



Monitoring of Nearshore Fishes Within and Adjacent to California Marine Protected Areas: CA Collaborative Fisheries Program

Rick Starr¹, Dean Wendt², and Noëlle Yochum^{1*}

1: Moss Landing Marine Laboratories/ CA Sea Grant

2: San Luis Obispo Science and Ecosystem Alliance (Cal Poly)

Monterey Bay National Marine Sanctuary Advisory Council Meeting
12 December 2008



Captains



- Allen Chin (F/V *Tigerfish*)
- Roger Cullen (F/V *Dorado*)
- Tom Haffer (F/V *Kathyrn H*)
- Bob Ingles (F/V *Queen of Hearts*)
- Joe Kucera (F/V *Patriot*)
- Brad Leagues (F/V *Princess*)
- Michele Leary (F/V *Rita G*)
- David Lemon (F/V *Caroline*)
- Tom Mattusch (F/V *Huli Cat*)
- Giovanni Nevoloso (F/V *Gabbiano*)
- Mike Ricketts (F/V *Sea Hawk*)
- Sal Rocha (F/V *Pacific Horizon*)
- John Rowley (F/V *Fiesta*)
- Dustin Selck (F/V *Pacific Horizon*)
- Charlie (F/V *Admiral*)

The Starr Lab at MLML



Photo by Rick Starr



Photo by Dave Lemon



Photo by Rick Starr

- CA Collaborative Fisheries Research Program (Commercial and Recreational)
- Resource Management: Managing Data-Poor Fisheries
- Delta Submersible Surveys of Fishes and Invertebrates
- Assessment of Nearshore Fishes in Duxbury Reef
- Fish Movement (External Tagging): Duxbury Reef
- Survey Methodology Comparisons
- CPUE of Nearshore Fishes in Carmel Bay
- Fish Movement (Acoustic Tagging):
 - Blue and Black Rockfish (Carmel Bay)
 - Groupers (Spain and Belize)
 - Leopard and Prickly Sharks (Monterey Bay)
 - Lingcod (Carmel Bay)

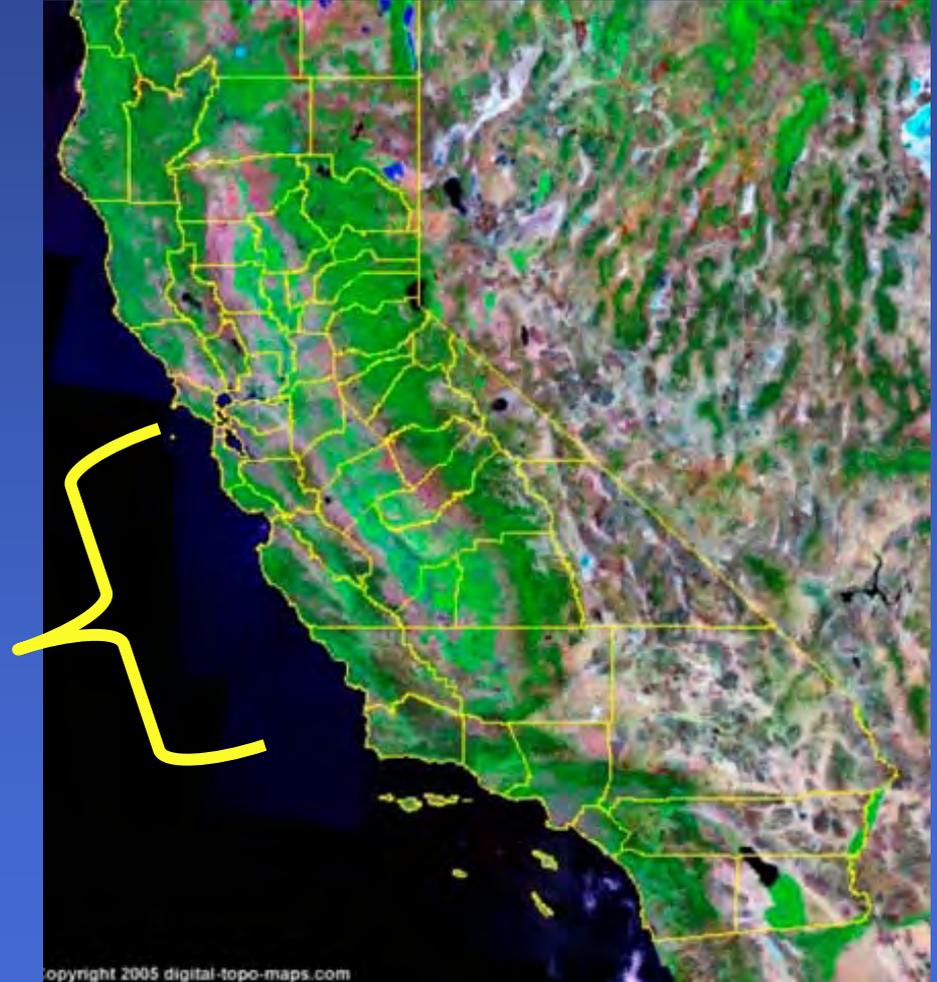


Rick Starr, Dean Wendt

CA Collaborative Fisheries Research Program



- Improve Resource Management:
 - Collaborative Research
 - Involve Local Communities



Collaborative Fisheries Approach



- PEW Oceans Commission, US Commission on Ocean Policy
- Utilize the extensive expertise of fishermen
- Makes fishermen part of the information solution
- Generate useful and needed data for DFG and NOAA
- Traditional fishing gear samples certain habitats and species better than other methodologies
- Tremendous outreach potential to diffuse historic tensions



Baseline Studies



- 5 Peer-reviewed Projects Funded for Baseline Surveys of Central CA MPAs
 - Collaborative Fishing
 - Intertidal
 - SCUBA
 - Submersible
 - Socio-economic



CA Collaborative Fisheries Research Program



- Objectives of the Baseline Surveys:
 - Generate baseline comparisons between MPA and reference sites
 - Develop rigorous scientific monitoring protocols
 - Engage the fishing community in MPA monitoring
 - Create a sampling design that can be used to collect data for stock assessments



CA Collaborative Fisheries Research Program



Recreational Rod and Reel 2007 and 2008



- Año Nuevo SMR
- Point Lobos SMR
- Piedras Blancas SMR (2008 only)
- Point Buchon SMR

Commercial Trapping 2008



- Año Nuevo SMR
- Point Lobos SMR
- Piedras Blancas SMR
- Cambria SMCA



DO NOT USE FOR NAVIGATIONAL PURPOSES

4/19/2007

SMCA = state marine conservation area SMP = state marine park
 SMR = state marine reserve SMRMA = state marine recreational management area





Project Development



- Commercial and Recreational Fishermen
- CA DFG
- NMFS
- NGOs
- Academic Scientists

CA Collaborative Fisheries Research Program



Recreational Rod and Reel 2007 and 2008



Photo by Noëlle Yochum

- Año Nuevo SMR
- Point Lobos SMR
- Piedras Blancas SMR (2008 only)
- Point Buchon SMR

