "no adverse affect" conclusion for the two known sites. However, should *Caulerpa* be discovered at another site and/or different methods be proposed for eradication, the Service would expect that informal consultation would occur and a determination made at that time as to the need for formal ESA section 7 consultation.

The Service strongly supports the completion of the *Caulerpa* eradication efforts that are under way at the two known sites. These efforts have been executed pursuant to the adopted plan and without incurring any adverse affect upon Threatened or Endangered species or adversely modifying any designated Critical Habitat. As an agency very interested in the ecological health of our coastal wetlands, we are very grateful to NMFS, U.S. Department of Agriculture, California Department of Fish and Game, and the two involved Regional Water Quality Control Boards (Regions 8 and 9) for their significant efforts to pool resources and cooperatively combat this threatening, invasive plant. Communication between NMFS and the Service has been particularly rewarding and effective on this matter. Therefore, we have every reason to expect that informal consultation will occur in a very timely way between us and the Corps of Engineers and/or NMFS, in the very unhappy event of *Caulerpa* discovery in another southern California coastal wetland or nearshore marine zone. Feel free to contact me at (760) 431-9440 ext. 215 or by email at: jack fancher@r1.fws.gov.

Sincerely,

Jack m. Faucher-

Jack M. Fancher Coastal Program Chief

cc: RWQCB, San Diego CDFG, San Diego Corps of Engineers, Los Angeles Merkel and Assoc., San Diego CCC, San Francisco and San Diego NMFS, Long Beach

CALIFORNIA COASTAL COMMISSION South Coast Area Office 200 Oceangate, Suite 1000 png Beach, CA 90802-4302 562) 590-5071

EMERGENCY PERMIT

TO: Merkel & Associates Date: October 6, 2000 3944 Murphy Canyon Road, Suite C106 San Diego, CA 92123

Agent: Keith Merkel

Emergency Permit No. 5-00-403-G

Location of Emergency Work: The eastern of the two ponds located on the north side of Huntington Harbour, near the intersection of Trinidad Lane and Edinger Way in the City of Huntington Beach, Orange County.

Work Proposed: Identification of the areas infested with *Caulerpa taxifolia* at the project location followed by eradication. Eradication will be accomplished through a combination of techniques including hand retrieval as well as the placement of plastic tarps over large patches. The tarps will be anchored to the bottom of the pond and solid chlorine pellets will be placed under the tarps. The tarps will be left in place until the end of the next growing season to ensure that any rhizoids which may have survived to not re-grow.

This letter constitutes approval of the emergency work you or your representative has requested to be done at the location listed above. I understand from your information that an unexpected occurrence in the form of an infestation of *Caulerpa taxifolia* requires immediate action to prevent or mitigate loss or damage to life, health, property or essential public services. 14 Cal. Admin. Code Section 13009. The Executive Director hereby finds that:

- (a) An emergency exists which requires action more quickly than permitted by the procedures for administrative or ordinary permits and the development can and will be completed within 30 days unless otherwise specified by the terms of the permit;
- (b) Public comment on the proposed emergency action has been reviewed if time allows; and
- (c) As conditioned the work proposed would be consistent with the requirements of the California Coastal Act of 1976.

The work is hereby approved, subject to the conditions listed on the reverse.

Very Truly Yours,

Peter M. Douglas Executive Director

Kyma for

By: Deborah Lee Deputy Director

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California Coastal Commission

Page: 2

CONDITIONS OF APPROVAL:

- 1. The enclosed form must be signed by the **PROPERTY OWNER** and returned to our office within 15 days.
- 2. Only that work specifically described above and for the specific property listed above is authorized. Any additional work requires separate authorization from the Executive Director.
- 3. The work authorized by this permit must be completed within 30 days of the date of this permit.
- 4. Within 60 days of the date of this permit, the permittee shall apply for a regular Coastal Permit to have the emergency work be considered permanent. If no such application is received, the emergency work shall be removed in its entirety within 150 days of the date of this permit unless waived by the Director.
- 5. In exercising this permit the applicant agrees to hold the California Coastal Commission harmless from any liabilities for damage to public or private properties or personal injury that may result from the project.
- 6. This permit does not obviate the need to obtain necessary authorizations and/or permits from other agencies. (e.g. Department of Fish and Game, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, State Lands Commission)

Condition #4 indicates that the emergency work is considered to be <u>**TEMPORARY**</u> work done in an emergency situation. If the property owner wishes to have the emergency work become a permanent development, a Coastal permit must be obtained. A regular permit would be subject to all of the provisions of the California Coastal Act and may be conditioned accordingly. These conditions may include provisions for public access (such as an offer to dedicate an easement) and/or a requirement that a deed restriction be placed on the property assuming liability for damages incurred from storm waves.

If you have any questions about the provisions of this emergency permit, please call the Commission Area office.

Enclosures: 1) Acceptance Form; 2) Regular Permit Application Form

cc: Local Planning Department

STATE OF CALIFORNIA - THE RESOURCES AGENCY

GRAY DAVIS, Governor

CALIFORNIA COASTAL COMMISSION South Coast Area Office 200 Oceangate, Suite 1000 Long Beach, CA 90802-4302 (562) 590-5071

EMERGENCY PERMIT

TO: Merkel & Associates 3944 Murphy Canyon Road, Suite C106 San Diego, CA 92123 Date: January 4, 2001

Agent: Keith Merkel

Emergency Permit No. 5-00-463-G

Location of Emergency Work: Various locations of Huntington Harbour on property owned by Seagate Lagoons in the City of Huntington Beach, Orange County.

