

North Coast MPA Baseline Monitoring: *Rocky Intertidal*

North Coast MPA Baseline Monitoring Symposium
5 May 2017

Sean Craig (HSU)

***Joe Tyburczy (California Sea Grant/HSU)**

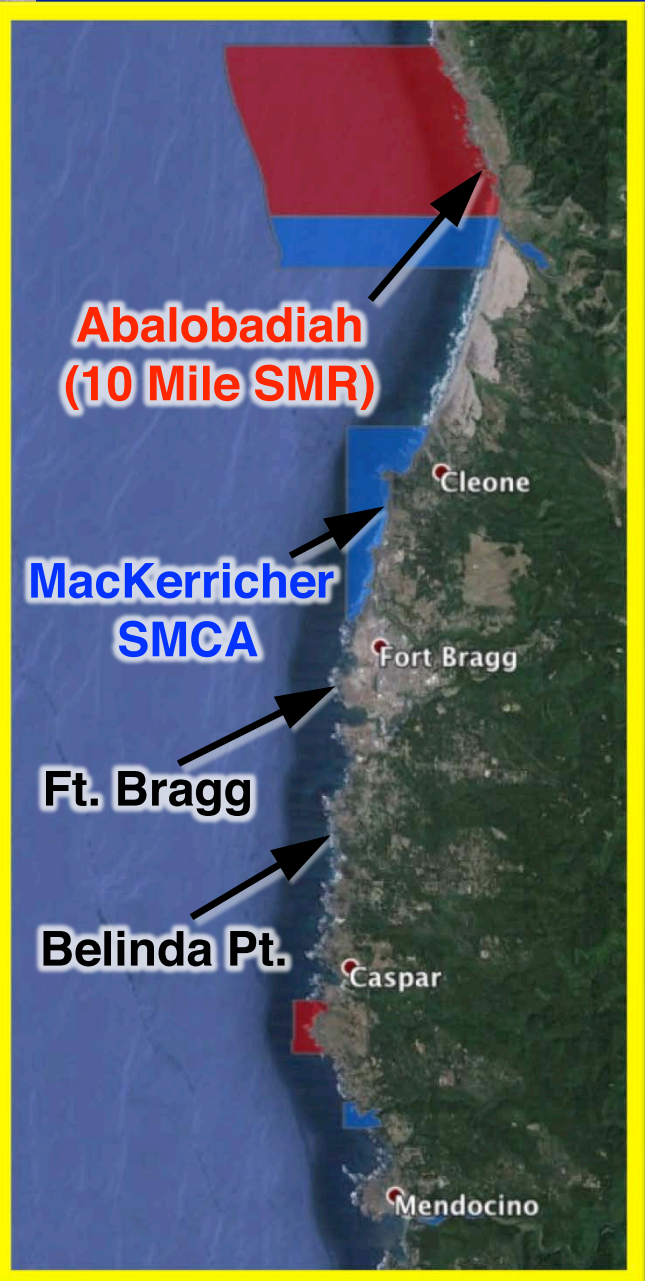
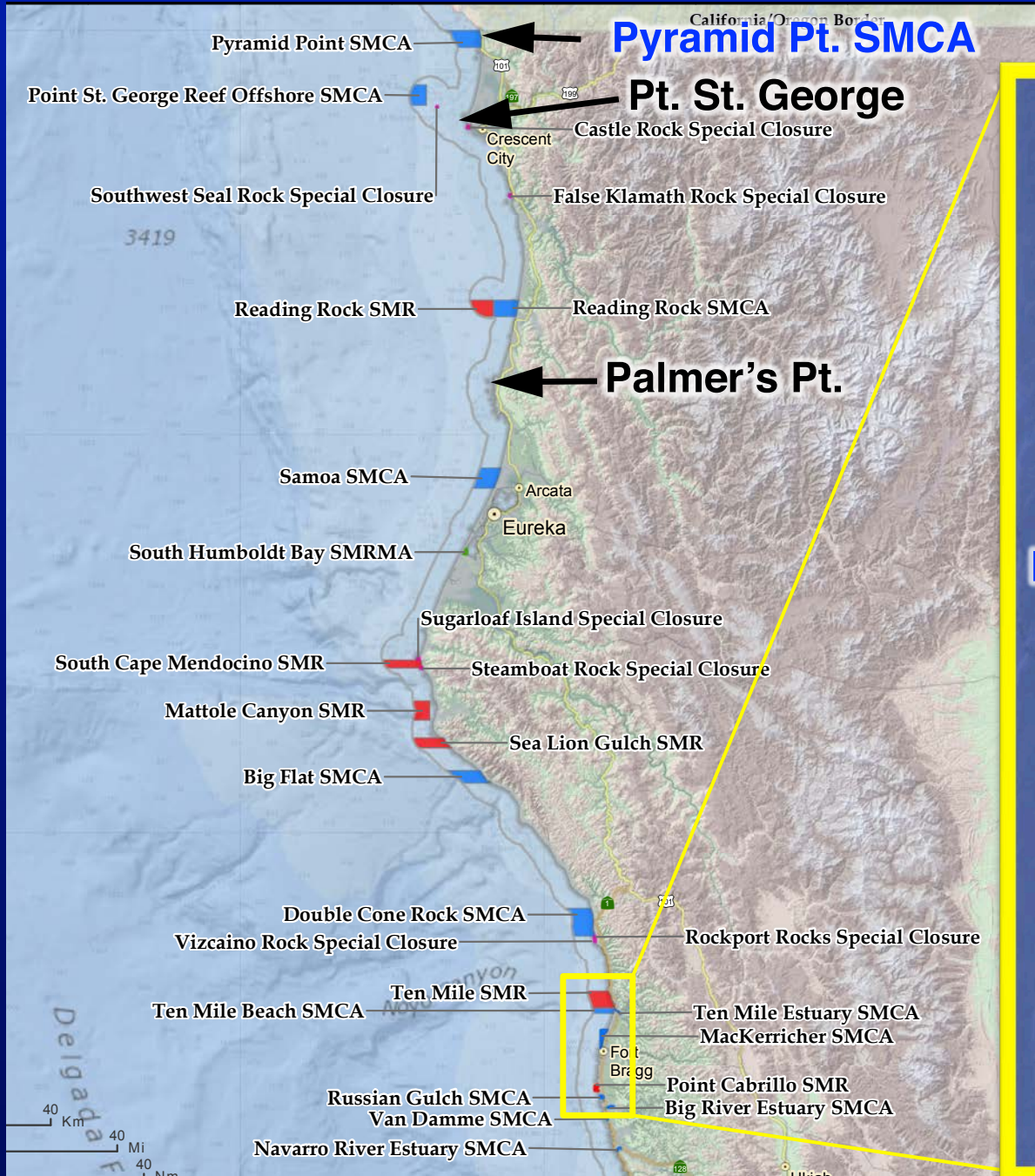
Rosa Laucci (Tolowa Dee-ni' Nation)

Andrew Kinziger (HSU)

Pete Raimondi (UC Santa Cruz)

Ivano Aiello (Moss Landing)





Project components

- Focal species
 - sea stars (and wasting syndrome)
 - mussel beds
 - abalone (*Haliotis* spp.)
 - sea palm (*Postelsia palmaeformis*)
 - surf grass (*Phyllospadix* spp.)
- Fish diversity surveys
- Algae & invertebrate biodiversity surveys
- High-resolution topographic surveys



Project components

- Focal species
 - sea stars (and wasting syndrome)
 - mussel beds
 - abalone (*Haliotis* spp.)
 - sea palm (*Postelsia palmaeformis*)
 - surf grass (*Phyllospadix* spp.)
- Fish diversity surveys
- Algae & invertebrate biodiversity surveys
- High-resolution topographic surveys



Methods: *Pisaster ochraceus*

- MARINe (Multi-Agency Rocky Intertidal Network)
- Permanently-marked irregular plots in mid/low zone
- Roughly 15–30m²
- 3 plots per site
- Data:
 - Counts by arm length (1cm bins) and wasting category (0 = healthy/no wasting, 4 = disintegrating)

