



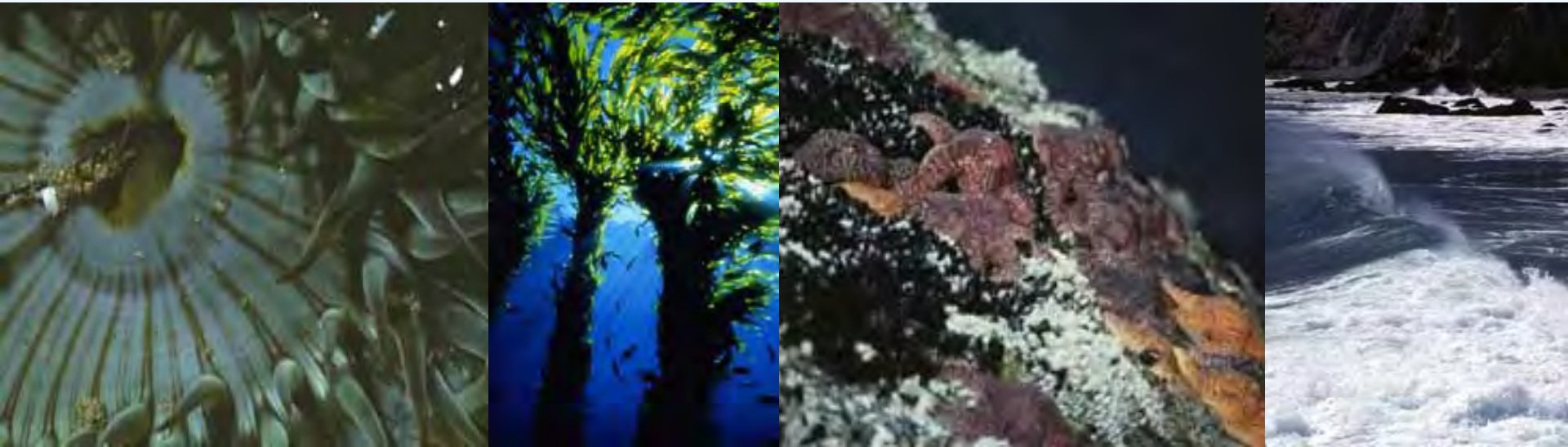
P I S C O

Partnership for Interdisciplinary Studies of Coastal Oceans

PISCO Program Overview

Oregon Nearshore Research Task Force, Newport, OR
January 21, 2010

Bruce Menge, Kristen Milligan, Jack Barth





PISCO

Partnership for Interdisciplinary Studies of Coastal Oceans

Outline

I. What is PISCO? Governance, organization, scales of inquiry, funding

II. Program elements. Examples of PISCO's coordinating roles and linking science with management.

- Continuous datasets
- Hypoxia and ocean acidification research
- Marine protected areas

III. Program review and strategic planning





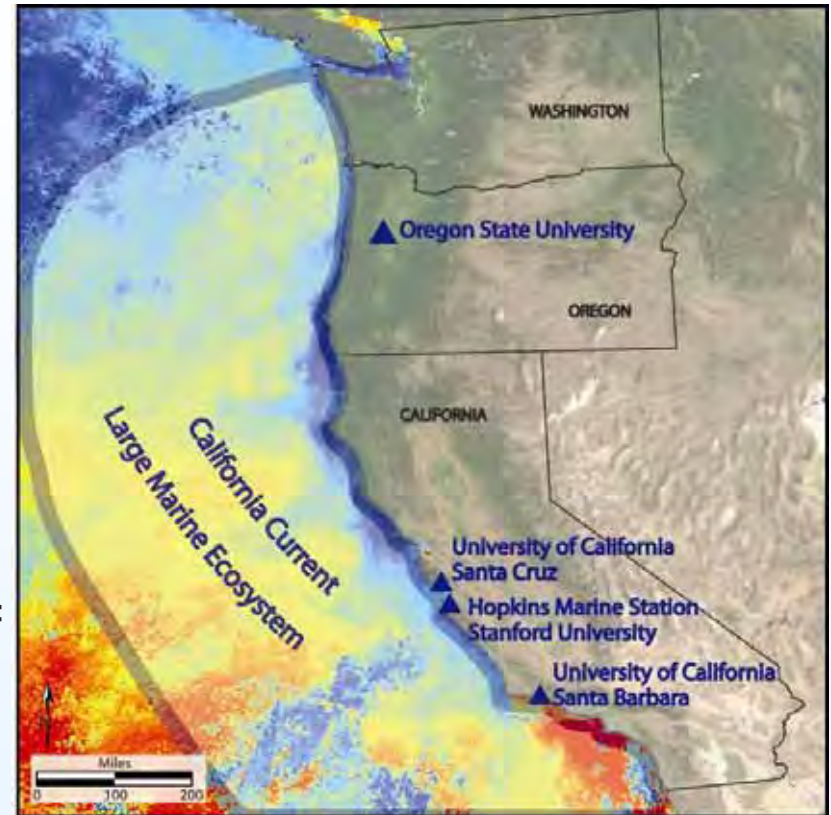
I. What is PISCO? Overview

Consortium of scientists:

- OSU
- UC Santa Cruz
- Stanford
- UC Santa Barbara

Goals:

- understand key dynamics of coastal ocean ecosystem along U.S. West Coast
- produce new generation of scientists trained in interdisciplinary approaches
- share knowledge for science-based decisions





I. What is PISCO? Core elements

Core elements of PISCO:

- Interdisciplinary ecosystem science
- Monitoring at ecosystem scale
- Data archiving and sharing
- Outreach to public and decision-making user groups
- Interdisciplinary training
- Coordination of distributed research team





I. What is PISCO? Organization

Organization

- 12 PIs
- PISCO-wide coordinator
- Science coordinators
- Policy coordinators
- Database support staff
- Postdocs, students, interns

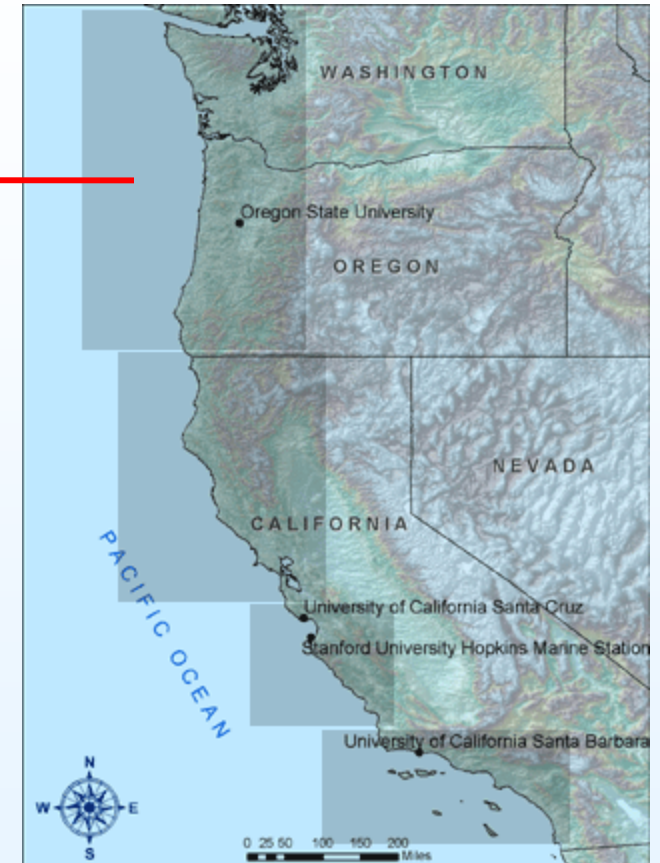
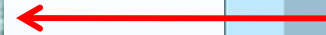


Governance

- Central Board
- Executive Committee
- External Advisory Board



I. What is PISCO? Geographic extent

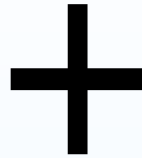




I. What is PISCO: Funding

Approach:

“core”= \$\$ base for salaries, program continuity across multiple years & campuses



Leverage for enhanced programs & special projects



Consortium-wide planning, resource sharing

Timeline of core:

PISCO-I, 1999:

PISCO established:
Core funds from DLPF

PISCO-II, 2005-2009:

DLPF + GBMF collaboratively fund “core” of second phase

PISCO-III, 2010-2014:

core operational support from DLPF and others; active work to diversify core



II. Program elements

Examples of PISCO's coordinating roles and linking science with management

1 – Collection of valuable continuous datasets in Oregon

2- Hypoxia and ocean acidification research

3 - Marine Reserves and MPAs
(Marine Protected Areas)



