Citizen Science to inform marine management

Community-Based Monitoring for Healthy Ecosystems

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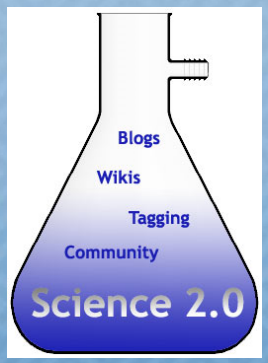
California Program
Reef Check Foundation

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

Volunteer Demographic

Scientific Outreach

Water Boards

FISH & GAME COMMISSIONERS STATE OF CALIFORNIA

RESOURCES AGENCY CALIFORNIA DEPARTMENT FISH & GAME

California Environmental Protection Agency

Reef Check Scientists

+

Science Advisory Team

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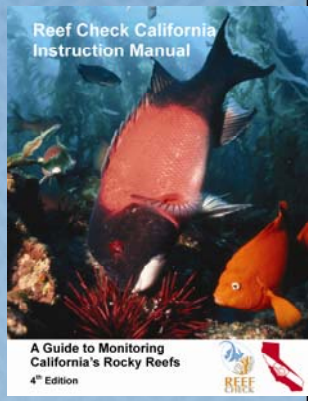

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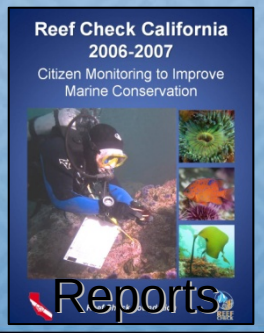


+ MEETINGS AND RELATIONSHIPS

Monitoring Protocol

- Based on academic and CDFG methods
  - Science Advisory Team
  - Directly compare to other subtidal datasets

- Ecosystem assessment
  - Fishes
  - Invertebrates
  - Seaweed
  - Substrate

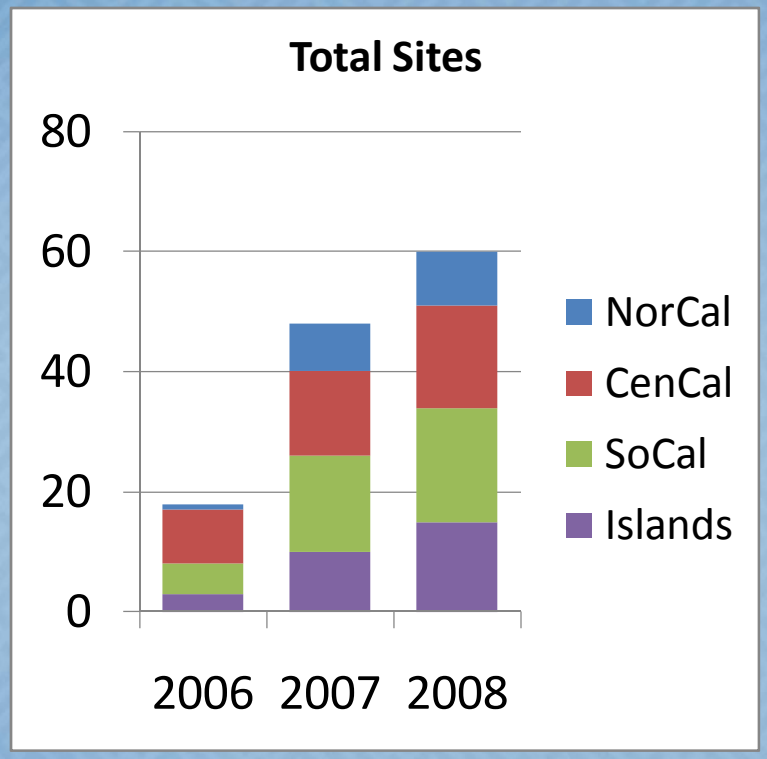
Photo: K. Kopp

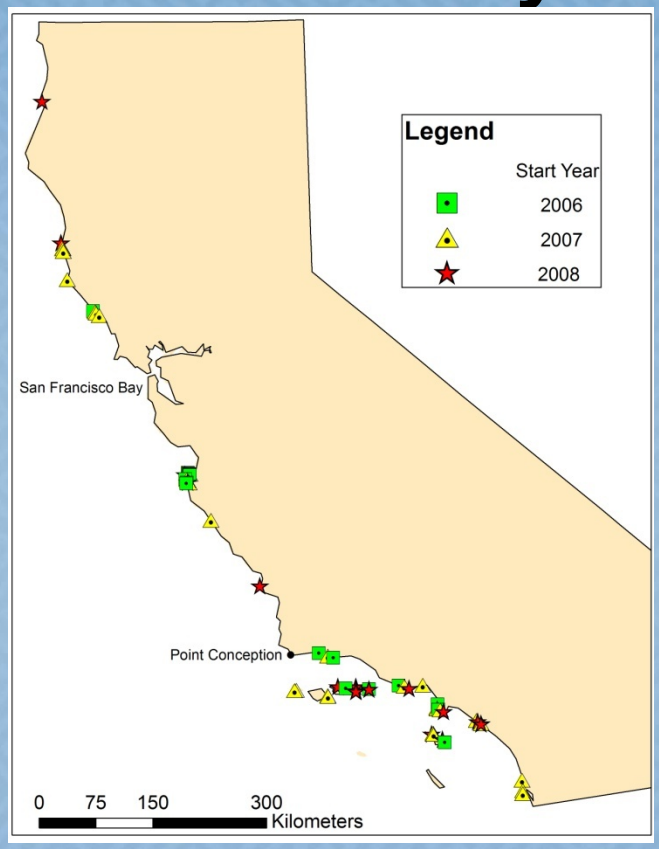
Partnerships = Lower cost

- **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:

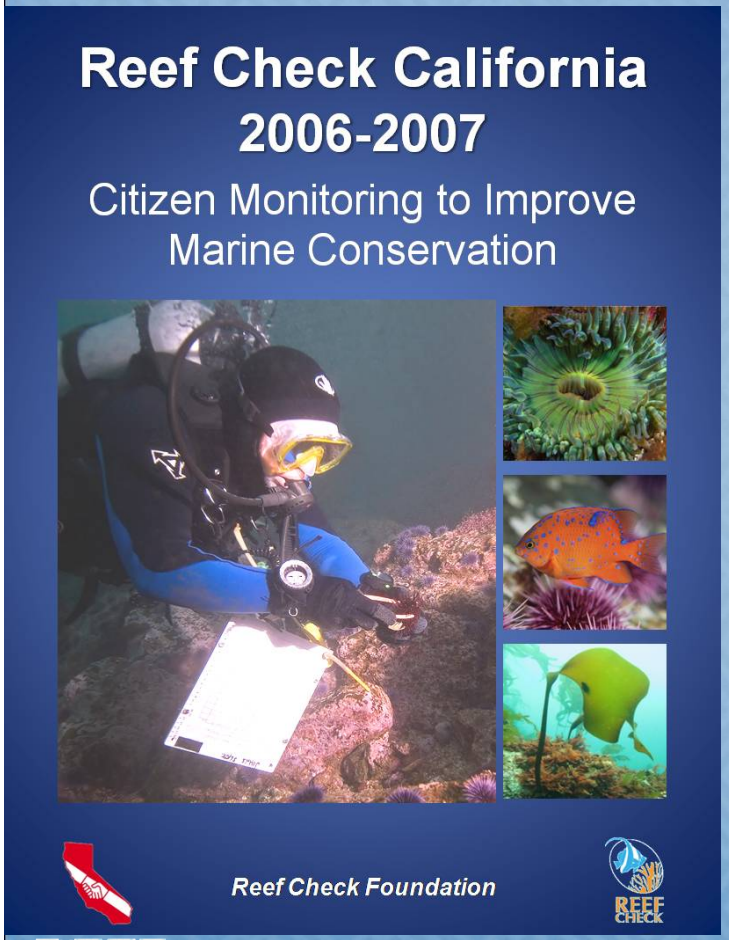
Fishes = over 65,000

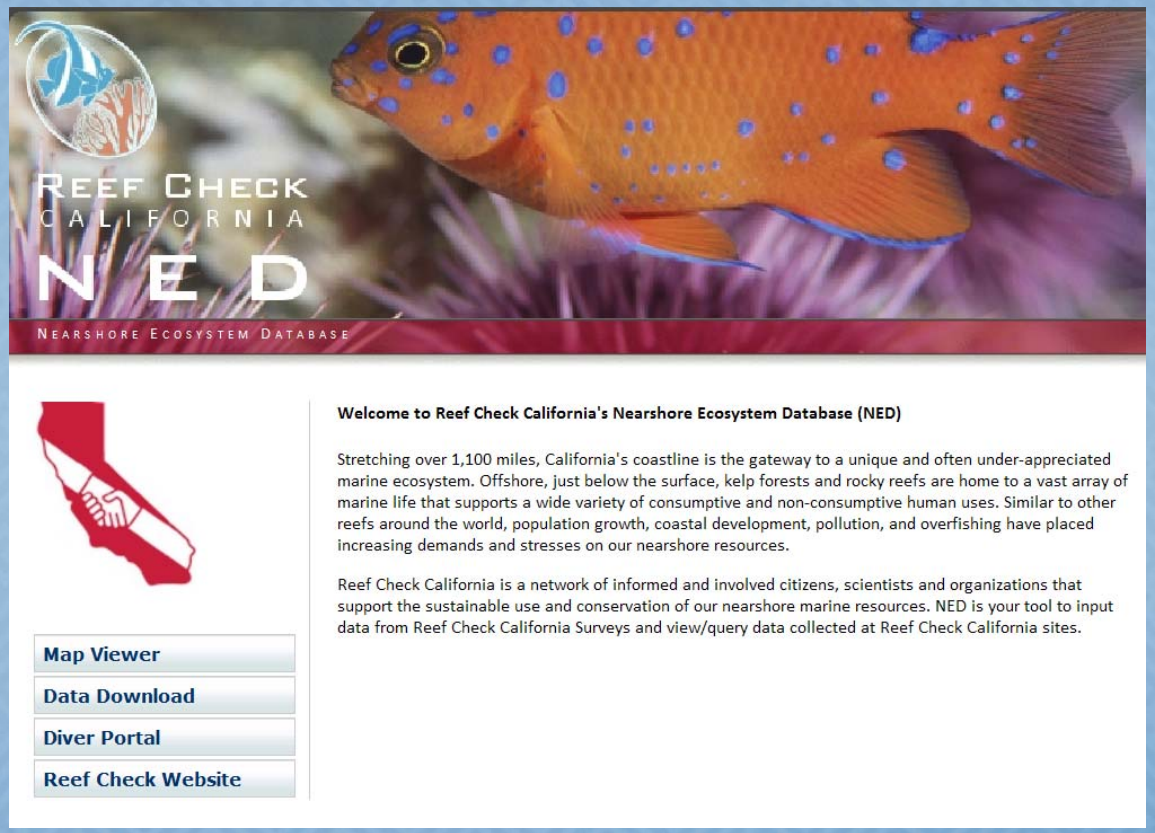
Invertebrates = over 198,000

Seaweed = over 57,000

Making Data Available

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





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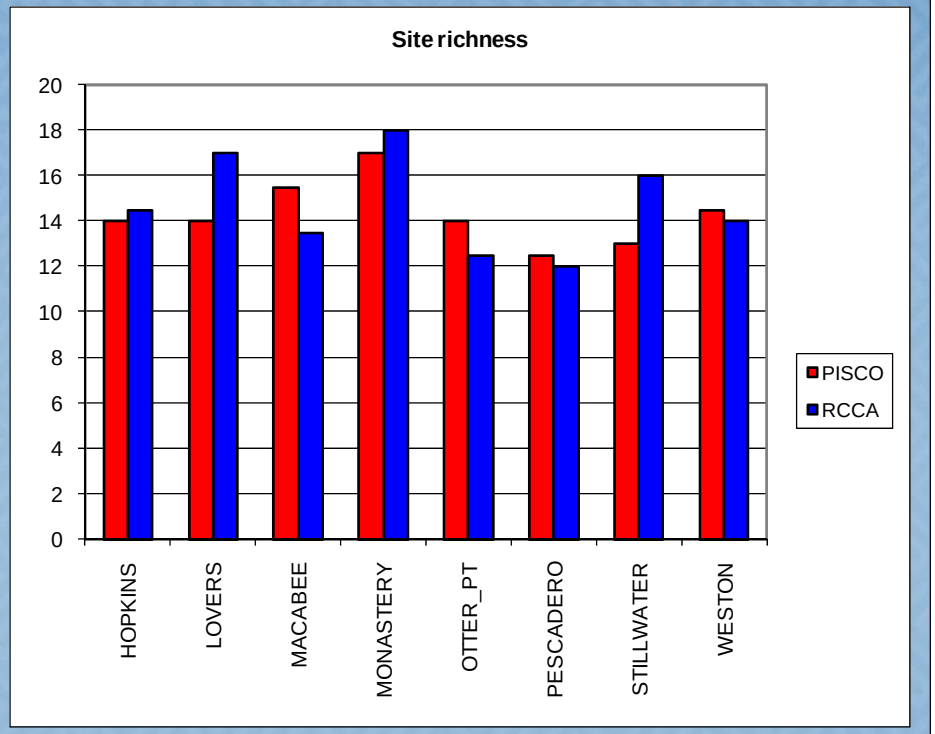
REEF CHECK