Commercial Trapping 2008



Photo by Tom Mattusch

- Año Nuevo SMR
- Point Lobos SMR
- Piedras Blancas SMR
- Cambria SMCA

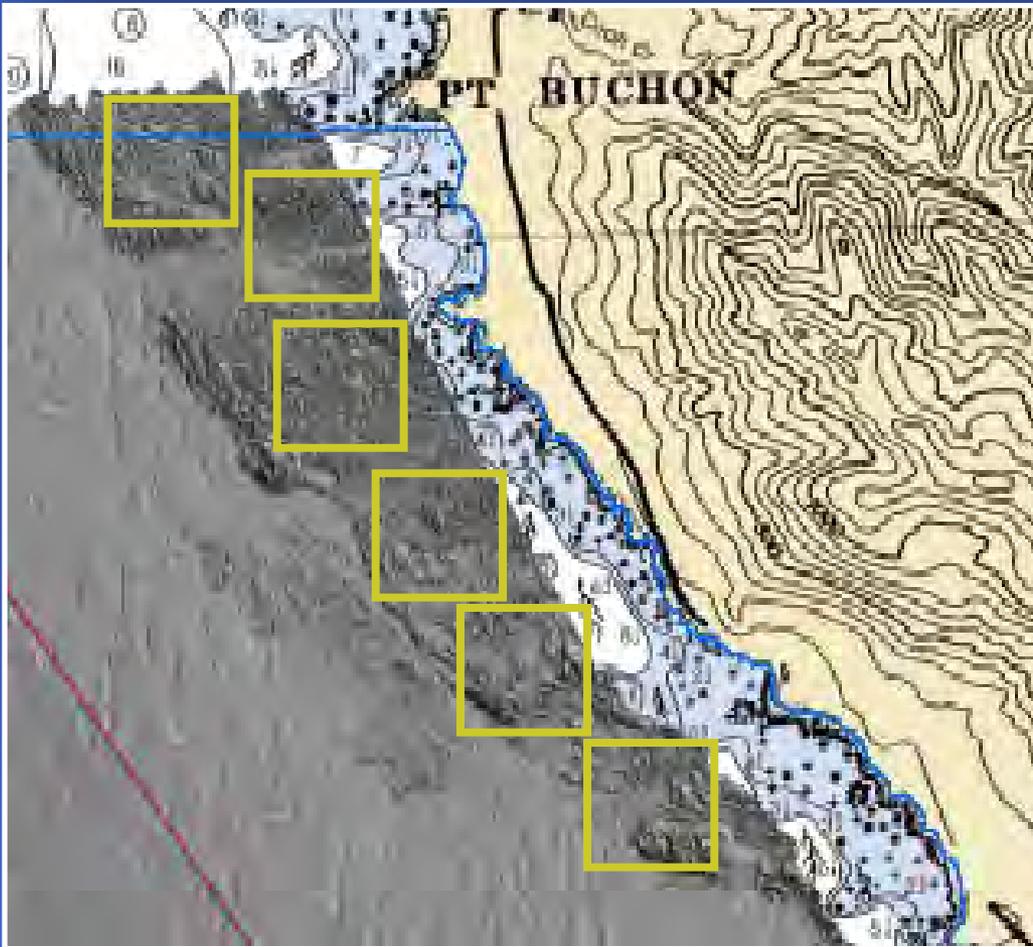


CA Collaborative Fisheries Research Program: Sampling



- MLML (North), Cal Poly (South)
- 2007: August, September, October
- 2008: July, August, September
- 4 Days/ Month (each MPA)
 - 2 in the MPA
 - 2 in the corresponding reference site

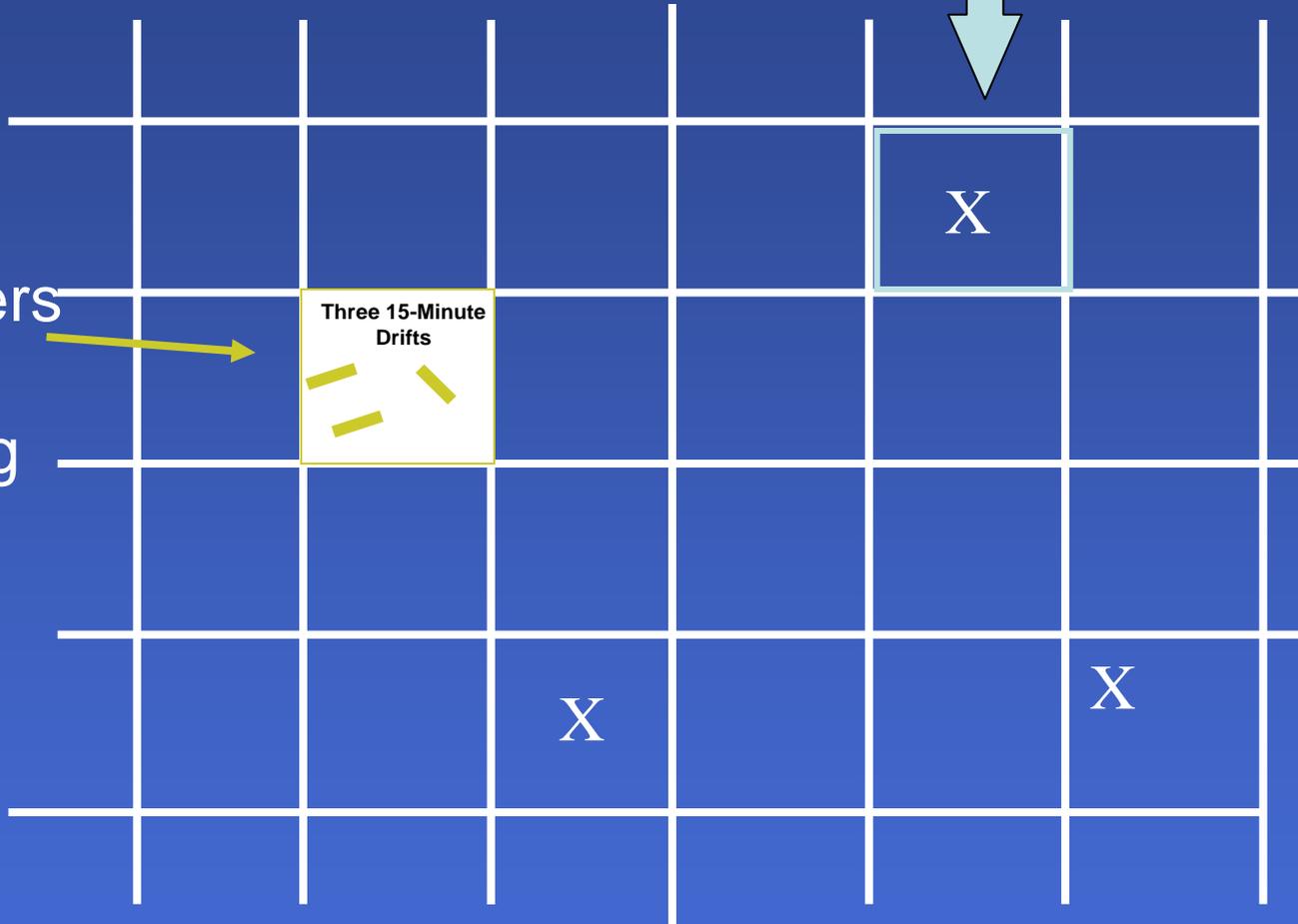
CA Collaborative Fisheries Research Program: Rec. Grid Cells