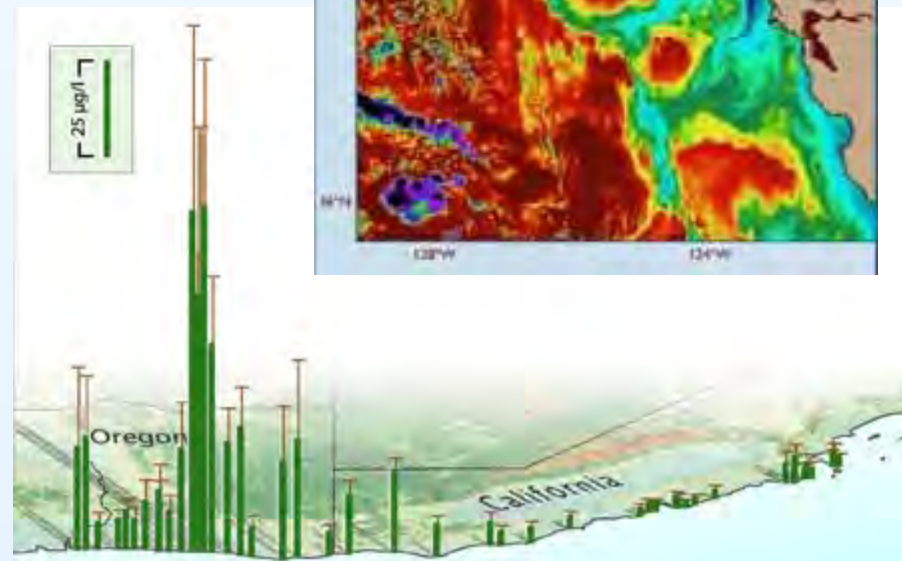
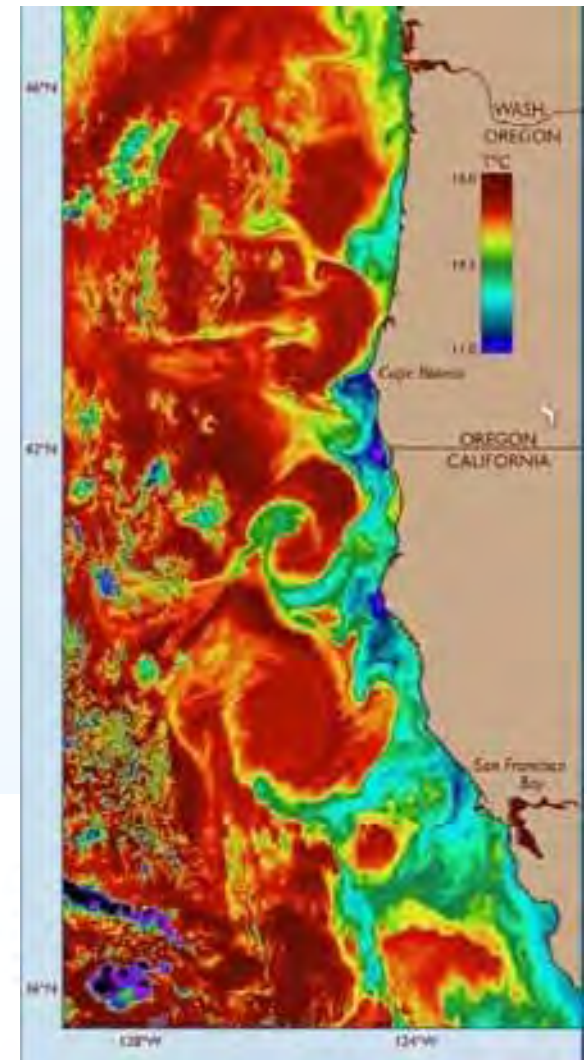


II. Program elements: PISCO in Oregon

Oregon: northern portion of the California Current Ecosystem

- ~same species
- differing magnitudes of processes but,
- same processes in operation
- e.g., similar upwelling but weaker, briefer
- stronger biological signals (i.e., more larvae)

→ unique place to study
major climactic shifts





II. Key program elements: PISCO in Oregon



- 20+ years
- Coastal ecosystem functioning (intertidal to subtidal): larval transport, populations, food-webs, biodiversity, productivity
- Some similar indicator species as Nearshore Strategy (fish, mussels, sea urchins, Ochre sea star, sea palm, surfgrass...)



II. Key program elements

Continuous data in Oregon (some >10-years)

- Rocky intertidal biodiversity and community structure
- Subtidal kelp forest community structure
- Nearshore moorings (currents, temperature, salinity, DO)
- Population replenishment rates
- Growth and fecundity for model organisms

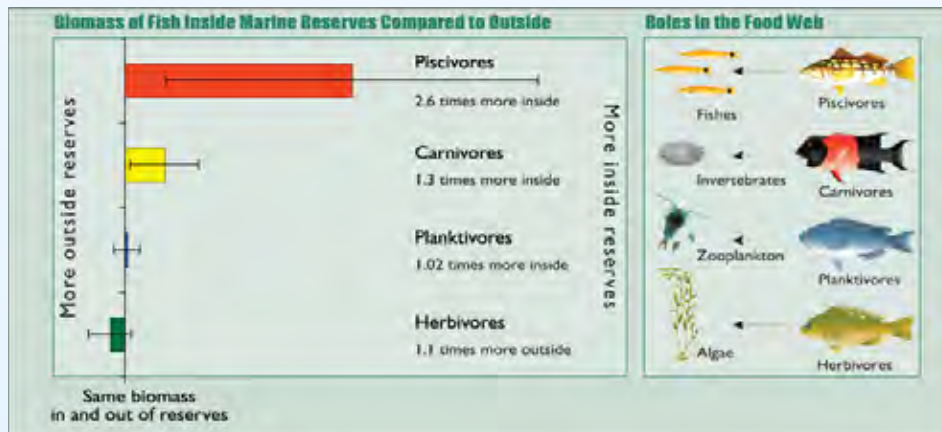




II. Key program elements: PISCO in Oregon

Examples of how continuous data have been used to inform management

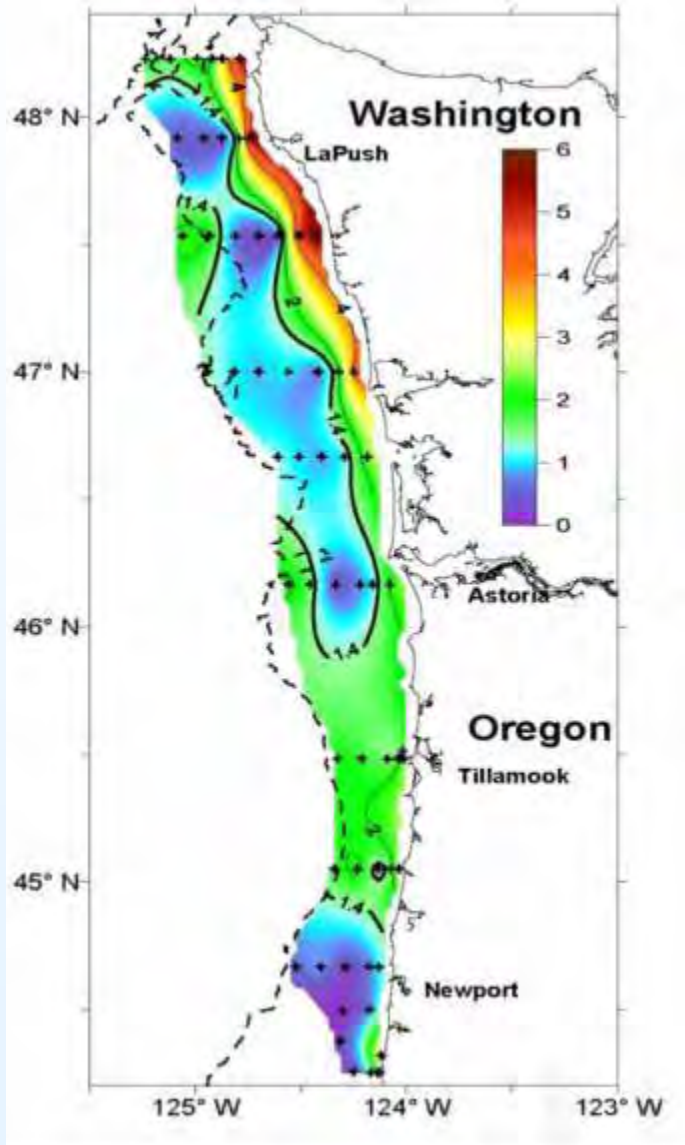
- ✓ Larval dispersal and population connectivity models
- ✓ Species:area evaluations for spatial planning
- ✓ Indices of ocean conditions (such as local upwelling)
- ✓ “Before” and “after” data for impact studies (landslides, application of new harvesting rules, erosion, oil spills)



Figure, left. Average response ratio for biomass of fish species surveyed in the Channel Islands MPAs arranged by trophic group. Ratios greater than 1 indicate more biomass inside whereas ratios less than 1 indicate more biomass outside reserves. Fishing intensity was highest on piscivores and carnivores, which accounts for their larger responses to protection. Average ratios are given with one standard error. Figure is from the 5-year Channel Islands evaluation booklet.



