

# CAULERPA CONTROL PROTOCOL

(Version 5 – October 20, 2021)

## A. Background Information:

The genus *Caulerpa* comprises a group of green algae with a wide global distribution throughout the marine realm. Although primarily found in shallow tropical and subtropical waters, some species can inhabit brackish lagoons. *Caulerpa* species possess unique characteristics that enable them to withstand a broad range of environmental conditions and give them great invasive potential. Recognizing the threat posed by *Caulerpa* species, the Aquatic Nuisance Species Task Force<sup>1</sup> developed the “National Management Plan for the Genus *Caulerpa*.” This National Management Plan contains specific goals to address *Caulerpa* at the genus level, including preventing the introduction and spread of *Caulerpa* and eradicating populations in U.S. waters where they are not native.

There are no *Caulerpa* species native to California. Therefore, *Caulerpa* species pose a substantial threat to marine ecosystems in California, particularly to the extensive eelgrass meadows and other benthic environments that make coastal waters such a rich and productive environment. The eelgrass beds and other coastal resources that could be impacted by an invasion of *Caulerpa* are part of a food web that is critical to the survival of numerous native marine species including those of commercial and recreational importance.

Infestations from two *Caulerpa* species, *C. taxifolia* and *C. prolifera*, have been detected in California. Both species can rapidly colonize new areas from small fragments and have the potential to cause substantial negative impacts on native ecosystems. For instance, a particularly cold tolerant clone (tolerant of temperatures at least as low as 10 °C for a period of three months) of *C. taxifolia* has proven to be highly invasive in areas of 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. *C. taxifolia* had previously been detected in 2000, but was eradicated in two locations in southern California. Another *Caulerpa* species detected in California, *C. prolifera*, can grow at least as deep as 50 meters and appears more tolerant of low light environments than most other macroalgae. In some areas, especially the Mediterranean Sea, seagrass meadows have been impacted, and even replaced, by *Caulerpa* species, including *C. prolifera*, which can have ecosystem scale implications. In March 2021, *C. prolifera* was discovered in Newport Bay, California. In response, the Southern California *Caulerpa* Action Team reconvened and implemented eradication efforts shortly thereafter, and those efforts are ongoing. Other infestations of *Caulerpa* species may also exist but remain undetected.

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<sup>1</sup> The Aquatic Nuisance Species Task Force (ANSTF) is an intergovernmental body responsible for coordination of national efforts to prevent the introduction and spread of aquatic invasive species. Co-chaired by the U.S. Fish and Wildlife Service and the National Oceanic and Atmospheric Administration, the ANSTF is composed of 13 Federal and 15 ex-officio members.

In September 2001, Assembly Bill 1334 was enacted by the State of California banning the transport, sale, and possession of nine potentially invasive species of *Caulerpa*, including *C. taxifolia*, *C. mexicana*, *C. racemosa*, *C. cupressoides*, *C. sertularioides*, *C. ashmeadii*, *C. floridana*, *C. scalpelliformis*, and *C. verticillata*. There was no evidence that *C. prolifera*, a popular saltwater aquarium plant, was potentially invasive in California at the time and it was not included in this list. However, new information, including the discovery of a *C. prolifera* infestation in Newport Bay, demonstrates that it, and all species in the genus *Caulerpa*, should be considered potentially invasive.

In order to detect existing infestations as well as avoid the spread of these invasive species within other systems, the following provisions have been established for California nearshore coastal and enclosed bays, estuaries, and harbors from Morro Bay to the U.S./Mexican border. This protocol outlines the certification, survey, and reporting guidelines required when surveying for all *Caulerpa* species with the exception of those exempted areas listed in Section G.

## **B. Definitions:**

Bottom Disturbing Activity – a work activity (e.g., bulkhead repair, pile driving, dredging, placement of navigation aids, research) initiated by a permit holder which could fragment or disseminate *Caulerpa*.