- < 40 m
- CSUMB Seafloor Mapping
- Fishermen Knowledge
- 4 Grid Cells/ Day



Randomly Select Grid Cells



Skippers
Select
Fishing
Sites

Three 15-Minute
Drifts

X

X

X



Standardized Fishing



Photo by Noëlle Yochum

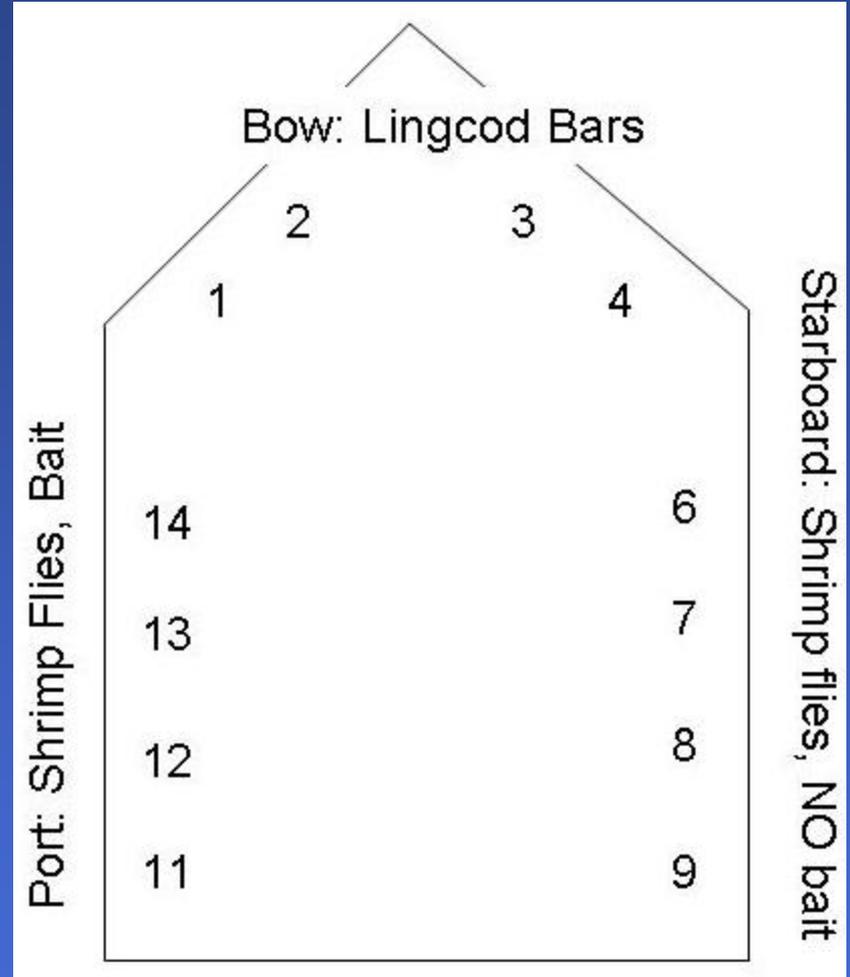


Photo by Robin Robinson



Photo by Robin Robinson



Rec. Protocols



Photo by Rick Starr



Photo by Noëlle Yochum



Photo by Noëlle Yochum



Rec. Protocols: Tagging



Photo by Noëlle Yochum



Photo by Noëlle Yochum



Photo by Robin Robinson



Photo by Rick Starr

Rec. Protocols: Release



Photo by Rick Starr

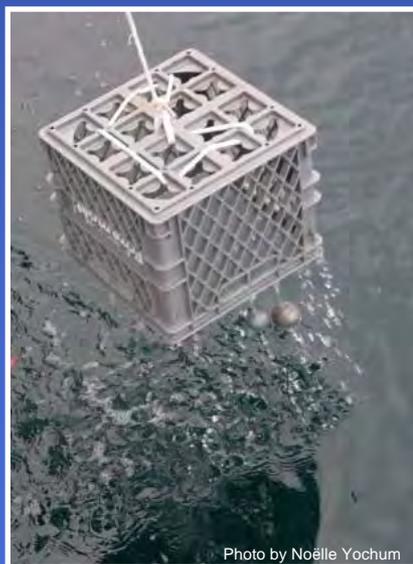


Photo by Noëlle Yochum



Photo by Noëlle Yochum



Outreach and Review



Collaborative Research Project: October 2007 Update

THANK YOU TO OUR VOLUNTEER ANGLERS!!

October marks the end of the 2007 field season for the collaborative research study being conducted by the UC Cooperative Extension Sea Grant Program at Moss Landing Marine Laboratories and California Polytechnic State University, San Luis Obispo. During the months of August, September and October we have been working with Commercial Passenger Fishing Vessels and recreational anglers to catch and tag fishes out of Monterey, Morro Bay, Pillar Point and San Luis Harbors. The aim of this project is to collect baseline information about the Point Buchon, Point Lobos, and Año Nuevo Marine Protected Areas (MPAs). Our volunteers caught a total of 3,668 fishes in August, 2,574 fishes in September and 1,760 fishes in October (all three areas combined).

Over the past three months we have met and exceeded the sampling objectives thanks to the commitment and expertise of our volunteer anglers and the captains and deckhands of the *FV Carolina, Fiesta, Hull Cat, Pacific Horizon* and *Patriot*. Of our volunteers, we had several who came out multiple times: Jeremy Harkins, Ido Nienhuis, and Jim and Bonnie Roberson: 5 times; Nancy and Gary Aubuchon, Jim Dull, and Jim Webb: 6 times; Mike Blackstone: 7 times; Darrell Bunsse: 8 times; David Reins: 12 times; David Kammerer: 15 times. Thank you for your continued support of this project!

Please check our websites for more information and to follow the progress of this study:

www.slosea.org/collaborative and <http://seagrant.mlmf.calstate.edu/crpmamonitor.php>

Below is a summary of our fishing trips (Note that the number of volunteers does not equate to the number of people fishing. Also, the duration of fishing varied per day.).

Date **No. Volunteers** **No. Fishes Caught**

Año Nuevo (AN)

10/08	6	106
10/09	5	64
10/11	8	51
10/12	16	7

Total Fishes Caught in October: 228
in September: 256
in August: 866

Point Lobos (PL)

10/22	10	277
10/23	12	96
10/24	14	356
10/25	12	111

Total Fishes Caught in October: 840
in September: 1631
in August: 1794

Point Buchon (PB)

10/15	10	181
10/16	12	138
10/23	10	134
10/24	10	239

Total Fishes Caught in October: 692
in September: 787
in August: 1008

Fishes caught in October: Black, Black-and-Yellow, Blue, Canary, China, Copper, Flag, Gopher, Grass, Kelp, Olive, Rosy, Starry, Treefish, Vermilion, and Yellowtail rockfishes, Cabezon, Kelp and Rock Greenling, Lingcod, Ocean Whitefish, Rock Sole, Sanddab and Sardines.

