

Asian kelp *Undaria pinnatifida*: A new invader in SF Bay

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SFB Regional Water Quality
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Undaria pinnatifida Asian Kelp

- Wakame
- A nuisance pest for boaters: attaches to boats, docks, ropes, chains
- Foul of aquaculture species and structures



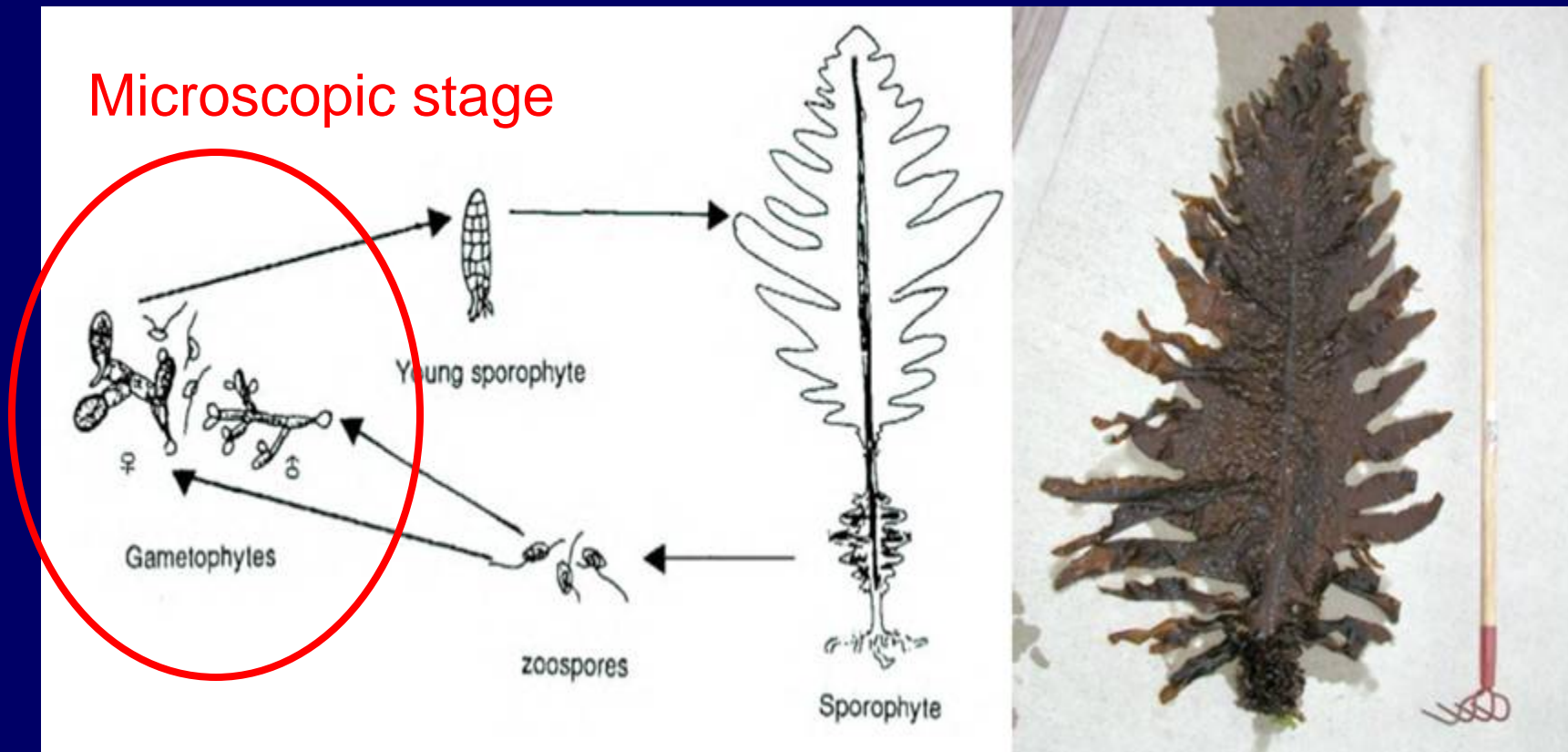
Undaria pinnatifida Asian kelp

- Competes with native algae in some locations
- Can grow to 6 ft in 2 months
- Each individual can release >10 million spores
- On many “worst invaders” lists



