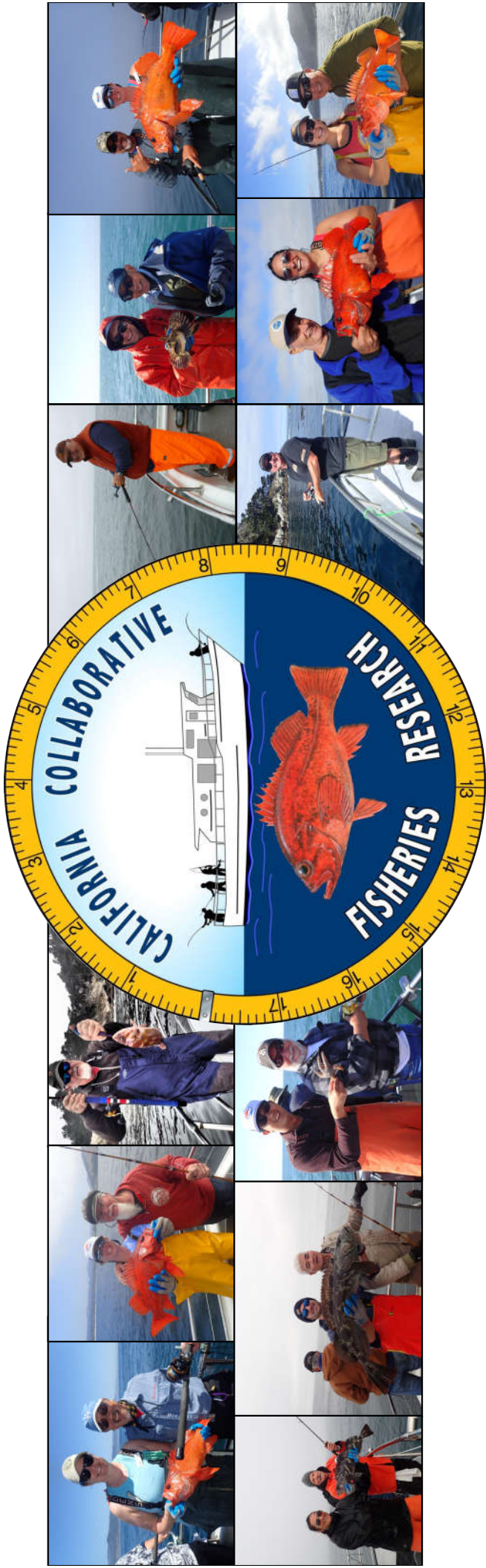
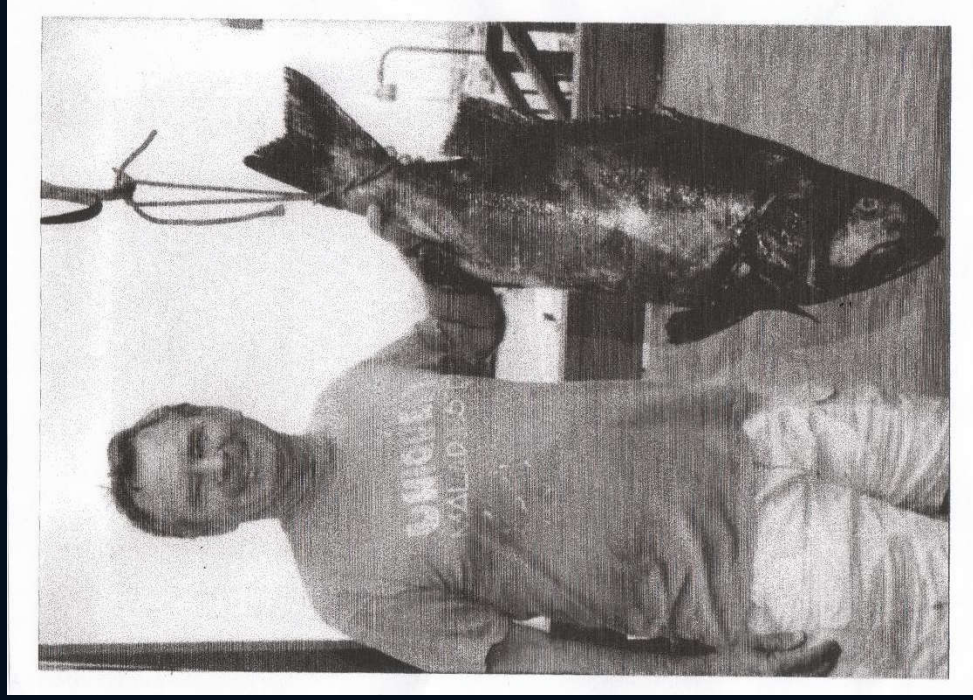


Volunteer Appreciation Event & Data Workshop



Moss Landing Marine Labs
March 20th, 2021

Remembering Robert "Hap" Gladstone





Outline

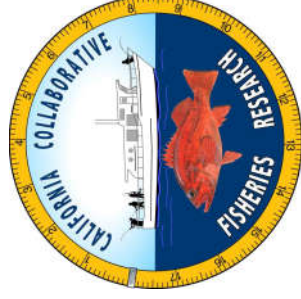
1. Program Background
2. MLML and Statewide Updates
3. General Trends in MPA Performance
4. Tag-Recapture Highlights
5. 2022 MPA Management Review
6. Angler Metrics
7. 2021 CDFW Regulations

California Collaborative Fisheries Research Program (CCFRP)

- Fishery-independent (catch- and-release) study that combines the expertise and ideas of:
 - Fishing community
 - Academia
 - Resources managers



Rick Starr



Dean Wendt

- Conduct scientifically rigorous data collection and analyses for MPA monitoring and fisheries management