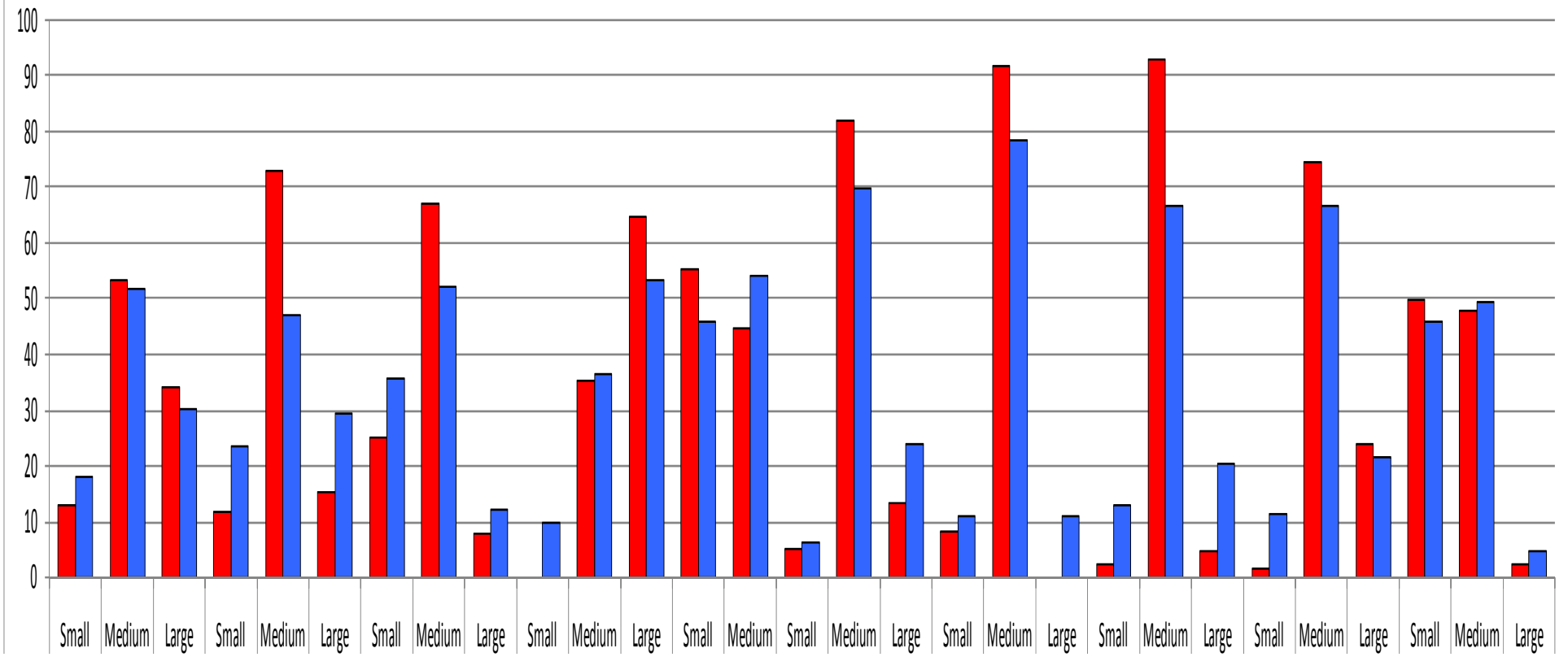
Comparison Study Preliminary Results



Fishes

Invertebrates and Seaweed

Comparison Study Preliminary Results



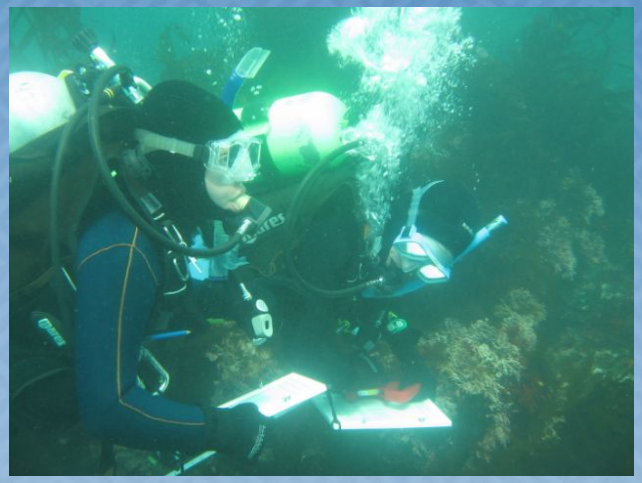