Undaria life cycle

Microscopic stage

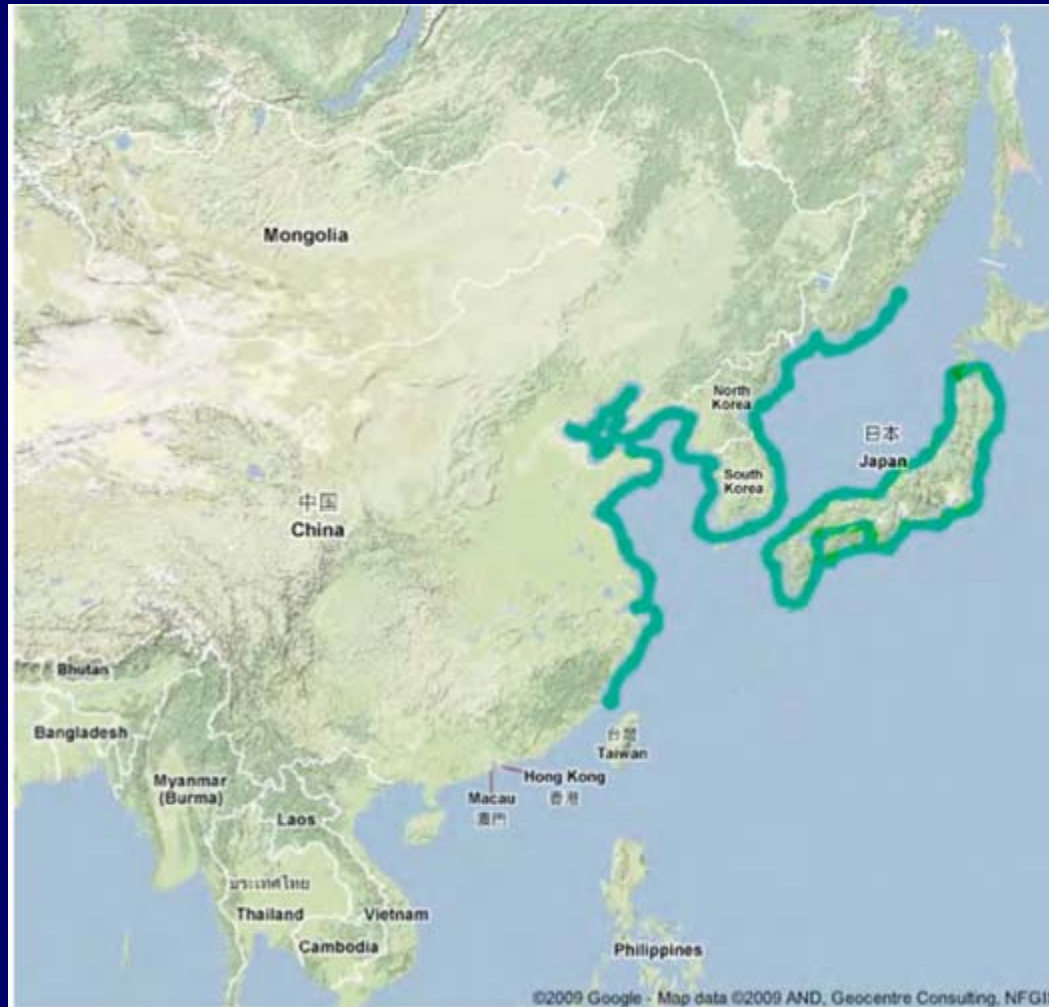


Undaria ecology

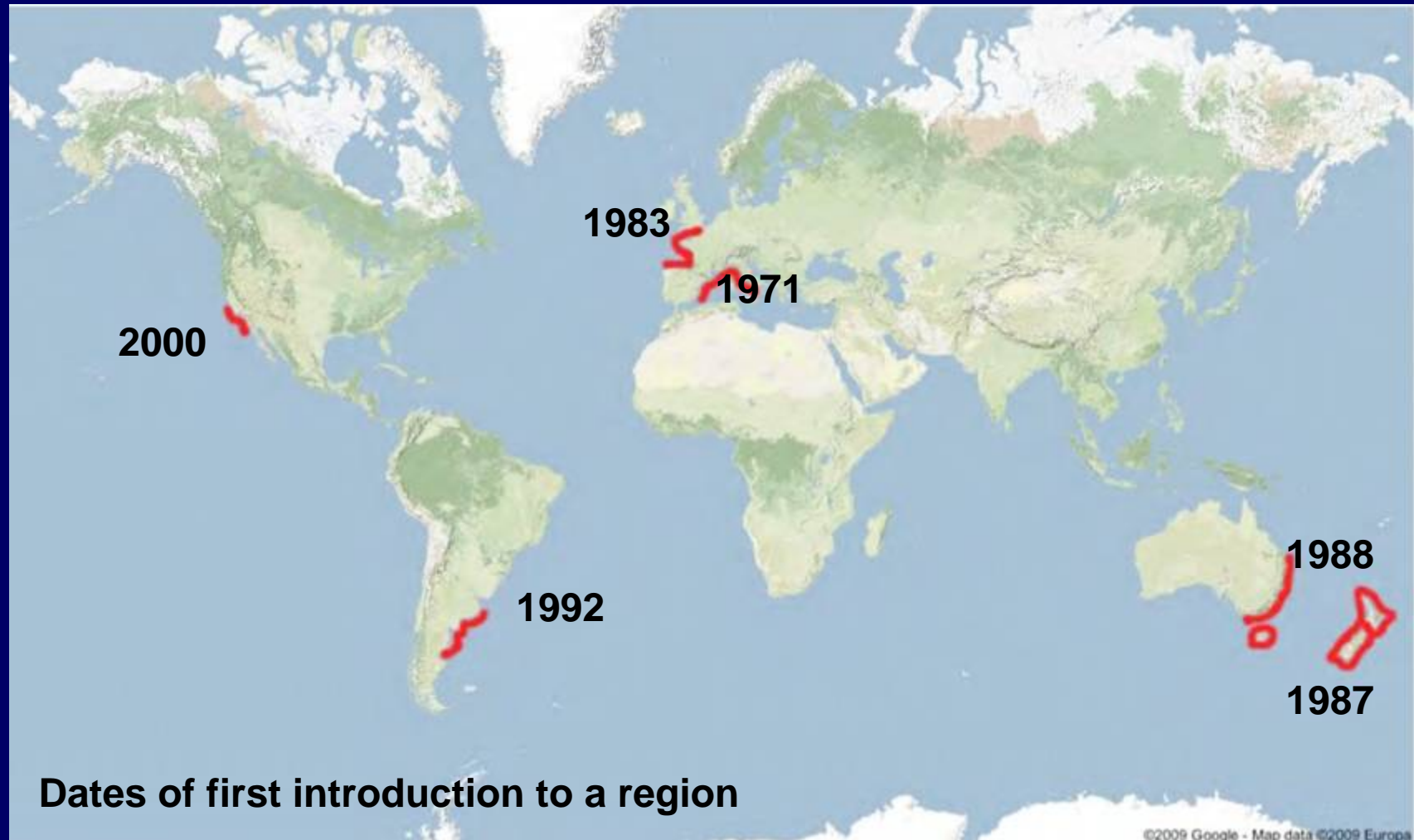
- Intertidal to 25 m depth
- High tolerance for turbid, nutrient rich water
- Broad salinity and temperature tolerances