Area of Potential Effect (APE) – the area surrounding an authorized project site that could be affected by a Bottom Disturbing Activity related to the implementation of the project work. This includes the project footprint, areas where equipment is stored or moored, areas where vessel prop-wash could occur in association with work, or in-water disposal areas used by the project. It does not include U.S. Environmental Protection Agency (EPA) designated deep-ocean disposal sites.

High Growth Period – March 1 to October 31.

Infected System – any bay, harbor, estuary, lagoon, or ecological unit in which *Caulerpa* has been identified, regardless of where the infestation occurs geographically within the system, unless determined otherwise by NOAA’s National Marine Fisheries Service (NOAA Fisheries) and California Department of Fish and Wildlife (CDFW). Following eradication and subsequent verification surveillance for at least two High Growth Periods, an Infected System may be re-designated as a “*Caulerpa*-Free System” by NOAA Fisheries and CDFW. Prior infected systems where eradication was successfully completed include:

    Agua Hedionda Lagoon

    Huntington Harbour (including Seal Beach Weapons Station/National Wildlife Refuge and Anaheim Bay)

Current infected systems are:

    Newport Bay

NOAA Fisheries/CDFW Contacts – 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  
West Coast Regional Office**  
501 West Ocean Boulevard, Suite 4200  
Long Beach, CA 90802  
Attn: Bryant Chesney  
ph.: (562) 980-4037  
fx.: (562) 980-4092  
e-mail: [nmfs.wcr.caulerpa@noaa.gov](mailto:nmfs.wcr.caulerpa@noaa.gov)

**Calif. Dept. of Fish & Wildlife  
Marine Region**  
3883 Ruffin Rd.  
San Diego, CA 92123  
Attn: Christopher Potter  
ph: (415) 740-9869  
e-mail: [Caulerpa@wildlife.ca.gov](mailto:Caulerpa@wildlife.ca.gov)

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

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

- 1) *Surveillance Level* – General survey coverage providing a systematic sub-sampling of the entire APE during which at least 20% of the bottom is inspected and widespread occurrences of *Caulerpa* would be expected to be identified if present. Surveys may be accomplished using diver transects, remote cameras, and acoustic surveys with visual ground truthing. Other proposed methods may be approved on a case-by-case basis by NOAA Fisheries and CDFW.
- 2) *High Intensity Level* – More intensive survey using a systematic sub-sampling of the entire APE during which at least 50% of the bottom is inspected. Surveys may be accomplished using diver or remote camera transects. Other proposed methods may be approved on a case-by-case basis by NOAA Fisheries and CDFW.
- 3) *Eradication Level* – This is the most intensive survey using a systematic and comprehensive survey of the entire APE during which 100% of the bottom is inspected. Surveys must be accomplished using divers moving at a rate appropriate to the site conditions to ensure that all areas are comprehensively searched irrespective of site conditions which may complicate surveys. Other proposed methods may be approved on a case-by-case basis by NOAA Fisheries and CDFW.

Surveyors – Individuals conducting *Caulerpa* surveys must be certified by NOAA Fisheries or CDFW. That certification shall consist of passing an exam demonstrating their ability to identify all *Caulerpa* species. Upon successfully passing that exam, individuals shall be certified for a set two-year period. Recertification may be completed up to 120 days prior to expiration of current certification. Any individual who fails the exam may retake the exam once within a six month period.

**C. Reporting Requirements:**

1. Surveys conducted in accordance with requirements outlined in this document shall be submitted to the NOAA Fisheries/CDFW Contacts within 15 calendar days of completion of each survey. Surveys shall be completed by certified *Caulerpa* surveyors and submitted on the attached survey form or in a suitable reproduction of the form fields.
2. If *Caulerpa* is identified at an authorized project site during a survey or at any other time prior, during, or after completion of authorized activities, the NOAA Fisheries/CDFW Contacts shall be contacted within 24 hours of first noting the occurrence.
3. For surveys that will be conducted within an Infected System or for actions requiring input from NOAA Fisheries/CDFW contacts, please provide information in a timely fashion and allow at least 5 working days for agency coordination and feedback.
4. Eradication Level survey reports require NOAA Fisheries/CDFW approval prior to conducting any authorized Bottom Disturbing Activity.

