Caulerpa prolifera Identified in Newport Bay

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Presented by
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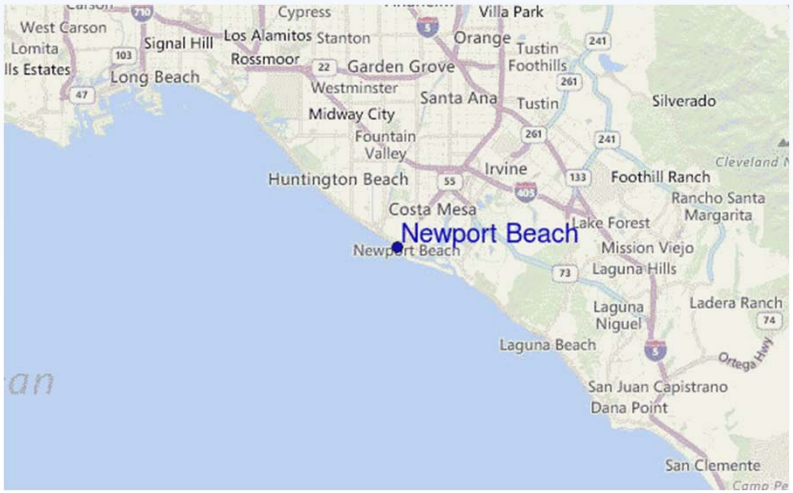
Caulerpa prolifera Identified

- Non-native species of algae identified as *Caulerpa prolifera*
  - China Cove, Newport Bay (in the Newport entrance channel)
    - California Department of Food And Agriculture Genetics Lab
      - Source Unknown



Newport Bay


Upper Newport Bay
PCH
Newport Beach
The Dunes
Lower Newport Bay
Newport Bay Entrance Channel
Data CSUMB SFML, CA OPC
Data USGS
1348 m
Google Earth


China Cove
97 m

Caulerpa prolifera Concerns

- Invasive alga outcompetes native species
  - Poses a threat to eelgrass recovery efforts in Newport Bay
  - Can disrupt native food webs
- Spreads by fragmentation
- Unknown extent of spread
- No danger to human health

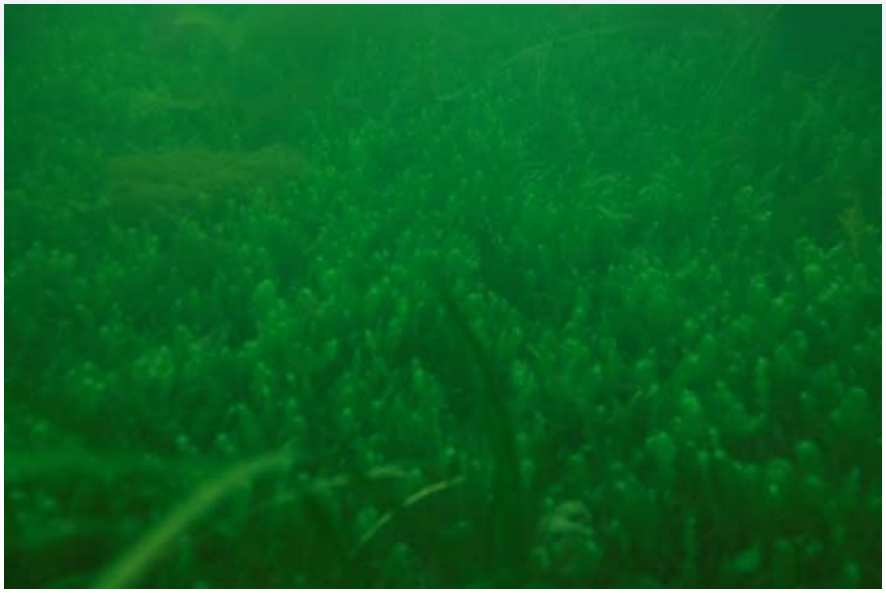


Photo Credit: Amanda Van Diggelen

Previous Caulerpa Infestation

- *Caulerpa taxifolia*
- Southern California Caulerpa Action Team
- Removal
  - Monitoring
    - Final Eradication
- Eradication Costs