Native range



Non-native range



Spread along West Coast



Major northern range expansion

- Monterey northernmost extent for ~8 years
- Found by SERC in mid-May in SF Marina, Pillar Point, South Beach Harbor Marina
- Searches in SF Bay recently have found it at Hyde Street Harbor and Piers 47, 1.5, 3, 38 and 40. Not found in East Bay, Sausalito or south of SBH or any of the Bay islands.
- Not found north of SF Bay (as of summer 09): Spud Point, Tomales Bay

Concerns and potential impacts

- Fouling pest
- Potential threat to native ecosystems
- Once established in SF Bay, possibilities for further spread are enormous




Response to date: community outreach

- Stories in local and national media, Latitude 38, marina newsletters
- Boaters, commercial divers, oyster growers contacted
- Fliers, posters, watch cards distributed to local marinas

ALERT!
Have you seen this kelp?

Undaria pinnatifida is a quick-growing, **non-native** kelp, occurring in Southern California and Monterey. Uncontrolled, it can become a fouling species on ship hulls, nets, fishing gear, moorings, ropes and other marine structures and is capable of having a profound influence on the ecosystem. Recently, small populations have been found in San Francisco Bay and Pillar Point.



An *Undaria* plant found in a S.F. Bay marina, estimated to have grown to this size (approx. 6 feet) in 2 months

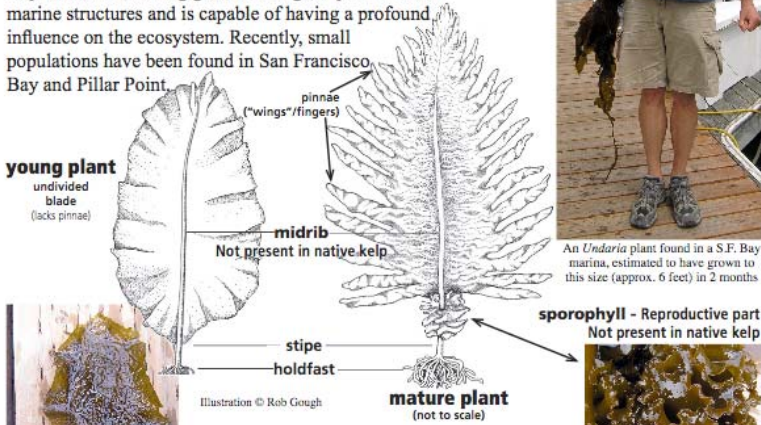




Illustration © Rob Gough

Where does it live and grow?
Commonly found in marinas.
Hard surfaces including rocks, wood, plastic, rope, buoys, docks, pilings, and on vessel hulls.
Found in the low intertidal zone to depths of approximately 15 feet.

How can I help?
Boat owners, harbor visitors and divers can inspect vessel hulls, boat slips, moorings, docks and piers. Report any observations North of Monterey and if possible send photos.



Contact us to join the volunteer effort to detect and control this invasive kelp
(415) 435-7128 - browncw@si.edu
printing courtesy of NOAA, illustration © Rob Gough, photos SERC

Management

- Surveys and physical removals
- Scientists from SERC, UCD, NOAA, Cal State Lands, USFWS, USDA, Waterboard, UC divers
- Volunteers from Baykeeper, The Bay Institute and others

