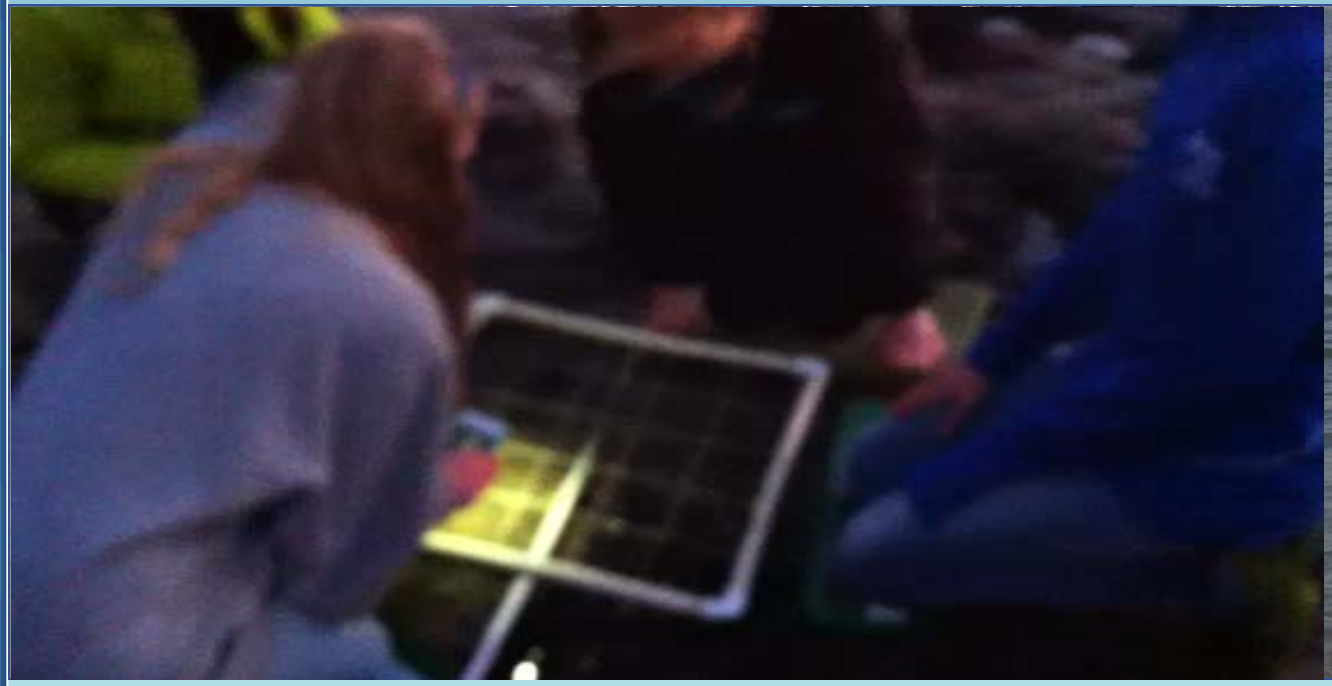
LiMPETS

Long-term Monitoring Program and Experiential Training for Students

MPAs & Youth-Based Citizen Science



Amy Dean

Farallones Marine Sanctuary Association

OVERVIEW

Objectives –

Results –

- *Beach & rocky intertidal trends*
- *Teacher and student impact data*

Outcomes –

- *Scientific outcomes for state MPAs*
- *Outcomes for students, teachers, community/society*

LiMPETS: program objectives

Education ⟷ **Science**

- Enhance scientific skills
- Achieve deeper levels of learning
- Increased interest in science & ocean stewardship

- Built a robust, long-term dataset
- Inform Sanctuary and university/marine management partners

LiMPETS: MPA baseline objectives

Education

- Quantitative assessment of citizen engagement
- Description of educational opportunities
- Description of value of citizen scientist involvement in MPA monitoring

Science

- Compilation & description of historic data set (01-11)
- Description / analyses of trends
- Spatial analyses
- Recommendations

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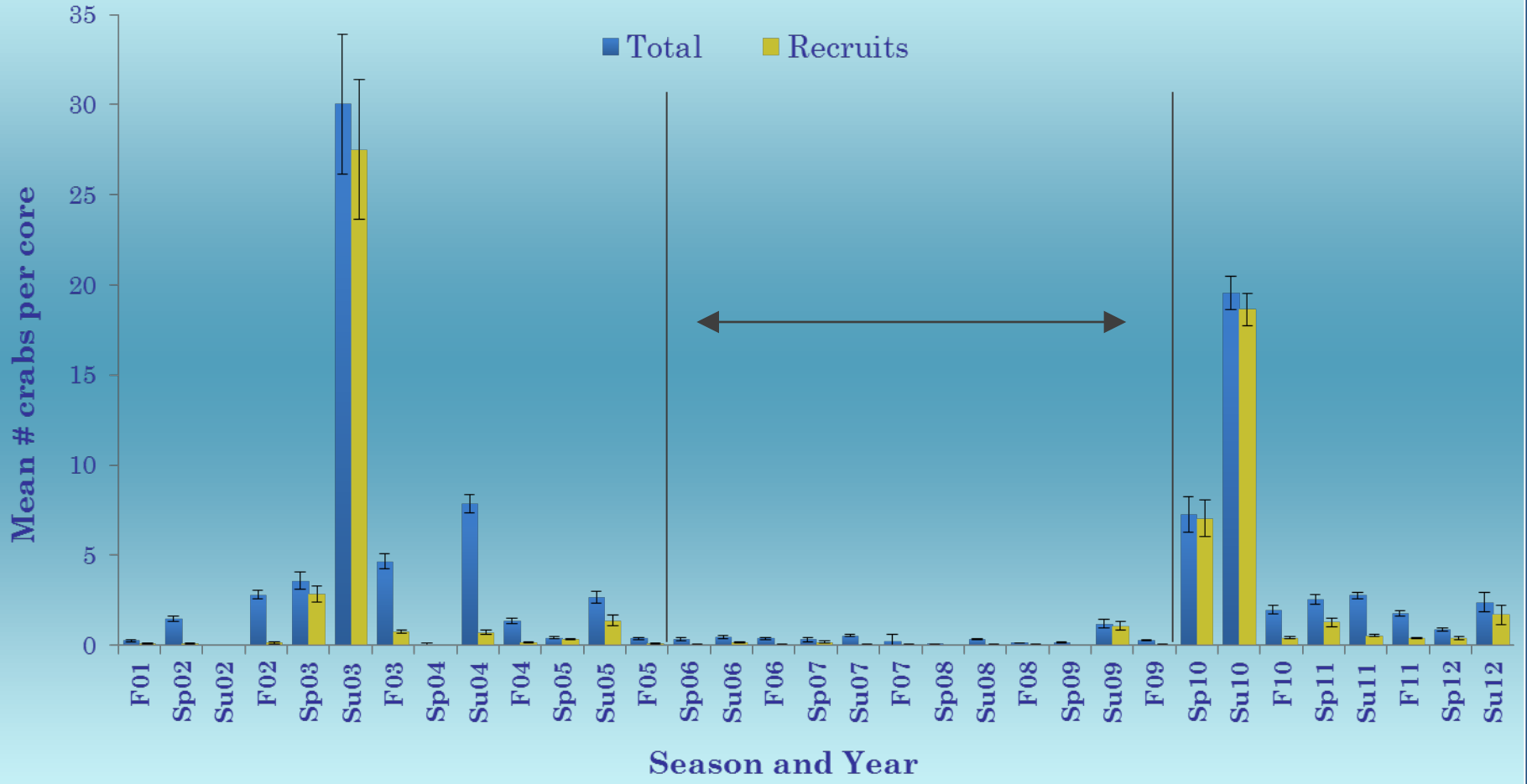
DATA SUMMARY: sandy beach