Work Proposed: Identification of the areas infested with *Caulerpa taxifolia* followed by eradication. Eradication will be accomplished through a combination of techniques including hand retrieval as well as the placement of plastic tarps over large patches. The tarps will be anchored to the bottom of the pond and solid chlorine pellets will be placed under the tarps. The tarps will be left in place until the end of the next growing season to ensure that any rhizoids which may have survived do not re-grow.

This letter constitutes approval of the emergency work you or your representative has requested to be done at the location listed above. I understand from your information that an unexpected occurrence in the form of an infestation of *Caulerpa taxifolia* requires immediate action to prevent or mitigate loss or damage to life, health, property or essential public services. 14 Cal. Admin. Code Section 13009. The Executive Director hereby finds that:

- (a) An emergency exists which requires action more quickly than permitted by the procedures for administrative or ordinary permits and the development can and will be completed within 30 days unless otherwise specified by the terms of the permit;
- (b) Public comment on the proposed emergency action has been reviewed if time allows; and
- (c) As conditioned the work proposed would be consistent with the requirements of the California Coastal Act of 1976.

The work is hereby approved, subject to the conditions listed on the reverse.

Very Truly Yours,

Peter M. Douglas Executive Director

By: Deborah Lee Deputy Director

> EXHIBIT NO. 8 APPLICATION NO. CD-051-02



CONDITIONS OF APPROVAL:

- 1. The enclosed form must be signed by the **PROPERTY OWNER** and returned to our office within 15 days.
- 2. Only that work specifically described above and for the specific property listed above is authorized. Any additional work requires separate authorization from the Executive Director.
- 3. The work authorized by this permit must be completed within 30 days of the date of this permit.
- 4. Within 60 days of the date of this permit, the permittee shall apply for a regular Coastal Permit to have the emergency work be considered permanent. If no such application is received, the emergency work shall be removed in its entirety within 150 days of the date of this permit unless waived by the Director.
- 5. In exercising this permit the applicant agrees to hold the California Coastal Commission harmless from any liabilities for damage to public or private properties or personal injury that may result from the project.
- 6. This permit does not obviate the need to obtain necessary authorizations and/or permits from other agencies. (e.g. Department of Fish and Game, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, State Lands Commission)

Condition #4 indicates that the emergency work is considered to be **TEMPORARY** work done in an emergency situation. If the property owner wishes to have the emergency work become a permanent development, a Coastal permit must be obtained. A regular permit would be subject to all of the provisions of the California Coastal Act and may be conditioned accordingly. These conditions may include provisions for public access (such as an offer to dedicate an easement) and/or a requirement that a deed restriction be placed on the property assuming liability for damages incurred from storm waves.

If you have any questions about the provisions of this emergency permit, please call the Commission Area office.

Enclosures: 1) Acceptance Form; 2) Regular Permit Application Form

cc: Local Planning Department

CALIFORNIA COASTAL COMMISSION



45 FREMONT, SUITE 2000 SAN FRANCISCO, CA 94105-2219 VOICE AND TDD (415) 904-5200 (415) 904-5400

June 4, 2002

Ron Ball Carlsbad City Attorney 1200 Carlsbad Drive Carlsbad, CA 92008 facsimile (760) 434-8367

Re: Ordinance Implementing Interim Management Plan to Facilitate the Agua Hedionda Lagoon *Caulerpa Taxifolia* Eradication Program

Dear Mr. Ball:

As I discussed with you in our telephone conversation of May 21, 2002, the Executive Director of the Coastal Commission will not request the City of Carlsbad to obtain a coastal development permit for the City's proposed ordinance to implement the Interim Management Plan to Facilitate the Agua Hedionda Lagoon *Caulerpa Taxifolia* Eradication Program ("Interim Management Plan").

Local government actions that restrict public access to, or recreation in, coastal waters can constitute "development" within the meaning of the Coastal Act. Specifically, Public Resources Code § 30106 states, "Development' means . . . change in the intensity of use of water, or of access thereto". The Commission, however, has not historically required public agencies to obtain coastal development permits for rules that simply designate where different kinds of recreational activities may occur within coastal waters, so long as those restrictions do not entirely or permanently prohibit a significant category of recreation. For example, the California Department of Parks and Recreation often designates different areas of State Beaches for different kinds of recreational activities. Most of the provisions of City's proposed ordinance are analogous to such restrictions.

A number of other factors are also significant in the Executive Director's decision not to request the City to obtain a coastal development permit for the ordinance. First, the Executive Director of the Commission has issued an emergency coastal development permit to the National Marine Fisheries Service (NMFS) authorizing the closure of that portion of Agua Hedionda Lagoon where *caulerpa taxifolia* has been discovered. Thus, the most stringent restrictions on public access and recreation contained in the proposed ordinance have already been reviewed and approved as consistent with the requirements of the Coastal Act. Second, NMFS will be submitting a federal consistency determination to the Commission regarding the overall caulerpa eradication program, including the Interim Management Plan. This will provide the Commission an opportunity to review the various restrictions on recreational activities in the Lagoon imposed by the Interim Management Plan in the

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California Coastal Commission

Ron Ball Carlsbad City Attorney June 4, 2002 Page 2

context of the entire *caulerpa taxifolia* eradication effort. Third, the restrictions established in the ordinance are for a limited time only.

For all of these reasons, the Executive Director has decided not to request the City of Carlsbad to obtain a coastal development permit for the proposed ordinance to implement the Interim Management Plan. If you have any further questions, feel free to contact me. Thank you.

Sincerely,

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Christopher Pederson Staff Counsel