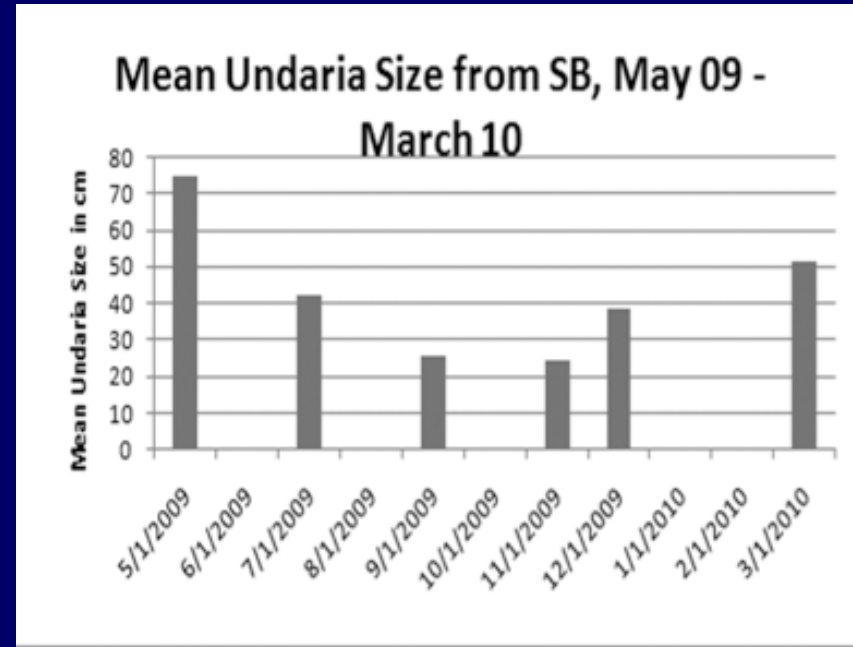
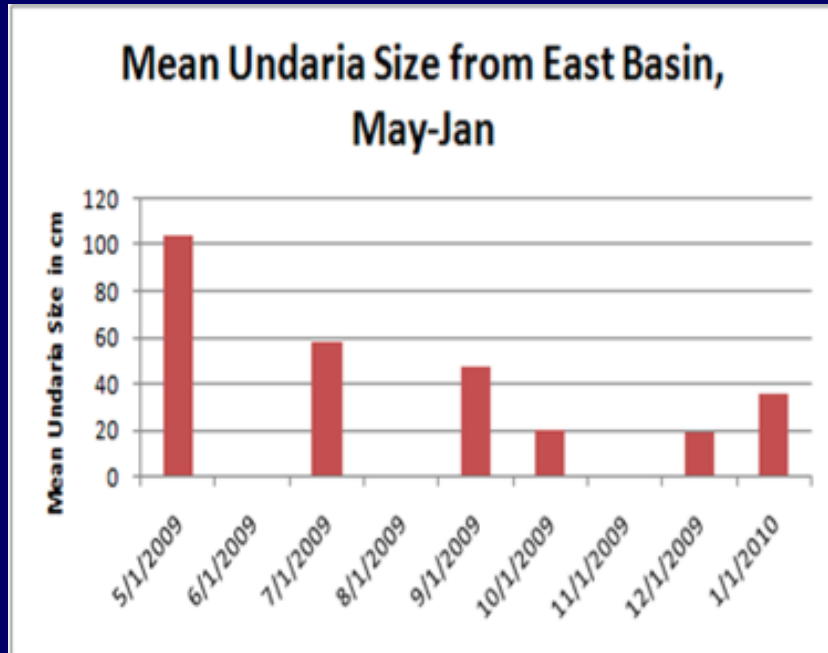