LiMPETS beach sites & survey effort

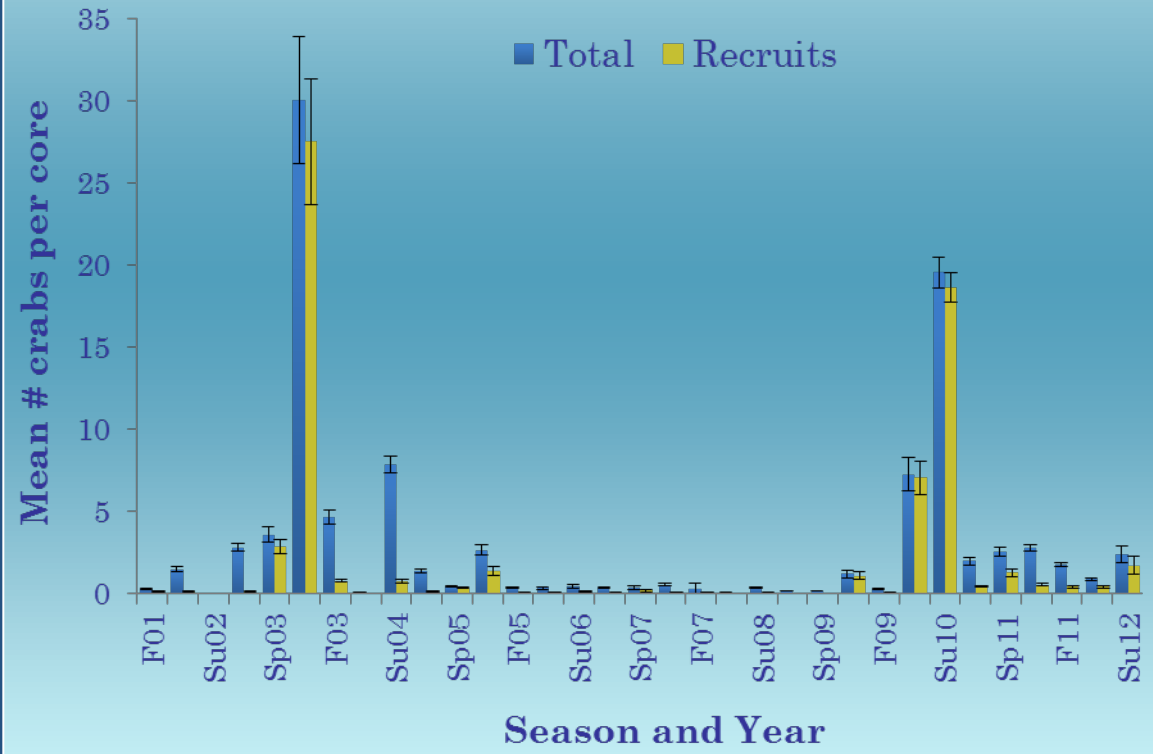
Beach name:	County:	Year established	Survey effort: total # surveys completed since site establishment
Salmon Creek	Sonoma	2002	19
Doran Beach	Sonoma	2001	9
Limantour Beach	Marin	2004	25
Stinson Beach	Marin	2001	32
Muir Beach	Marin	2002	55
Rodeo Beach - North	Marin	2003	19
Rodeo Beach - South	Marin	2006	13
Baker Beach	San Francisco	2001	19
Ocean Beach	San Francisco	2001	**252**
Fort Funston	San Francisco	2002	29
Linda Mar State Beach	San Mateo	2006	36
Montara Beach (south)	San Mateo	2006	8
Surfer's Beach	San Mateo	2002	64
Dunes Beach	San Mateo	2002	10
Pescadero State Beach	San Mateo	2007	10

DATA SUMMARY: abundance



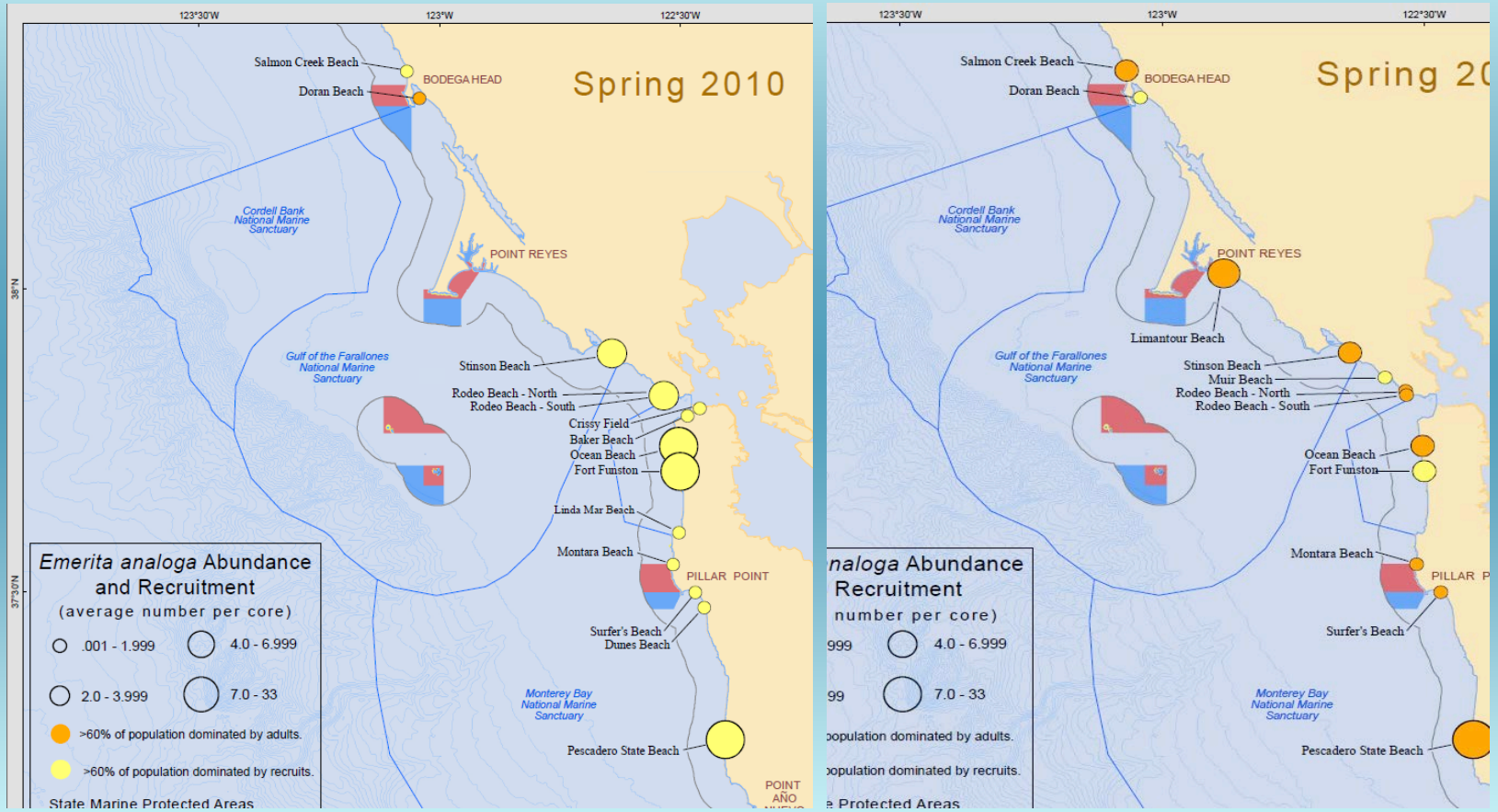
Trends in abundance and recruitment of *E. analoga* at Ocean Beach: Fall 01 – Summer 12