Biggest lingcod caught:

In August:	86 cm (34 in)	David Reins (PL)
	87 cm (34 in)	Nick Koozmin (AN)
In September:	81 cm (32 in)	Matt Michie (PL)
In October:	81 cm (32 in)	Wayne Macon (PL)



Workshops:

- In Half Moon Bay
- In Moss Landing
- In Morro Bay

Attendees:

- Fishermen
- CA DFG and NMFS
- NGOs
- Academic Scientists

Objectives:

- Get Feedback
- Review and Improve Protocols
- Discuss Use of Data in Stock Assessments



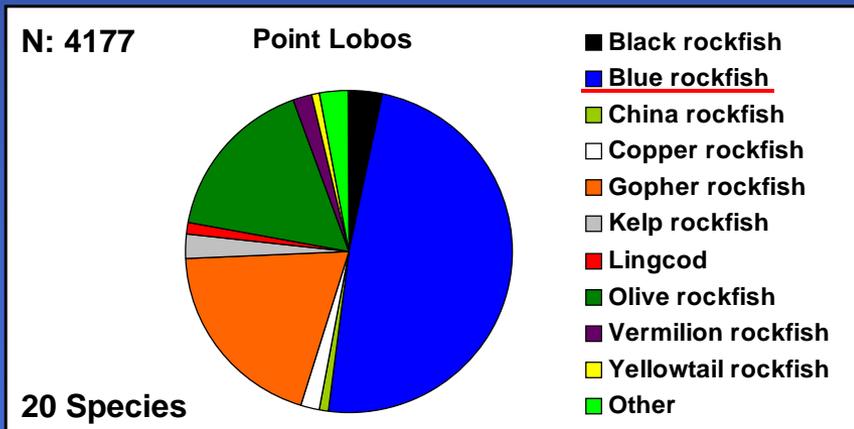
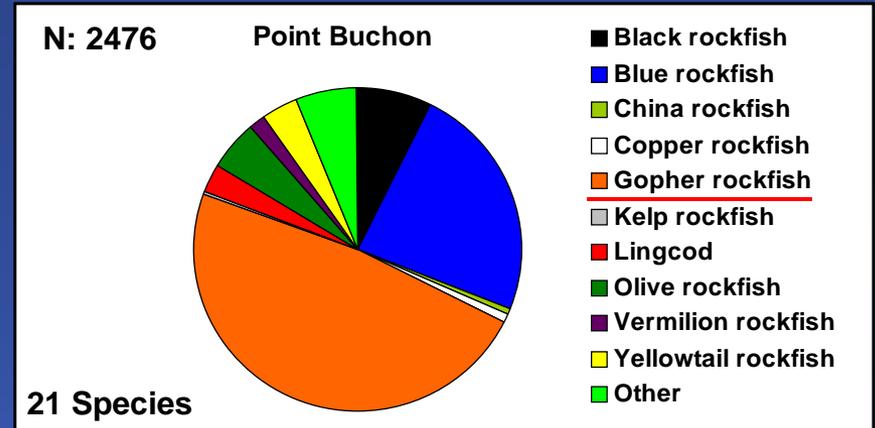
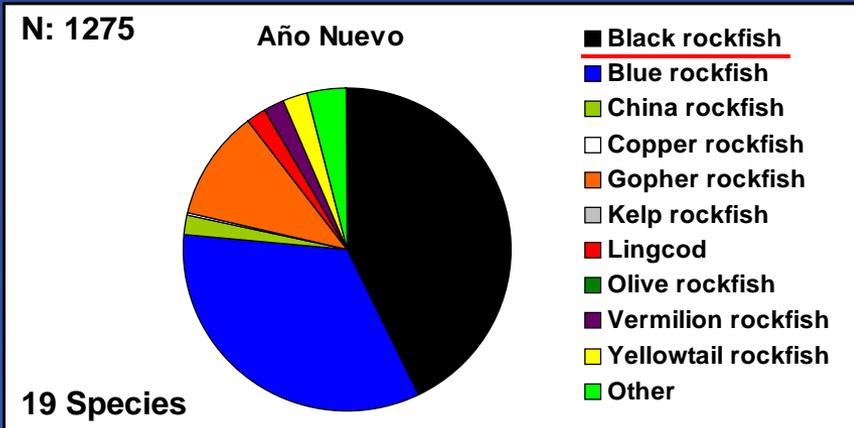
Rec. 2007 Results: Overview



- 34 Days of Sampling
- 96 Hours of Fishing
- 174 Discrete Anglers
- 366 Volunteer Days
- 57 of 62 Grid Cells
Sampled
- 5 CPFVs
- 5 Captains
- 7,928 Fishes Caught
- 27 Fish Species Caught
(10 Genera)
- 97% Rockfishes
(*Sebastes spp.*)



Rec. Results: Species Comp.



• All Areas Combined:

- Blue Rockfish 38%
- Gopher Rockfish 27%
- Black Rockfish 11%
- Olive Rockfish 10%

Ten most frequently caught species are those species that were greater than or equal to 1.5% of the total catch in any area: 96% of total catch



Rockfishes (*Sebastes spp.*) Caught



- Sedentary Bottom Dwellers < 200 ft
- Structure Association

Photo by Linda Snook



Gopher Rockfish

Photo by Noëlle Yochum



Black-and-Yellow

Photo by Noëlle Yochum



Brown Rockfish

Photo by Tom Laidig



China Rockfish



Photo by Noëlle Yochum



Rockfishes (*Sebastes spp.*) Caught



- Sedentary Bottom Dwellers < 500 ft
- Structure Association





Rockfishes (*Sebastes spp.*) Caught



- Kelp Forest Associated





Rockfishes (*Sebastes spp.*) Caught



- Semi-Pelagics

Canary Rockfish

Photo by Rick Starr



Olive Rockfish

Photo by Rick Starr



Yellowtail Rockfish

Photo by Rick Starr



Blue Rockfish

Photo by Rick Starr



Black Rockfish

Photo by Noëlle Yochum





Other Caught Fishes

- Mobile Predators

Kelp Greenling (*Hexagrammos decagrammus*)



Lingcod (*Ophiodon elongatus*)