Marine Science Institute
University of California, Santa Barbara

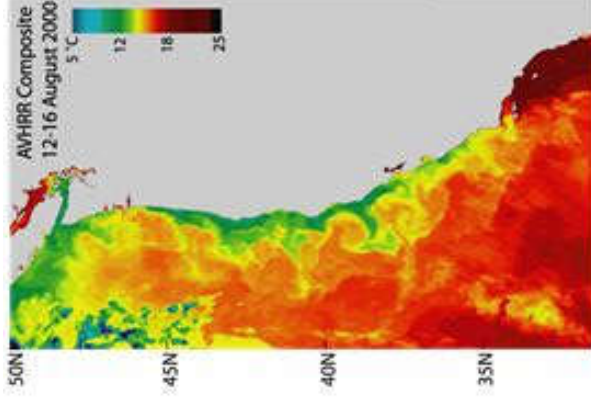
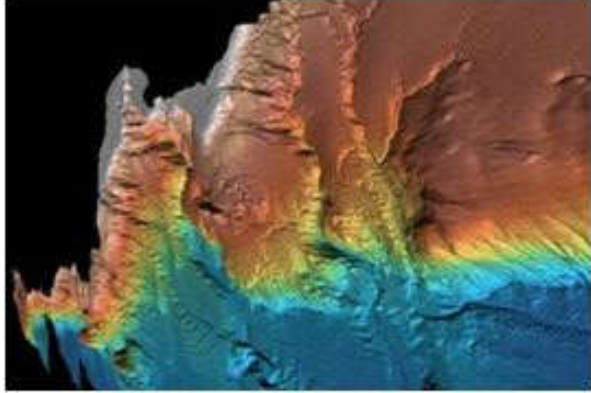


Family Owned Since 1939



Marine Life Protection Act (MLPA)

- Passed in 1999
- Mandated the creation of a network of marine protected areas (MPAs) to protect diversity and ecosystem function



<http://www.dfg.ca.gov/mlpa/>

Marine Protected Area (MPA) vs. Reference Site (REF)

- **State Marine Reserve (SMR)** – fully protected; all commercial and recreational harvest prohibited
- **State Marine Conservation Area (SMCA)** – limited recreational and/or commercial extraction permitted
- **State Marine Park (SMP)** – recreational harvest permitted
- **Reference Site (REF)** – areas open to both recreational and commercial fishing; subject to California Dept. of Fish and Wildlife (CDFW) rules and regulations (e.g., minimum/maximum sizes, seasonal closures, daily bag limits)



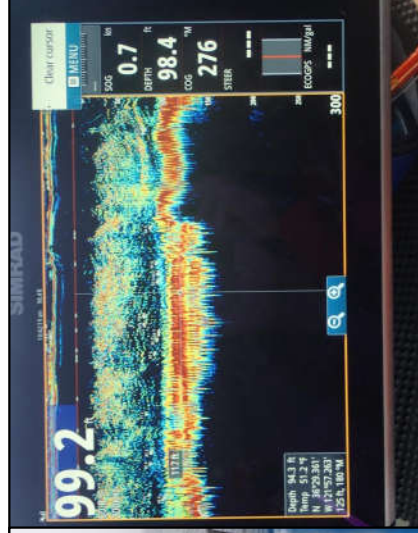
Why Monitor MPAs?

1. It is a priority adopted by regional stakeholders
2. It is required by MLPA (ensure MLPA goals are met)
3. Critical to enabling adaptive management

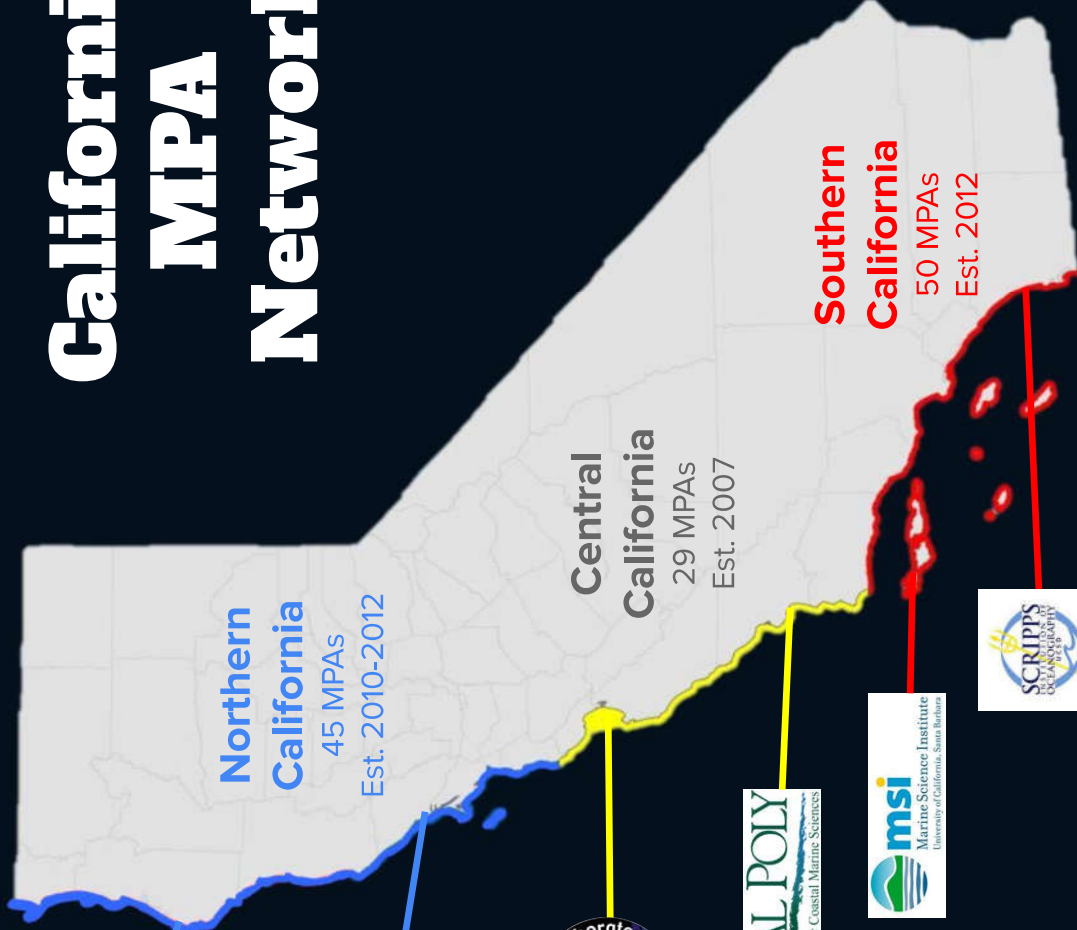


Benefits of Collaboration


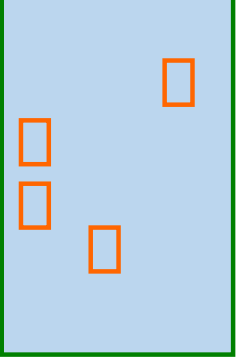
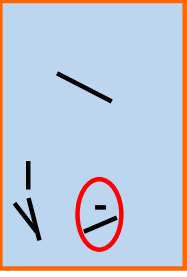