DATA SUMMARY: abundance



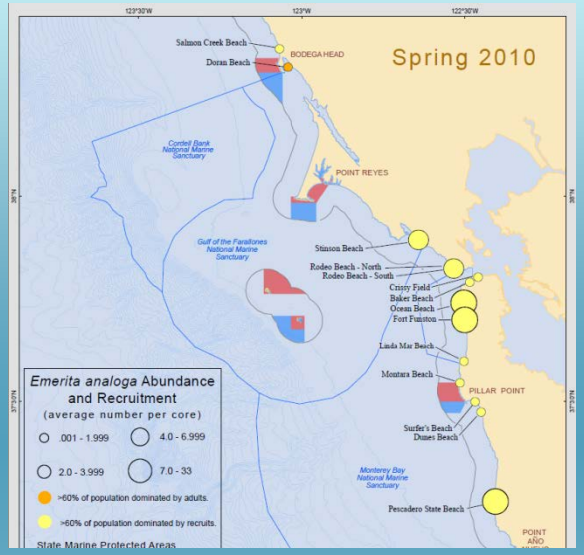
- High variability
- 10 yr period, 2 spikes in abundance caused by recruitment
- 5 yr period, 06-09, when abundance was near zero.

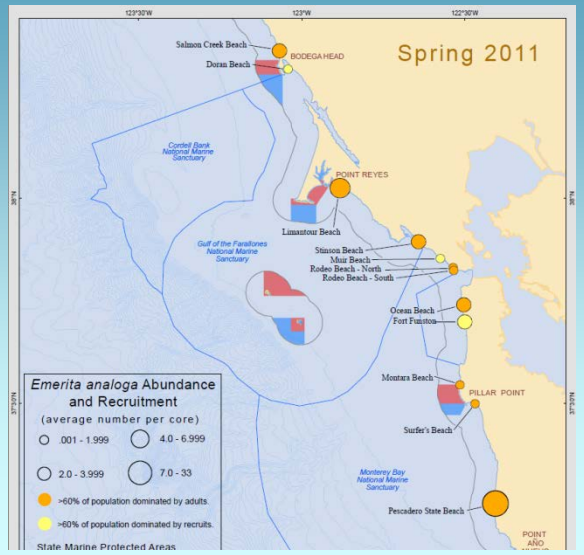
DATA SUMMARY: spatial trends



***Emerita analoga* abundance and recruitment at LiMPETS beach sites in the southern portion of the NCC MPA region, Spring 2010 & 2011**

DATA SUMMARY: spatial trends





During 'baseline' year 2010 (spring):

- large regional pulse of recruitment on beaches south of Pt. Reyes
- small recruitment & low abundance on beaches north & south of Montara SMR

During 'baseline' year 2011 (spring):

- Low recruitment on beaches throughout the region
- Populations dominated by adults, abundance lower
- Very low abundance on beaches north & south of Montara SMR