PISCO

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

REEF CHECK



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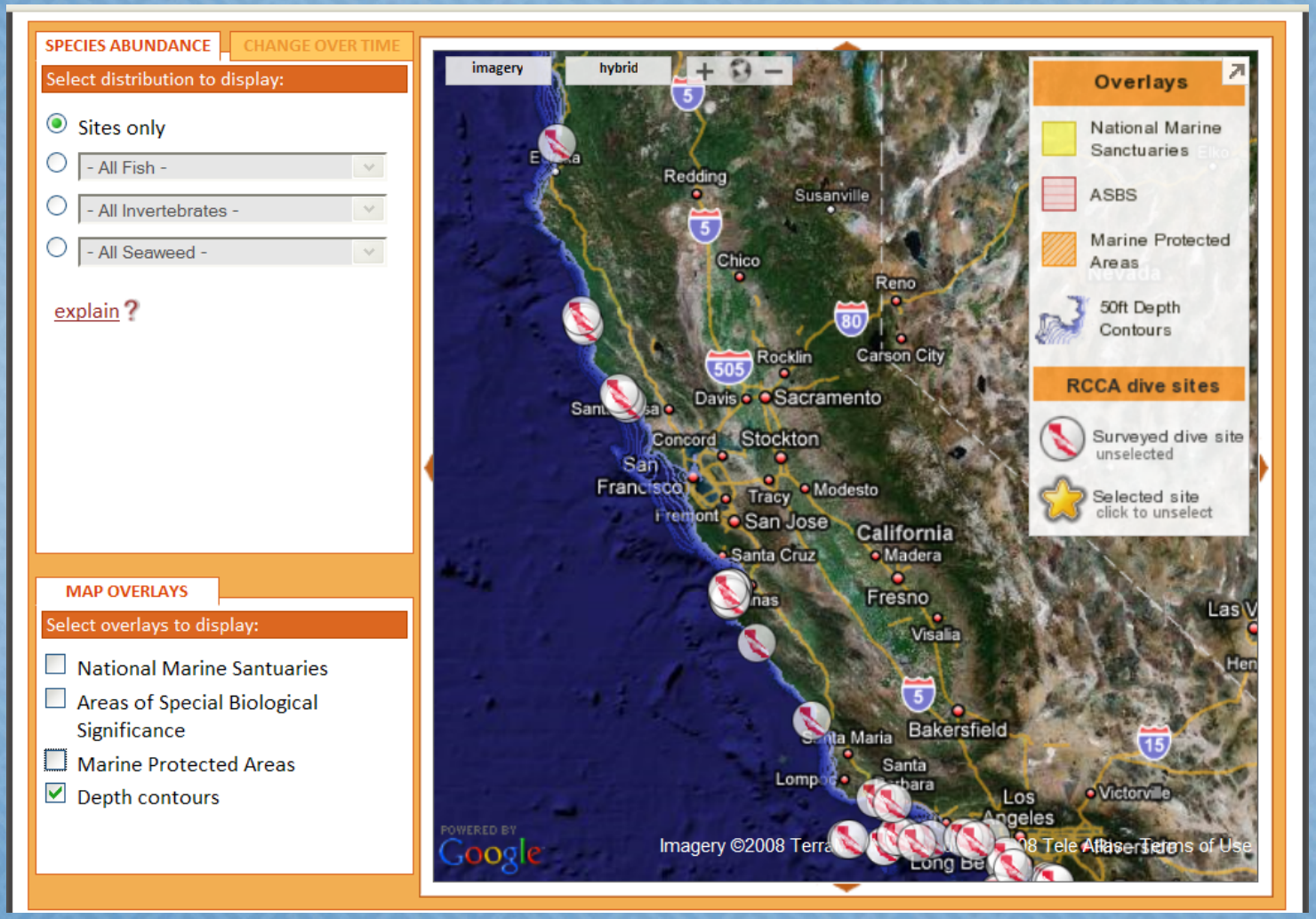
Acknowledgements