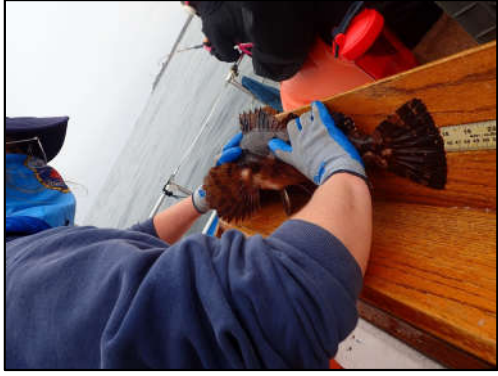
- Engage stakeholders in both science and management
- Utilize different areas of expertise to develop protocols and collect data
- Create a shared understanding of resources and facilitate communication among user groups
- Reduce costs associated with data collection
 - More information gathered for MPA monitoring and fisheries management



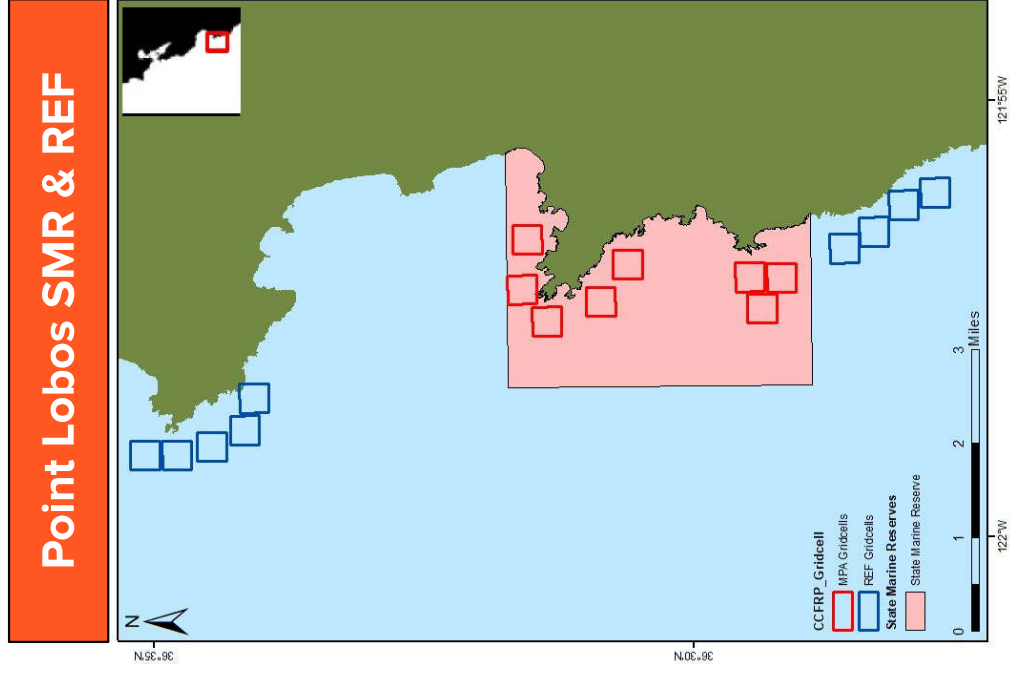
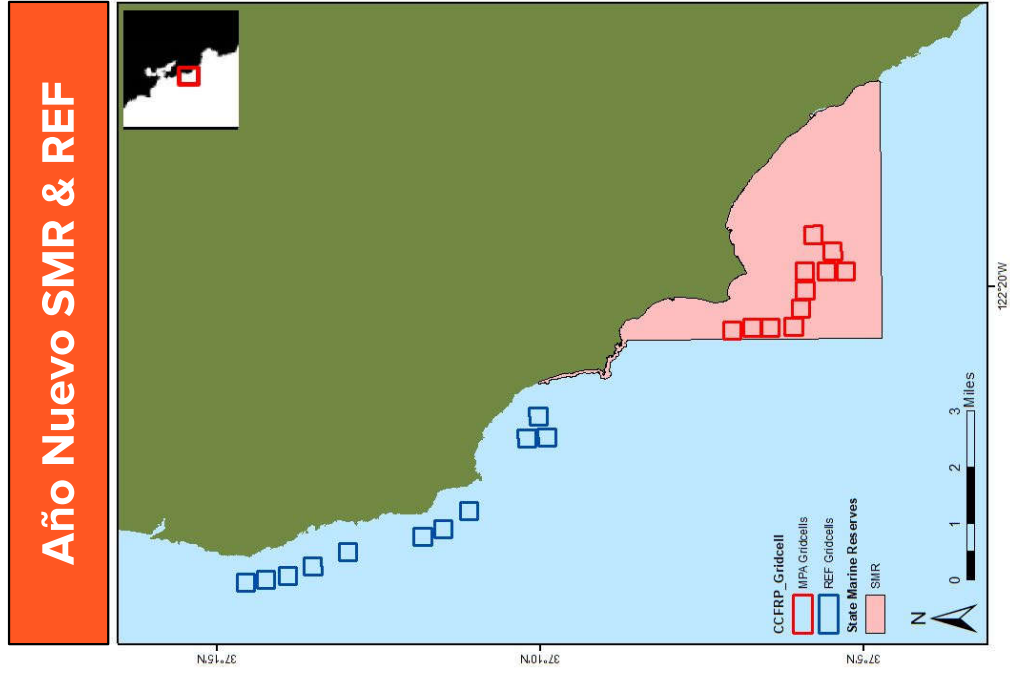
California MPA Network