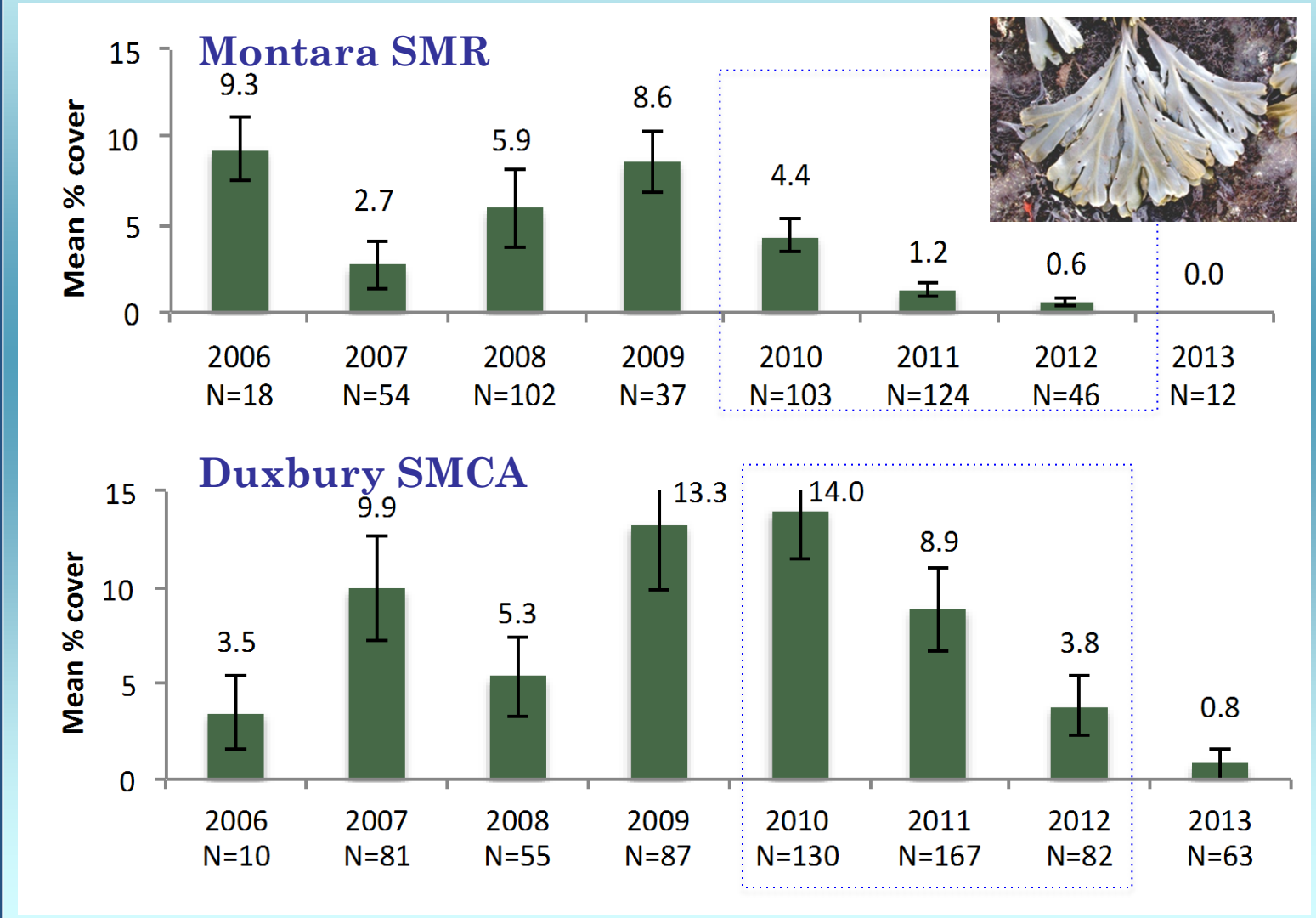
DATA SUMMARY: rocky intertidal

LiMPETS intertidal sites & survey effort

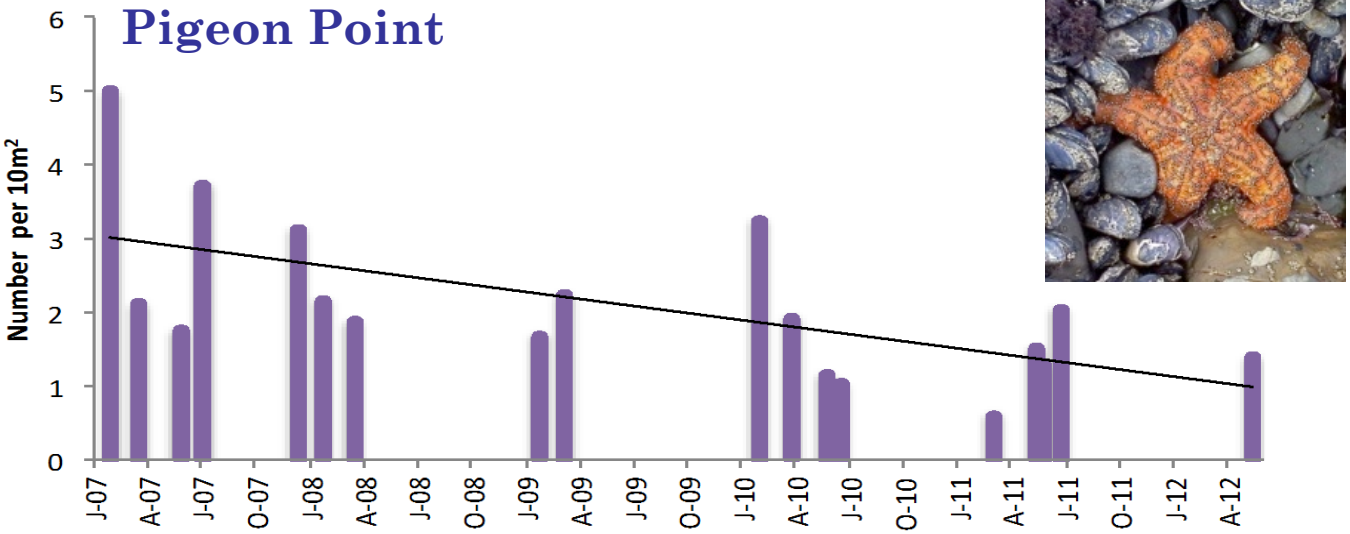
Rocky intertidal site:	County:	Year established	Survey effort: total # surveys completed since site establishment
Duxbury Reef SMCA	Marin	2004	48
Montara SMR	San Mateo	2006	95
Pillar Point	San Mateo	2009	21
Pigeon Point	San Mateo	2006	29