Photo Creit: Amanda Van Diggelen

Current Caulerpa Eradication Efforts

- Southern California Caulerpa Action Team reconvened
  - CDFW and Santa Ana RWQCB co-chair
  - State, federal, and local agencies
  - Steering Committee, Technical Advisory Committee, Regulatory Committee, and Outreach Committee
- Eradication Plan
  - Three phases: 1) removal, 2) monitoring, and 3) surveys.
  - Initial Budget: **$912,000**
  - Funding: state and federal
  - *Funding shortfall: $395,400*

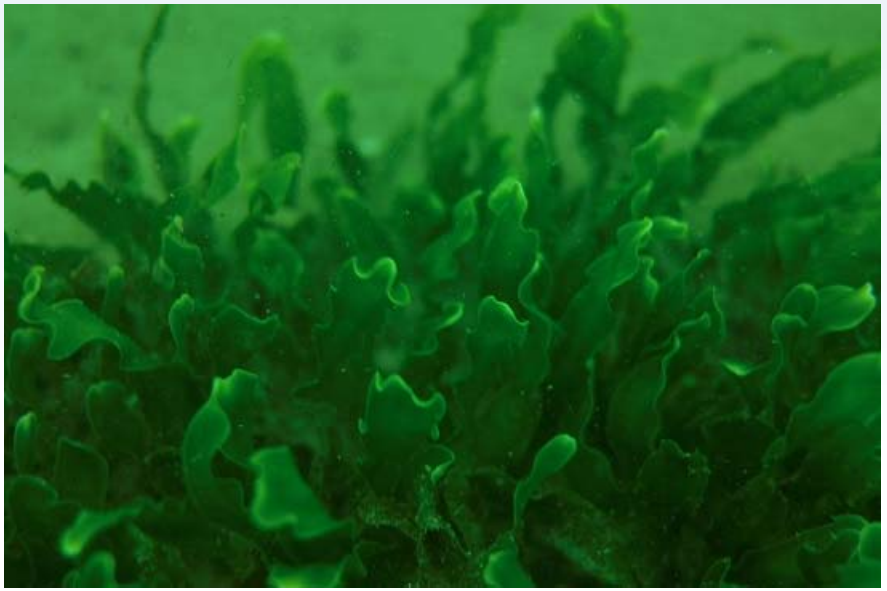
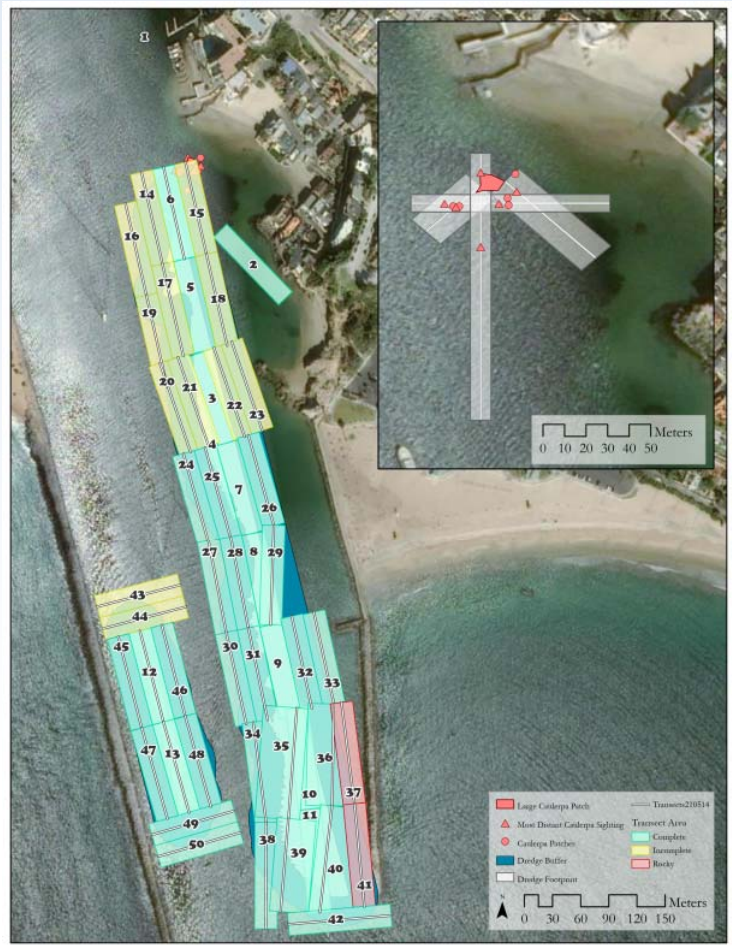