Sampling Design

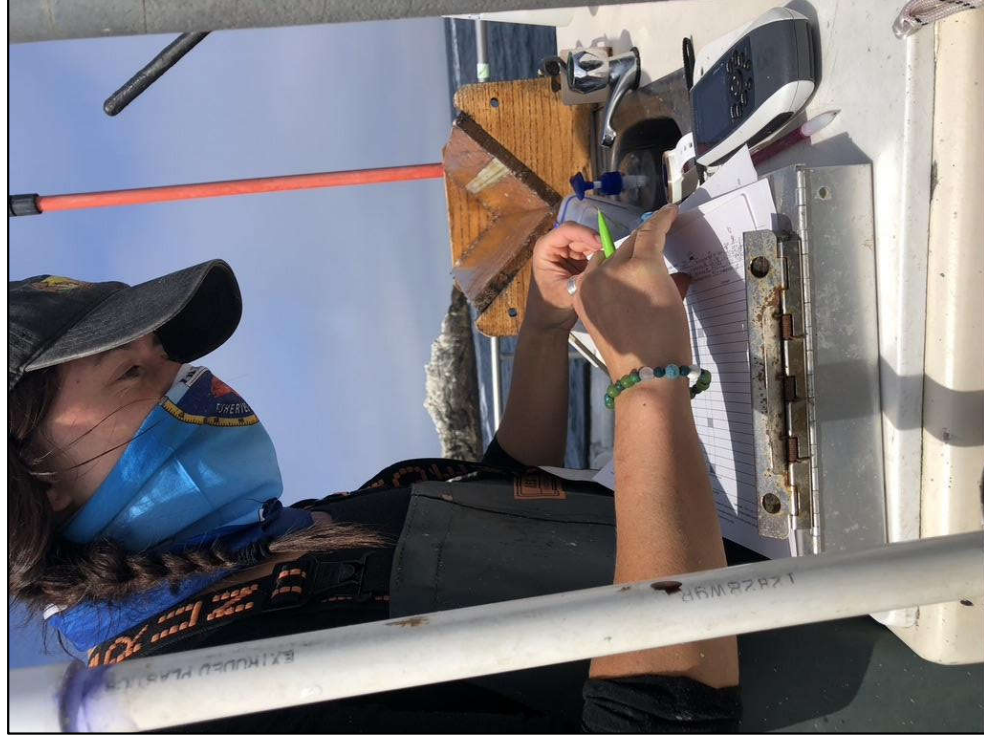
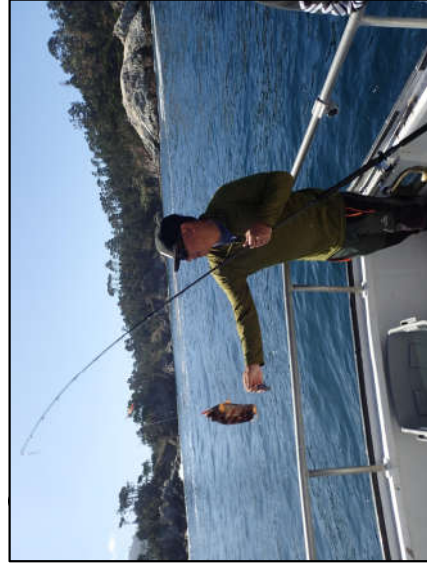
<p>Region</p>	<p>Area</p>	<p>Site</p>	<p>Grid Cell (x4)</p>	<p>Location (x3)</p>	
<p>North (MLML)</p>	<p>Año Nuevo SMR Point Lobos SMR</p>	<p>MPA REF</p>		<p>Drift (15 min / location)</p> 	
<p>Central CA</p>	<p>Piedras Blancas SMR Point Buchon SMR</p>				
<p>South (CaIPoly)</p>					

MILMI Study Areas:



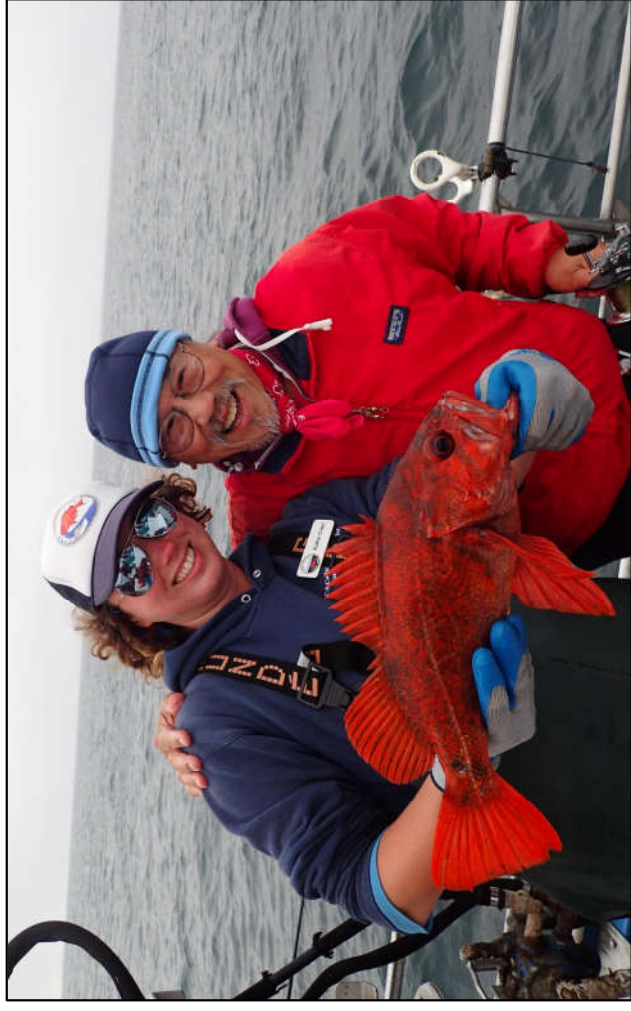
Data Collection During Fishing

- Angler number
- Start/stop times
- GPS coordinates
- Species
- Total length (cm)
- Fish condition
- Tag number



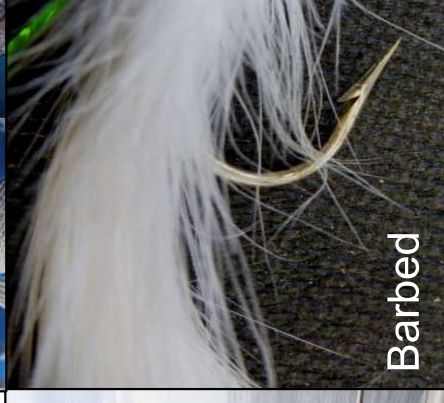
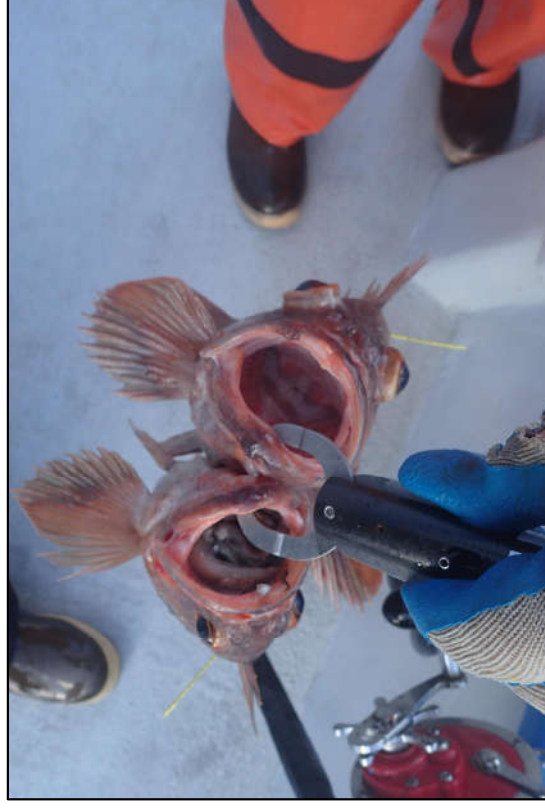
Rockfish are Diverse & Long-Lived!