- 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

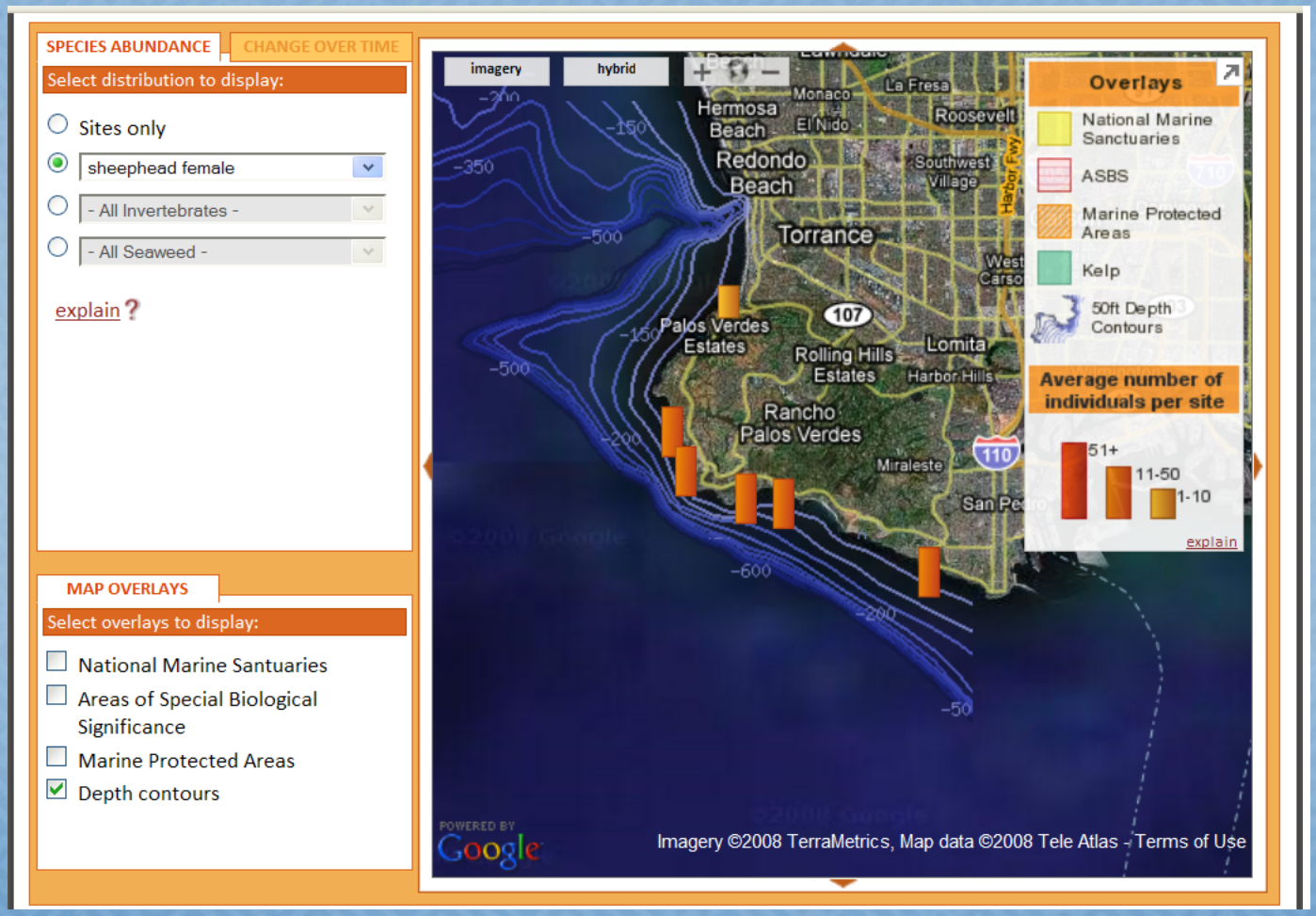
NED
Nearshore Ecosystem Database



Map Viewer

http://ned.reefcheck.org

Compare Species Abundance



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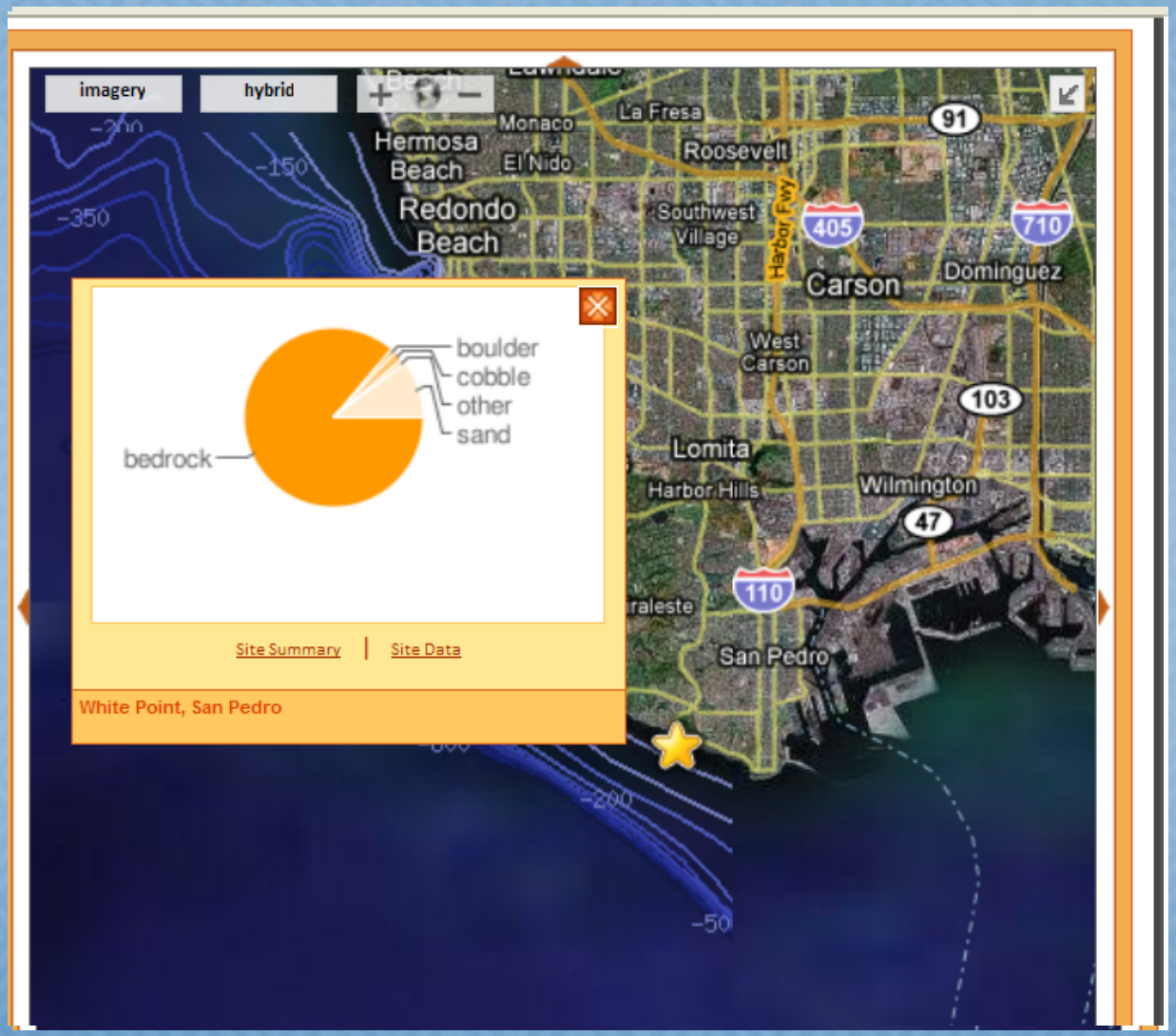
Detailed Site Information



Site Summary

Site Summary for White Point

White Point

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,

kellet's whelk

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

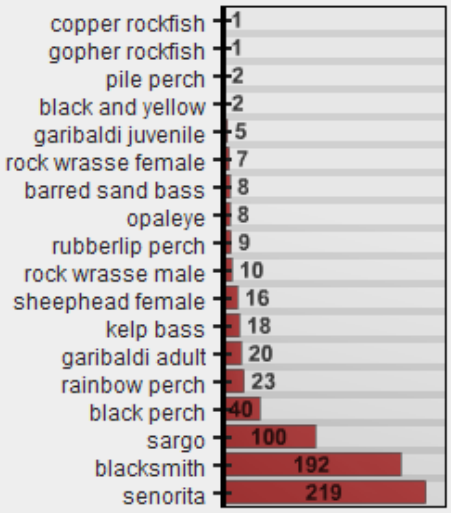
INVASIVE SPECIES SEEN:

Site Data

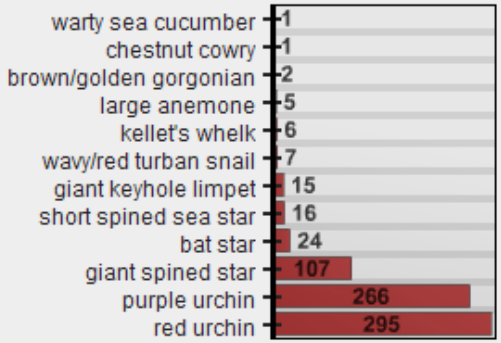
White Point | 2008 | create species lists

Species Abundances at White Point during 2008

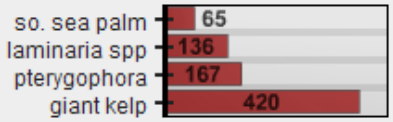
Fish abundance



Invertebrate abundance



Seaweed abundance



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Changes Over Time

Reef Check California Survey Sites

Discover California's diverse marine life!

California's rocky reef ecosystems are highly dynamic and experience natural population fluctuations over time. Change over time comparisons presented here are not statistically verified and only reflect the direction of change in estimated abundance between selected surveys. These summaries cannot be used to evaluate the magnitude or cause of observed trends.