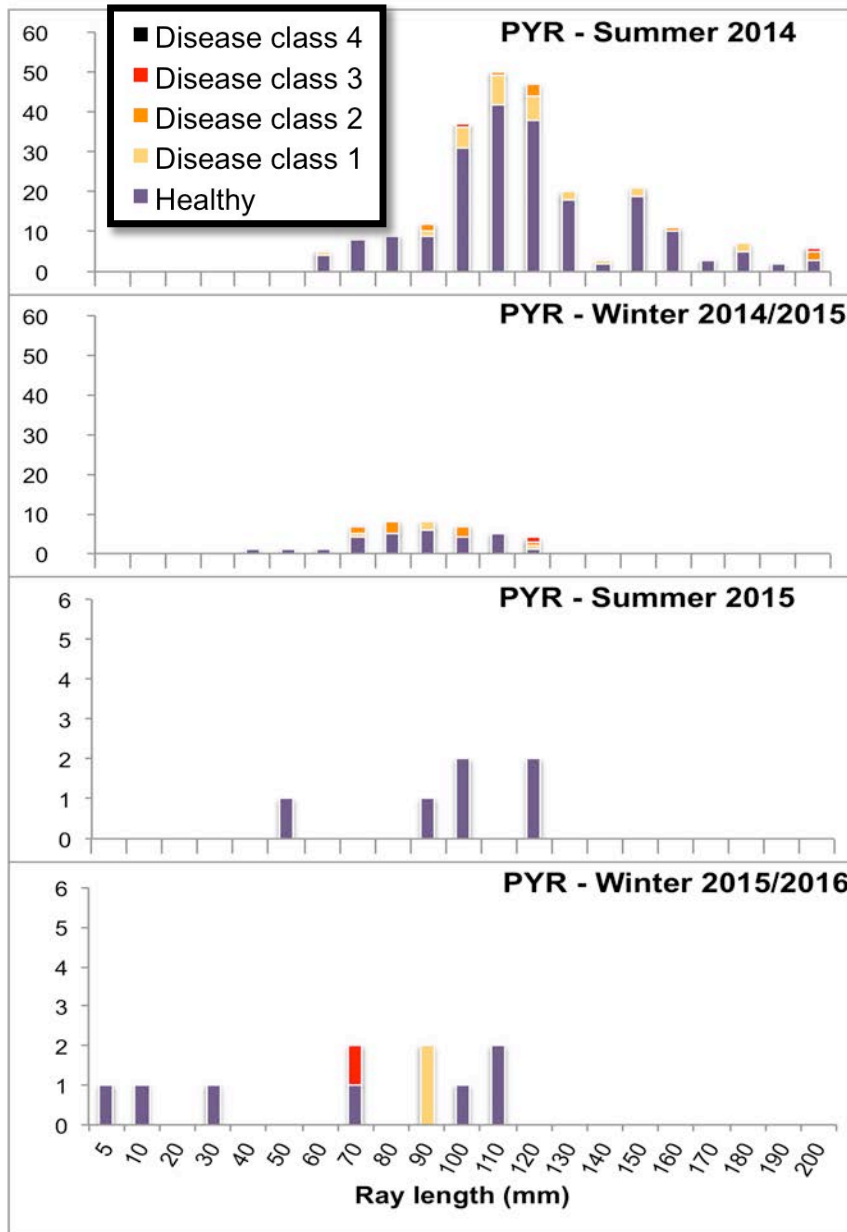


Methods: mussel bed

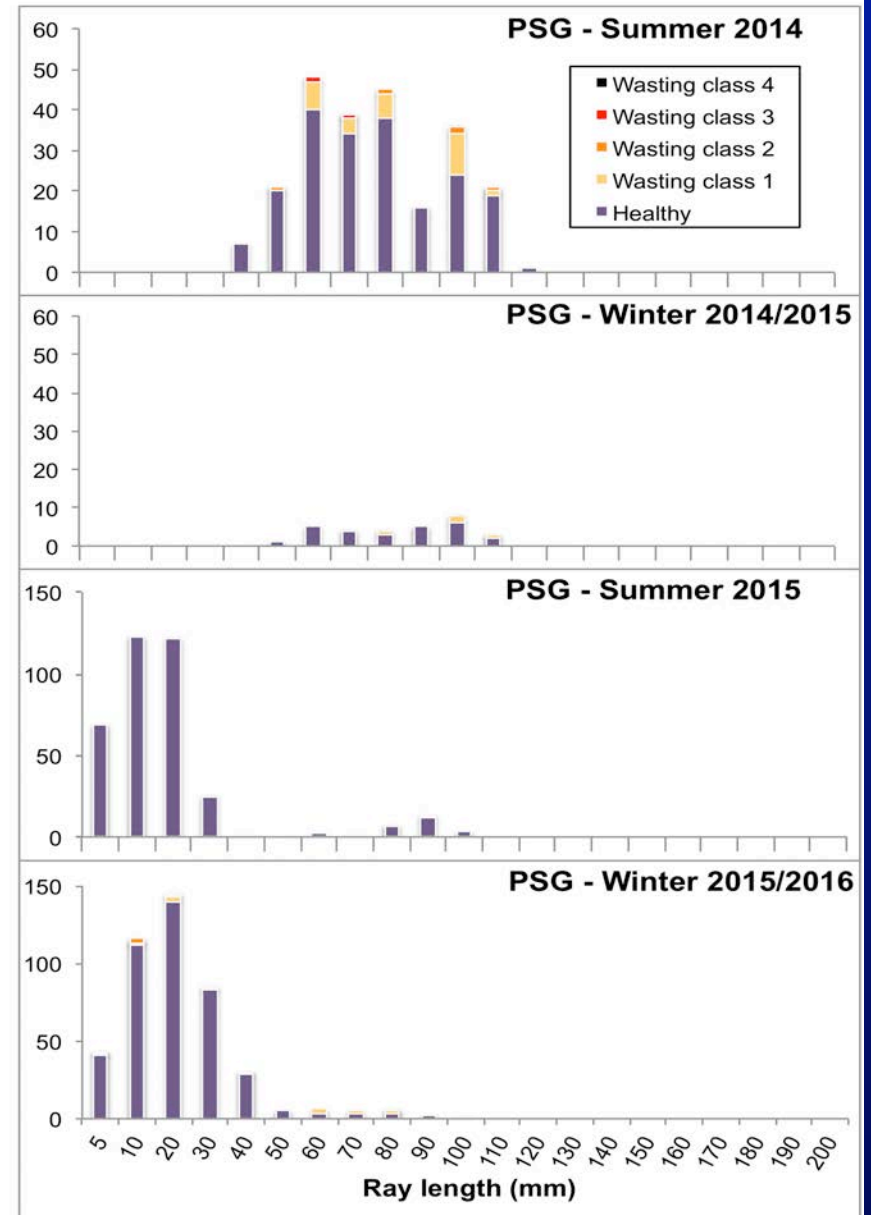
- MARINe (Multi-Agency Rocky Intertidal Network)
- Permanently-marked photo quadrats in mussel bed (mid zone)
- 50cm × 75cm = 0.375m²
- 5 quadrats per site
- Data:
 - Percent cover (100 contact points/quad)
 - Mussel bed depth (5/quad = 25/site)
 - Individual mussel length (10/quad = 50/site)