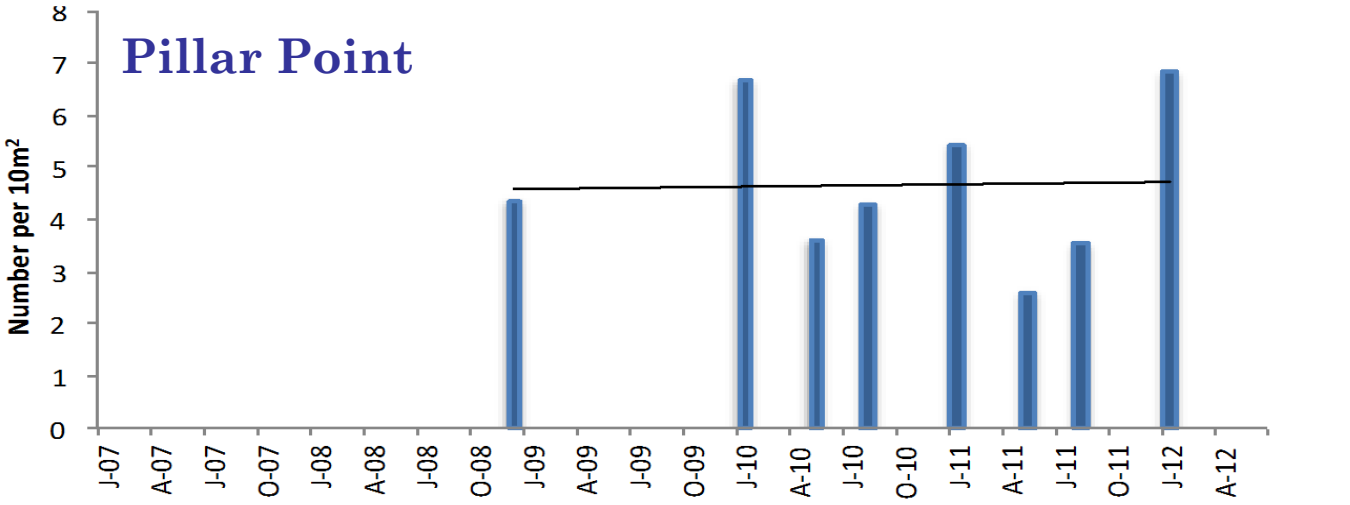



DATA SUMMARY: *Fucus gardneri*

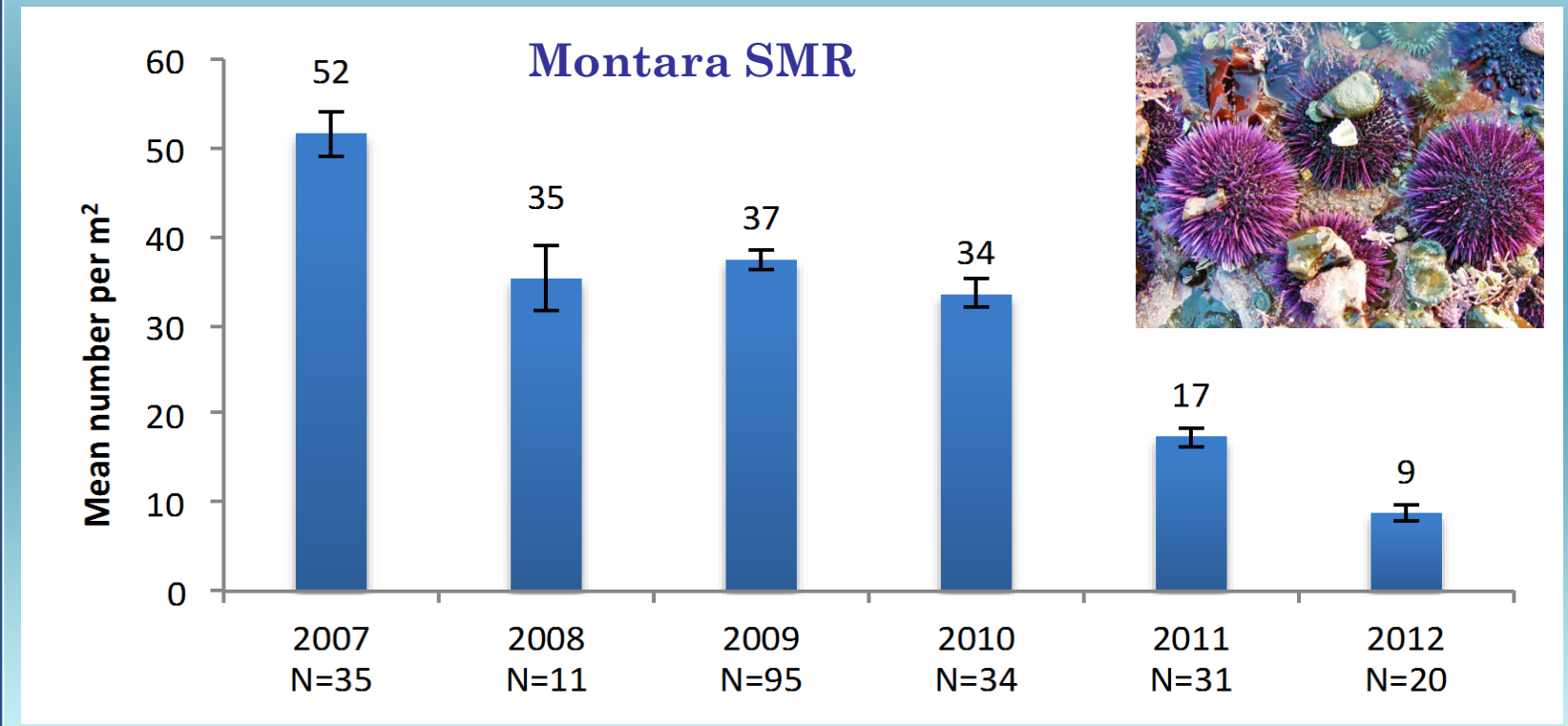


DATA SUMMARY: *Pisaster ochraceous*

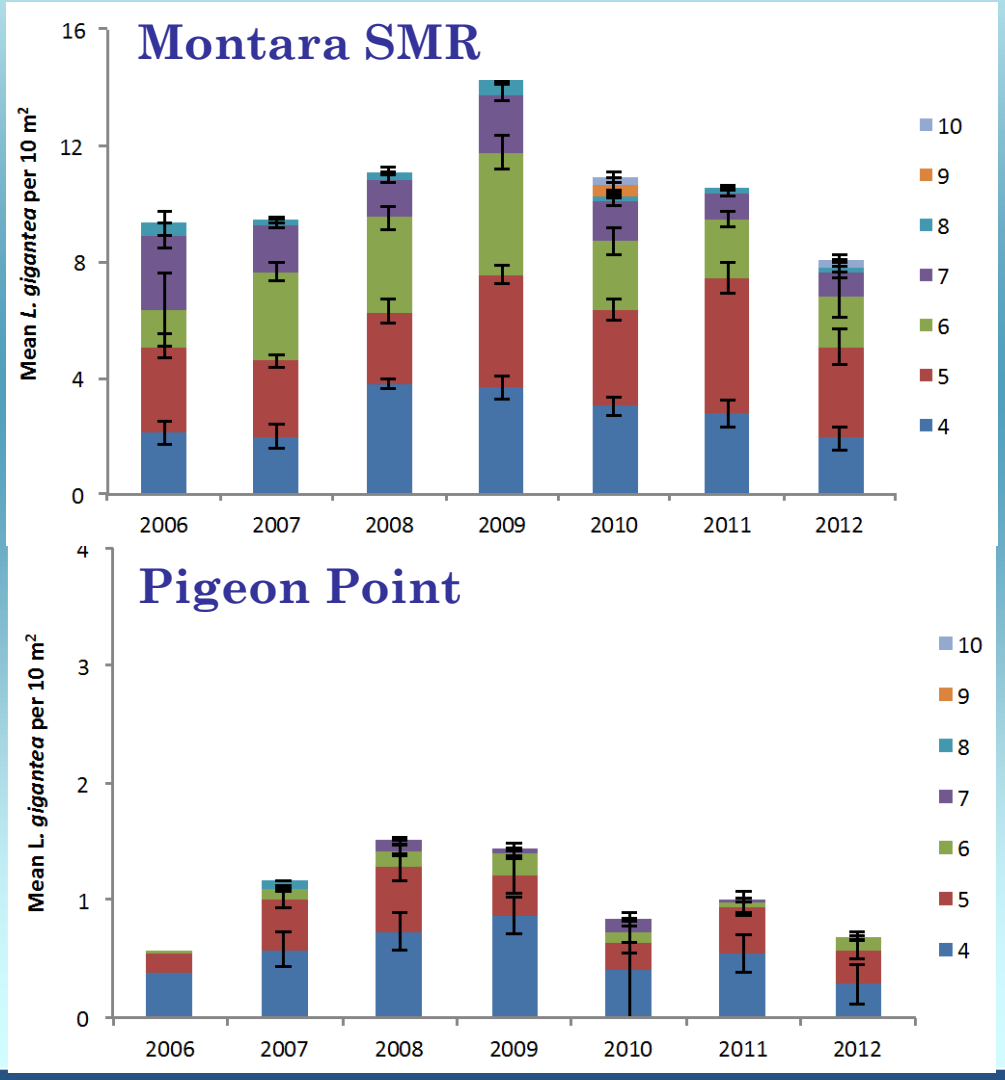


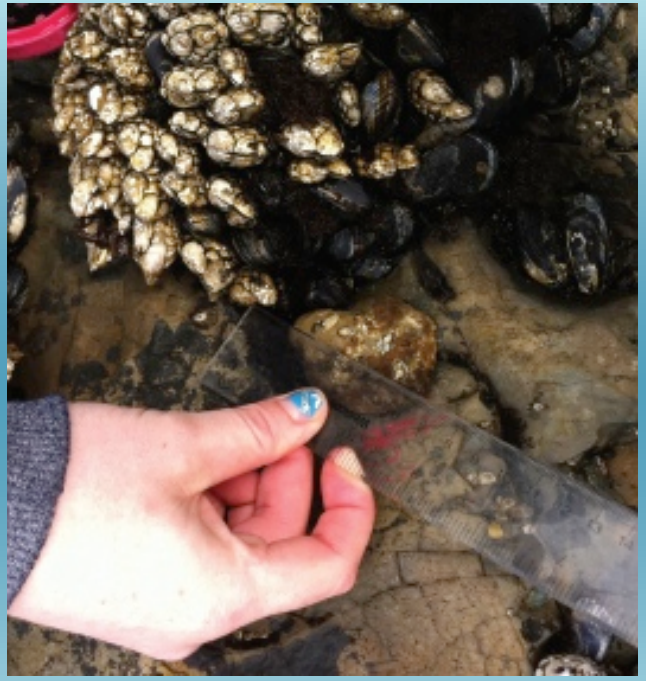


DATA SUMMARY: Urchins



DATA SUMMARY: Owl limpets





DATA SUMMARY: in decline

Rockweed (*Fucus gardneri*):

- recent declines to near absence in 2013 at both Montara & Duxbury

Sea star (*Pisaster ochraceous*):