SPECIES ABUNDANCE | CHANGE OVER TIME

Select distribution to display:

- sheephead female
- CA spiny lobster
- - All Seaweed -

Select time averages to compare:

A: 2007

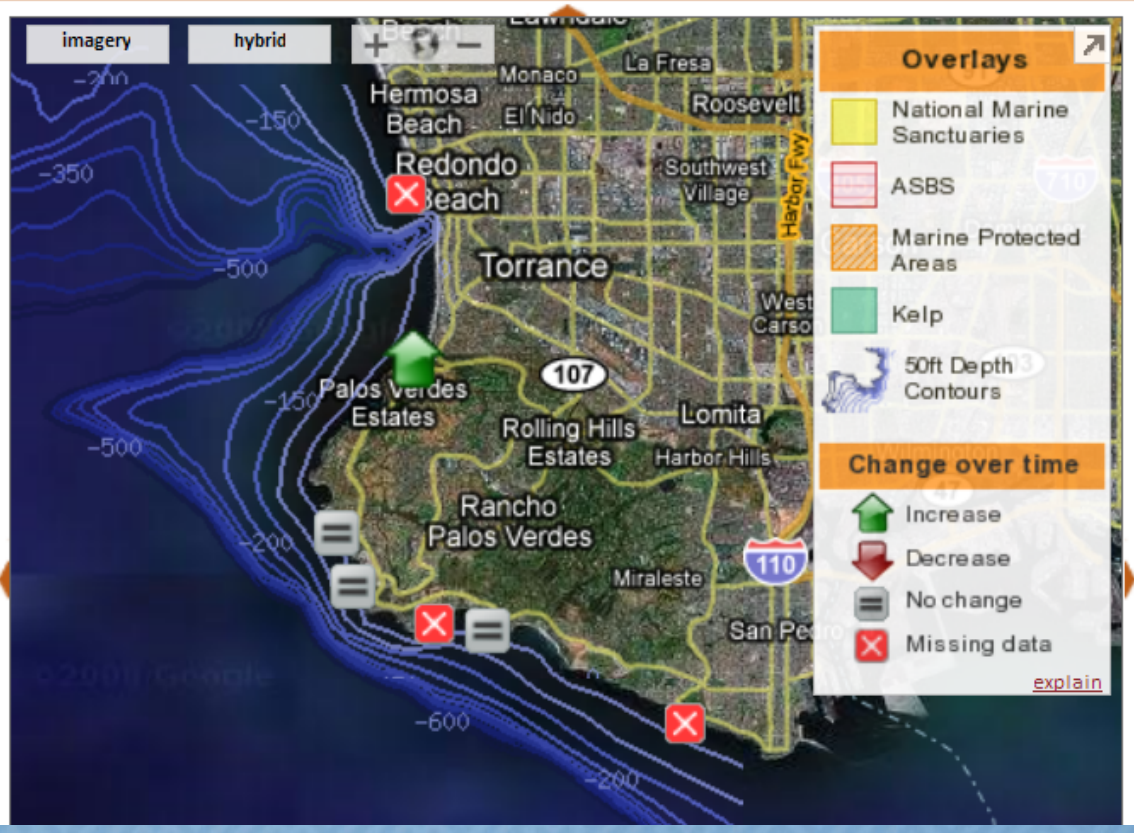
B: 2008

explain ?

GO

MAP OVERLAYS

Select overlays to display:



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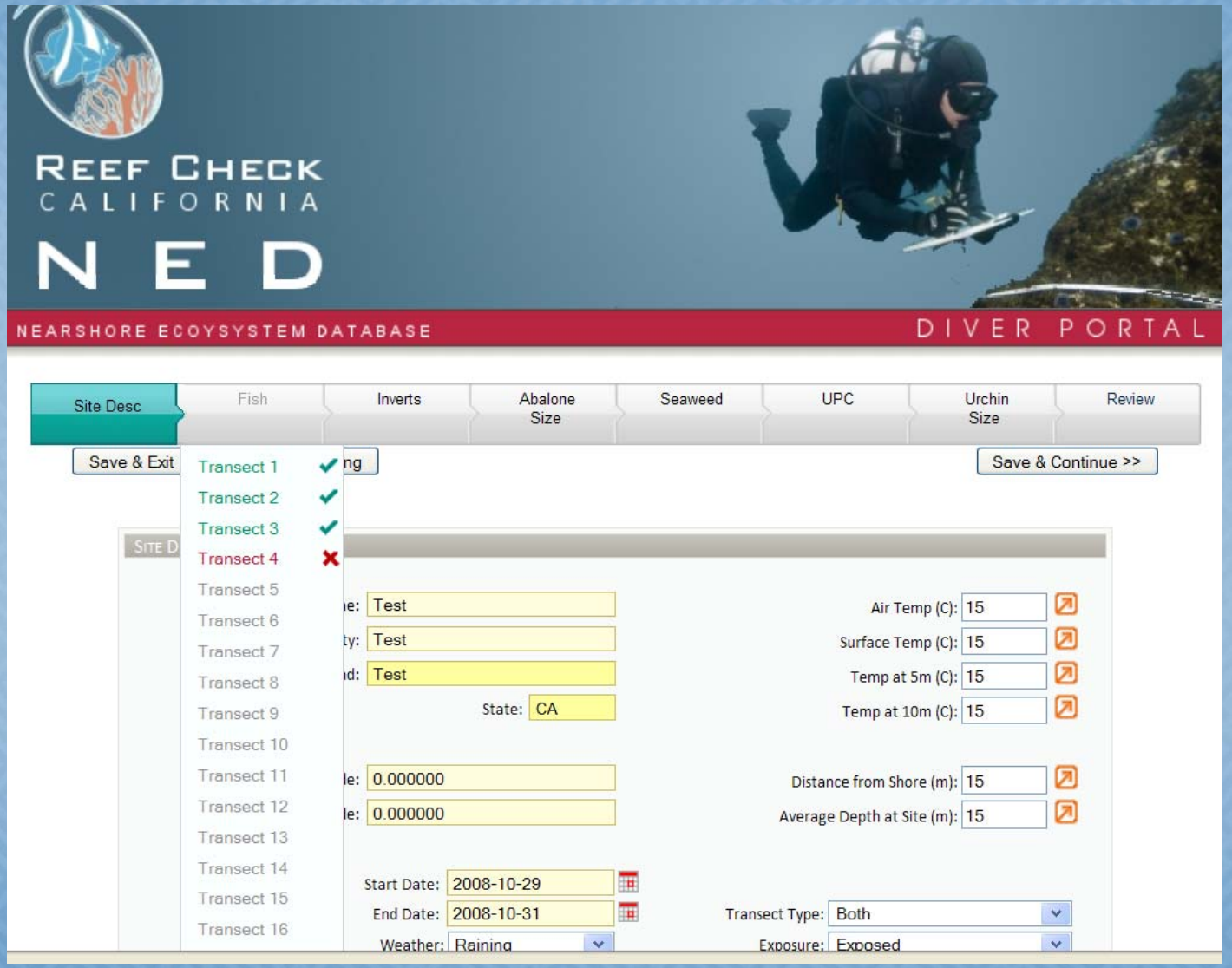
Diver Portal = Data Upload