Other Caught Fishes



Sea Perch: Reefs and Kelp Beds

Photo by Noëlle Yochum



Photo by Noëlle Yochum



Cabezon (*Scorpaenichthys marmoratus*): Sedentary Bottom Dwellers, Kelp Beds

Photo by Noëlle Yochum



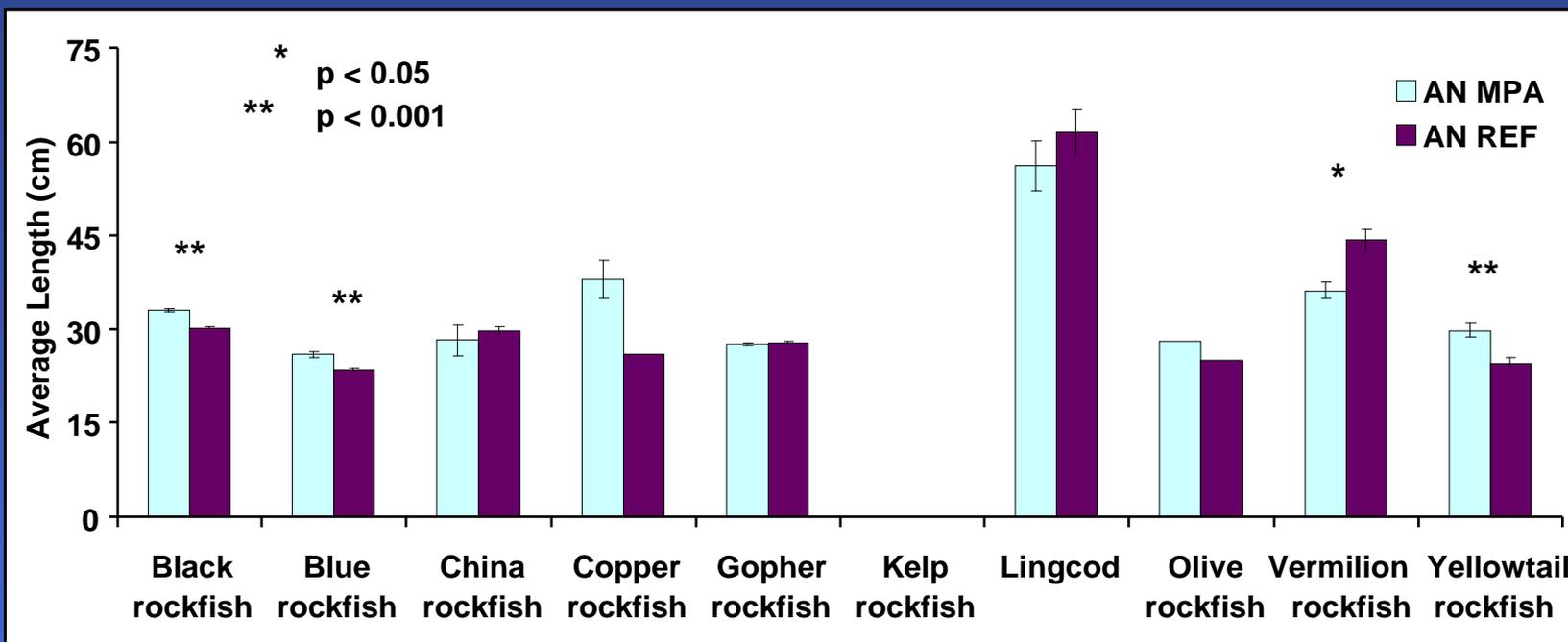
Photo by Noëlle Yochum

Photo by Noëlle Yochum

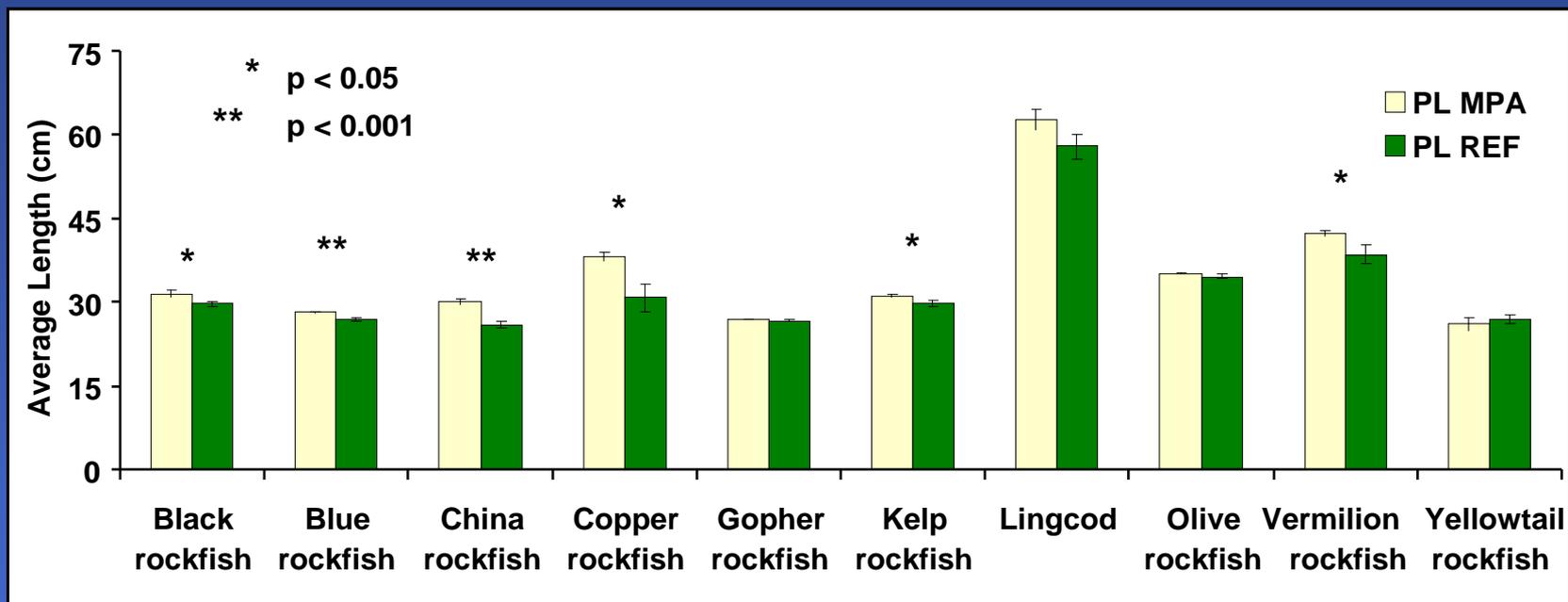


Photo by Noëlle Yochum

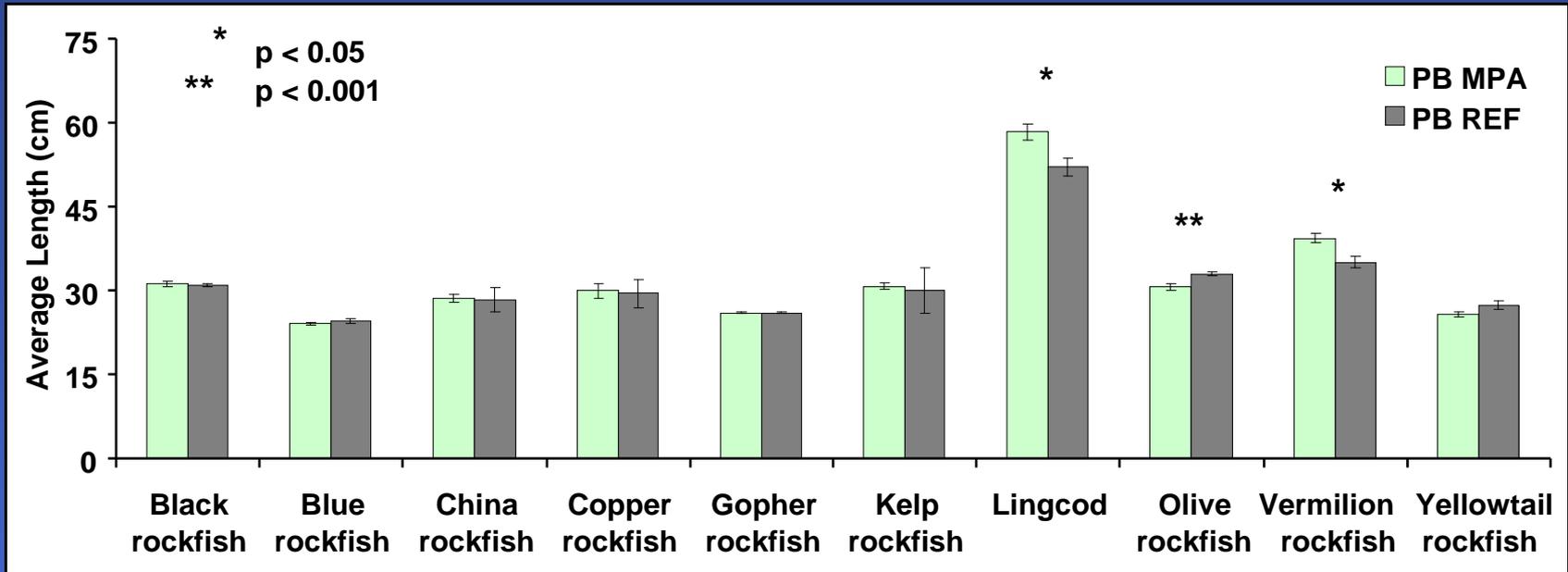
Rec. Results: Avg. Length



Rec. Results: Avg. Length

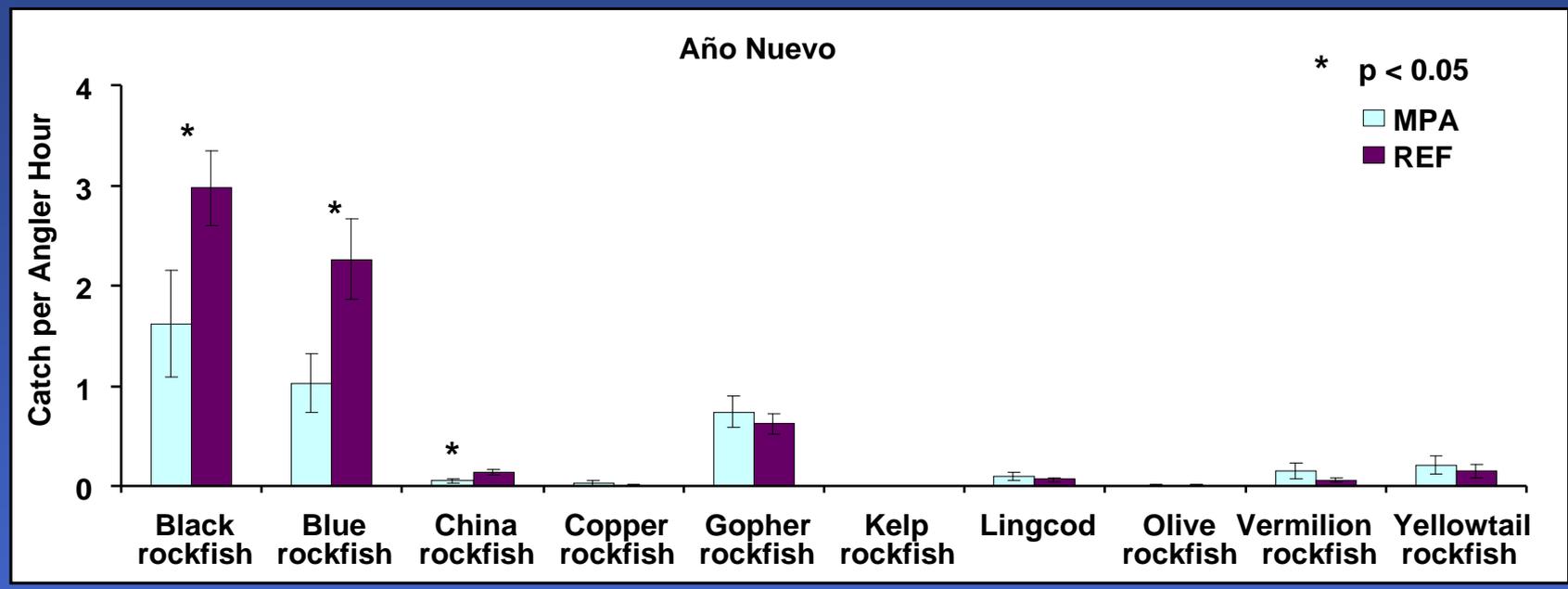


Rec. Results: Avg. Length



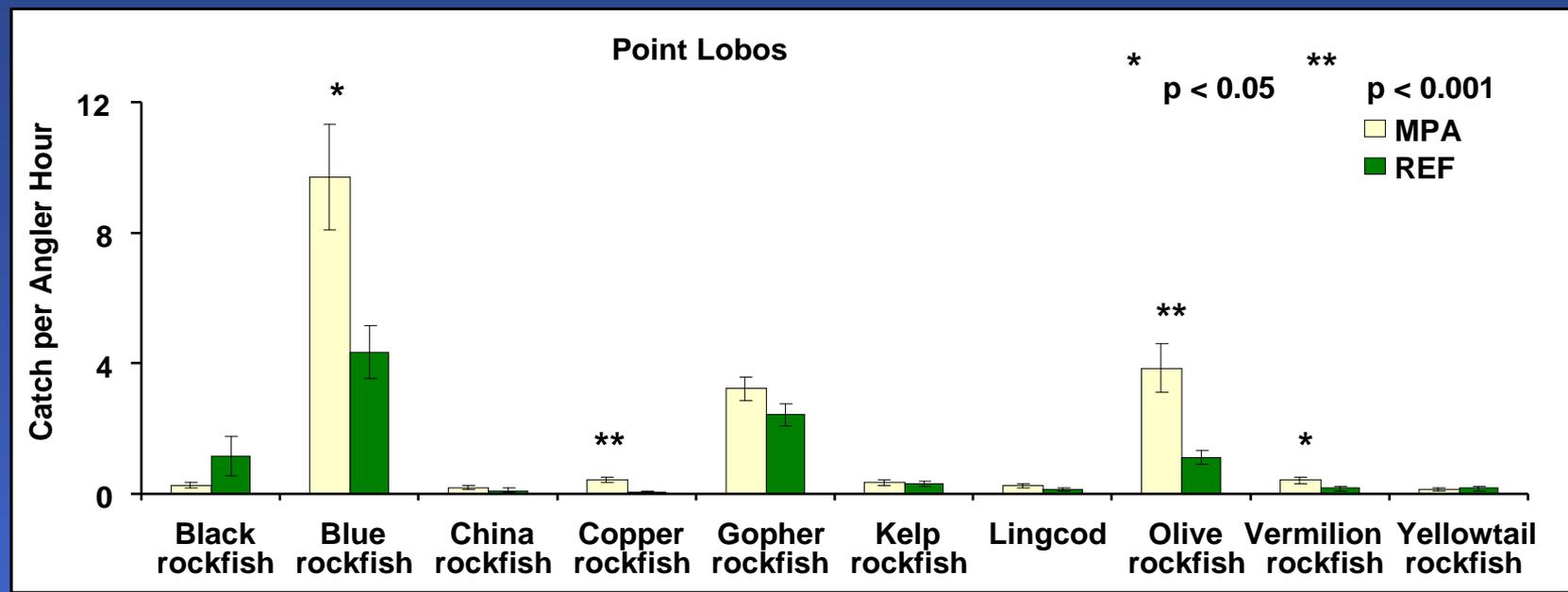


Rec. Results: CPUE



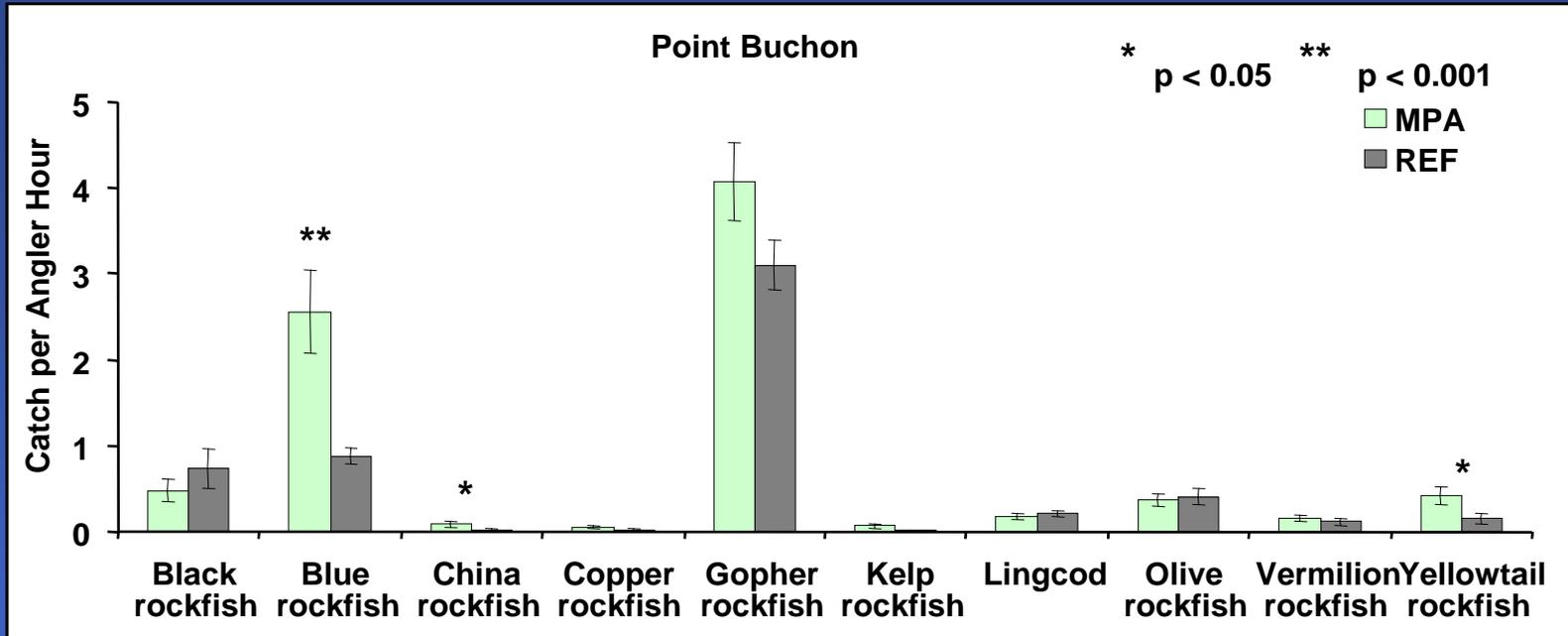


Rec. Results: CPUE





Rec. Results: CPUE





Rec. Results: Final Report



http://www.slosea.org/collaborative/CCFRP_2007_Final_Report.pdf

Project Websites:

<http://seagrant.mlml.calstate.edu/crmpamonitor.php>

<http://www.slosea.org/collaborative/>

Tag Returns



Reward For Returned Fish Tags