- Approx. 70 species along the northeast Pacific
 - 100+ worldwide
- Nearshore - 2,830 m (9,285 ft)
- EX: Vermilion Rockfish - 60 years old (Love et al. 2002)



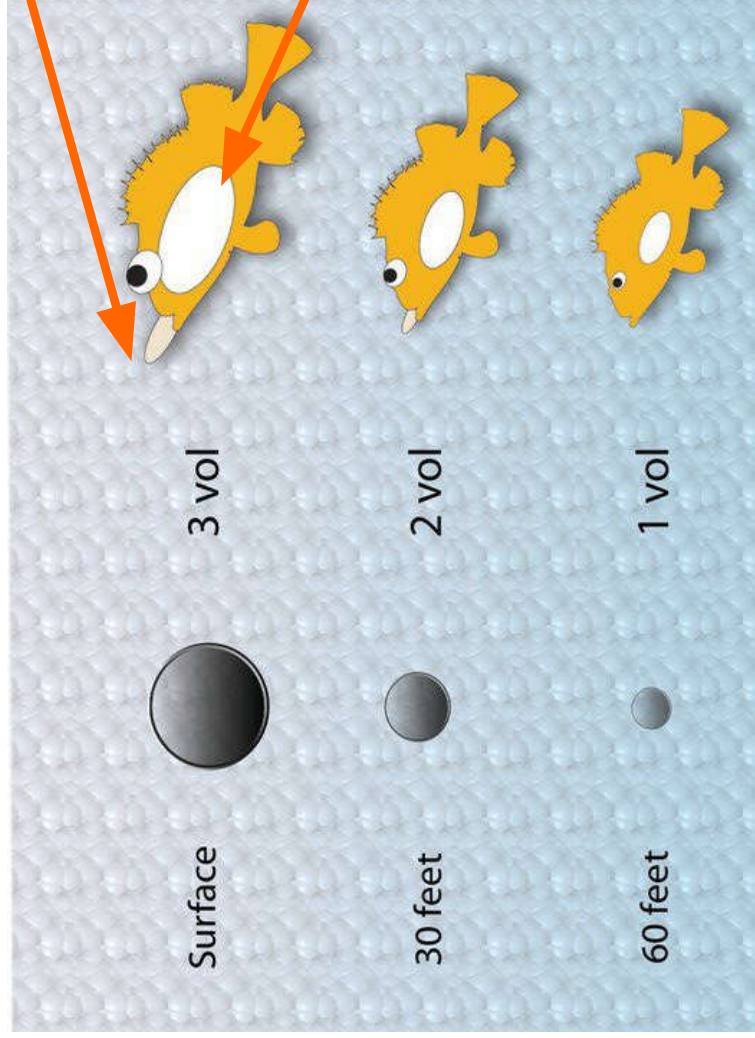
Maximizing Survivorship

- Sample < 120 feet
- Fish without barbed hooks
- Use careful handling techniques
- Keep surface time < 5 min
- Regularly replace seawater
- Only tag fishes in good condition
- Descend fishes, when necessary

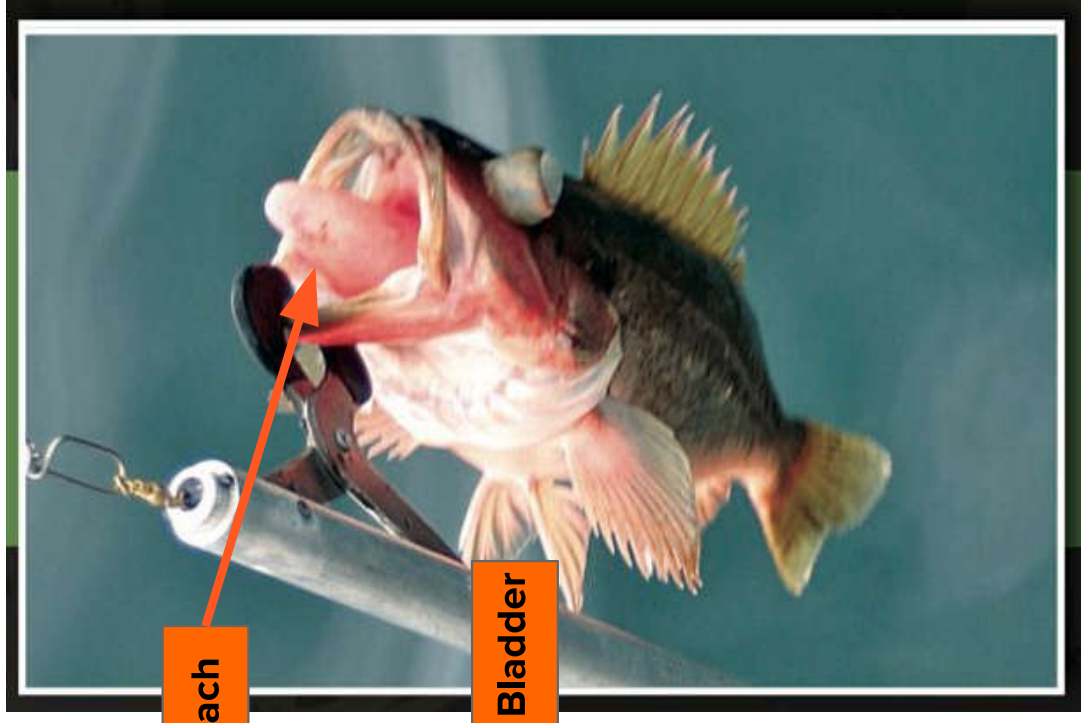


The Plight of the Rockfish

Symptoms of Barotrauma



The volume of a fish's swim bladder can triple when reeled in from depths as shallow as 60 feet



The Plight of the Rockfish

Descending Devices

Ace Calloway (Blacktip)



SeaQualizer



Weighted Milk Crate



Why Can't I Fish My Own Tackle?