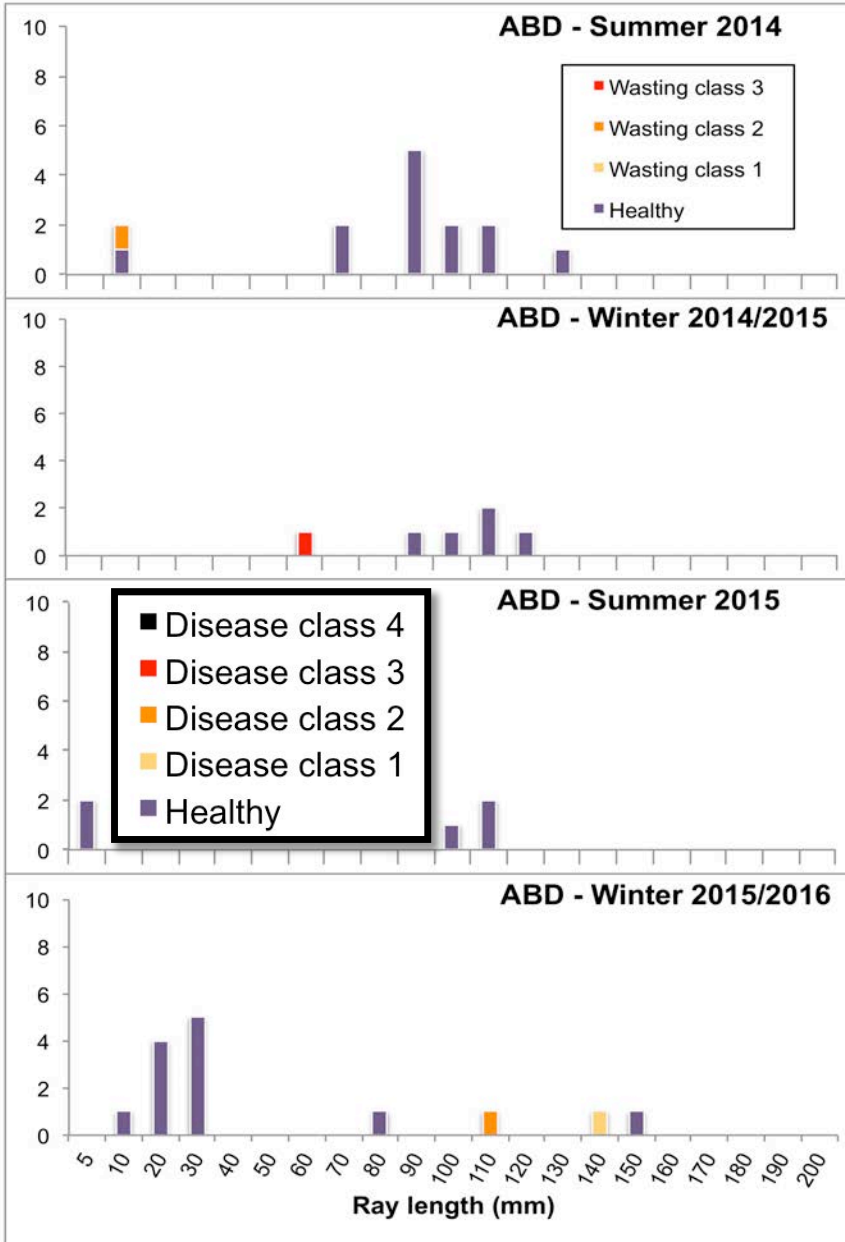
Pyramid Pt. SMCA



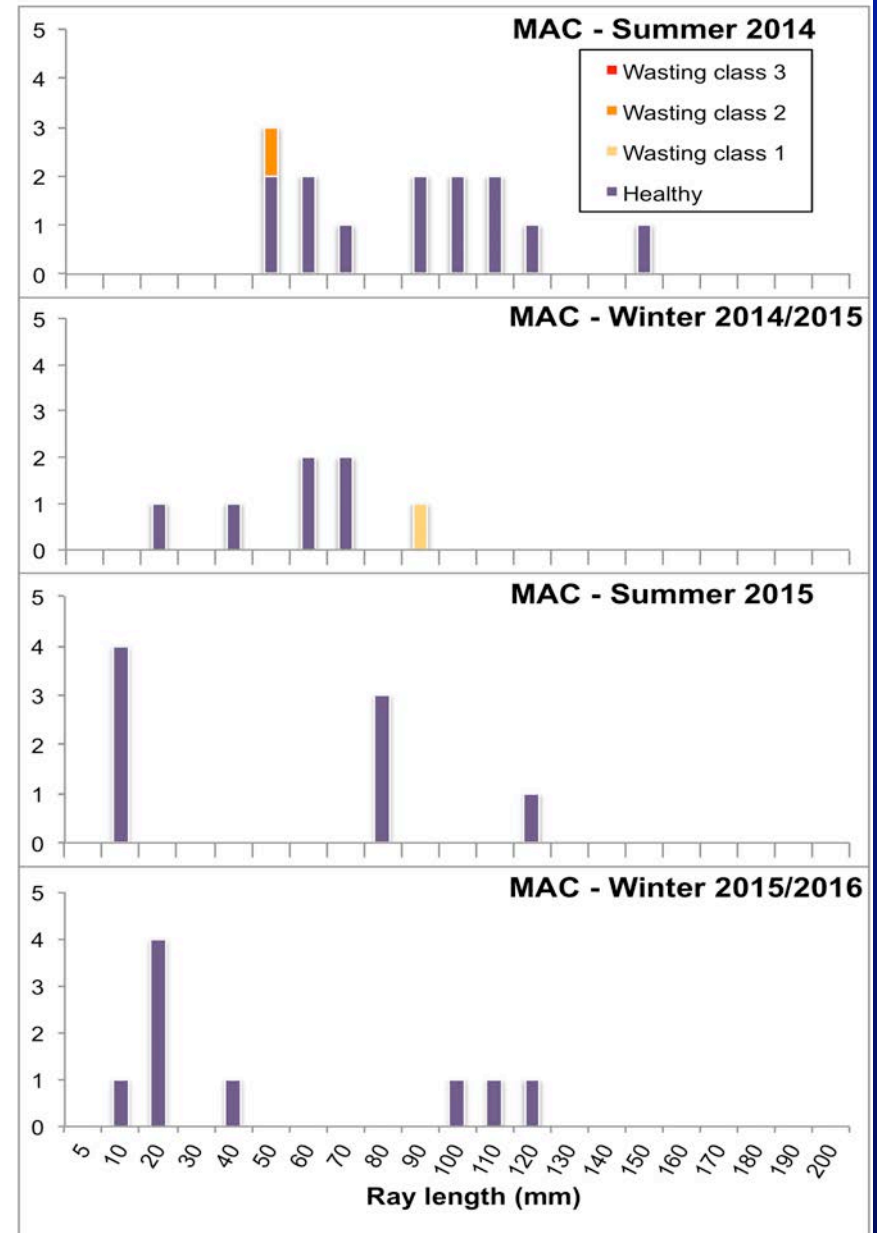
Pt. St. George



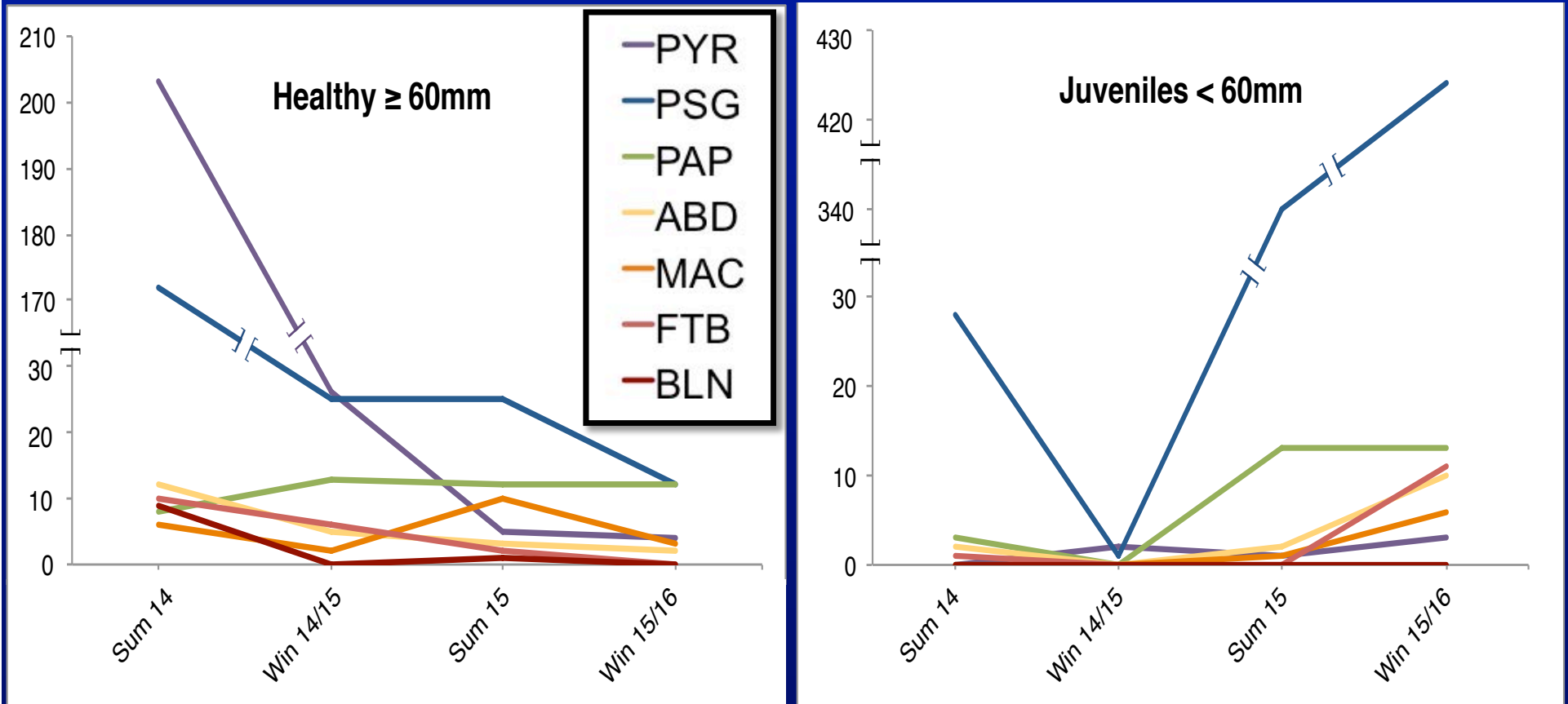
Abalobadiah (10 Mi. SMR)