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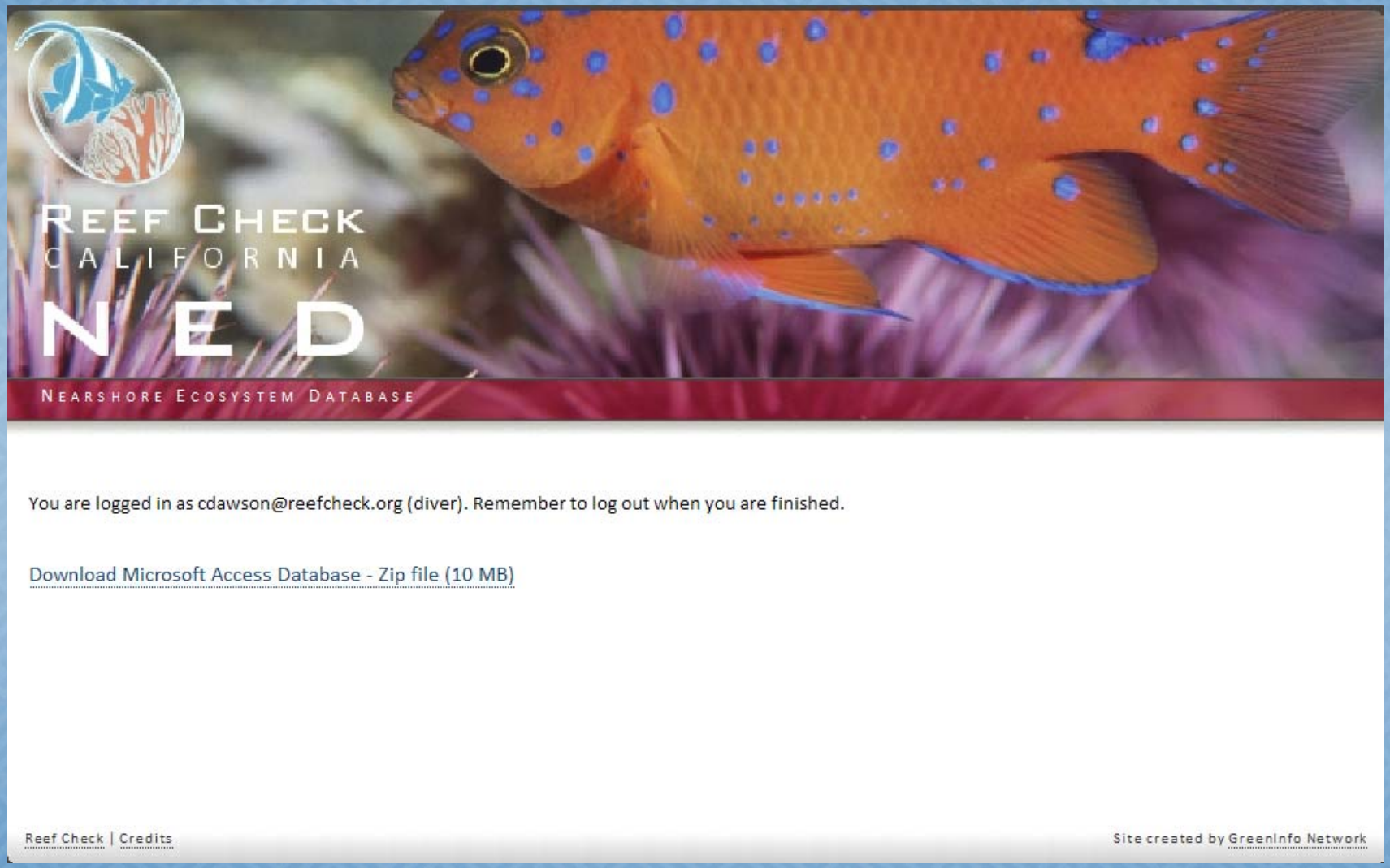
Data Download ≡ Raw data



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