II. Key program elements: Hypoxia research



2002: dead crabs and fishes reported by citizens

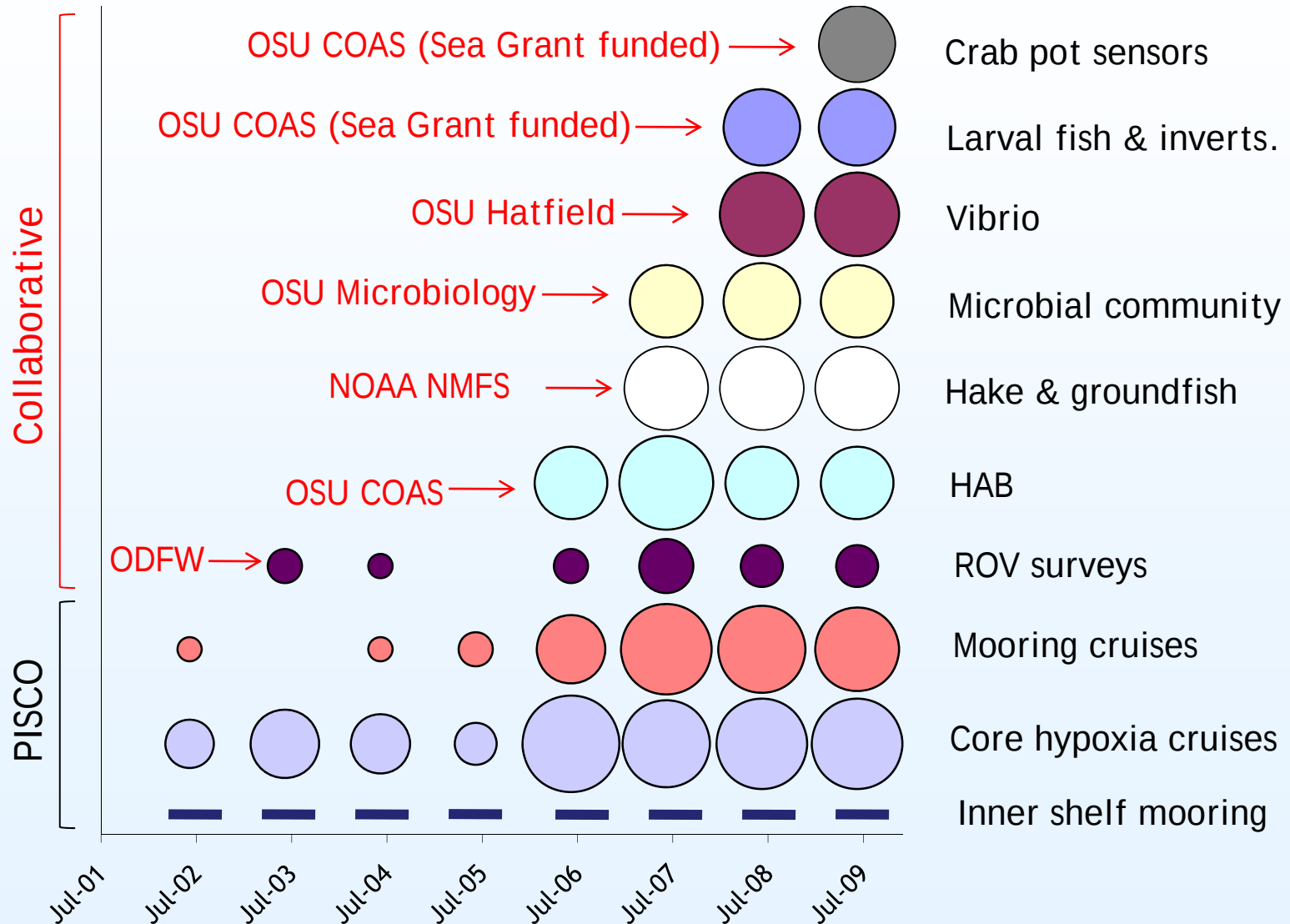


PISCO monitoring: rapid identification of cause

Discovery catalyzes research of others



II. Key program elements: Hypoxia research





II. Key program elements: Hypoxia research

PISCO advises state & federal policy:

- Oregon Ocean Policy Advisory Council (Aug '06)
- Dead Zone briefing for Oregon Congresswoman Darlene Hooley (Oct '06)
- Testify before U.S. House Select Committee on Energy Dependence and Global Climate Change (Apr '08)
- Oregon House Committee on Energy and the Environment (Apr '08)
- West Coast Governors Agreement on Ocean Health Executive Committee (Nov '08)

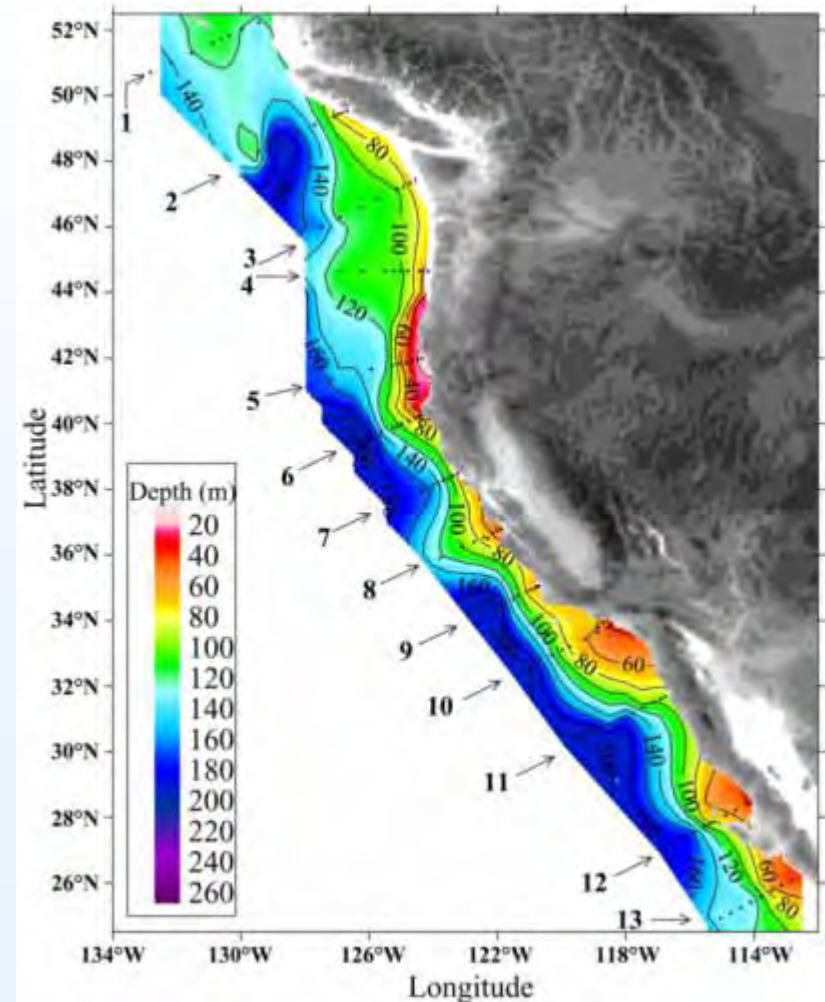




II. Key program elements: Ocean acidification research

Our coast is vulnerable to
hypoxia **and** ocean
acidification

Location of OSU and PISCO
expertise critical to studying
the linkages between them



Feely et al. 2007



II. Key program elements: Ocean acidification research

PISCO combines **genomics**, **ecology**, and **oceanography** to study climate effects on marine life



