When Control is Constrained to Containment

Undaria pinnatifida in the Channel Islands, CA

Sean Hastings

NOAA Channel Islands National Marine Sanctuary
Asian Kelp, Wakame
Scientific Name: *Undaria pinnatifida*
Asian Kelp, Wakame

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Native range
Asian Kelp, Wakame
Scientific Name: *Undaria pinnatifida*

Invasive range: So. America, Australia, New Zealand & California
Distribution of *Undaria* and year of discovery

- **2000**
  - Port Hueneme
  - Channel Islands Harbor
  - Santa Barbara Harbor
  - Ventura Harbor
  - Long Beach

- **2001**
  - Ports of Los Angeles

- **2016**
  - Anacapa

- **2019**
  - Santa Cruz
  - Santa Rosa
  - Santa Catalina

- **2019**
  - San Miguel

- **2019**
  - Channel Islands National Marine Sanctuary

- **Undaria pinnatifida** observed
Why should we care?

- Grows quickly and forms dense patches that can over-grow and displace natives, e.g. giant kelp
- Threatens native ecosystems, i.e., the food web that relies on native giant kelp
Life history & reproduction of *Undaria*

- Up to 700 million spores released per plant
- Swim up to 6 hours in water column before settling on hard substrate (e.g., rocks, plastic, metal, concrete, metal, rubber, other organisms)
- Growth triggered by drop in water temperature
- Microscopic gametophytes can lay dormant for up to 3 years
Seasonality of Undaria

Juvenile (<6”) → Adult (1-10’)

Winter-Spring
- Flat, undivided blade
- Single midrib

Spring-Summer
- Fragmented blade
- Reproductive spiral structure at base
  (not present in native kelp)

Drawings by Rob Gough. Not to scale.
Harbors are invasion “hotspots”
Boats as vectors for *Undaria*
Distribution in Santa Barbara Harbor

Source: Carolynn Culver, California Sea Grant

Marina 1

November 2018

All Surveys

2013-2014 Surveys

Summer 2014

Fall 2013

Summer 2006
Distribution in Santa Barbara Harbor

Source: Carolynn Culver, California Sea Grant
Controlling the spread of Undaria

1) Monitoring

Citizen Scientists

ROV surveys
Controlling the spread of *Undaria*

1) Monitoring
2) Research

Genetic sequencing
Controlling the spread of Undaria

1) Monitoring
2) Research
3) Outreach

Preventing the Spread of the Invasive Alga Undaria pinnatifida in the Santa Barbara Channel Region: Management Options and Case Studies

Roxanne Diaz¹, Sean Hastings², Aubrie Fowler², and Lindsay Marks²

Wakame (Undaria pinnatifida)
Controlling the spread of Undaria

1) Monitoring
2) Research
3) Outreach

ATTENTION
BOATERS AND DIVERS

Help protect kelp beds and reefs from invasive seaweeds!

LOOK FOR and REPORT sightings* of two non-native seaweeds in California

DEVIL WEED
Sargassum horneri

ASIAN KELP
Undaria pinnatifida

PREVENT the SPREAD of invasives from harbors and other infested sites*

HARBORS
Clean your hull regularly and check for invasives before leaving the harbor
Remove seaweed from hull, slip, and gear; contain in a sealed bag for disposal on land

REEFS
Plan to visit uninfested sites first*
Contain seaweed fragments from yourself, your gear, and boat deck before moving to new locations
DO NOT DISTURB OR REMOVE INVASIVES ON UNDERWATER REEFS; THEY CAN BE EASILY SPREAD!

* LEARN HOW TO IDENTIFY INVASIVE SEAWEEDS, VIEW MAP OF INFESTED SITES, AND REPORT SIGHTINGS AT
MarineInvasives.org
Management Controls

1) Monitoring
2) Research
3) Outreach
4) Control

Removal and heat treatment

Plywood box with elements used to heat a boat hull infested with Undaria (targeting microscopic gametophytes)
Management Controls

1) Monitoring
2) Research
3) Outreach
4) Control

Ultraviolet Light treatment