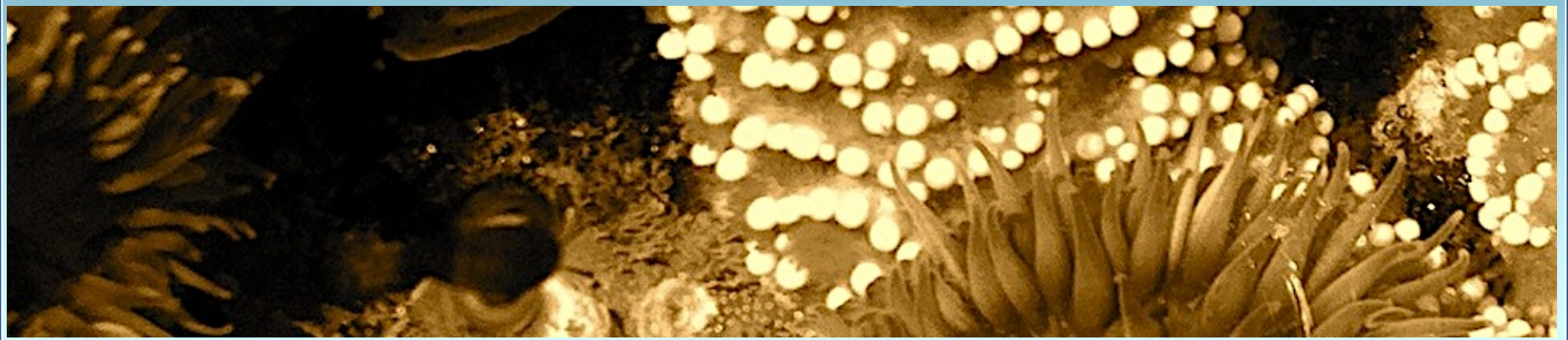
- 5-yr decline at Pigeon Pt

Urchins (*S. purpuratus*):

- 6-yr decline at Montara SMR

Owl limpets (*Lottia gigantea*):

- similar trends inside & outside protected areas
- larger individuals and greater density inside SMR



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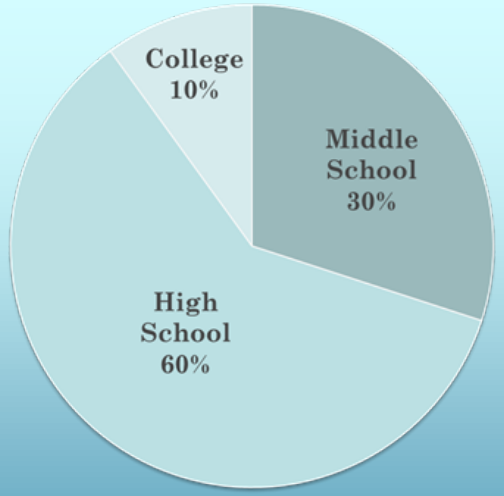

LiMPETS

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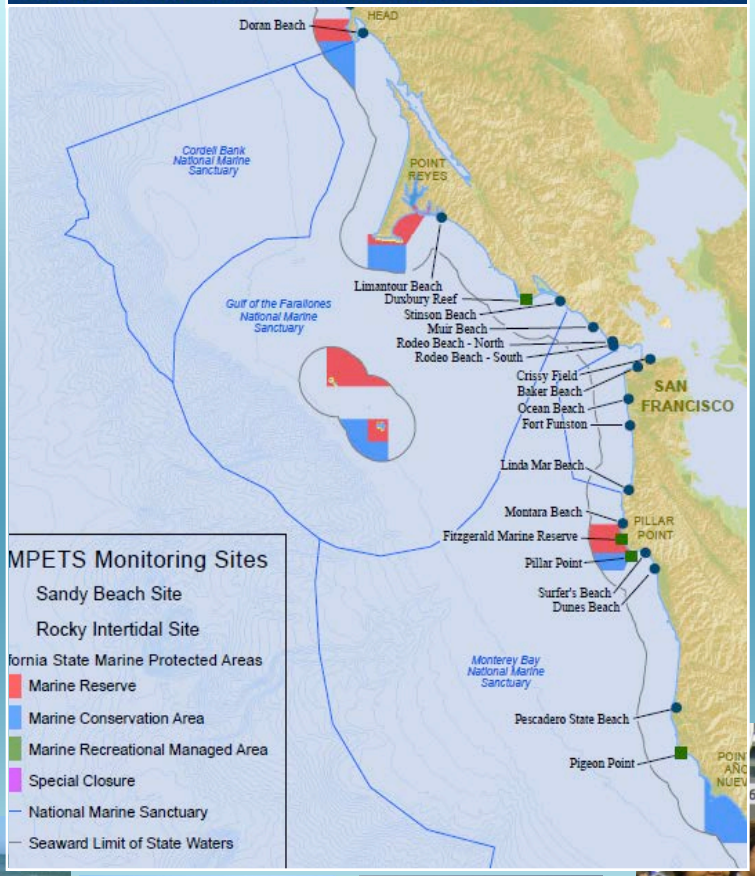
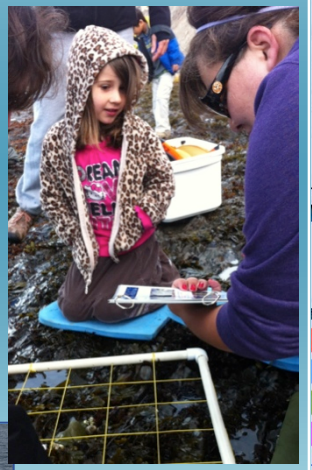
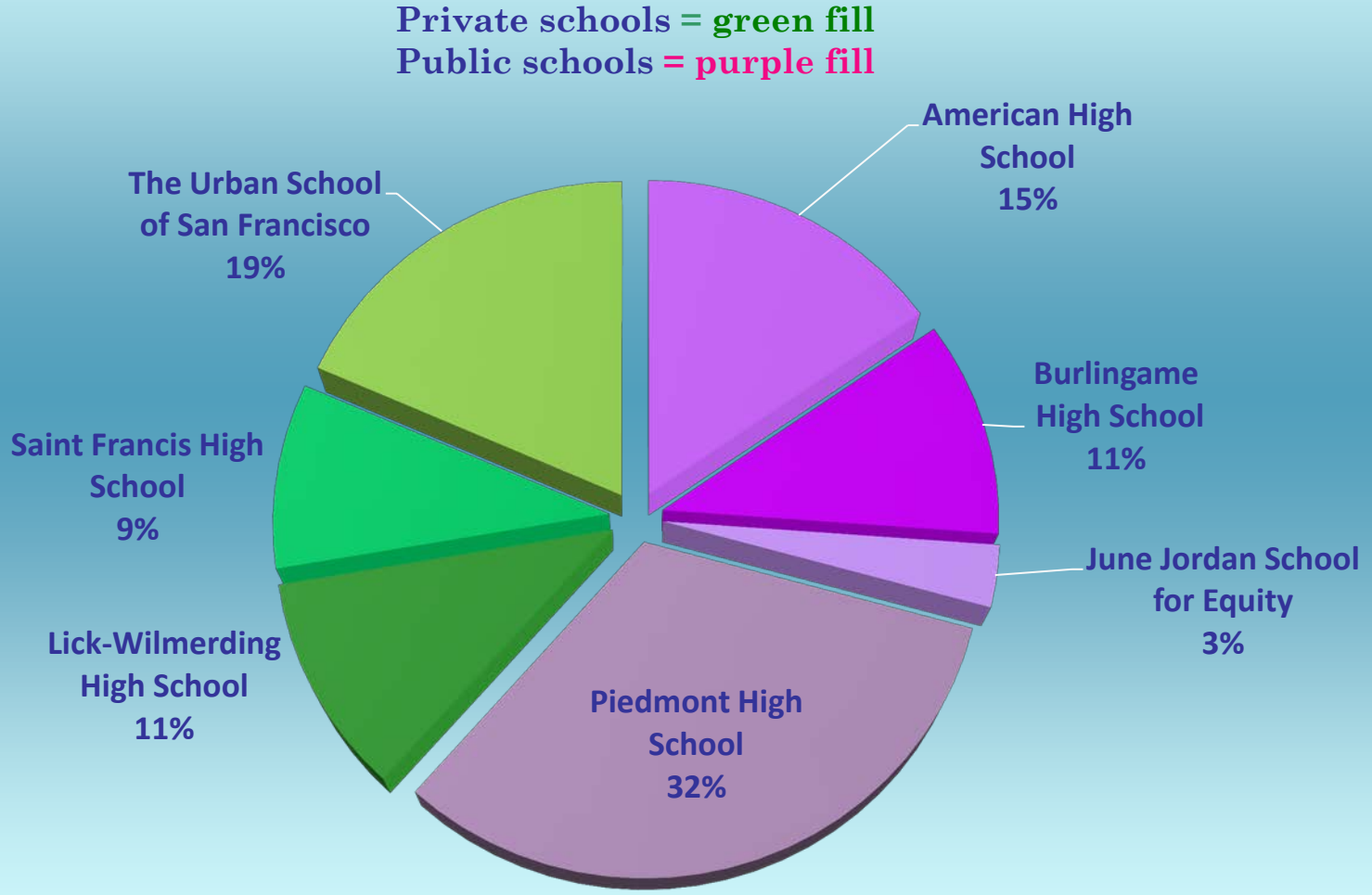
STUDENT SCIENTISTS ON OUR SANCTUARY SHORES