Divers manually remove *Undaria*



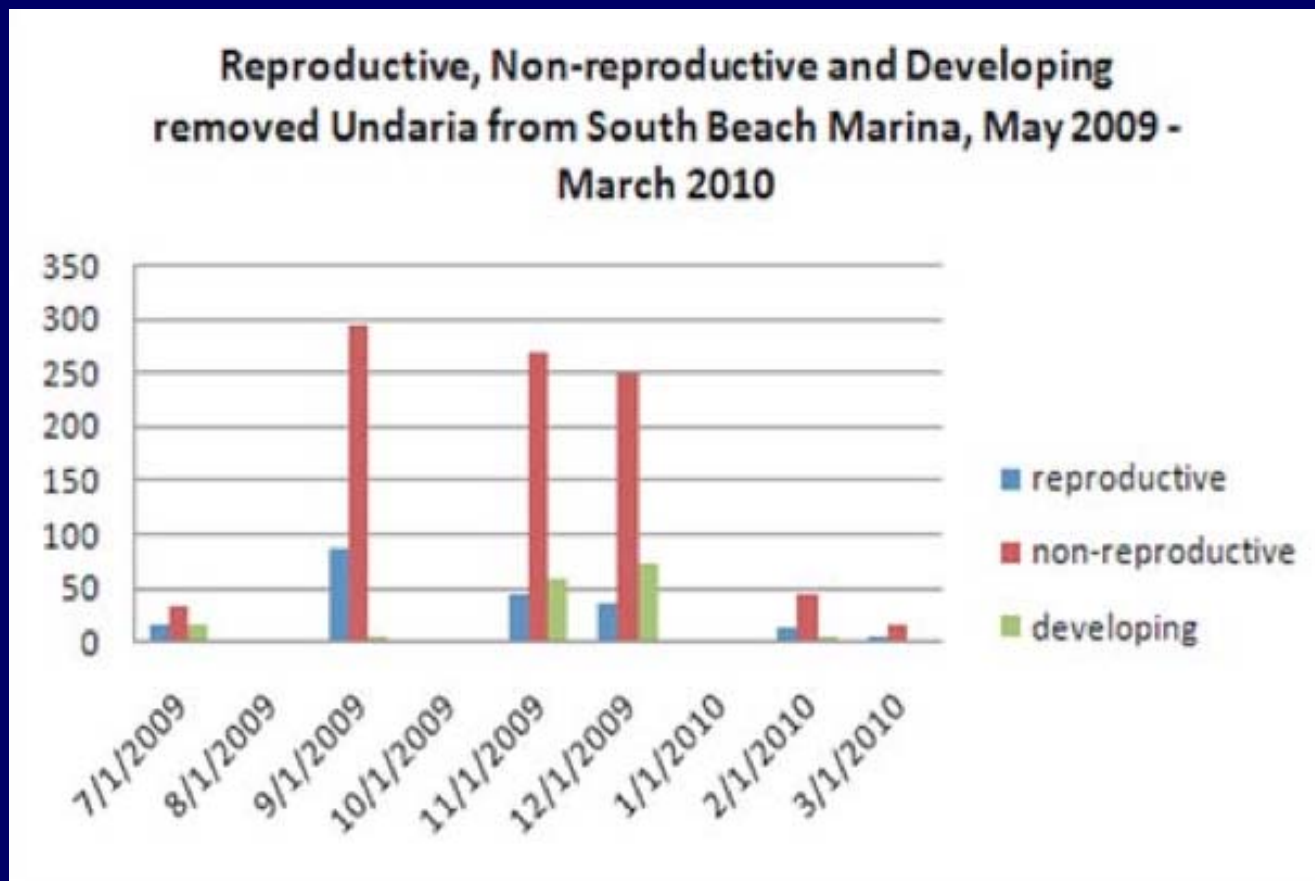
Hand removals: effects

- 440+ pounds removed
- Reduction in mean size



Hand removals: effects

- Reduction in potential spore output



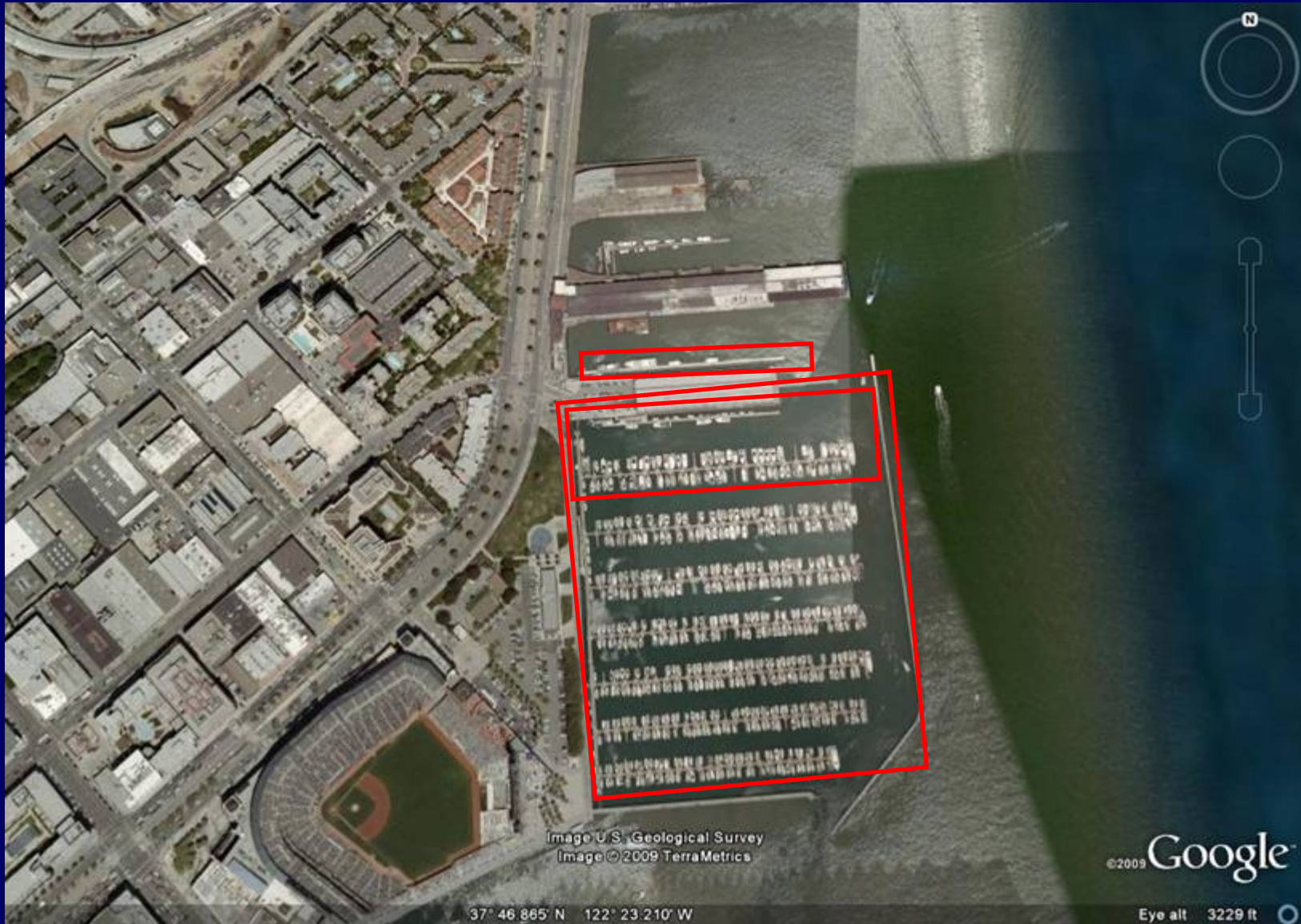
Hand removals 12 months later

- *Undaria* not found at Pillar Point, 4 months
- Very few in SF Marina, 4 months
- However, spread continues at South Beach
- And extent along SF waterfront not completely unknown





San Francisco Marina



South Beach Harbor Marina

Next steps

- Complete assessment of extent along SF waterfront
- Test alternative methods
- Develop eradication plan for SF
- Distribution watch cards widely and develop network of rapid responders for points north



What you can do

- Look for this kelp
- If you can, remove it
- Take a photo and contact us at marineinvaders@gmail.com
- Dispose in land-based trash
- **Don't throw it back in the water!**
- **Check your boat before getting underway**
- Talk to boaters and others about it