Rick Starr of the UC Cooperative Extension Sea Grant Program and Dean Wendt of California Polytechnic State University, San Luis Obispo have been working with commercial fishermen, Commercial Passenger Fishing Vessel captains, and recreational anglers to catch and tag fish out of Port San Luis and Morro Bay, Monterey, and Pillar Point Harbors. The purpose of this collaborative research is to collect baseline and monitoring information about the Piedras Blancas, Cambria, Point Buchon, Point Lobos, and Año Nuevo Marine Protected Areas.

If you catch a tagged fish, please record the species and/or description of the fish, total length (snout to the longest tip of the tail), tag number, date caught, latitude and longitude and depth where the fish was caught, and call, email, or mail the information to:

Noëlle Yochum
Moss Landing Marine Labs
8272 Moss Landing Road
Moss Landing, CA 95039
831.771.4479
nyochum@mml.calstate.edu

Leslie Longabach
Biological Sciences Department
California Polytechnic State University
San Luis Obispo, CA 93407
805.756.2950
llongaba@calpoly.edu

For more information about this study go to:
<http://seagrant.mml.calstate.edu/cmpanmonitor.php> and <http://www.siosea.org/collaborative/>

Please report the information even if you decide to release the fish!

Thank you for your help!

August 2008





2008 Rec. Study



- Preliminary Results:

- 4 MPAs
- 48 Sampling Days
- 473 Volunteer Days
- 10 CPFVs
- 9,917 Fishes Caught

- Species Composition:

- Same as 2007, except the following fishes were also caught:
 - Bocaccio and chilipepper RF
 - Sea perch
 - Smelt
 - Pacific bonito
 - Painted greenling



CA Collaborative Fisheries Research Program



Recreational Rod and Reel 2007 and 2008



Photo by Noëlle Yochum

- Año Nuevo SMR
- Point Lobos SMR
- Piedras Blancas SMR (2008 only)
- Point Buchon SMR

Commercial Trapping 2008



Photo by Tom Mattusch

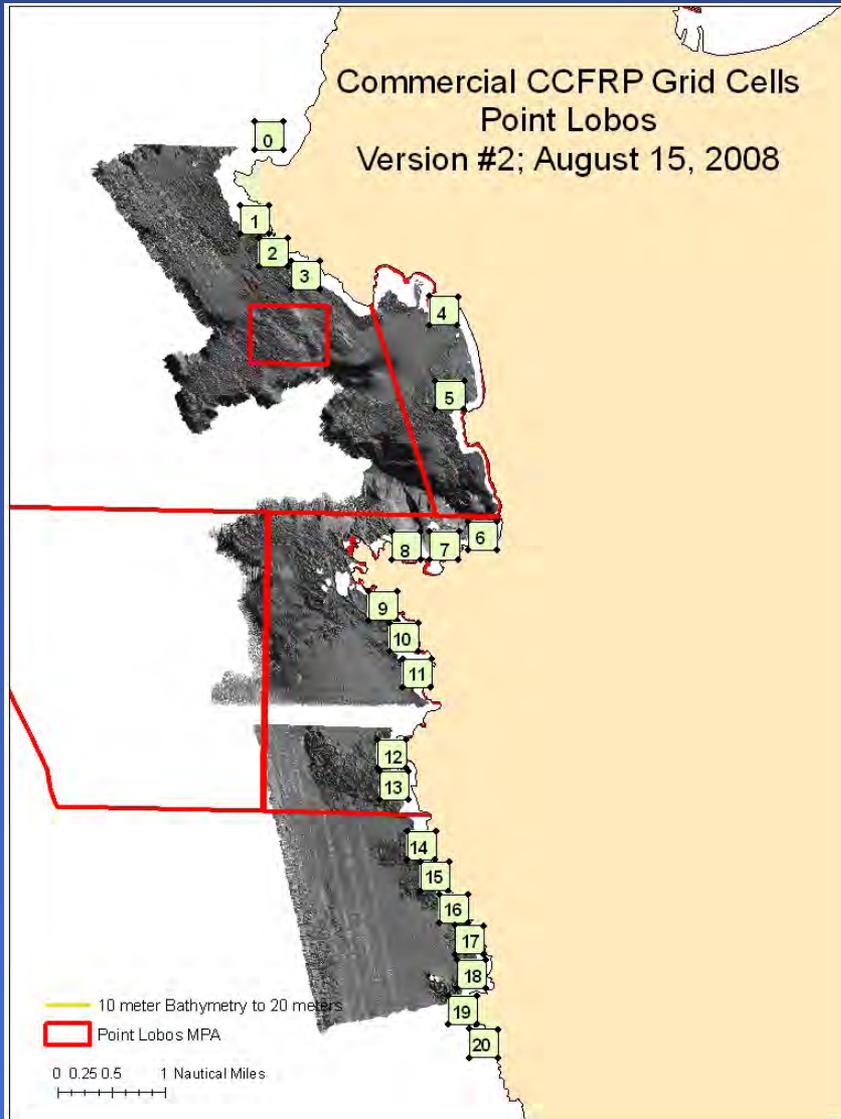
- Año Nuevo SMR
- Point Lobos SMR
- Piedras Blancas SMR
- Cambria SMCA