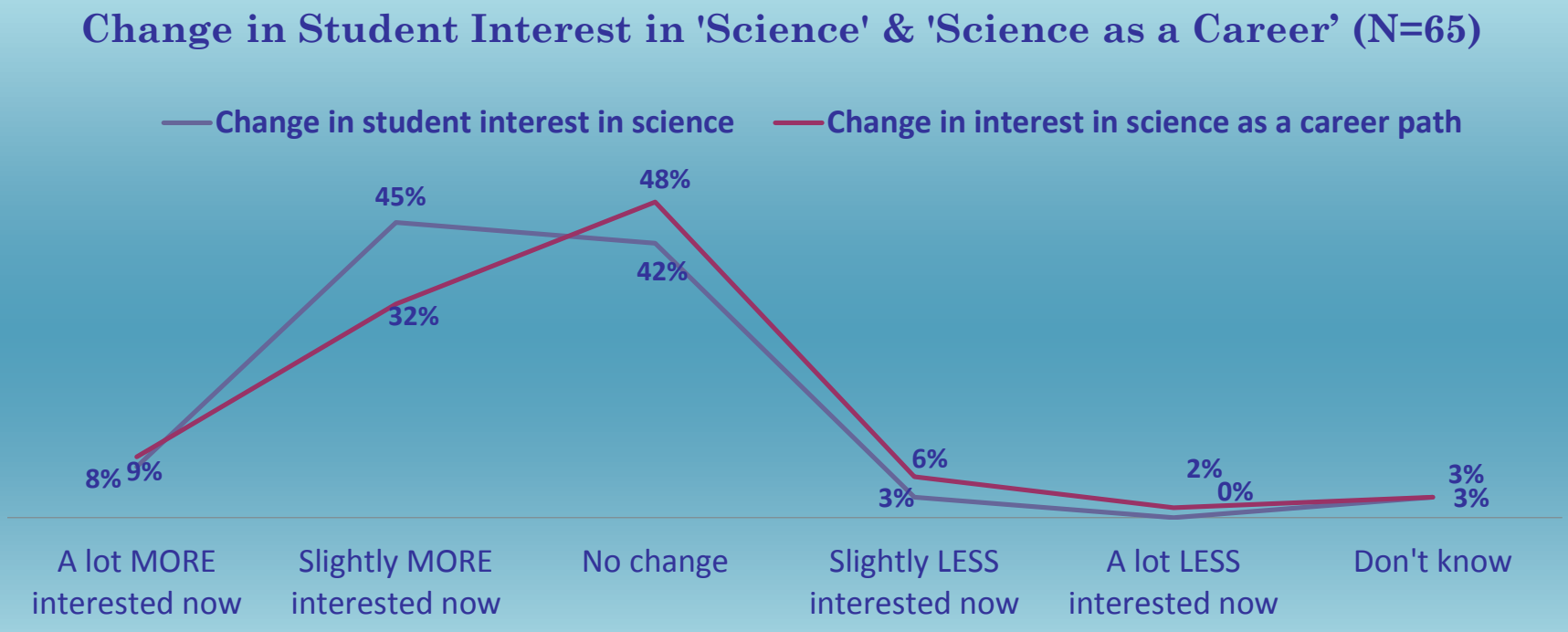


RESULTS: impact on students



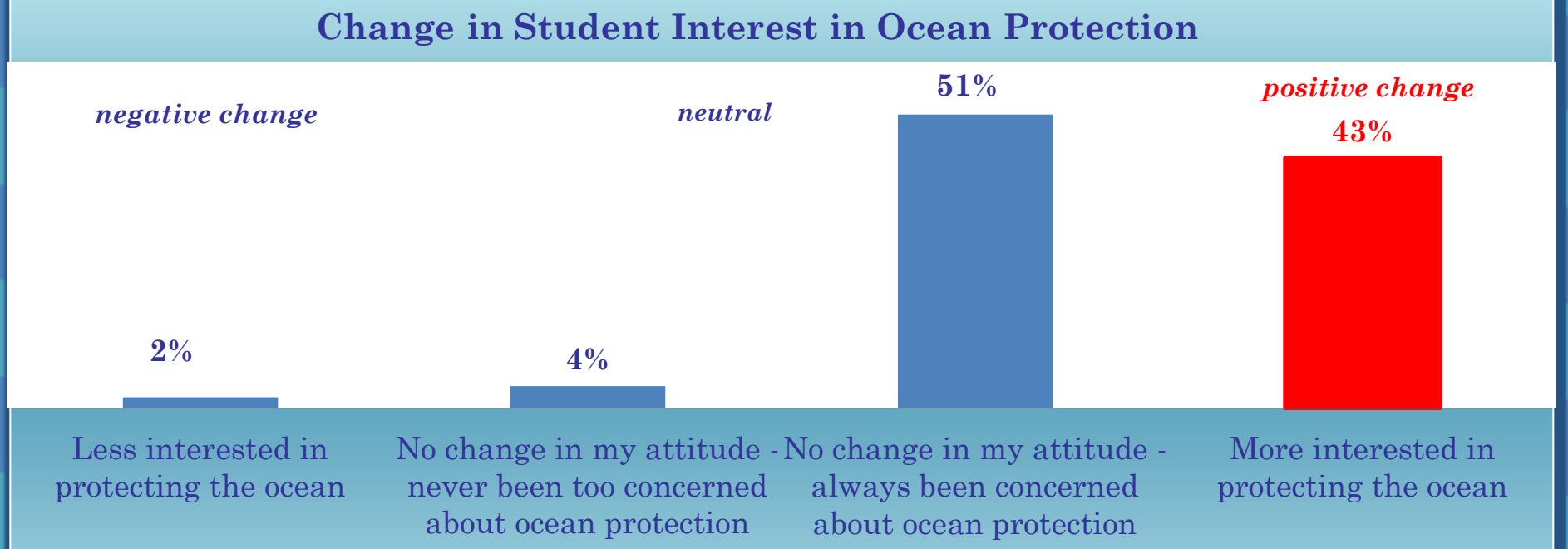
School Affiliation & Student Respondents (n=65) in LiMPETS Longitudinal Study: Year 1, 2012 -2013

RESULTS: student interest in science



When asked 7 months - 1 year after their LiMPETS experiences, the majority of students (53%) feel that their participation in LiMPETS has increased their interest in science.