abalone



oyster



urchin



urchin larvae example



II. Key program elements: Marine protected area research

PISCO's contributions

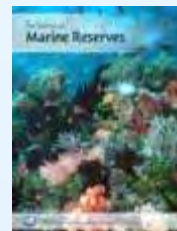
1 – Science

- biogeographic patterns
- larval dispersal
- conceptual framework

2 - Scientific advising

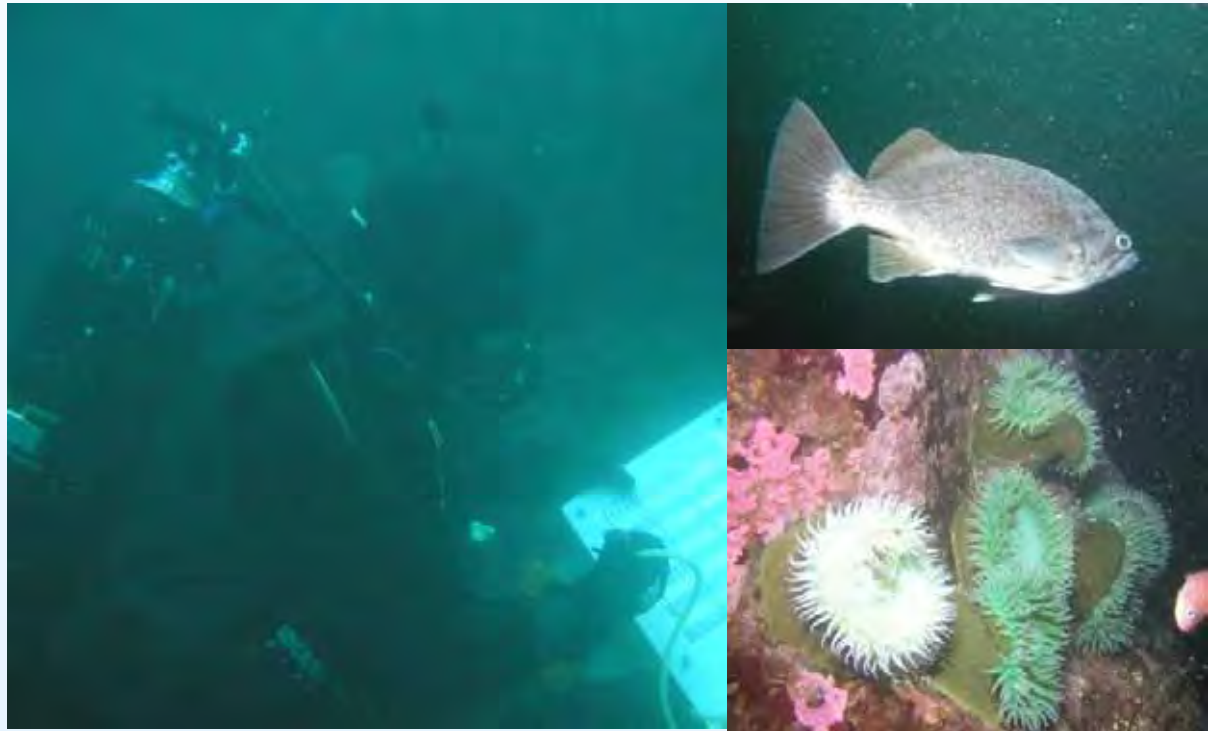
- 2 PISCO PIs and 4 PISCO coordinators participate in OPAC size & spacing workshop (April 2008)
- PISCO PI serves on STAC

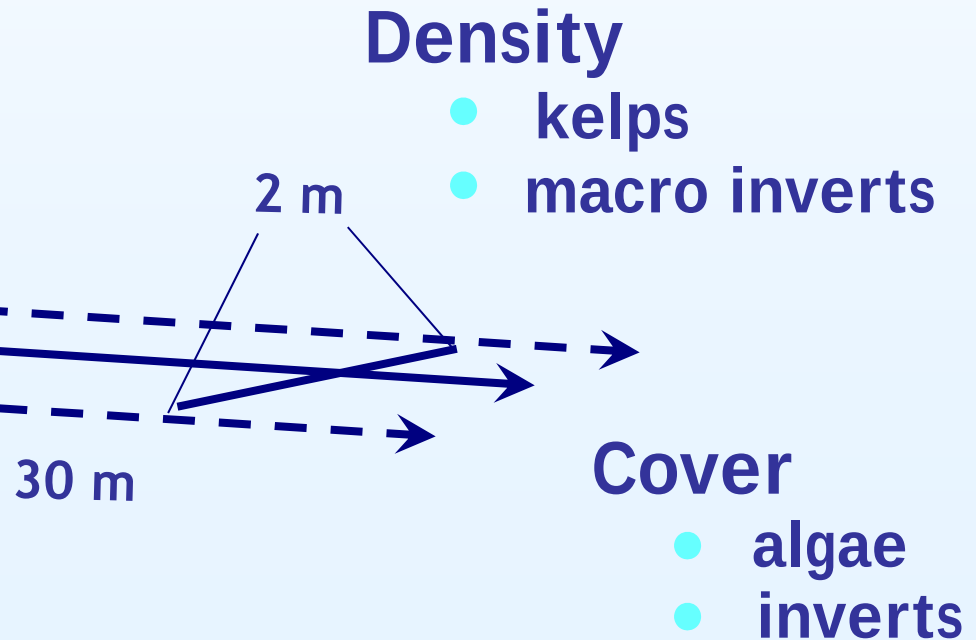
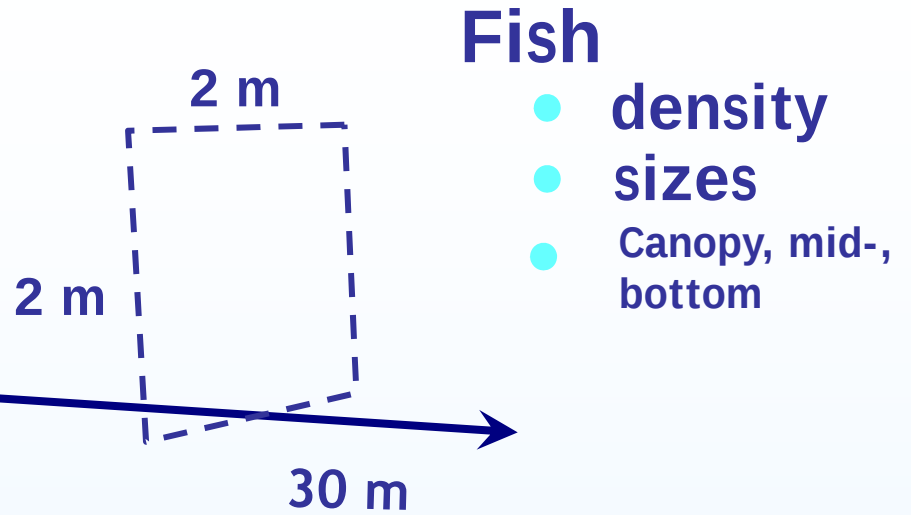
3 - Communication tools



Subtidal monitoring in OR

- 2001-2004: subtidal fish and benthic surveys







III. Program review and strategic planning



2-year project for strategic planning. Examined strengths, weaknesses, future

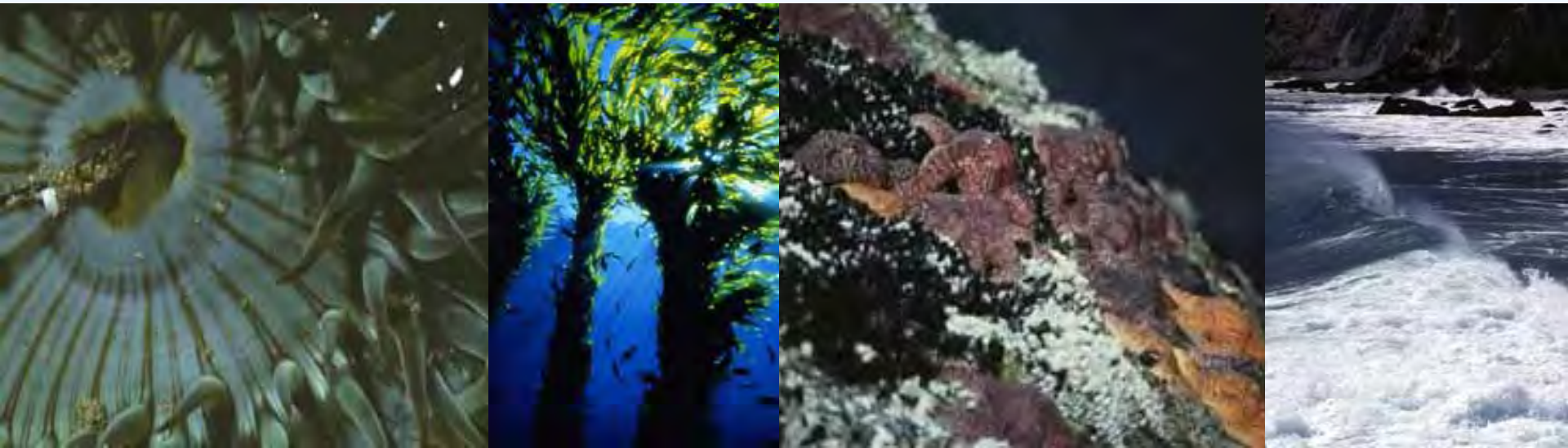
- Organization: increased central coordination
- Develop and maintain strong internal governance policies
- Priority-setting: to maintain core support operations and develop new Research Programs for 2010-2014
- Address how to maintain priorities with diverse \$\$ sources



Thank you

Questions?