**D. Surveys within *Caulerpa*-Free System:**

The following survey conditions shall apply to any authorized Bottom Disturbing Activity within *Caulerpa*-Free Systems.

1. Prior to initiation of any authorized Bottom Disturbing Activity, a pre-construction survey of the project APE shall be conducted to determine the presence or absence of *Caulerpa*. This survey shall be conducted at a Surveillance Level. Survey work shall be completed not earlier than 90 days prior to the Bottom Disturbing Activity and not later than 30 days prior to the Bottom Disturbing Activity and shall be completed, to the extent feasible, during the high growth period of March 1 – October 31. Surveys outside of the high growth period shall be allowed on a case-by-case basis by the appropriate regulatory agency in consultation with NOAA Fisheries and CDFW.
2. In the event that *Caulerpa* is detected, the Bottom Disturbing Activity shall not be conducted until such time as the infestation has been isolated, treated or the risk of spread from the proposed Bottom Disturbing Activity is eliminated in accordance with section F.
3. Exemptions – Individual, privately owned boat docks and related structures are exempt from provisions 1 and 2 of this section when such facilities are found in *Caulerpa*-Free Systems and authorized 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 any authorized Bottom Disturbing Activity within Infected Systems.

1. Prior to initiation of any authorized Bottom Disturbing Activity within an Infected System, two surveys, initiated not less than 60 days apart, shall be conducted within the project APE. The first survey shall be conducted using High Intensity Level techniques and the second survey shall be conducted using Eradication Area Level techniques. Both surveys shall be conducted within the same High Growth Period. Deviations from this condition may be considered on a case-by-case basis by the appropriate regulatory agency in consultation with NOAA Fisheries and CDFW.
2. At least one survey shall be conducted within 45 days of initiation of an authorized Bottom Disturbing Activity (a “Pre-Act Survey”). This survey could be the second (Eradication Area Level) survey conducted during the High Growth Period. However, project delays may require that a third survey be conducted prior to initiation of the Bottom Disturbing Activity in order to meet this 45-day requirement. If a third survey is required, this survey shall be conducted at either a High Intensity Level or Eradication Area Level as determined by the NOAA Fisheries/CDFW Contacts based upon site circumstances and proximity to infestations. To determine appropriate survey level, please contact the NOAA Fisheries/CDFW Contacts with project specific information.
3. If the Bottom Disturbing Activity extends for over 90 calendar days, the portions of the APE that would be expected to be impacted by a Bottom Disturbing Activity within the subsequent 90 days must be re-surveyed at a High Intensity Level. This subsequent survey must be conducted within 15 days following the first 90 days. Prolonged activities would require a repetition of this phased survey requirement.
4. If dredged material is removed from the APE and placed elsewhere in the marine environment, then between 60 and 120 days after placement of the dredged materials and, to the extent feasible, during the High Growth Period, the applicant shall conduct a Surveillance Level survey at all disposal areas except where material is disposed of within an existing U.S. EPA designated deep ocean disposal site. Deviations from this condition may be considered on a case-by-case basis by the appropriate regulatory agency in consultation with NOAA Fisheries and CDFW.

**F. If *Caulerpa* is Found:**

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

2. All *Caulerpa* assessment and treatment shall be conducted under the auspices of the CDFW and NOAA Fisheries as the state and federal lead agencies for implementation of *Caulerpa* eradication in California.
3. Within seven days of notification, NOAA Fisheries and CDFW will coordinate with the SCCAT and relevant permitting and resource agencies (and project proponent, as warranted) to fully document the extent of the *Caulerpa* infestation within the project APE. *Caulerpa* eradication activities, which are subject to review and approval by NOAA Fisheries and CDFW, in coordination with the SCCAT and relevant permitting and resource agencies, shall be undertaken using the best available technologies at the time and will depend upon the specific circumstances of the infestation. This activity may include in situ treatment using contained chlorine applications, mechanical removal, or other appropriate methods. The eradication technique is subject to change at the discretion of NOAA Fisheries and CDFW and as technologies are refined.
4. The efficacy of treatment shall be determined prior to proceeding with authorized bottom disturbing activities. To determine effectiveness of the treatment efforts, a written Survey Plan shall be prepared. The plan shall be developed in conjunction with the CDFW and NOAA Fisheries and shall be approved by these agencies prior to implementation.
5. 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.