RESULTS: interest in protecting the ocean



When asked 7 months - 1 year after their LiMPETS experiences, the majority of students (43%) feel that their personal interest in protecting the ocean had increased due to LiMPETS.

DATA SUMMARY: student impact

Knowledge:

- > 80% retain scientific knowledge (MPAs, importance of LT monitoring, etc.)

Basic, tougher to quantify stuff:

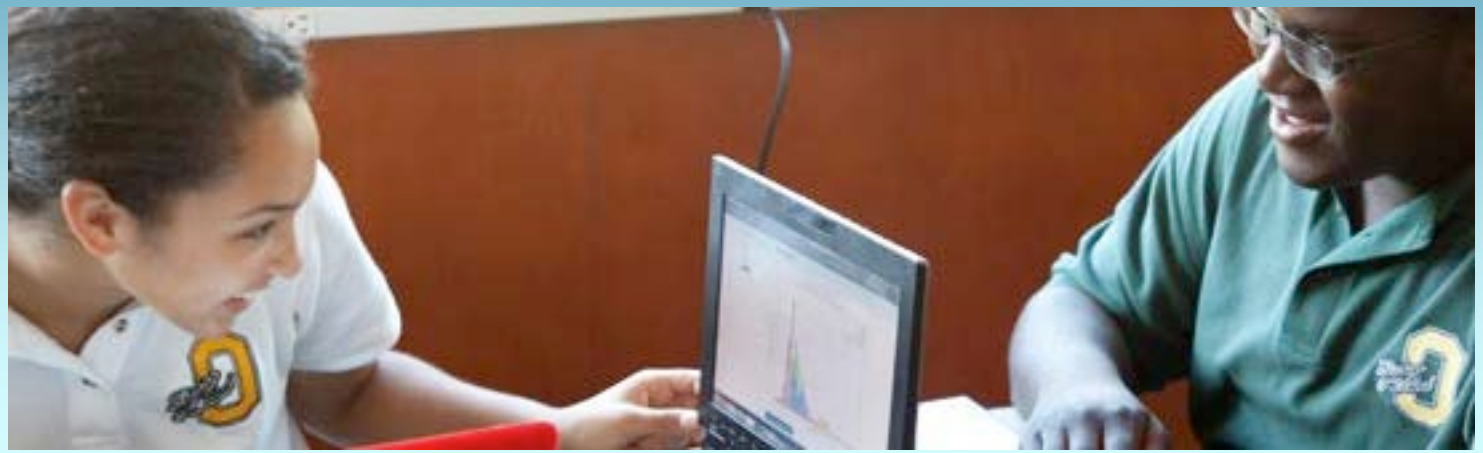
- Higher level, meaningful way for students to engage

Interest in science / careers:

- Develop and retain interest in science & science careers

Ocean Stewardship:

- Develop personal interests and values around the ocean & stewardship.



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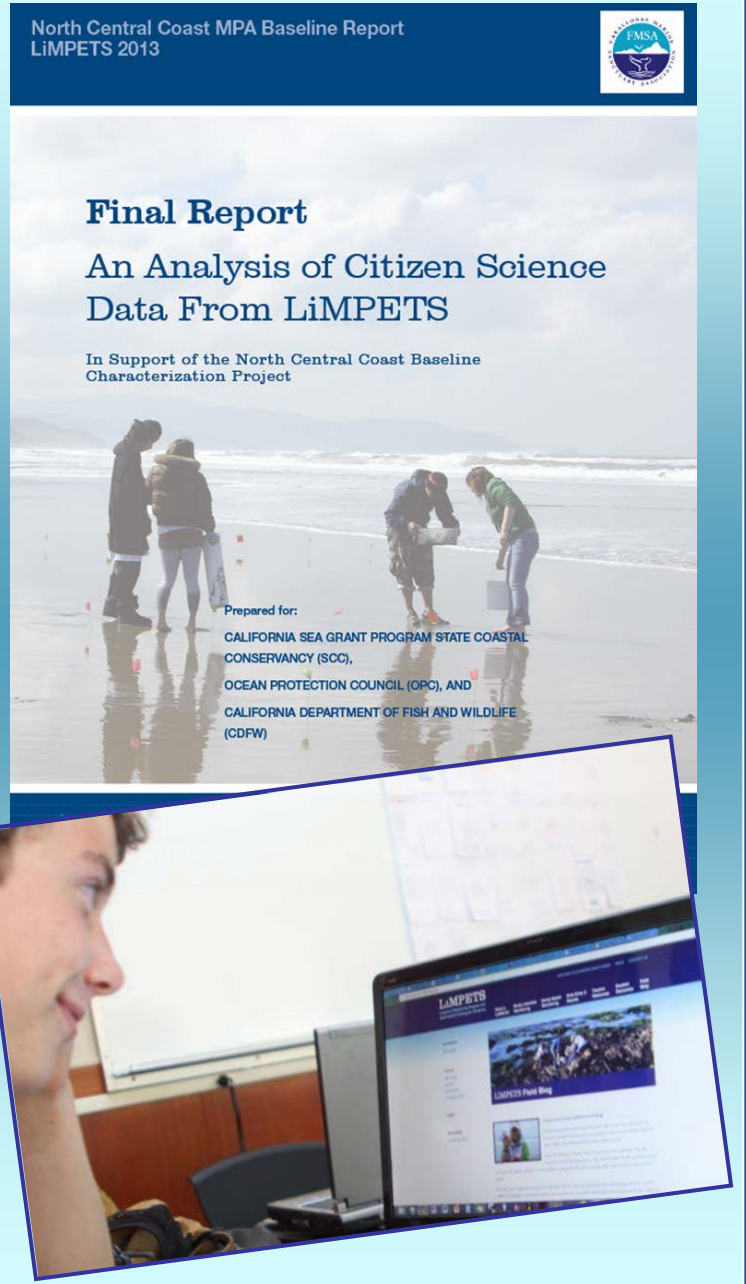

THANK YOU TO…

Our network of dedicated students, teachers, staff, Dr. John Pearse & other science advisors, funders

GFNMS & Sanctuary partners

CalOST & MPA Monitoring Enterprise

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> "Studying shore ecology inside the classroom with books and specimens could never be as interesting or educational!"
>
> — Tom Clark, Tamalpais High School

STUDENT SCIENTISTS ON OUR SANCTUARY SHORES

LiMPETS is an environmental monitoring and education program for students, educators, and volunteer groups throughout California. Approximately 4,000 teachers and students along the coast of California are involved with the collection of rocky intertidal and sandy beach data as part of the LiMPETS network. Join us—learn the process of science and help to protect our local marine ecosystems.

LIMPETS NEWS

LiMPETS Unveils Long-Term Monitoring Results to the State >

Largest Mole Crab Baby Boom in 10+ Years >

New Rocky Intertidal Field Guide >

More news >