- Standardization, reproducibility, and historical precedent
- Allows us to compare data on a state and regional scale



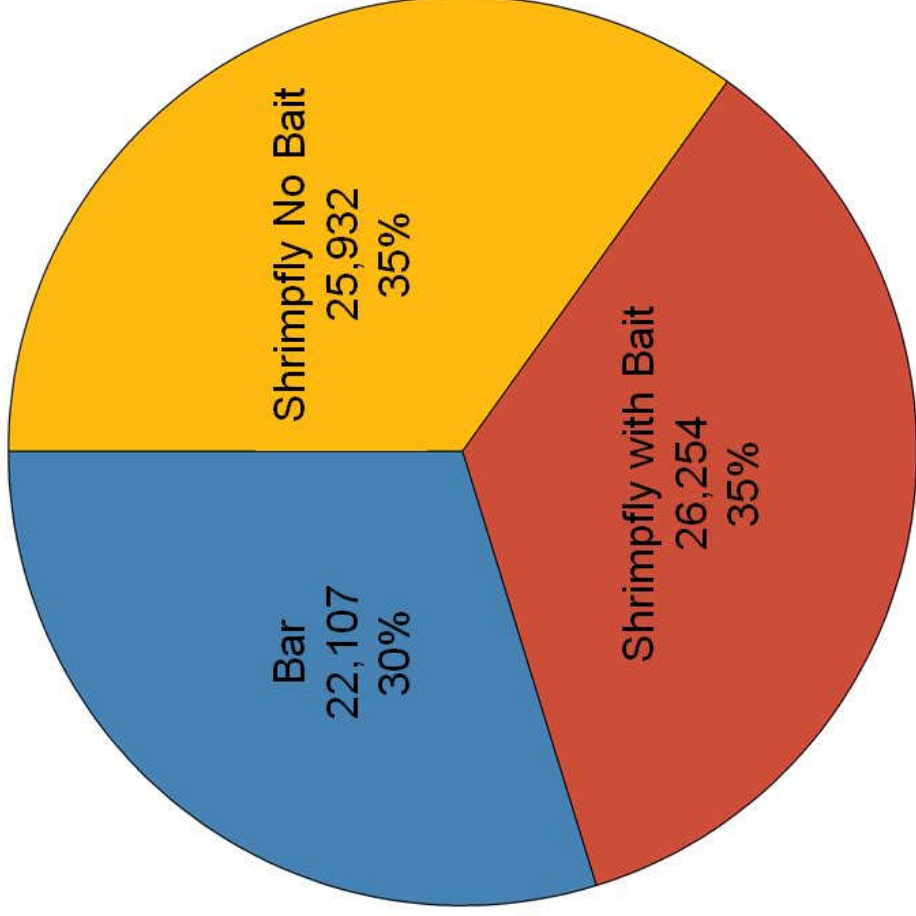
Why Can't I Fish My Own Tackle?

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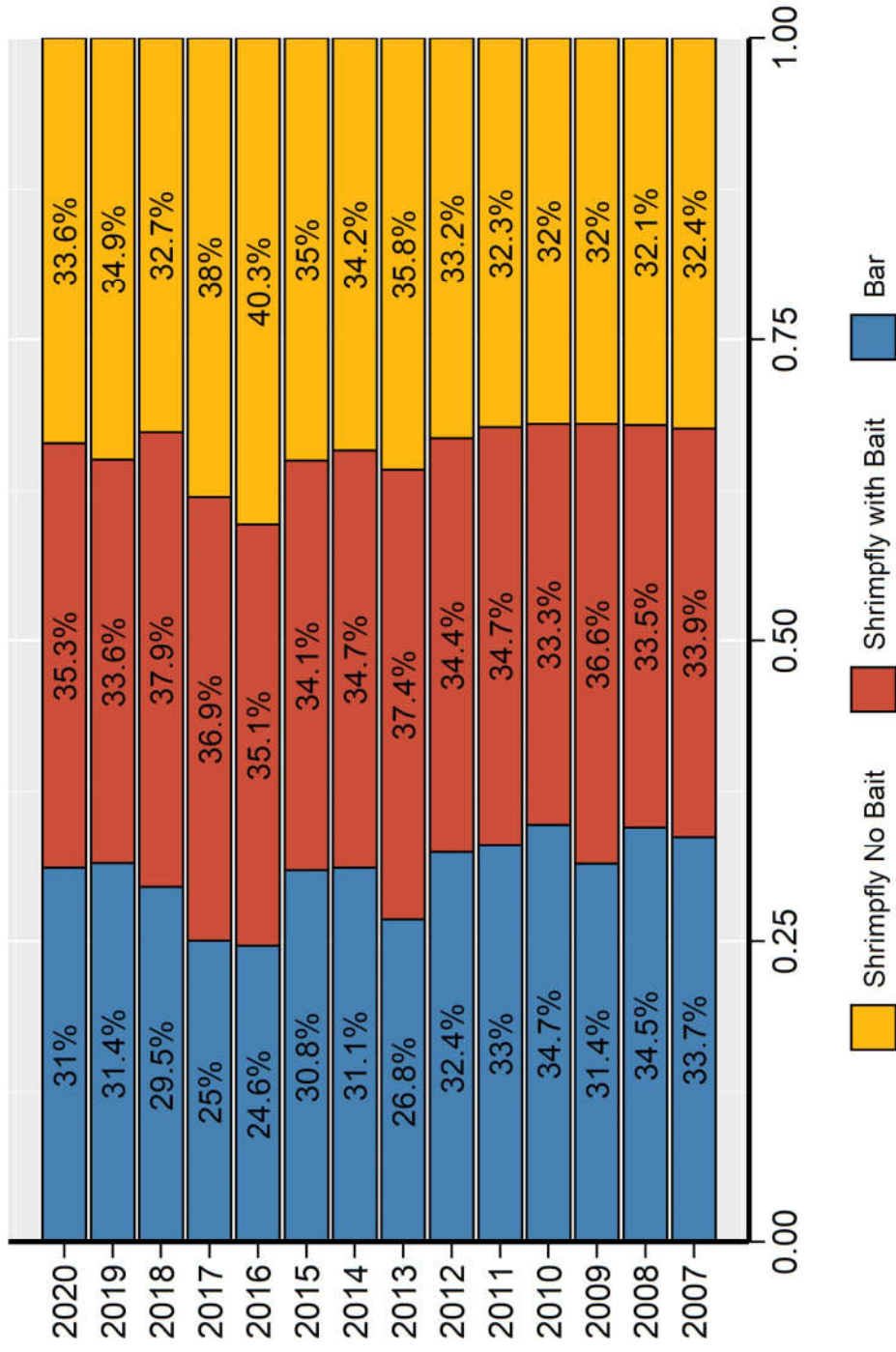
Catch by gear type: 2007-2020