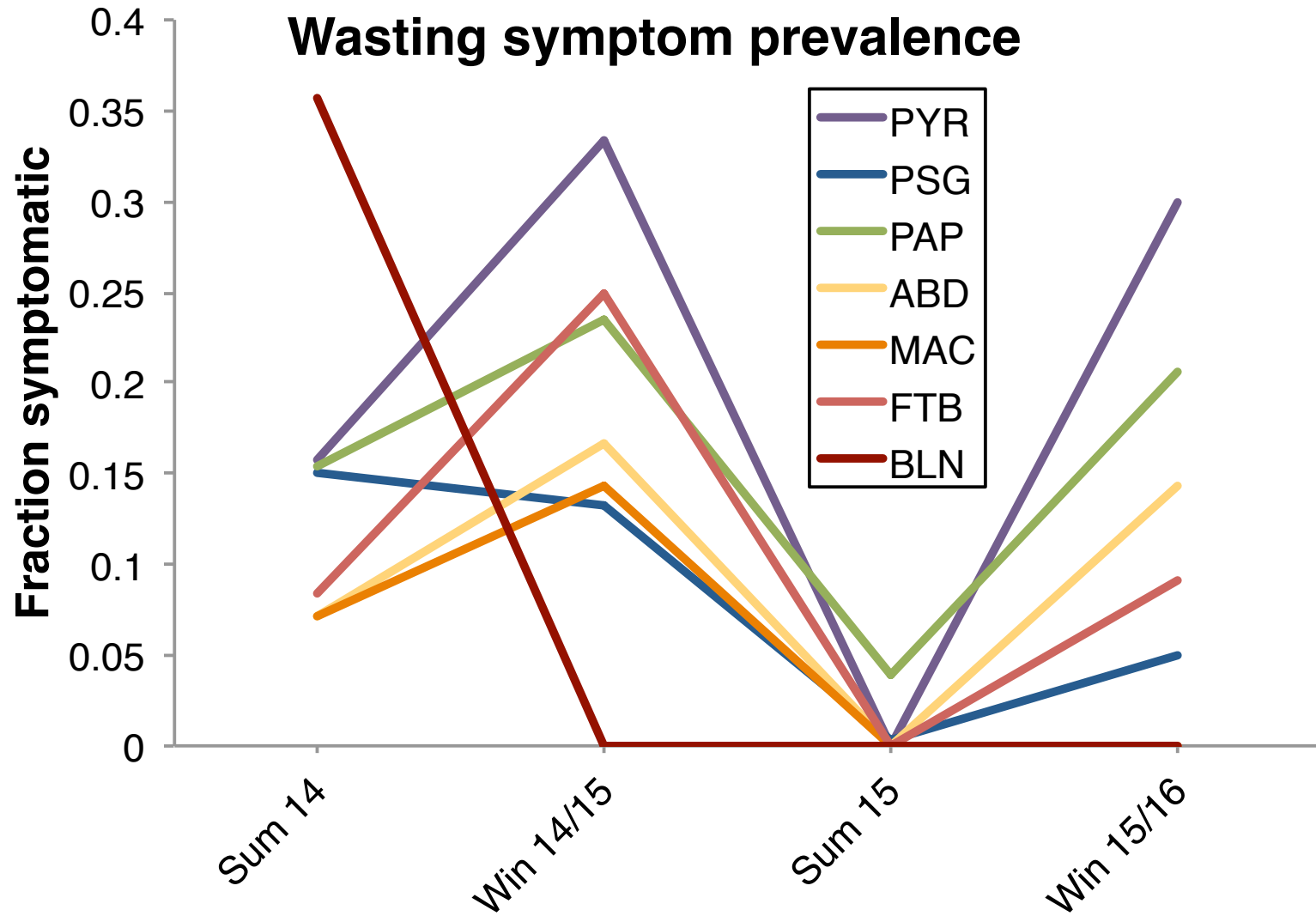
MacKerricher SMCA



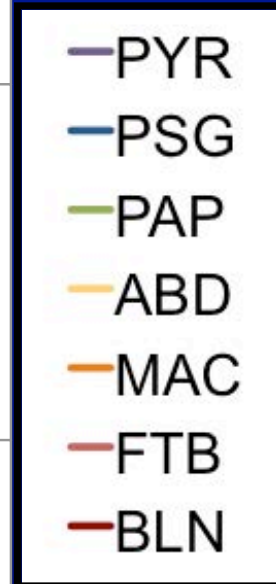
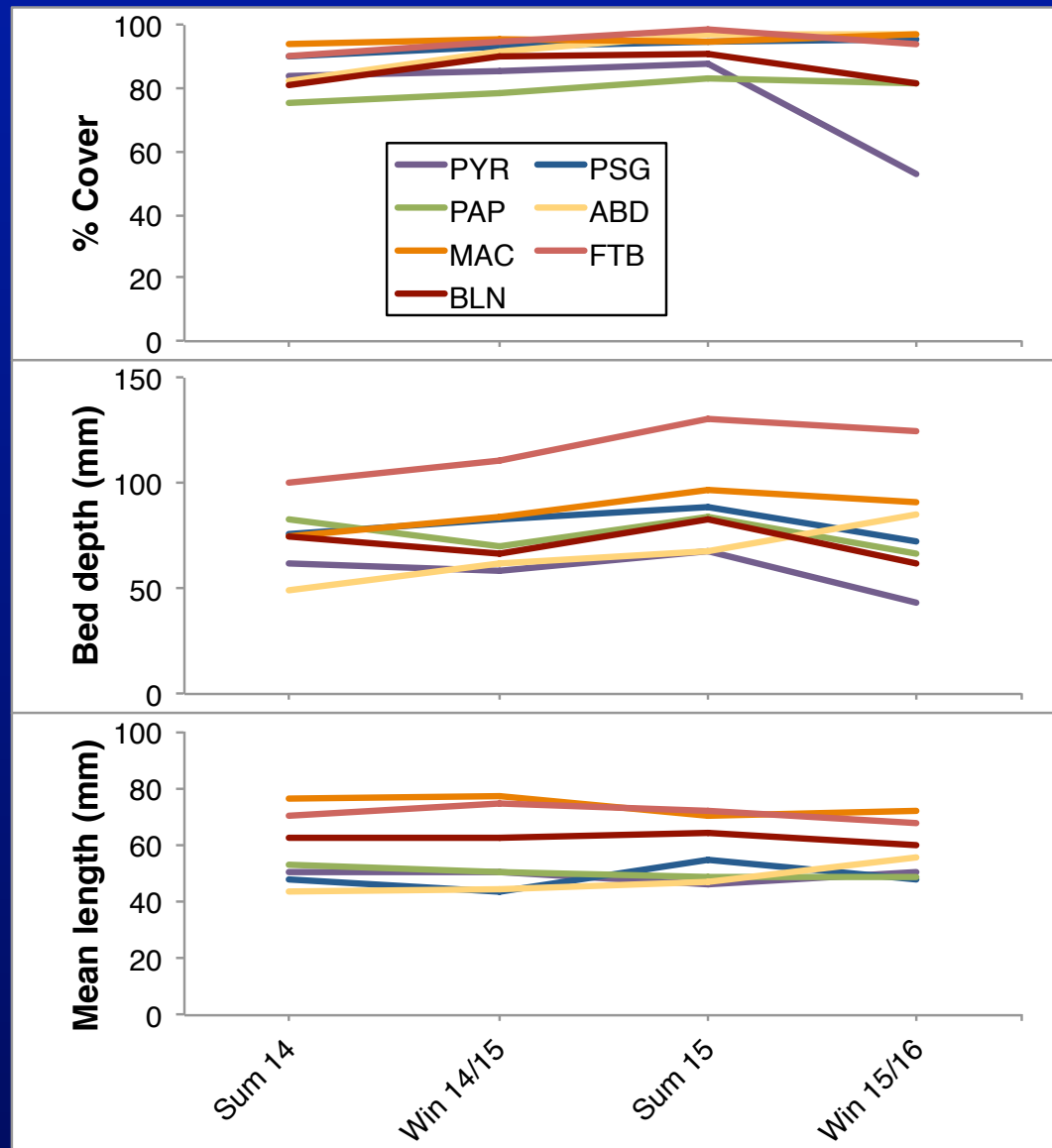
Pisaster trends by site



Pisaster trends by site (wasting)



Mussels

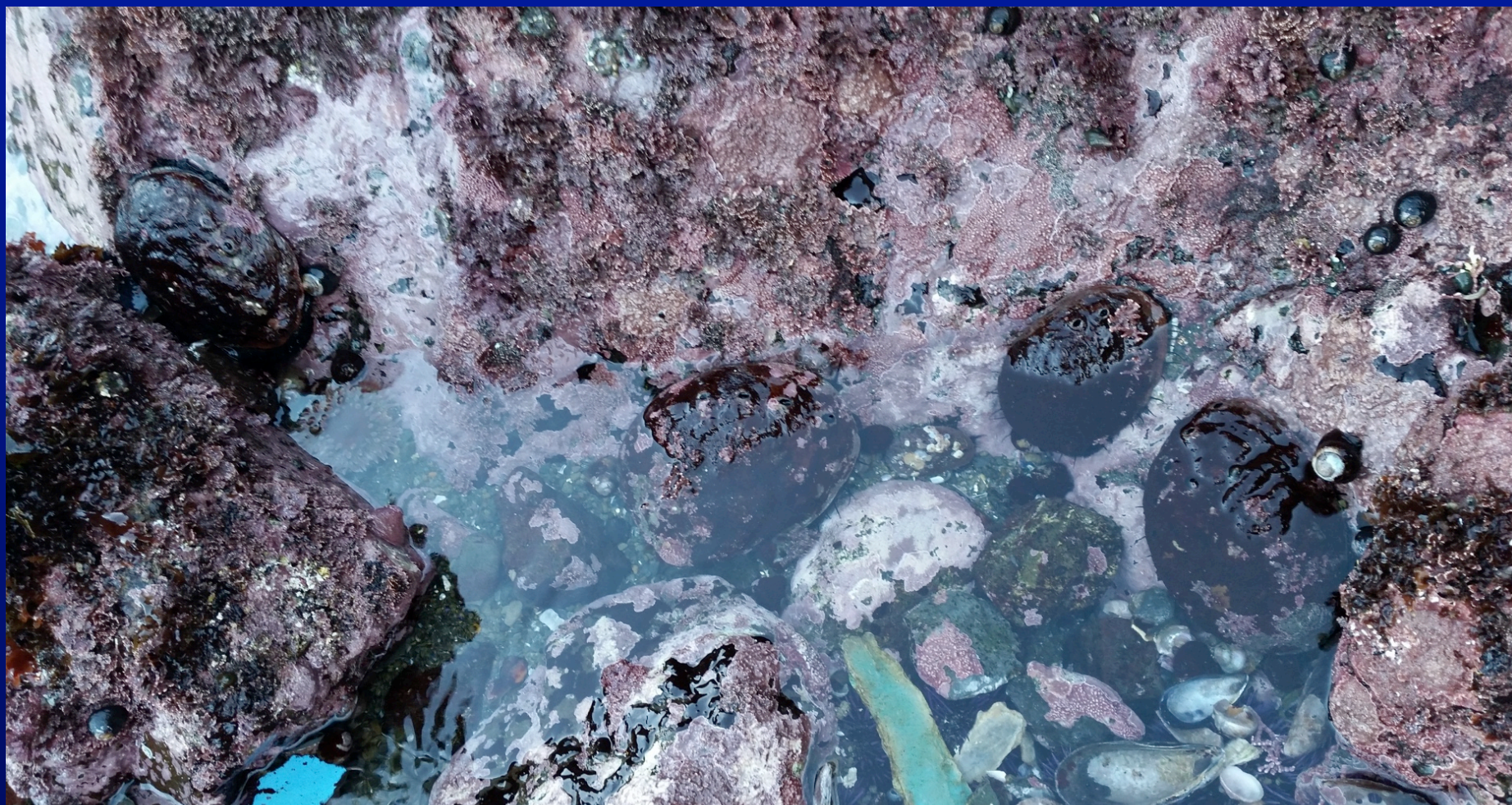


Observed patterns

- Many more *Pisaster* at northern sites in summer 2014.
- Major declines in abundance of large *Pisaster*.
- Wasting syndrome prevalence has decreased.
- Pulse of juvenile *Pisaster* at two sites, especially in the north.
- Little trend in mussel abundance; no obvious response to decrease in sea stars.



Recognize these?