Photo Credit: Amanda Van Diggelen

Caulerpa Surveys/Location Map

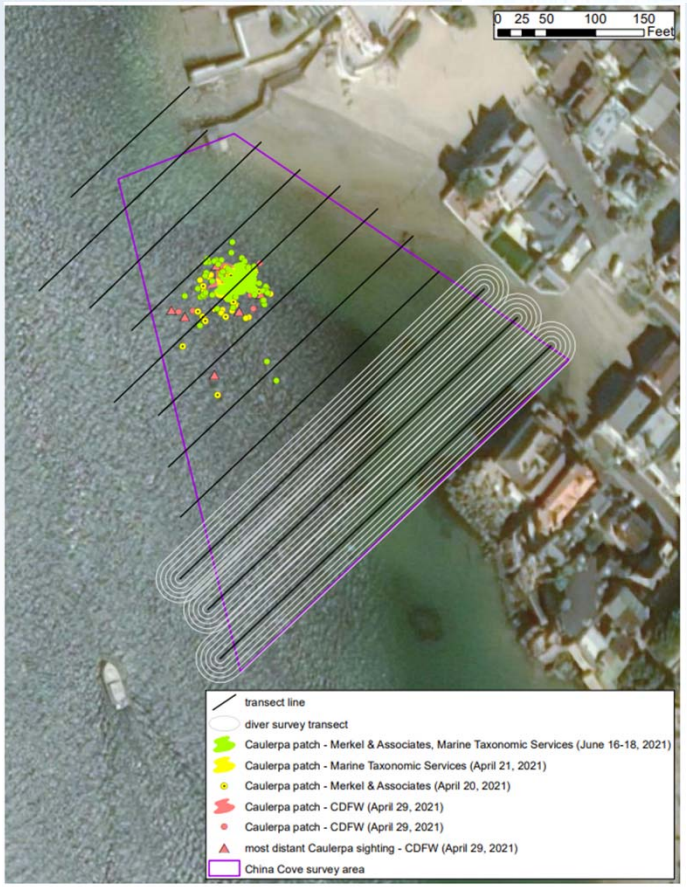


Department Dive Surveys Video

Video Credit: Amanda Van Diggelen

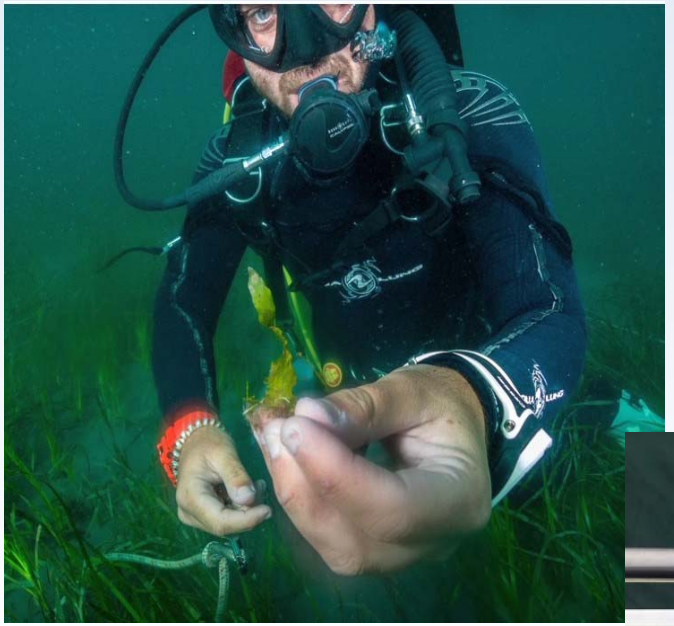
Implementation of Eradication Plan

- Pre-removal eradication level surveys completed June 16-18
  - 48 patches observed over 1,060 square feet.
  - Patch size ranged from 0.1 to 926 square feet.
- Some previously identified unanchored “rollers” no longer present
- Fake *Caulerpa prolifera* placed in the field
  - Return rate of approximately 80%