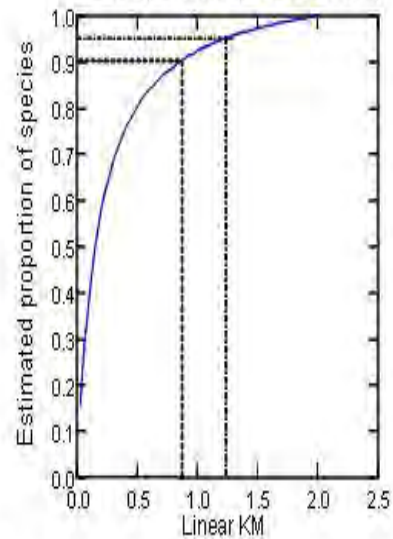
Bruce Menge, Oregon State University
MengeB@oregonstate.edu



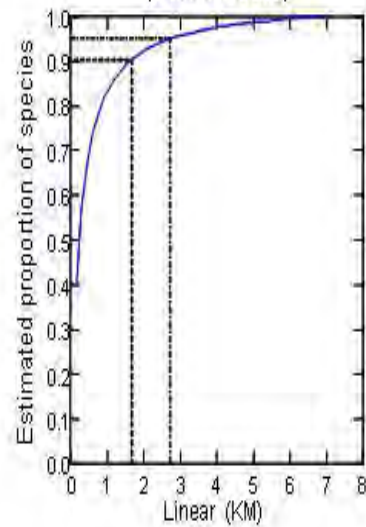
Extra slides



a) Rocky Shore (PISCO data)



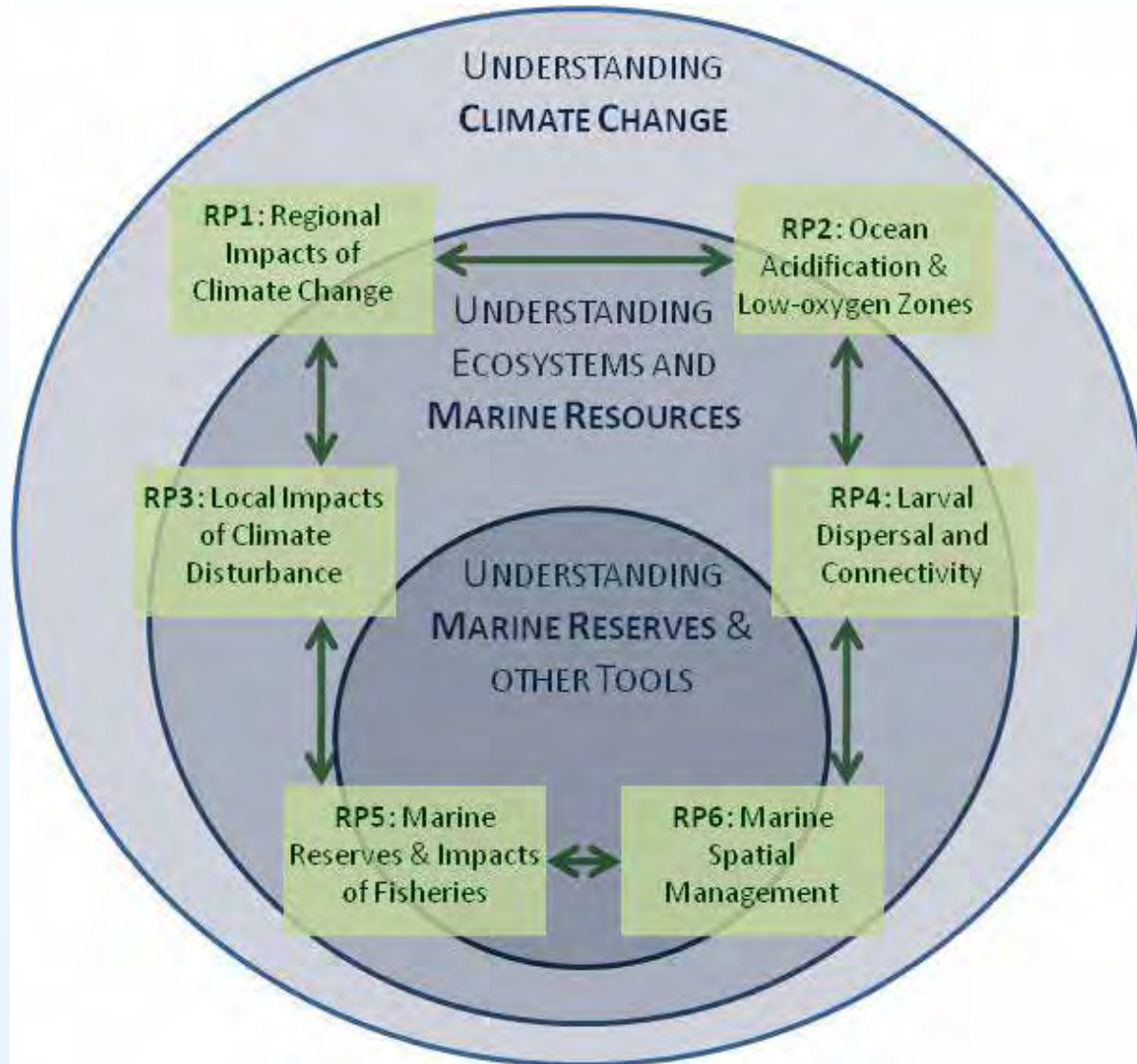
b) Shallow Rock and Kelp Forest (PISCO data)



Species-Area: Time series data are used in CA to estimate the area of these habitats needed to protect 90% of the biodiversity associated with these habitats.