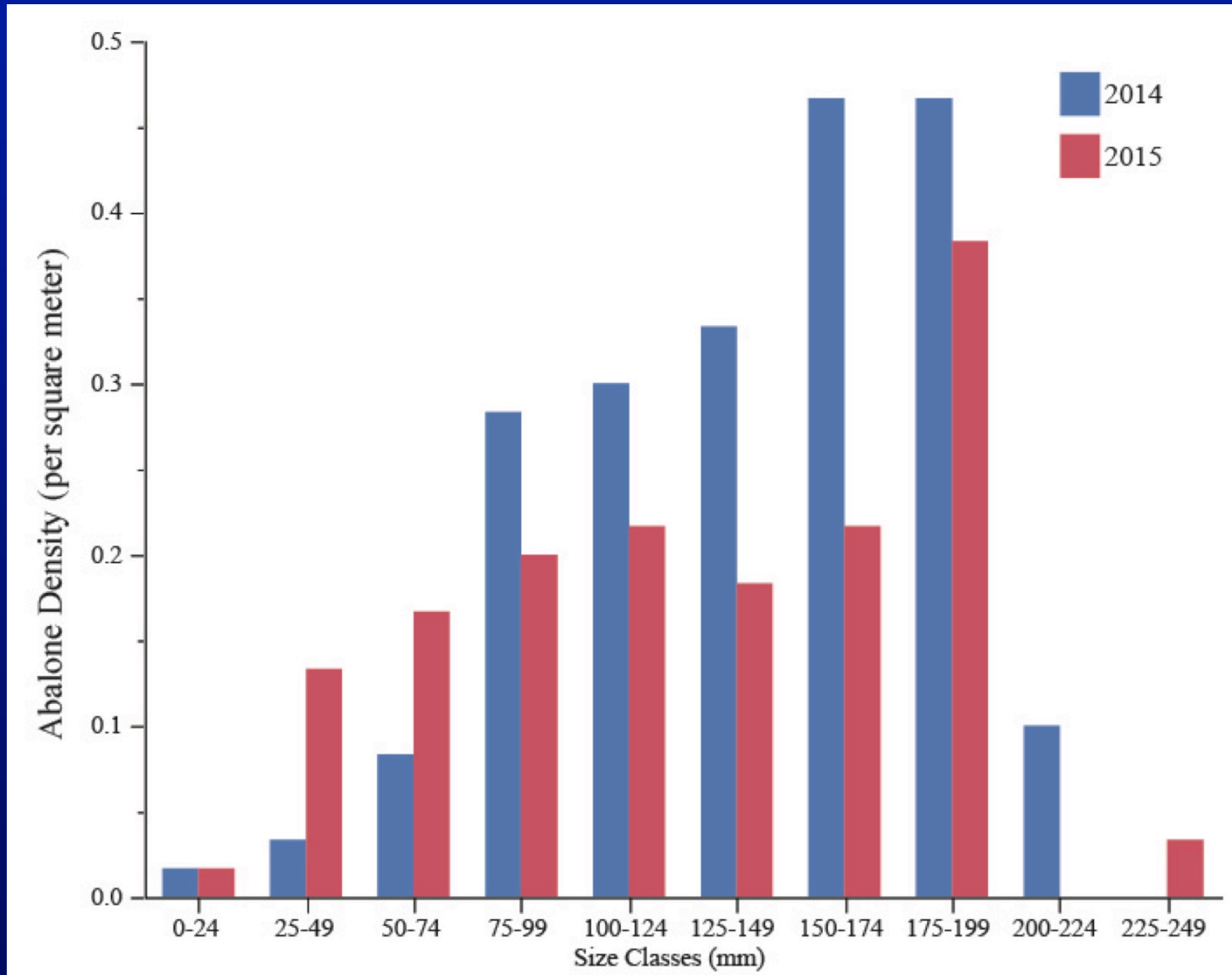
Recognize these?



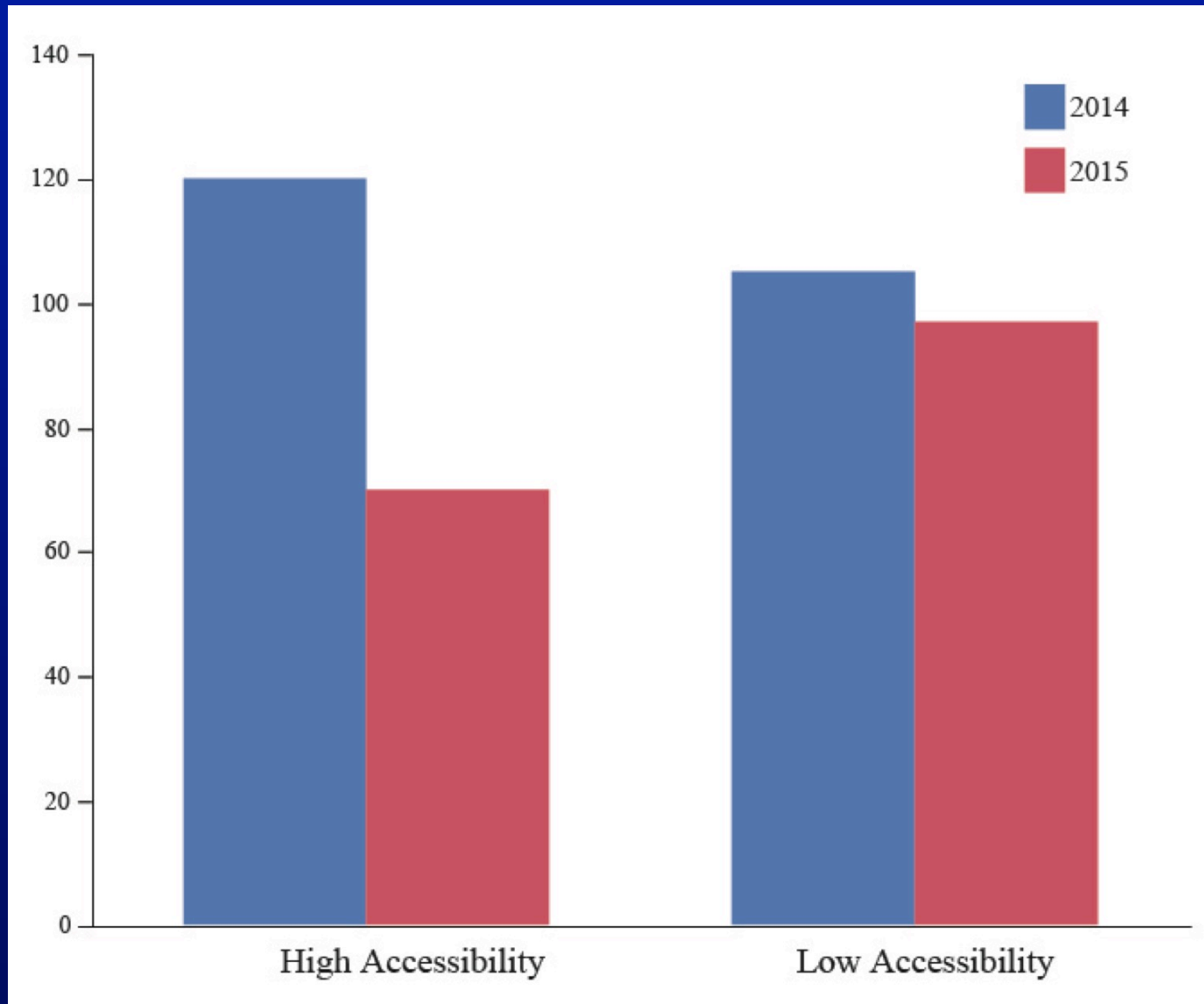
Large abalone – in the *intertidal* ?!!