CA Collaborative Fisheries Research Program: Sampling



- MLML (North), Cal Poly (South)
- 2008: July, August, September (November)
 - 2 days/ month in the MPA
 - 2 days/ month in the corresponding reference site

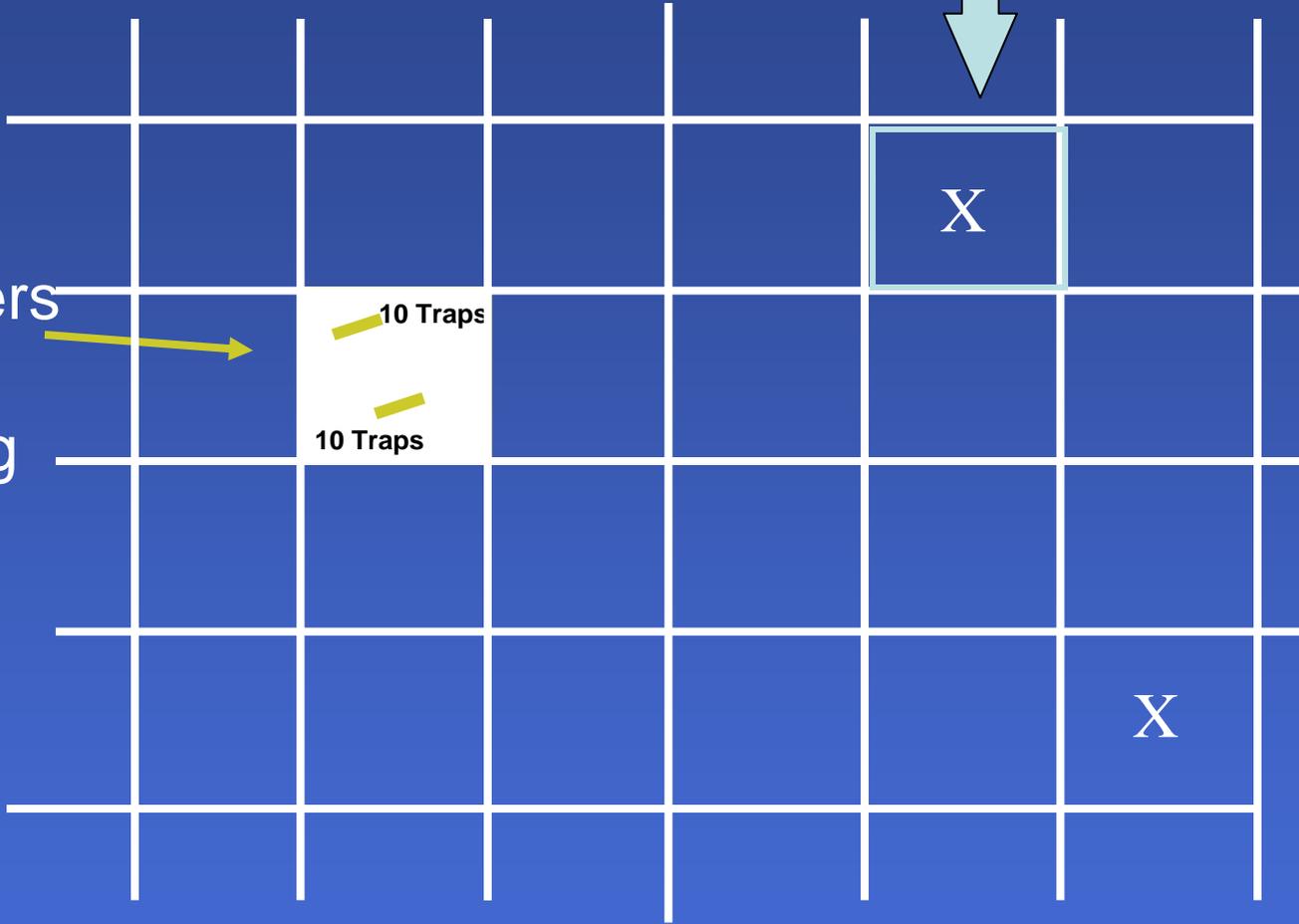
CA Collaborative Fisheries Research Program: Comm. Grid Cells



- < 20 m
- CSUMB Seafloor Mapping
- Fishermen Knowledge
- 2-3 Grid Cells/ Day



Randomly Select Grid Cells



Skippers
Select
Fishing
Sites

10 Traps
10 Traps

X

X



Commercial Protocols



10 Traps per Set



Photo by Noëlle Yochum

One Pint of Squid



Photo by Noëlle Yochum



Photo by Noëlle Yochum



Commercial Protocols



Photo by Noëlle Yochum



Photo by Tom Mattusch



Comm. Preliminary Results



We worked:

- With 6 commercial captains
- Aboard 5 fishing vessels
- In 4 MPAs and corresponding reference sites
- Overall Totals:
 - Fishes: 2,609
 - Invertebrates: 2,937

Species Composition:

Fishes:

Rockfishes: Black-and-Yellow, Blue, Brown, China, Copper, Gopher, Grass, Kelp, Treefish, Vermilion

Other: Cabezon, Kelp Greenling, Lingcod, Rainbow Sea perch, Striped Seaperch, Wolf Eel



Photo by Noëlle Yochum

Comm. Preliminary Results



Species Composition:

Invertebrates:

Crabs: Brown Rock, Cryptic Kelp, Dungeness, Northern Kelp, Red Rock, Slender, Sharpnose





Comm. Preliminary Results



Species Composition:

Invertebrates:

Sea Stars: Blood, Bat,
Giant Pink, Giant Spined,
Leather, Short Spined,
Sunflower

Other: Snails, Whelk,
Urchin



Leather Star



Giant Pink Star



Sunflower Star



Giant Spined Star



Bat Star



CCFRP



Work Accomplished: 2007 and 2008

- Developed rigorous scientific monitoring protocols that are capable of detecting statistically significant differences between the MPA and reference sites
- Engaged the fishing community in MPA monitoring
- Generated baseline comparisons between MPA and reference sites
- Created a sampling design that can be used to collect data for stock assessments

Acknowledgements



- Science Crew: Daniel Adams, Cassandra Brooks, Jahnava Duryea, Kristen Green, Ashley Greenley, Eden Gonzalez, Owen Hackleman, Nate Hall, Kristin Hunter-Thomson, Dave Kammerer, Leslie Longabach, Erin Loury, Cathryn Lucas, Erin Nakada, David Nishijima, Dave Rasmussen, Kristen Sanchez, Katie Schmidt, and Grant Waltz

- Deckhands: Evan Beckett, Matt Breneman, Gary Christensen, James Crissman, Tom Foss, Frank Galibay, Lucas Haffer, Nick Kilday, Joe Kucera, Mike Lane, David Lapchuk, Joe Lousou, Sam Majilla, Andrea Mizera, Jessica Rhodes, Joe Saputo, Larry Schumacher, Darren Seiji, and Bryan Smith

- CA Department of Fish and Game
- NMFS
- Our Volunteer Anglers

- Funding Provided By:

- The Ocean Protection Council
- The Resource Legacy Fund Foundation
- CA Department of Fish and Game
- CA Sea Grant College Program



Photo by Noëlle Yochum