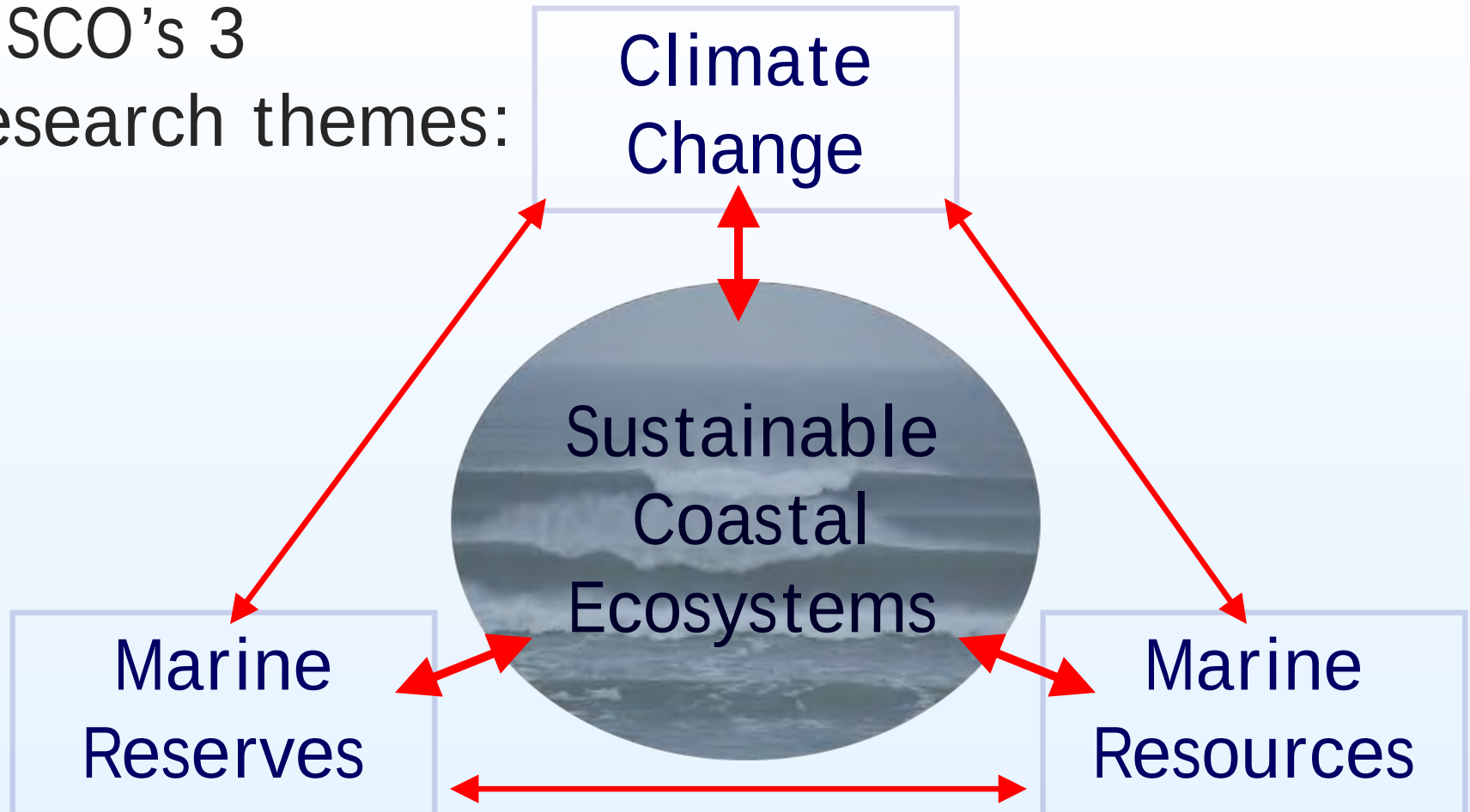
PISCO 2010-2014





PISCO 2010-2014

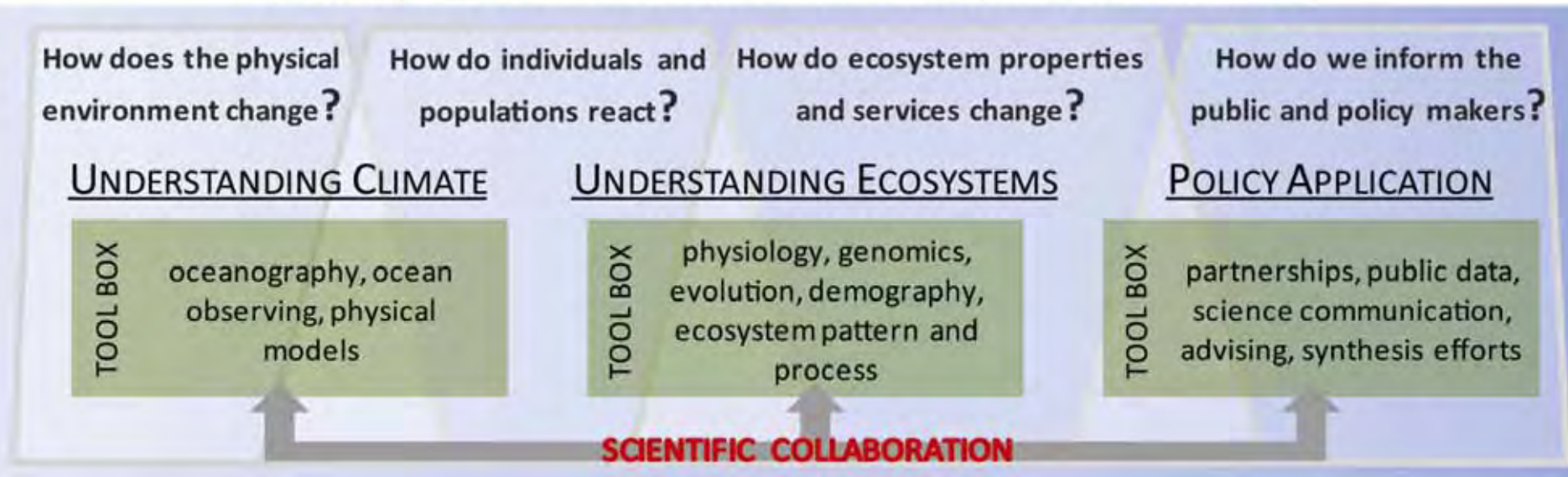
PISCO's 3
research themes:





PISCO 2010-2014

PISCO Approach to Addressing the Climate-Ecosystem-Policy Problem



understanding physical forcing - how ecosystems work and react to the physical environment - applying that to policy:

THESE CHALLENGES ARE NOT SEPARATE

PISCO integrates science & policy tools to address this problem



PISCO 2010-2014

Climate Change

Marine Reserves

Marine Resources

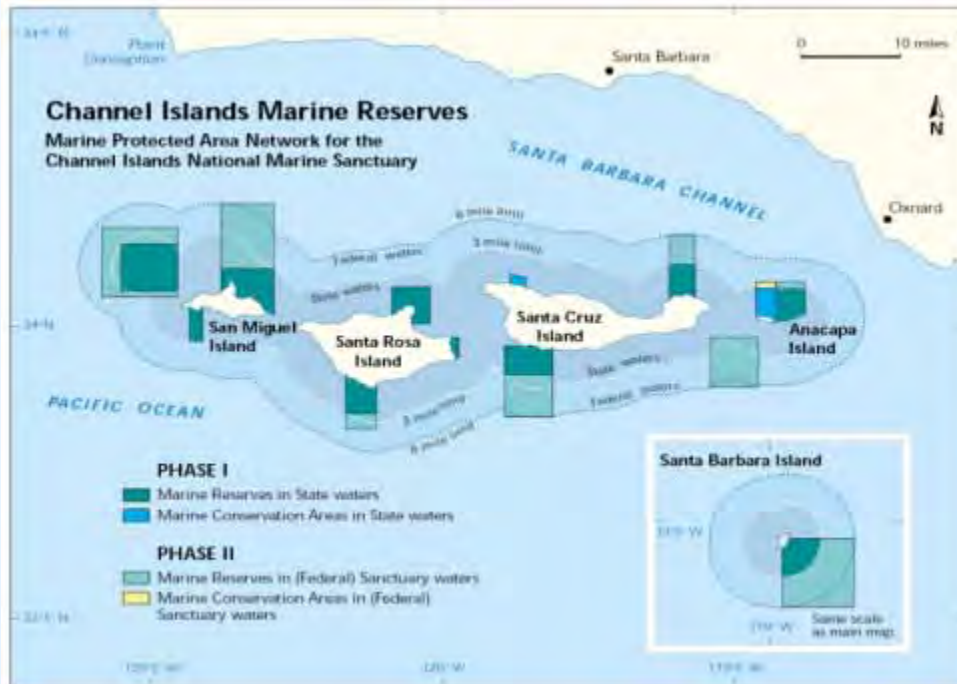
Examples of integrating research in 3 themes:

- use of marine reserves in fish stock assessments
- theoretically intriguing ties between marine reserves and catch-share fisheries
- implementation of wave parks and marine reserves at the same time – ocean zoning questions
- marine reserves and climate change resiliency



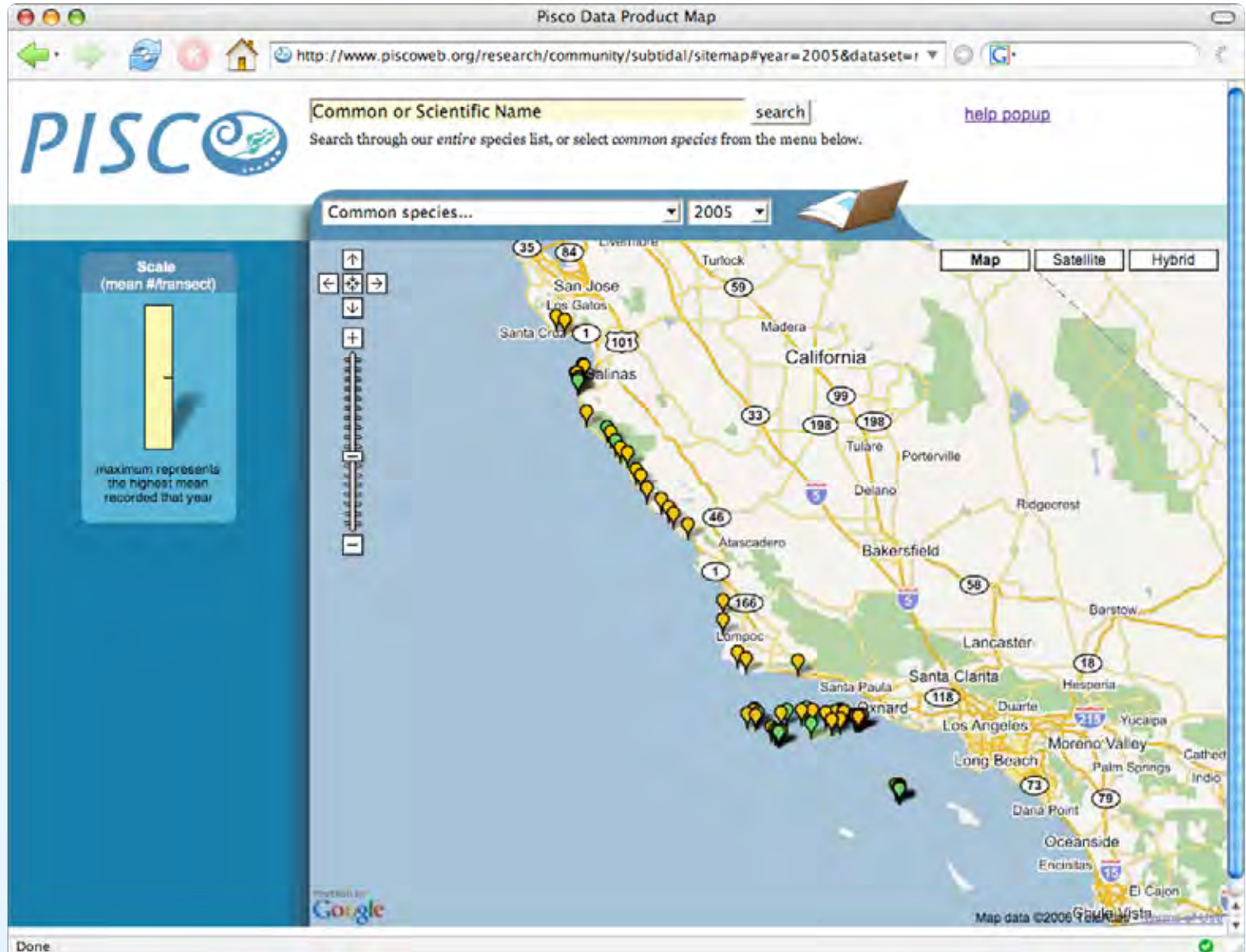
Marine Reserves & MPAs

PISCO science has informed the ongoing process to plan, implement, and monitor marine reserves within CCLME





Subtidal Monitoring





Species Search Feature

Dropdown

PISCO Data Product Map

http://www.piscoweb.org/research/community/subtidal/sitemap#year=2005

PISCO  [help popup](#)

Search through our entire species list, or select common species from the menu below.