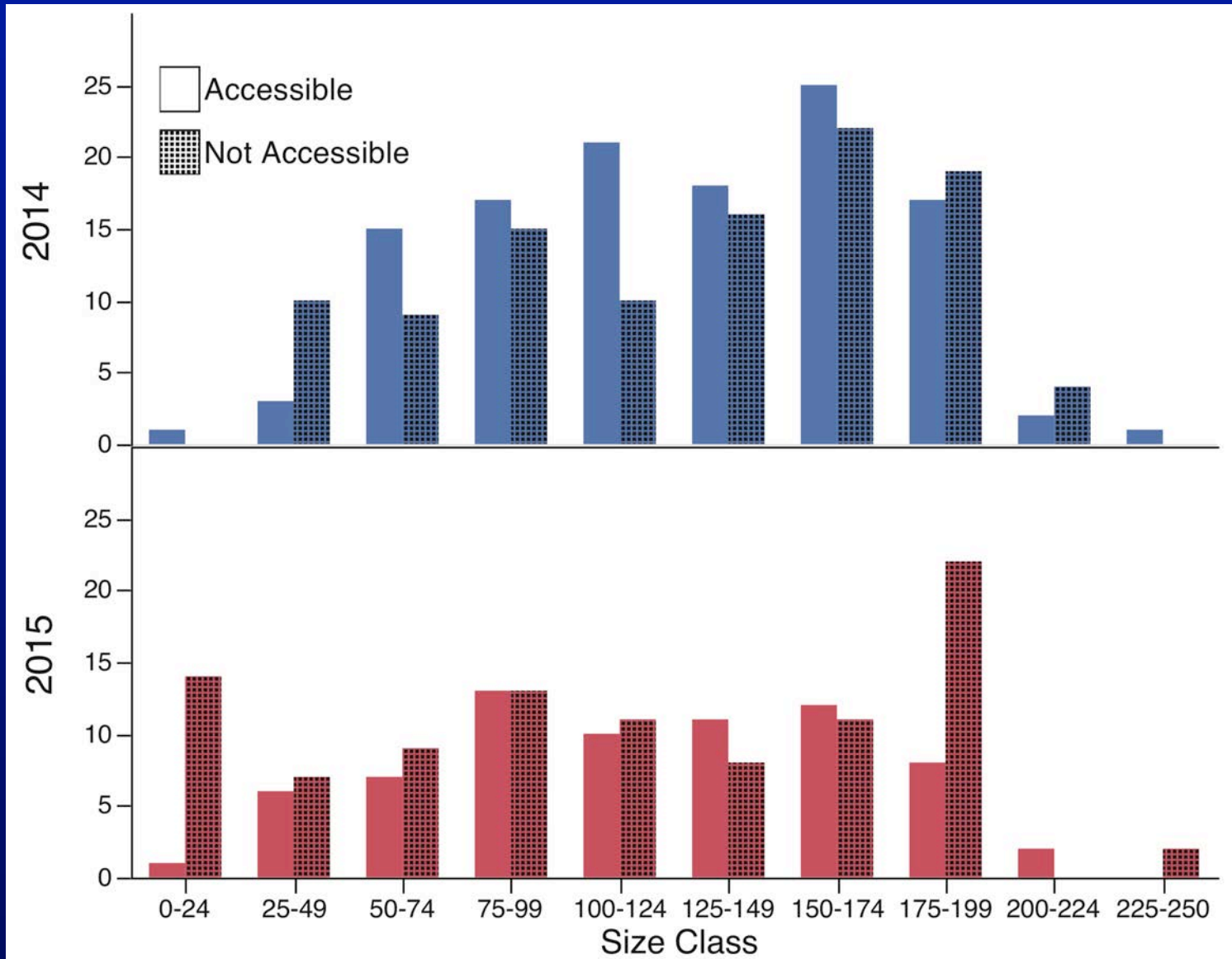
Abalone sizes



Abalone accessibility



Abalone size & accessibility





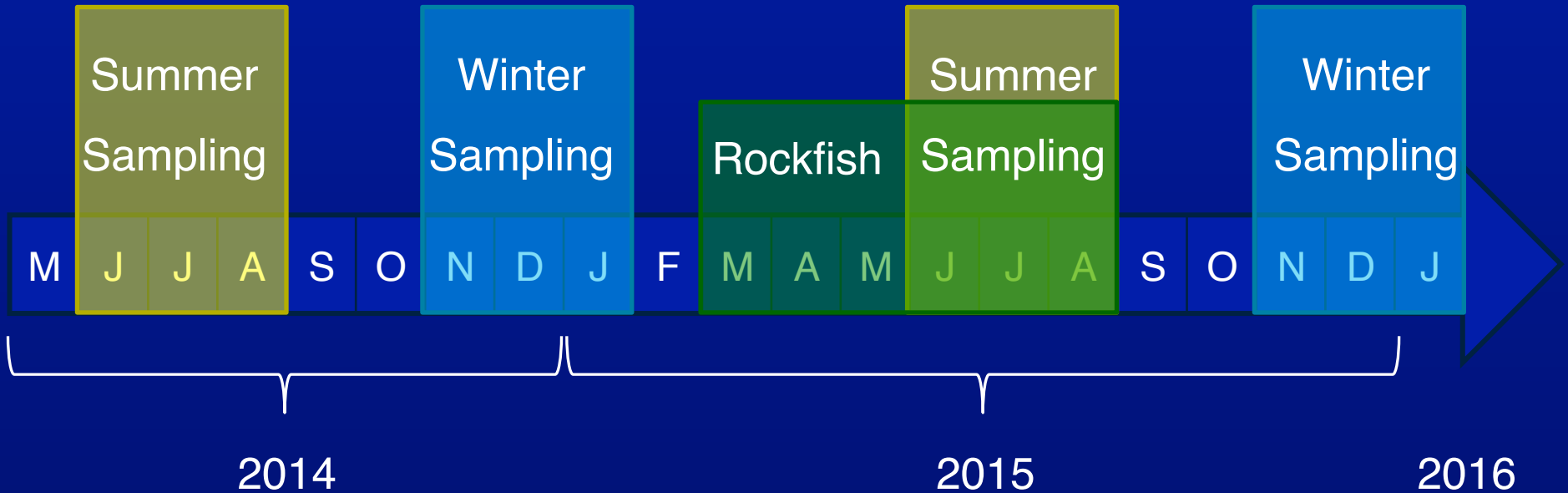
Baseline Monitoring and Characterization of Rocky Intertidal Fish Communities in Northern California

Kevin Hinterman

M.S. Thesis (Dr. Andrew Kinziger, Advisor)

Department of Fisheries Biology

Sampling timeline



Collecting intertidal fish



Tidepool

+



+

Water pump



=



People

Fish!

Diversity results

- High diversity overall: 34 species, 8 families
 - Sculpins (Cottidae) most common
 - Many juveniles of recreational fished species
- Marine protected area sites (MPA's) have similar diversity, **but lower species richness**
- **And lower abundance at MPA sites**
- High intertidal zone had lower species richness but similar abundance (vs. mid and low zone pools)

