

Citizen Science to inform marine management

Community-Based Monitoring for Healthy Ecosystems



Colleen Wisniewski
Southern California Regional Manager
California Program
Reef Check Foundation



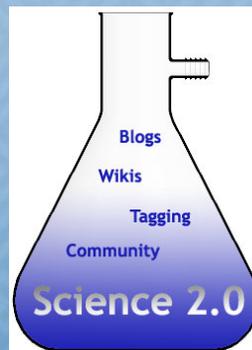
A diver in a black wetsuit and scuba gear is swimming in clear blue water. In the background, a large, textured reef structure is visible. The overall scene is underwater and brightly lit.

Reef Check Approach

- Use immersion learning to build a constituency of citizen scientists
- Reef Check teams are in over 90 countries and territories worldwide
- Citizen scientists support improved management of marine ecosystems
- California program started in 2005 to monitor rocky reef ecosystem

Science 2.0 → Why Citizen Science?

- Reduced budgets and lack of staff resources in agencies
- Increasing data needs for implementation of EBM
- Implementation of adaptive management
- Increasing stressors on marine environment



End User =
Decision Makers



Data
Quality/Scientific
Rigor

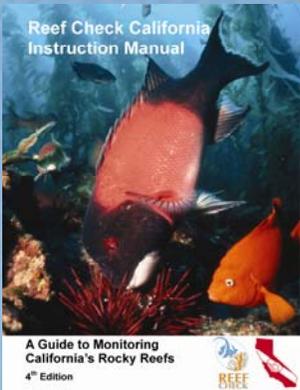
Reef Check Scientists + Science Advisory Team



+



=



Volunteer
Demographic



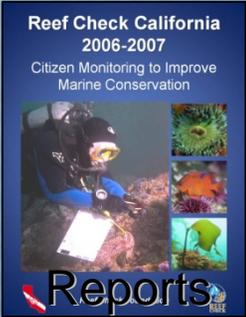
Experienced Divers



Scientific
Outreach



+



+

MEETINGS
AND
RELATIONSHIPS

Monitoring Protocol

- Based on academic and CDFG methods
 - Science Advisory Team
 - Directly compare to other subtidal datasets
- Ecosystem assessment
 - Fishes
 - Invertebrates
 - Seaweed
 - Substrate



Photo: K. Kopp



Partnerships = Lower cost

- Government

- State (e.g. Department of Fish and Game)
- Federal (e.g. National Marine Sanctuaries)



- Academic Research Programs

- PISCO



- Scientific Dive Programs

- Universities and Aquaria



- Industry

- Dive Shops
- Charter Operators

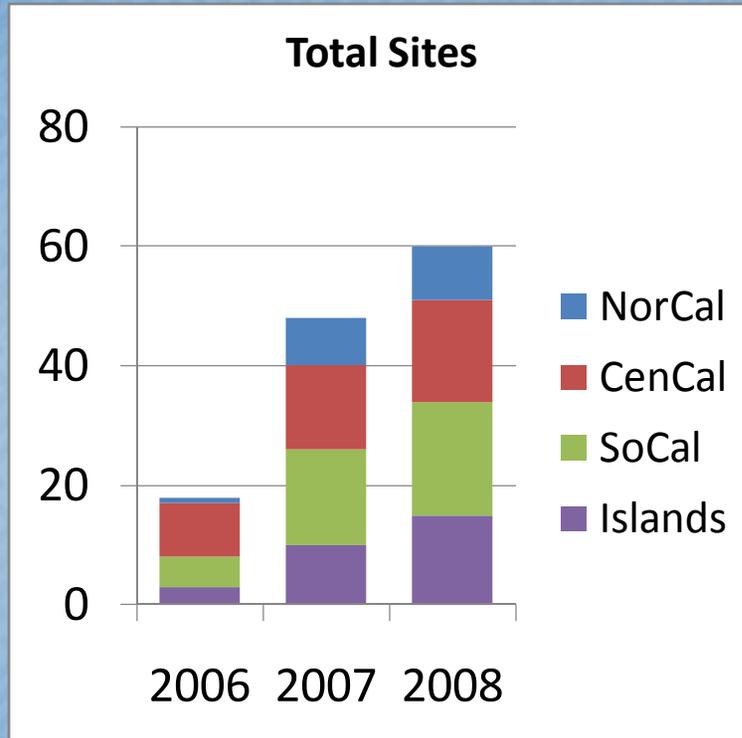


- Volunteers



Reef Check CA Sites

2008 → 60 Sites and 76 surveys



COUNTS TO DATE:

Fishes = over 65,000

Invertebrates = over 198,000

Seaweed = over 57,000



Making Data Available

<http://www.reefcheck.org/rcca/2yr.php>

Reef Check California 2006-2007

Citizen Monitoring to Improve
Marine Conservation



Welcome to Reef Check California's Nearshore Ecosystem Database (NED)

Stretching over 1,100 miles, California's coastline is the gateway to a unique and often under-appreciated marine ecosystem. Offshore, just below the surface, kelp forests and rocky reefs are home to a vast array of marine life that supports a wide variety of consumptive and non-consumptive human uses. Similar to other reefs around the world, population growth, coastal development, pollution, and overfishing have placed increasing demands and stresses on our nearshore resources.

Reef Check California is a network of informed and involved citizens, scientists and organizations that support the sustainable use and conservation of our nearshore marine resources. NED is your tool to input data from Reef Check California Surveys and view/query data collected at Reef Check California sites.

- Map Viewer
- Data Download
- Diver Portal
- Reef Check Website



Reef Check Foundation

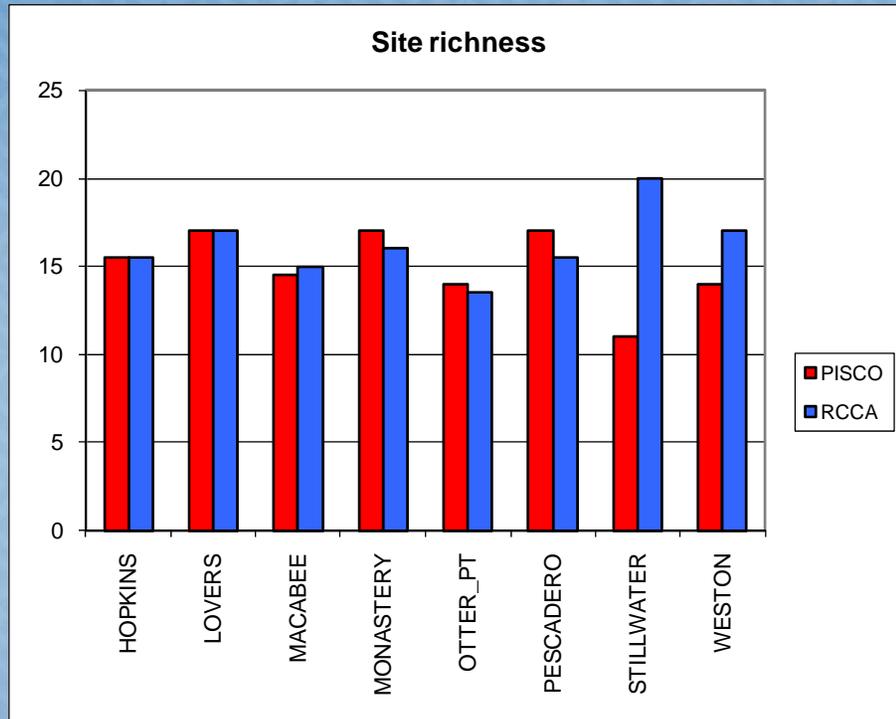


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CHECK

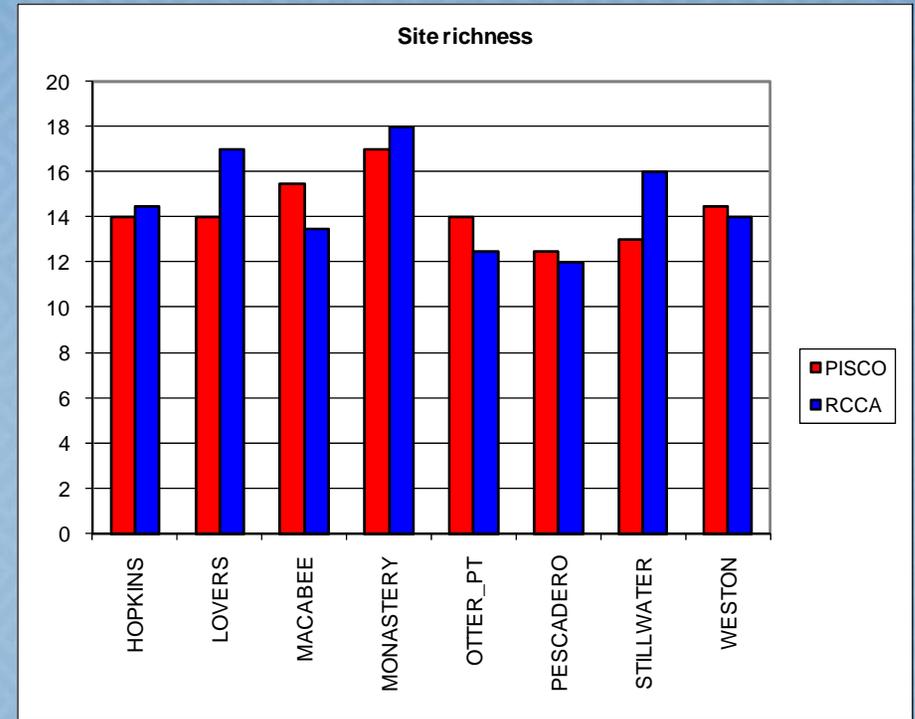
<http://ned.reefcheck.org>



Comparison Study Preliminary Results



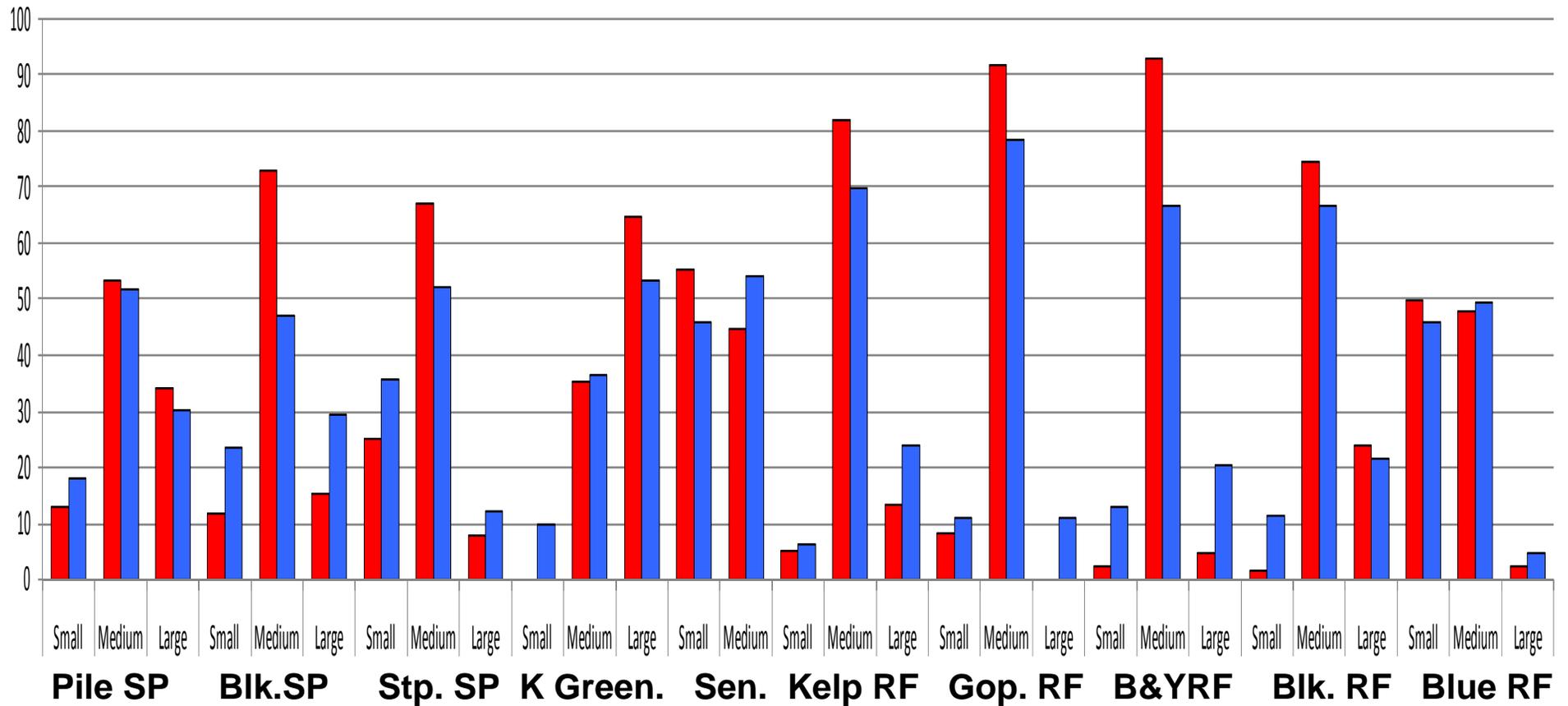
Fishes



Invertebrates
and Seaweed



Comparison Study Preliminary Results



■ PISCO
■ RCCA



Conclusions

- RCCA data has broader applications than fisheries management and NED makes data easily available
- Data quality has been established and is continually assessed (North Coast Comparison 2010, Bight 08)
- Partnerships multiply resources and lower costs, increasing spatial and temporal scope
- Volunteers are engaged and supportive of science based management





www.reefcheck.org

Acknowledgements

- California Coastal Marine Initiative of the David and Lucille Packard Foundation, Richard and Rhoda Goldman Fund, California Ocean Protection Council/State Coastal Conservancy, Quiksilver Foundation, Body Glove, SIMA, UCSB Shoreline Preservation Fund, Patagonia, Campbell Foundation, Code Blue
- Scientific Review Team
- Reef Check volunteers worldwide

NED

Nearshore Ecosystem Database

SPECIES ABUNDANCE **CHANGE OVER TIME**

Select distribution to display:

Sites only

- All Fish -

- All Invertebrates -

- All Seaweed -

[explain ?](#)

MAP OVERLAYS

Select overlays to display:

National Marine Sanctuaries

Areas of Special Biological Significance

Marine Protected Areas

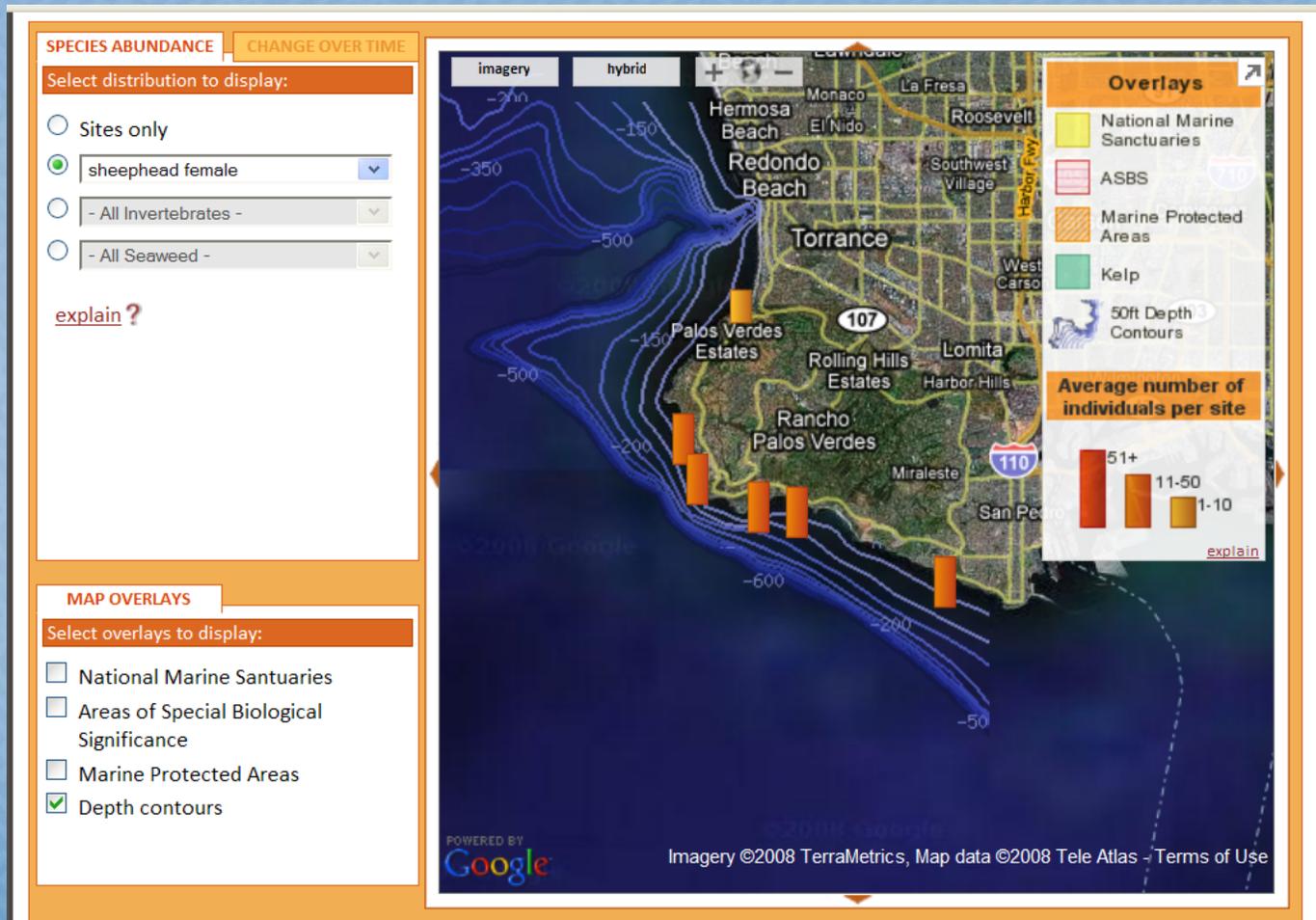
Depth contours

The map viewer displays a satellite-style map of the California coast. It features several overlays: National Marine Sanctuaries (yellow), ASBS (pink), Marine Protected Areas (orange), and 50ft Depth Contours (blue). Numerous red and white striped buoys are scattered along the coast, representing surveyed dive sites. Some buoys are marked with a yellow star, indicating they are selected. The map includes major cities like Redding, Sacramento, San Francisco, San Jose, and Los Angeles, as well as major highways like I-5, I-80, and I-15. A legend on the right side of the map provides details for the overlays and site selection. The map is powered by Google Imagery and includes a copyright notice for TerraMetrics.