Common species... 2005

Search Results

- [*Paralabrax clathratus*](#)
kelp bass, calico bass fish dataset
- [*Paralabrax maculatofasciatus*](#)
spotted sandbass fish dataset
- [*Paralabrax nebulifer*](#)
barred sandbass fish dataset
- [*Stereolepis gigas*](#)
giant sea bass fish dataset

search results enhanced by ITIS 

Scale
(mean #/transect)



maximum represents the highest mean recorded that year

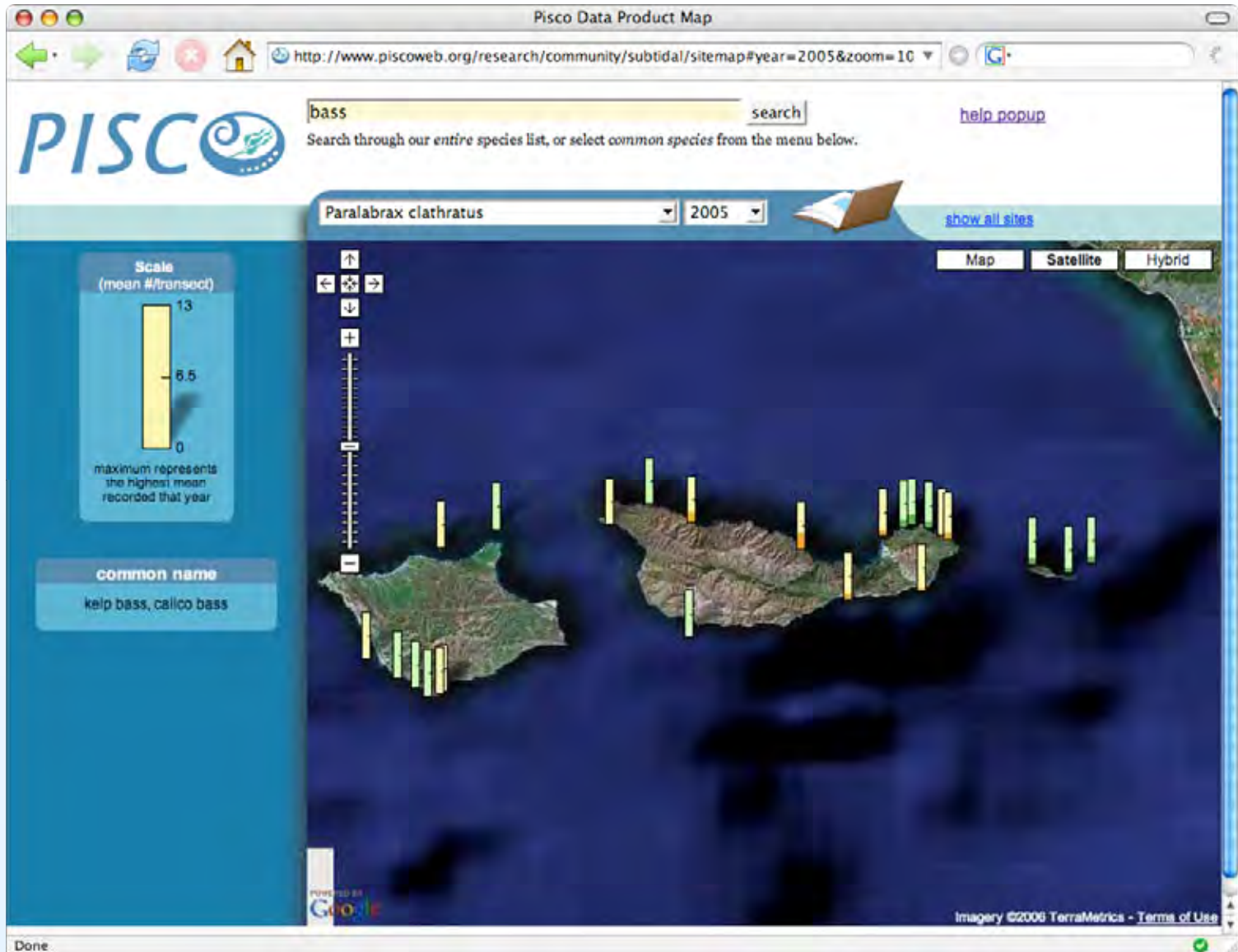
Map

Map data ©2006 Google

Done

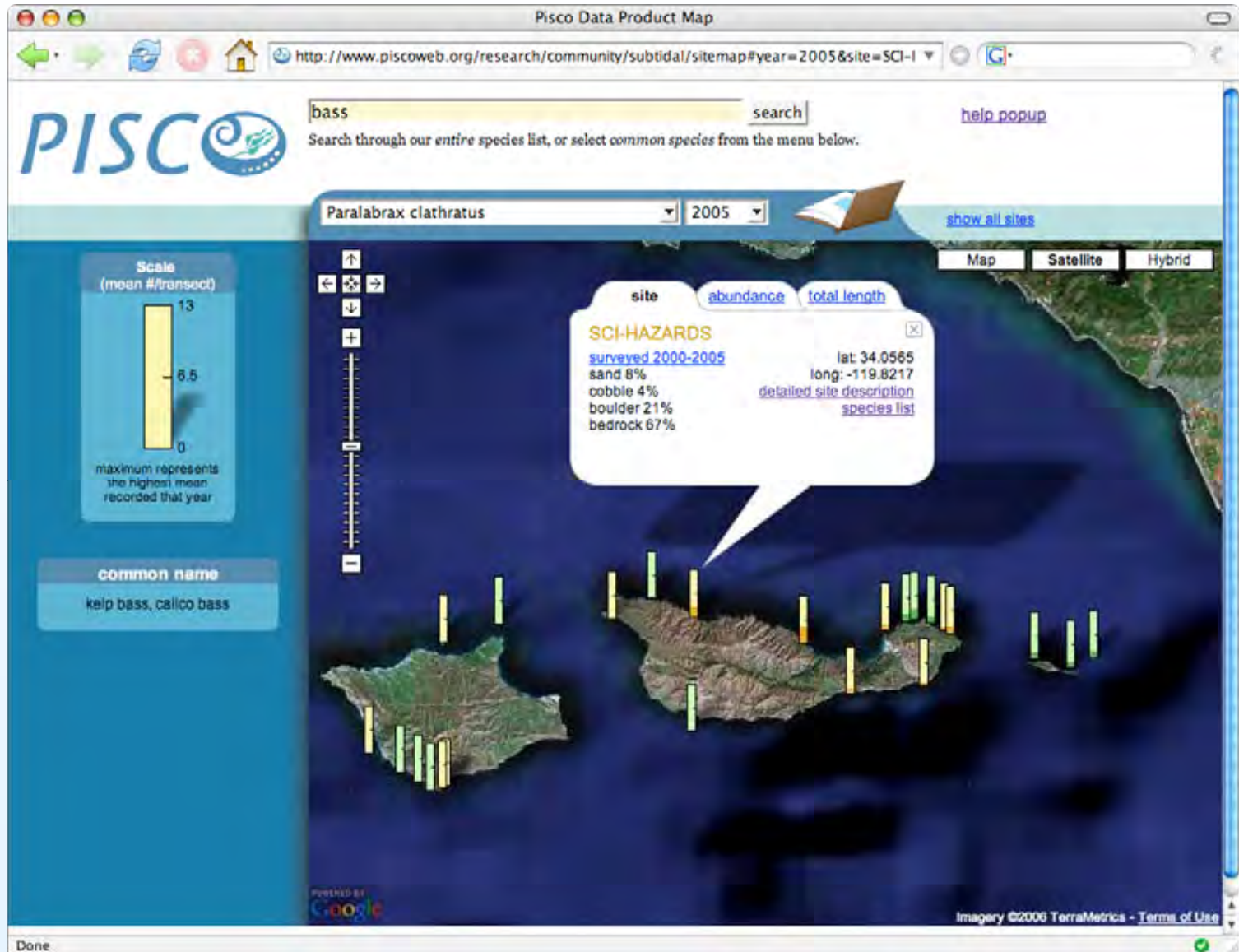


Species Abundance Map Satellite Detail



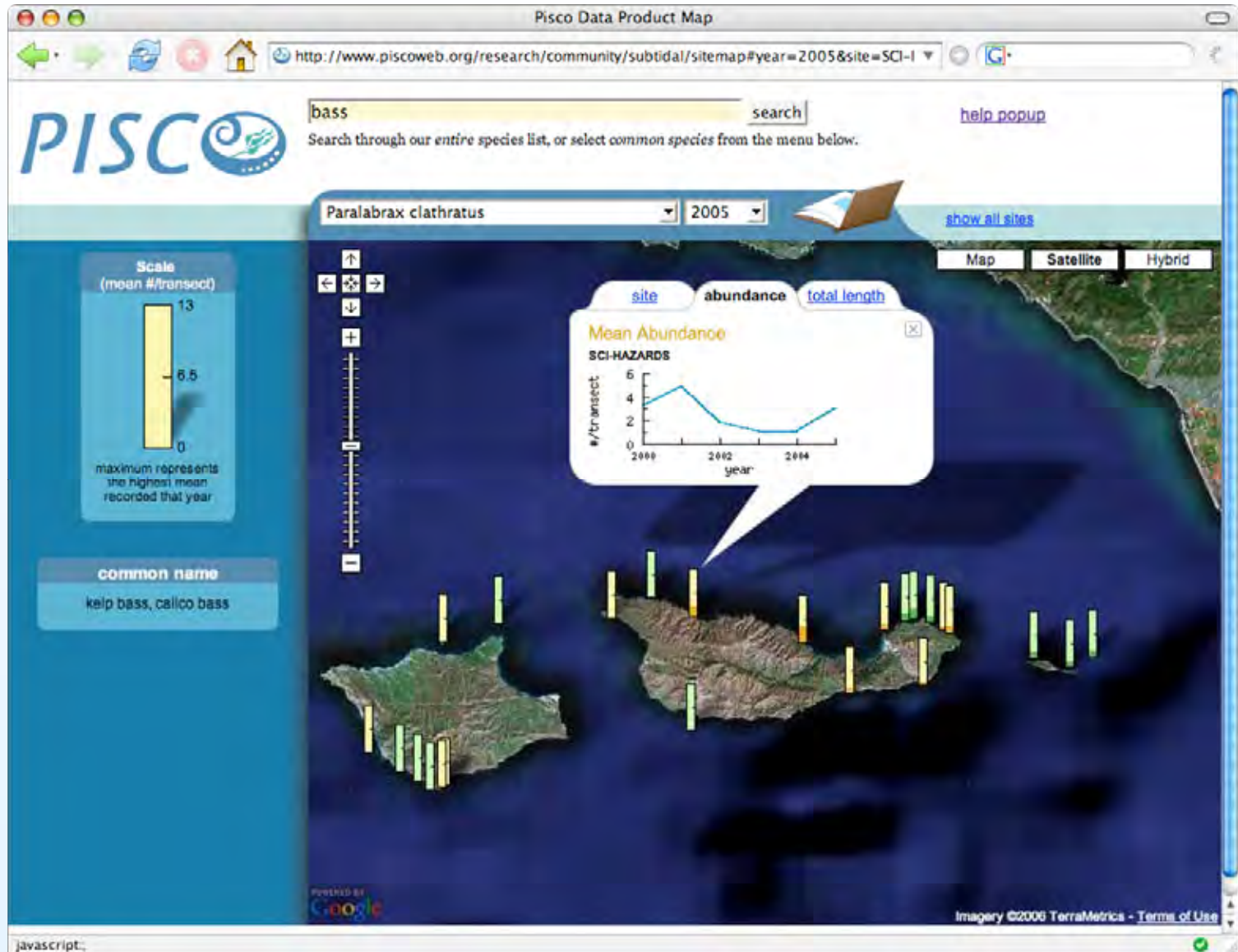


Site Overview Information Window