(All species combined; MLML sampling areas only)

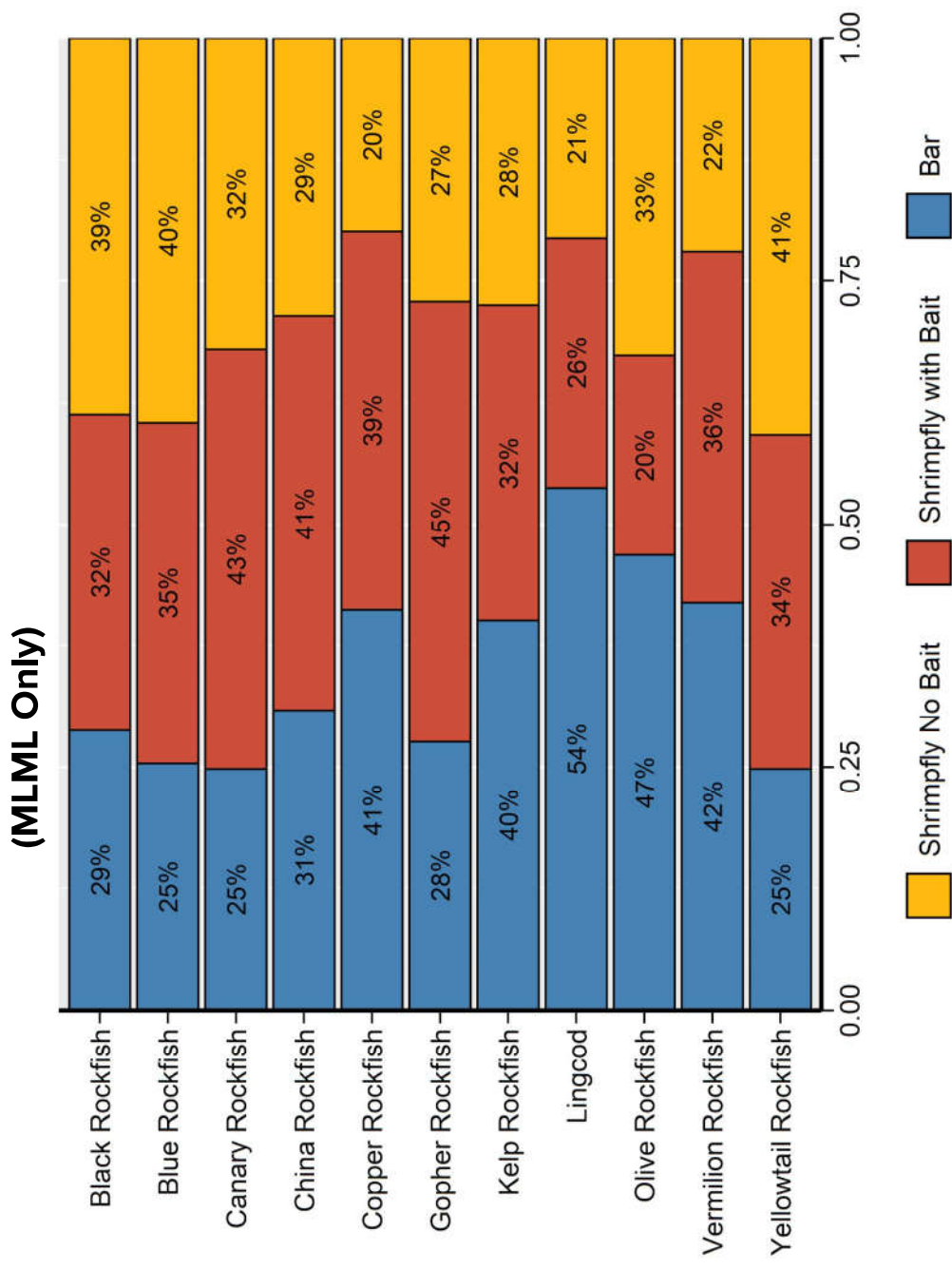


Catch by Gear Type and Year

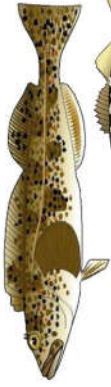