Map
Viewer

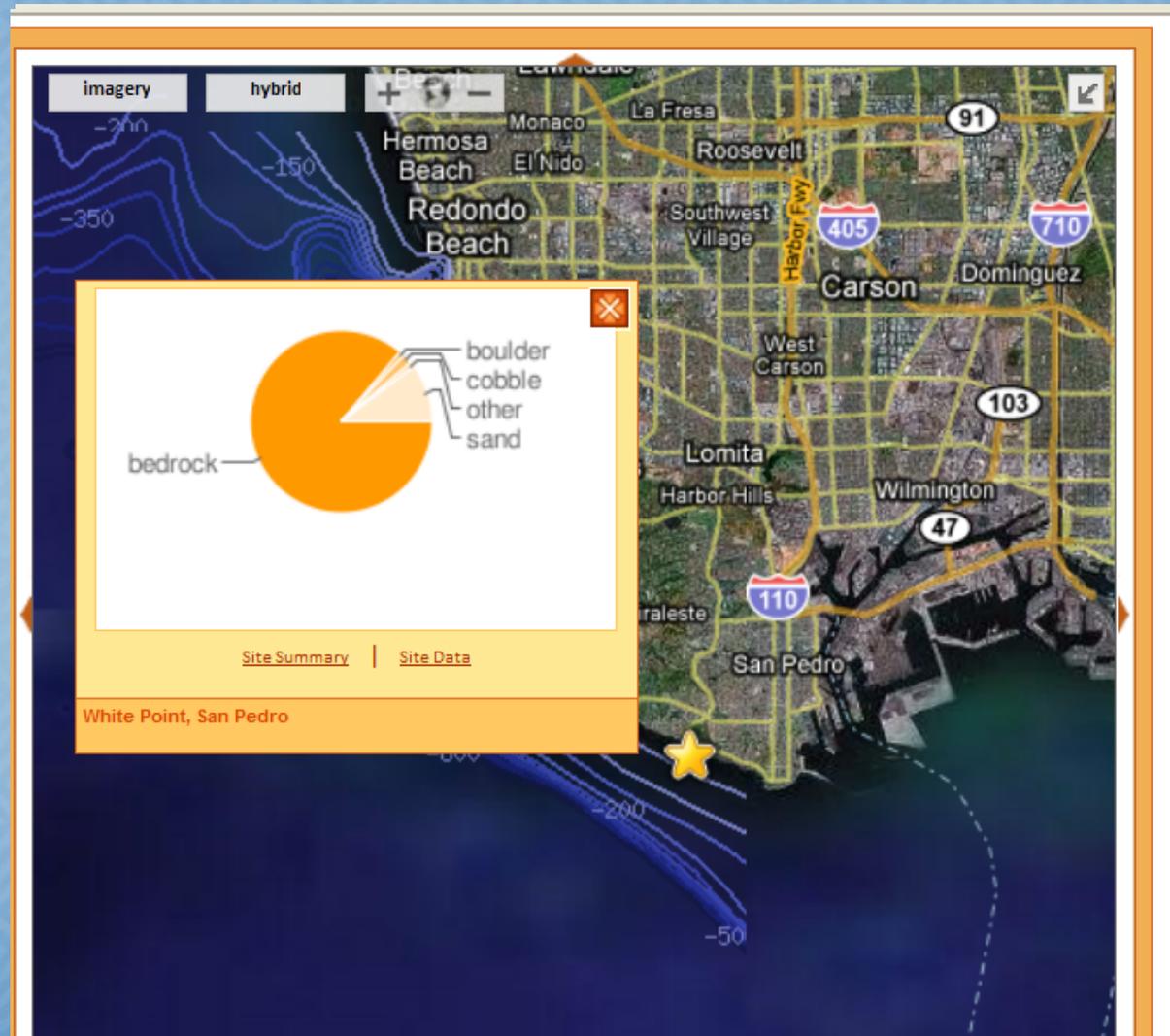
<http://ned.reefcheck.org>

Compare Species Abundance



<http://ned.reefcheck.org>

Detailed Site Information



Site Summary

Site Summary for White Point



White Point

kelleys whelk

Seaweed: laminaria spp, giant kelp, so. sea palm, pterygophora

INVASIVE SPECIES SEEN:

RCCA Survey Site Name: White Point

City or Island: San Pedro

County: Los Angeles

Protection: Not protected

Survey depth: 9 meters

Survey history:

Surveyed 09/27/2008 - 09/27/2008:

- Commercial fishing: Unknown impact
- Recreational fishing: Medium impact
- Diving/snorkeling: Medium impact
- Sewage pollution: No impact
- Nonpoint pollution: No impact

Indicator species observed:

Fish: garibaldi juvenile, rainbow perch, garibaldi adult, black perch, senorita, rock wrasse male, sargo, kelp bass, rock wrasse female, black and yellow, blacksmith, gopher rockfish, rubberlip perch, pile perch, sheephead female, opaleye, copper rockfish, barred sand bass

Invertebrates: bat star, chestnut cowry, giant keyhole limpet, giant spined star, large anemone, purple urchin, red urchin, short spined sea star, wavy/red turban snail, warty sea cucumber, brown/golden gorgonian,

Site Data

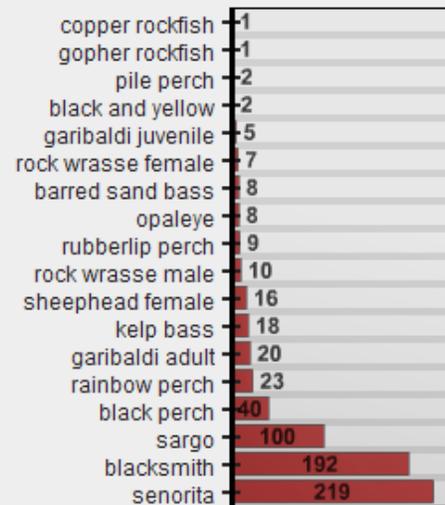
White Point

2008

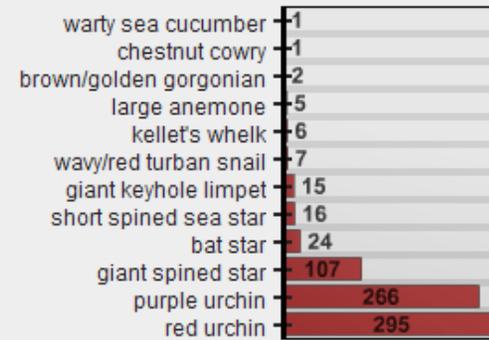
create species lists

Species Abundances at White Point during 2008

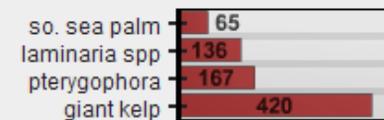
Fish abundance



Invertebrate abundance



Seaweed abundance



<http://ned.reefcheck.org>

Diver Portal = Data Upload



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CALIFORNIA
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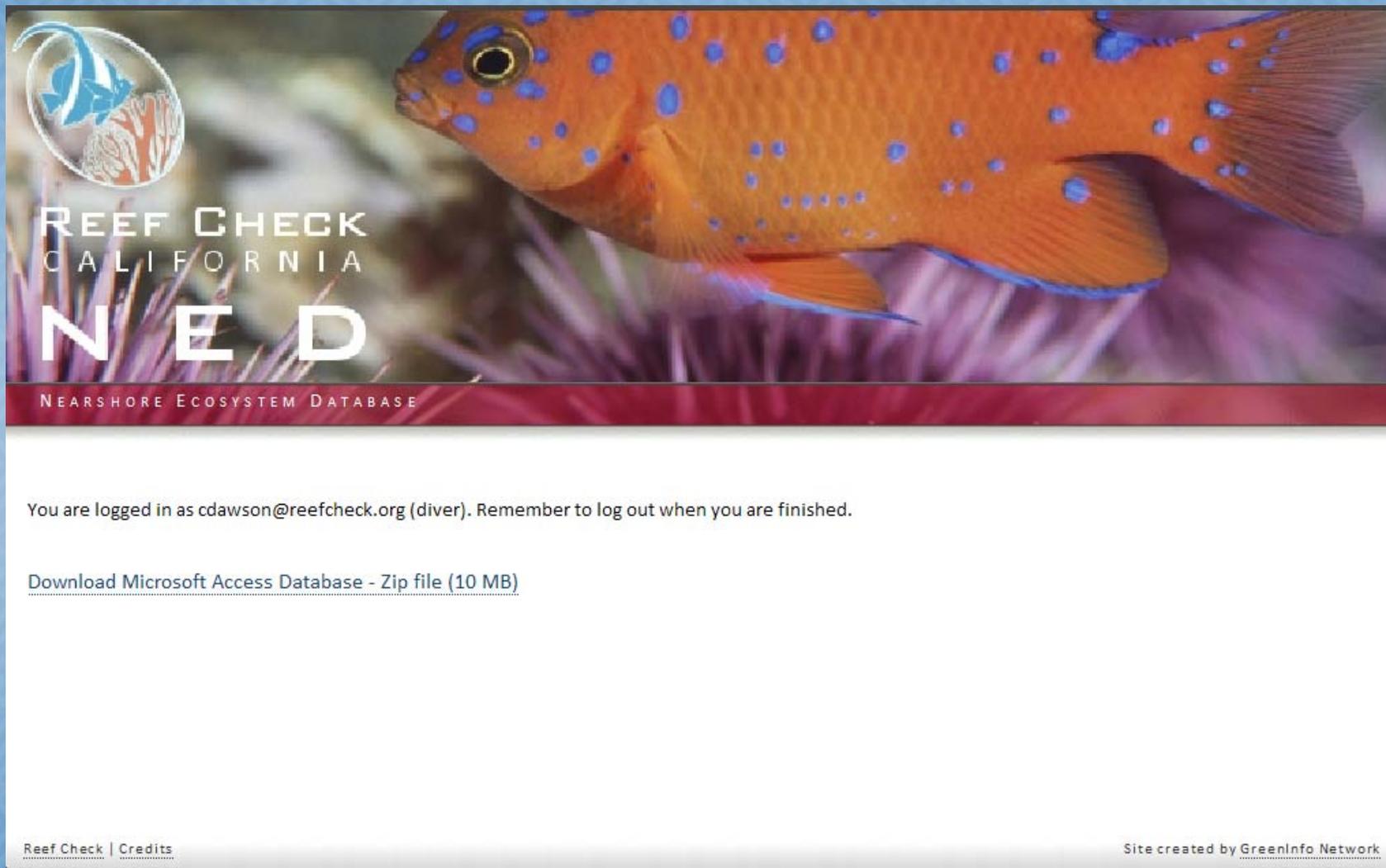
NEARSHORE ECOSYSTEM DATABASE

DIVER PORTAL

Site Desc	Fish	Inverts	Abalone Size	Seaweed	UPC	Urchin Size	Review
Save & Exit	Transect 1	✓	ng				Save & Continue >>
	Transect 2	✓					
	Transect 3	✓					
SITE D	Transect 4	✗					
	Transect 5		Test			Air Temp (C): 15	