Site & Species Abundance Thumbnail Chart





I. What is PISCO? Scales of inquiry

Scientific expertise within PISCO:

- ecology
- physical oceanography
- biomechanics
- genetics
- molecular and organismal physiology
- biogeography



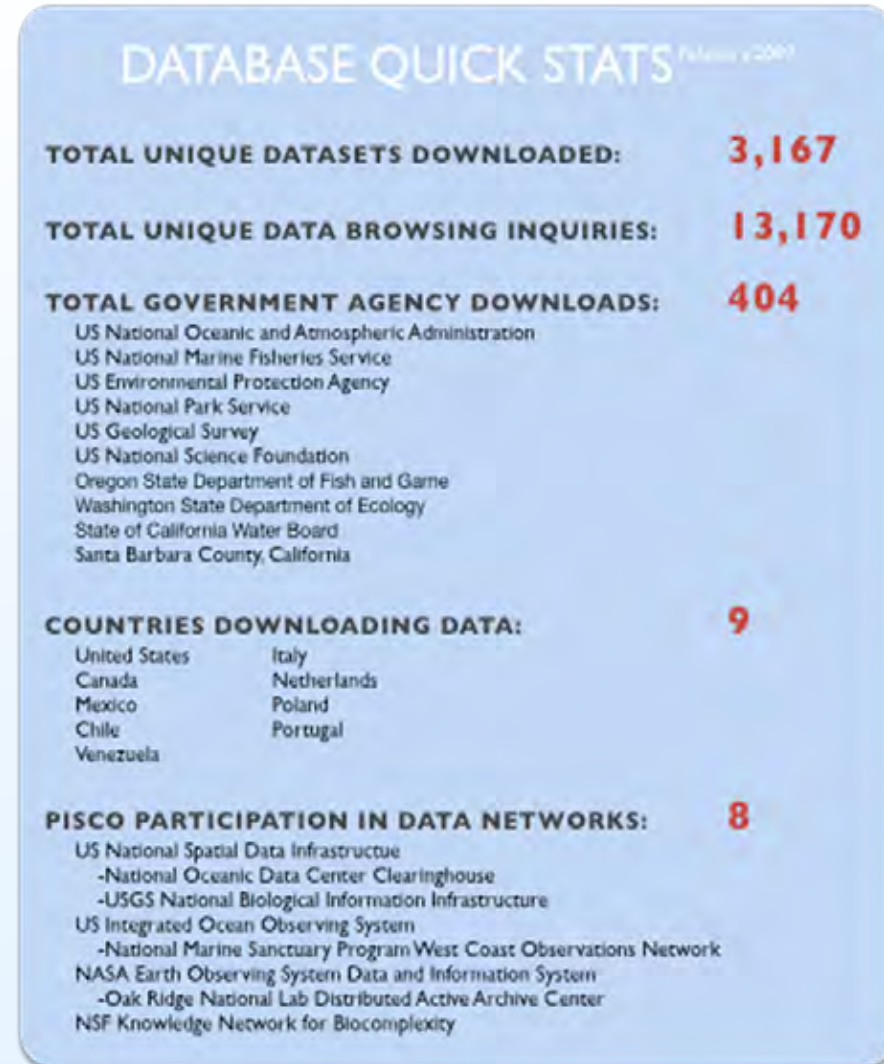


II. Key program elements: PISCO in Oregon

Connects with PISCOwide database

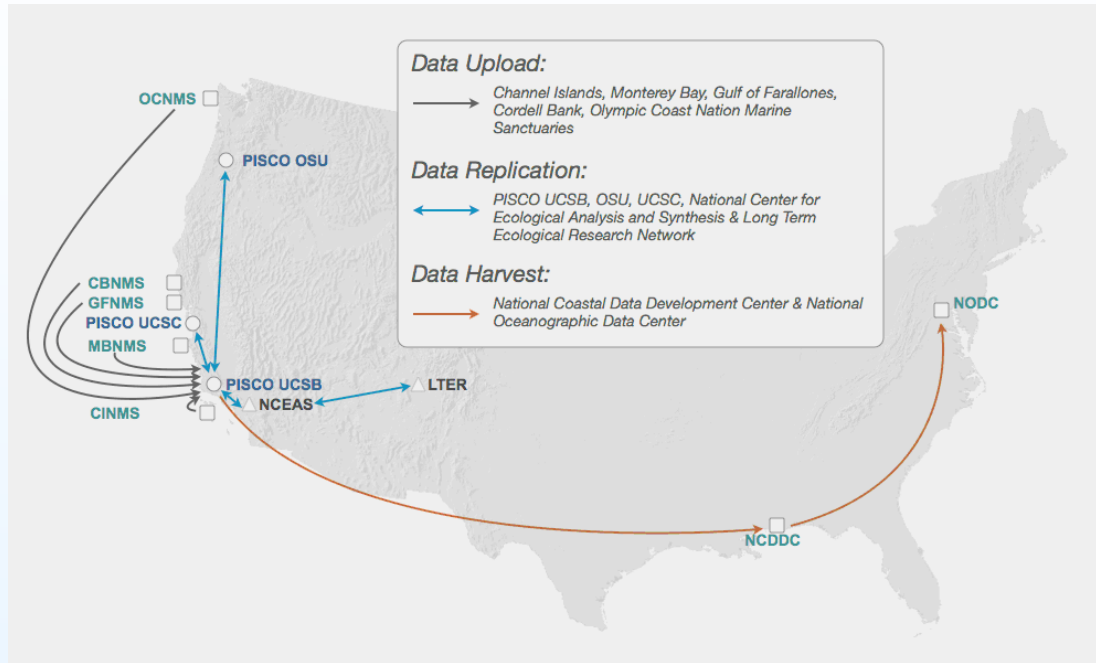
- ecological+oceanographic data
- diverse content and structure
- detailed metadata
- quality control

Stats since release of data portal in '09 →





II. Key program elements: PISCO in Oregon



Coordination with data centers. Replication across PISCO campuses and with other data centers.