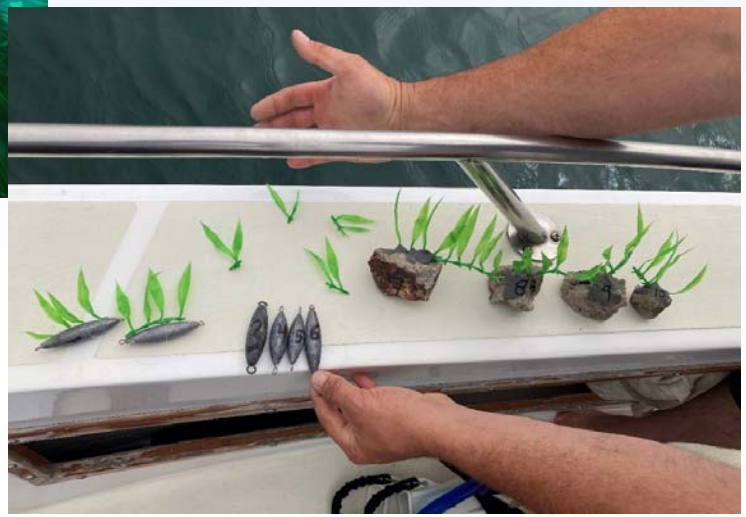


Courtesy of Merkel & Associates

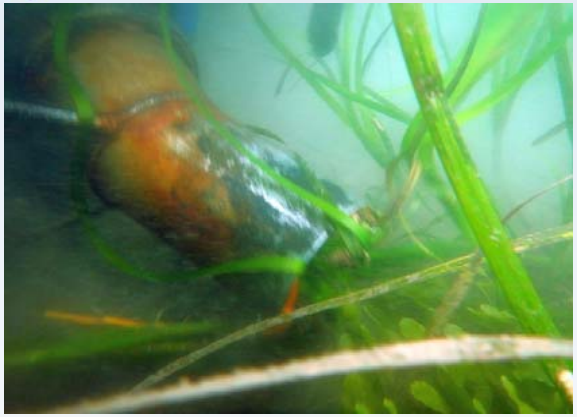
Removal Effort Surveys



- Survey efficacy was tested by deploying fake *C. prolifera*
- As divers removed small patches and loose rollers by hand, they also picked up the fake Caulerpa.
- Percent of fake Caulerpa retrieved against the total Caulerpa deployed provide a good measure of diver efficacy



Removal Effort



Courtesy of Merkel & Associates

- Santa Ana RWQCB contracted with Merkel and Associates (with Marine Taxonomic Services as subcontractor)
- Took place July 6 -14
  - Diver operated suction
  - Piped to dewatering boxes on beach
- Outlying areas were checked by divers
- Collected material dried and disposed

Removal Effort

- Onshore filter boxes and pumps for *Caulerpa* removal

Post Removal Surveys

- Eradication Plan calls for post removal surveys at 2, 4, 8 and 12 weeks
- However, changed conditions found during removal operations showed extensive burial and fragmentation of *Caulerpa*
- Dive schedule accelerated to address *Caulerpa* being uncovered as sands are winnowed away by currents
  - Additional funds have been requested from the Cleanup and Abatement Account

eDNA Potential

Currently exploring the possibility of using eDNA to detect *Caulerpa*

- 15 water samples were collected in August
- Samples are being analyzed currently by Tanner Waters at UCLA as part of his thesis work
- “Proof of Concept” to determine detectability of *Caulerpa* in a known infected system

eDNA Potential

If Proven, future surveys could be a cost-effective way to:

- Determine if an infected system is cleared,
- Expand areas surveyed beyond the zone of infection (i.e., coastal zones),
- Act as an early detection mechanism,
- Reduce labor intensive diver surveys.

Current Activities and Next Steps

- Ongoing China Cove removal effort funded by the State Water Board's Cleanup and Abatement Account ($308,000)
  - Additional funds requested to support the increased frequency of post-removal diver surveys
- Substantial funding provided by the USFWS and NOAA Fisheries to survey other areas of Newport Bay and coastal areas southeast of the Newport entrance channel
- eDNA proof of concept in conjunction with UCLA
- Additional funding needed for
  - Post removal surveys and long-term eradication surveys
  - Determine source of infestation and method of propagation through DNA analysis
  - Outreach to divers and aquarium hobbyists and suppliers

Thank You

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- https://wildlife.ca.gov/Conservation/Invasives/Species/Caulerpa