	Transect 6		Test			Surface Temp (C): 15	
	Transect 7		Test			Temp at 5m (C): 15	
	Transect 8		State: CA			Temp at 10m (C): 15	
	Transect 9						
	Transect 10						
	Transect 11		0.000000			Distance from Shore (m): 15	
	Transect 12		0.000000			Average Depth at Site (m): 15	
	Transect 13						
	Transect 14		Start Date: 2008-10-29				
	Transect 15		End Date: 2008-10-31			Transect Type: Both	
	Transect 16		Weather: Rainy			Exposure: Exposed	

<http://ned.reefcheck.org>

Data Download = Raw data



The screenshot shows the Reef Check California NED (Nearshore Ecosystem Database) website. At the top, there is a header image featuring a blue and orange spotted fish swimming over purple coral. The text 'REEF CHECK CALIFORNIA NED' is overlaid on the image, with 'NEARSHORE ECOSYSTEM DATABASE' written below it. Below the header, a message states: 'You are logged in as cdawson@reefcheck.org (diver). Remember to log out when you are finished.' Underneath this message is a link: 'Download Microsoft Access Database - Zip file (10 MB)'. At the bottom left, there are links for 'Reef Check' and 'Credits'. At the bottom right, it says 'Site created by GreenInfo Network'.

REEF CHECK
CALIFORNIA
NED
NEARSHORE ECOSYSTEM DATABASE

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