**G. Exempted Areas and Activities from the Requirements of Sections B-D.**

1. The Channel Islands off of southern California including all areas of Anacapa, San Miguel, Santa Cruz, Santa Rosa, San Clemente, San Nicolas, and Santa Barbara Islands. The exempted area also applies to all of Santa Catalina with the exception of the Avalon and Two Harbors areas.
2. Pile driving activities by the U.S. Navy in San Diego Bay and Ports of Los Angeles, Long Beach, and San Diego.

## ***Caulerpa* Survey Reporting Form**

Surveys shall only be completed by certified *Caulerpa* surveyors. A current list of certified surveyors is available online (<https://www.fisheries.noaa.gov/west-coast/habitat-conservation/certified-caulerpa-surveyors>). This form is required to be submitted for any surveys conducted for *Caulerpa* species that are required under federal or state permits and authorizations issued by the U.S. Army Corps of Engineers, California Coastal Commission, or Regional Water Quality Control Boards. 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: Bryant Chesney, National Marine Fisheries Service (NOAA Fisheries), (562) 980-4037, or Christopher Potter, California Department of Fish and Wildlife, (415) 740-9869.

<b>Report Date:</b>	
<b>Name of bay, estuary, lagoon, or harbor:</b>	
<b>Specific Location Name:</b> (address or common reference)	
<b>Site Coordinates:</b> (UTM, Lat./Long., datum, accuracy level, and an electronic survey area map or hard copy of the map <b>must</b> be included)	
<b>Survey Contact:</b> (name, phone, e-mail)	
<b>Personnel Conducting Survey (if other than above):</b> (name, phone, e-mail)	
<b>Permit Reference:</b> (ACOE Permit No., RWQCB Order or Cert. No.)	
<b>Which survey is this for this project (e.g., first, second, etc.)?</b>	
<b>Was <i>Caulerpa</i> Detected?:</b> (if <i>Caulerpa</i> is found, please immediately contact NOAA Fisheries or CDFW personnel identified above)	<p style="text-align: center;"><b>Yes, <i>Caulerpa</i> was found at this site and</b></p> <p style="text-align: center;"><b>has been contacted on _____ date.</b></p> <p style="text-align: center;"><b>No, <i>Caulerpa</i> was not found at this site.</b></p>

<p><b>Description of Authorized Work:</b> (describe briefly the work to be conducted at the site under the permits identified above)</p>		
<p><b>Description of Site:</b> (describe the physical and biological conditions within the survey area at the time of the survey and provide insight into variability, if known. Please provide units for all numerical information).</p>	<i>Depth range:</i>	
	<i>Substrate type:</i>	
	<i>Temperature:</i>	
	<i>Salinity:</i>	
	<i>Dominant flora:</i>	
	<i>Dominant fauna:</i>	
	<i>Exotic species encountered (including all Caulerpa species):</i>	
<p><b>Description of Survey Effort:</b> (please describe the surveys conducted including type of survey (SCUBA, remote video, etc.) and survey methods employed, date of work, and survey density (estimated percentage of the bottom actually viewed). Describe any limitations encountered during the survey efforts).</p>	<i>Survey date and time period:</i>	
	<i>Horizontal visibility in water:</i>	
	<i>Survey type and methods:</i>	
	<i>Survey personnel:</i>	
	<i>Survey density:</i>	
<i>Survey limitations:</i>		
<p><b>Other Information:</b> (use this space to provide additional information or references to attached maps, reports, etc.)</p>		