Oligocottus snyderi



Oligocottus maculosus

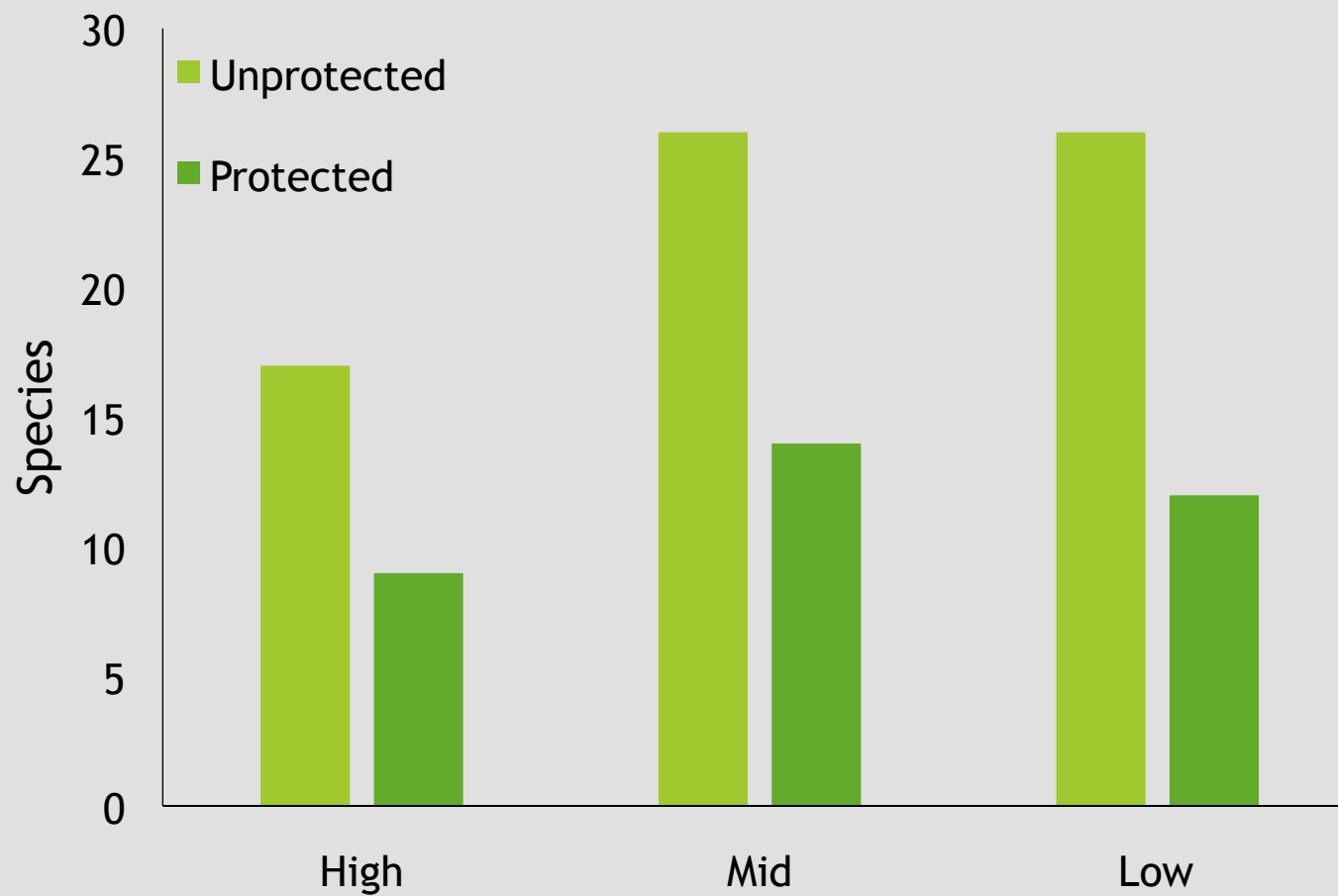




Kevin Hinterman

Gibbonsia montereyensis

Richness by zone





Sebastes melanops

Rockfish



Sebastes mystinus

- Typically *Sebastes melanops* recruit March-August
- **Previous studies found hundreds per pool**
 - Rebecca Studebaker & Tim Mulligan (2008)
 - Mark Lomeli (2009)
- **But almost none seen in this study!**

Sebastes miniatus

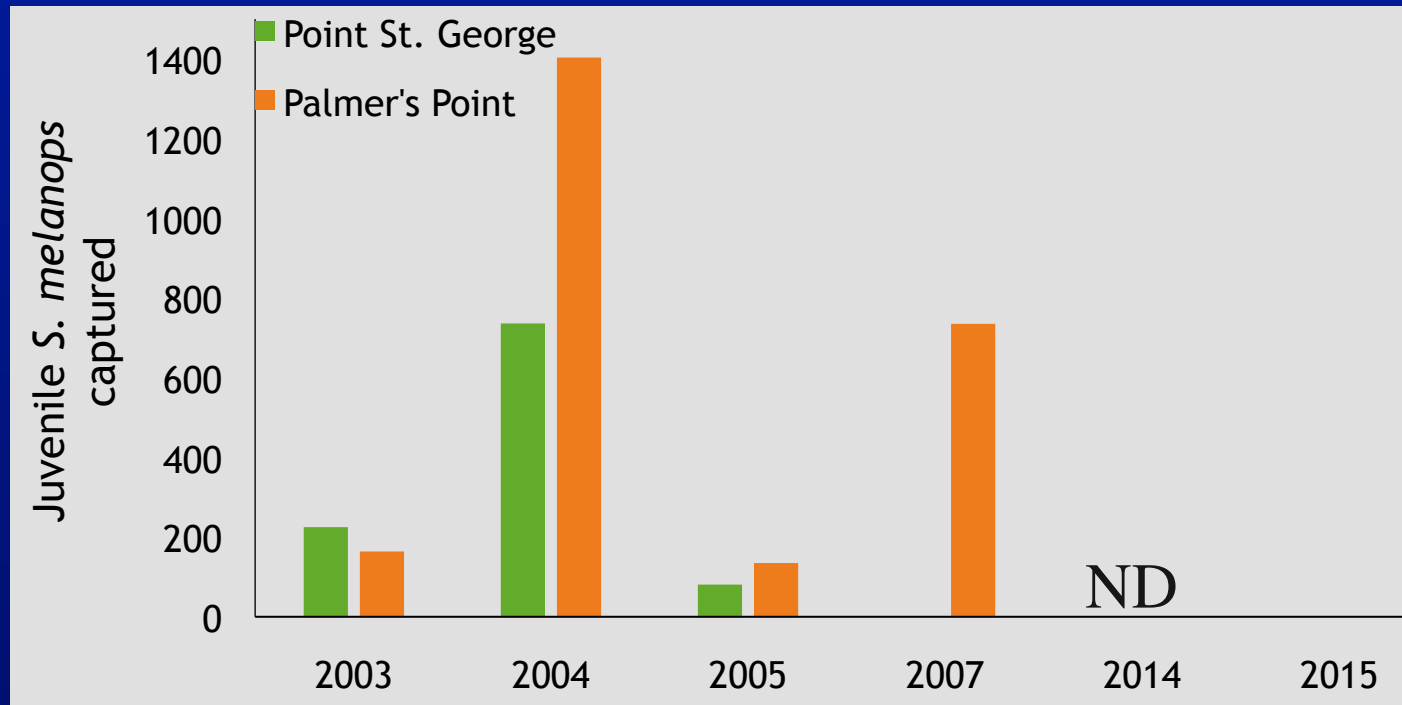


Sebastes spp.





Rockfish



Conclusions

- Lots of sculpin recruits in high intertidal zone
- Nearly all likely species were detected
- MPA sites started with lower species richness & abundance
- Why were there no black rockfish?
 - Poor recruitment years?
 - Anomalous (warm) ocean conditions during 2014, 2015?

Oligocottus rimensis



Kevin Hinterman

Acknowledgements

A group of about ten people, likely researchers or field workers, are standing on a rocky beach at sunset. They are wearing various types of field gear, including hats, jackets, and waders. Some are holding equipment like buckets and a metal frame. The background shows the ocean and a bright sun low on the horizon, creating a warm, golden light.

HSU Intertidal Crew

- Leslie Booher
- Holly Clegg
- Kevin Hinterman
- Angela Jones
- Kellan Korcheck
- Brianne Kottenbach
- Catherine Lamb
- Jason Lopiccolo
- Sioni Martin
- Allison Mitchell
- Torre Polizzi
- Johnny Roche
- Jaclyn Schneider
- Shelby Shapiro
- Sarah Wickman
- Jana Litt

HSU Colleagues

- Brian Tissot
- Tim Mulligan
- Anthony Desch

Funders & Partners

- California Ocean Protection Council
- Ocean Science Trust & MPA Monitoring Enterprise
- California Department of Wildlife
- California Sea Grant



Kevin Hinterman

Ascelichthys rhodorus

Summary values by site

Site	Species	Families	Fish/pool
North			
Point St. George	13	4	29.9
False Klamath	14	4	24.7
Palmer's Point	20	5	39.2
South			
Ten Mile	16	5	8.8
MacKerricher	14	4	9.1
Fort Bragg	20	8	30.9
Belinda Point	22	8	15.6

Species List

Stichaeidae

Anoplarchus purpurescens

Cebidichthys violaceus

Phytichthys chirus

Xiphister atropurpureus

Xiphister mucosus

Pholidae

Apodichthys flavidus

Apodichthys fucorum

Gobiesocidae

Gobiesox maeandricus

Clinidae

Gibbonsia metzi

Gibbonsia montereyensis

Cottidae

Artedius corallinus

Artedius fenestralis

Artedius harringtoni

Artedius lateralis

Ascelichthys rhodorus

Clinocottus acuticeps

Clinocottus analis

Clinocottus embryum

Clinocottus globiceps

Clinocottus recalvus

Enophrys bison

Hemilepidotus hemilepidotus

Hemilepidotus spinosus

Oligocottus maculosus

Oligocottus rimensis

Oligocottus rubellio

Oligocottus snyderi

Scorpaenichthys marmoratus

Hexagrammidae

Hexagrammos decagrammus

Hexagrammos lagocephalus

Liparidae

Liparis florae

Scorpaenidae

Sebastes carnatus

Sebastes melanops

Sebastes miniatus