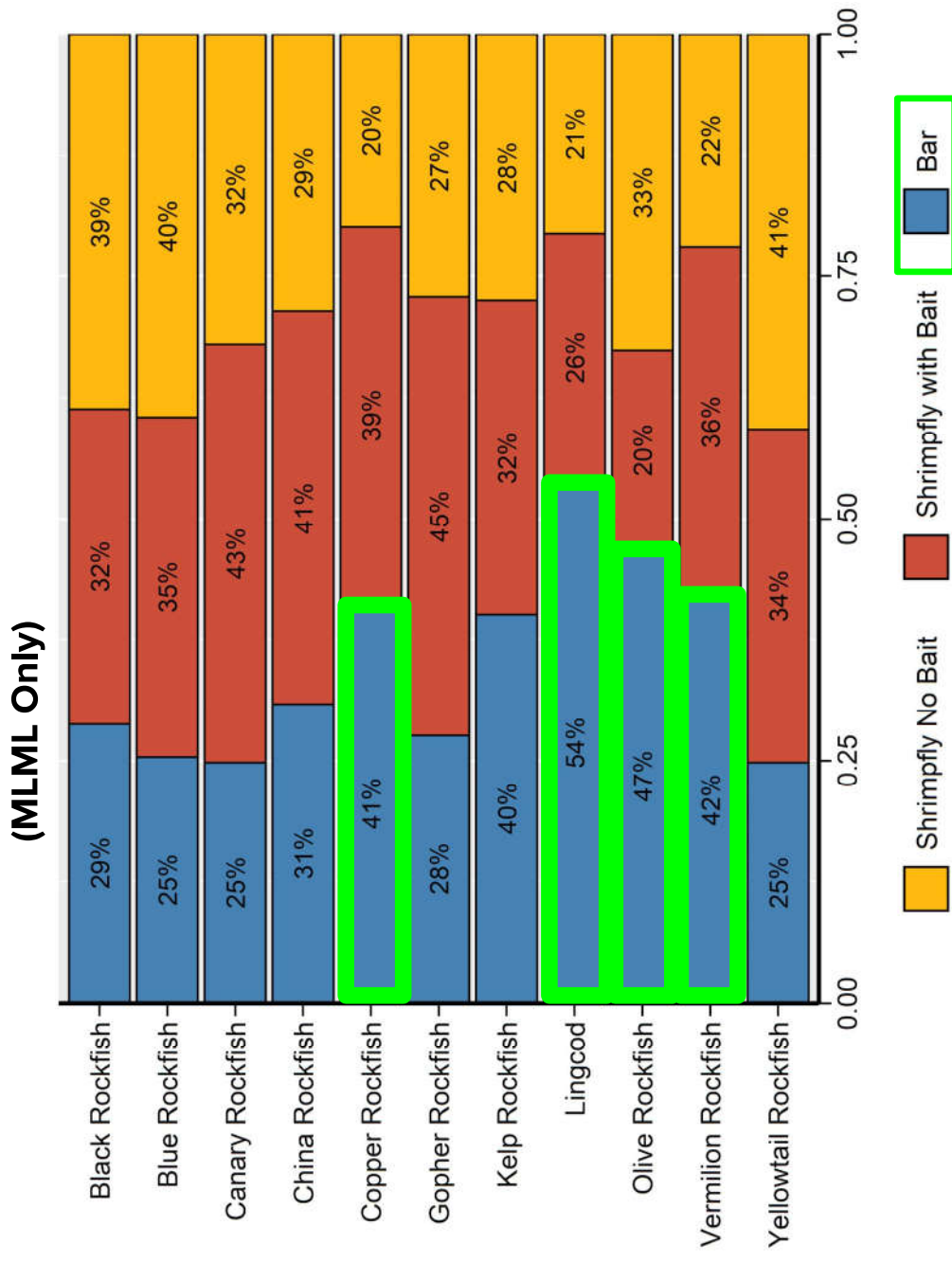
(MLML Only)



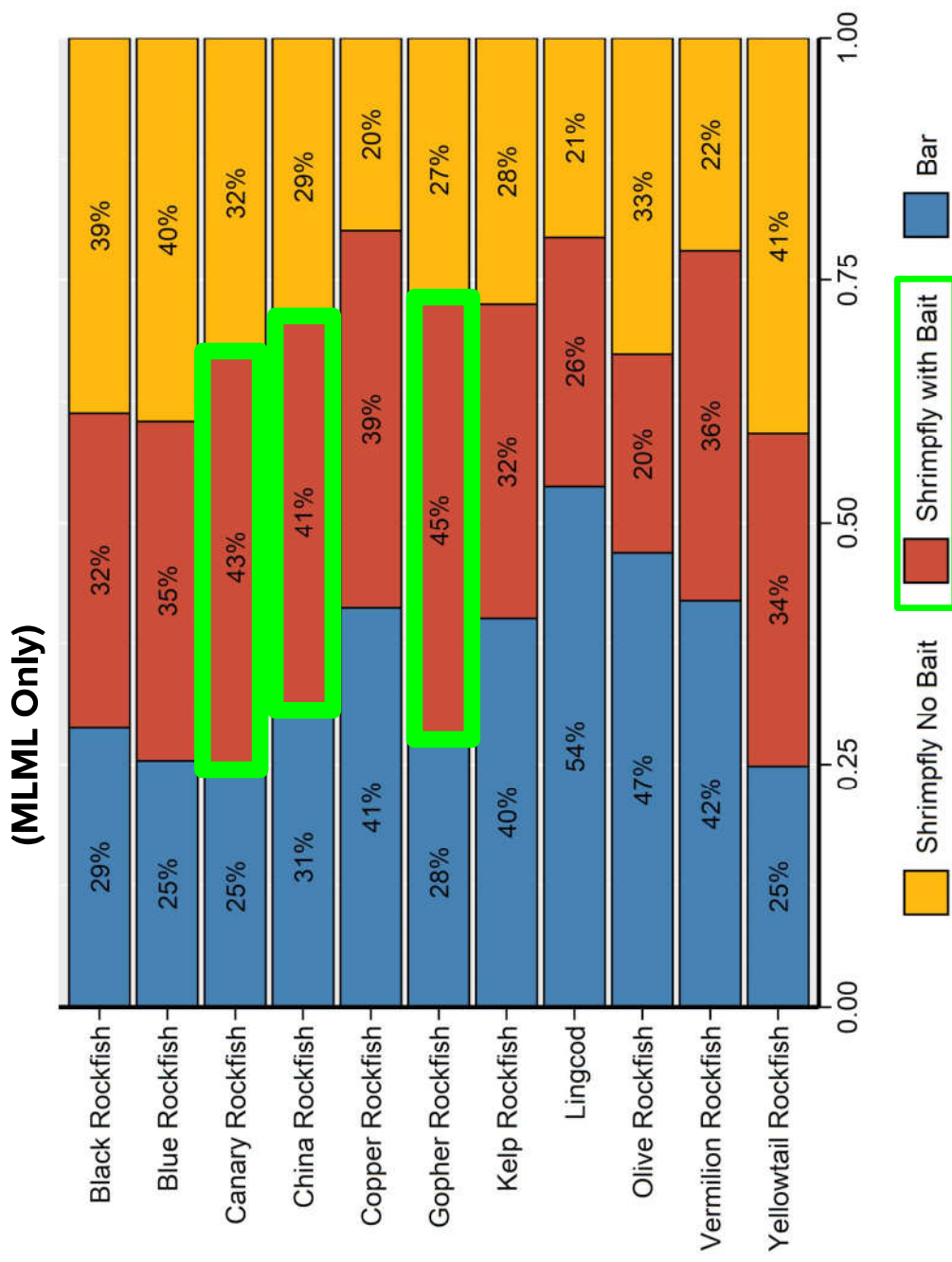
Species Catch by Gear Type: 2007-2020



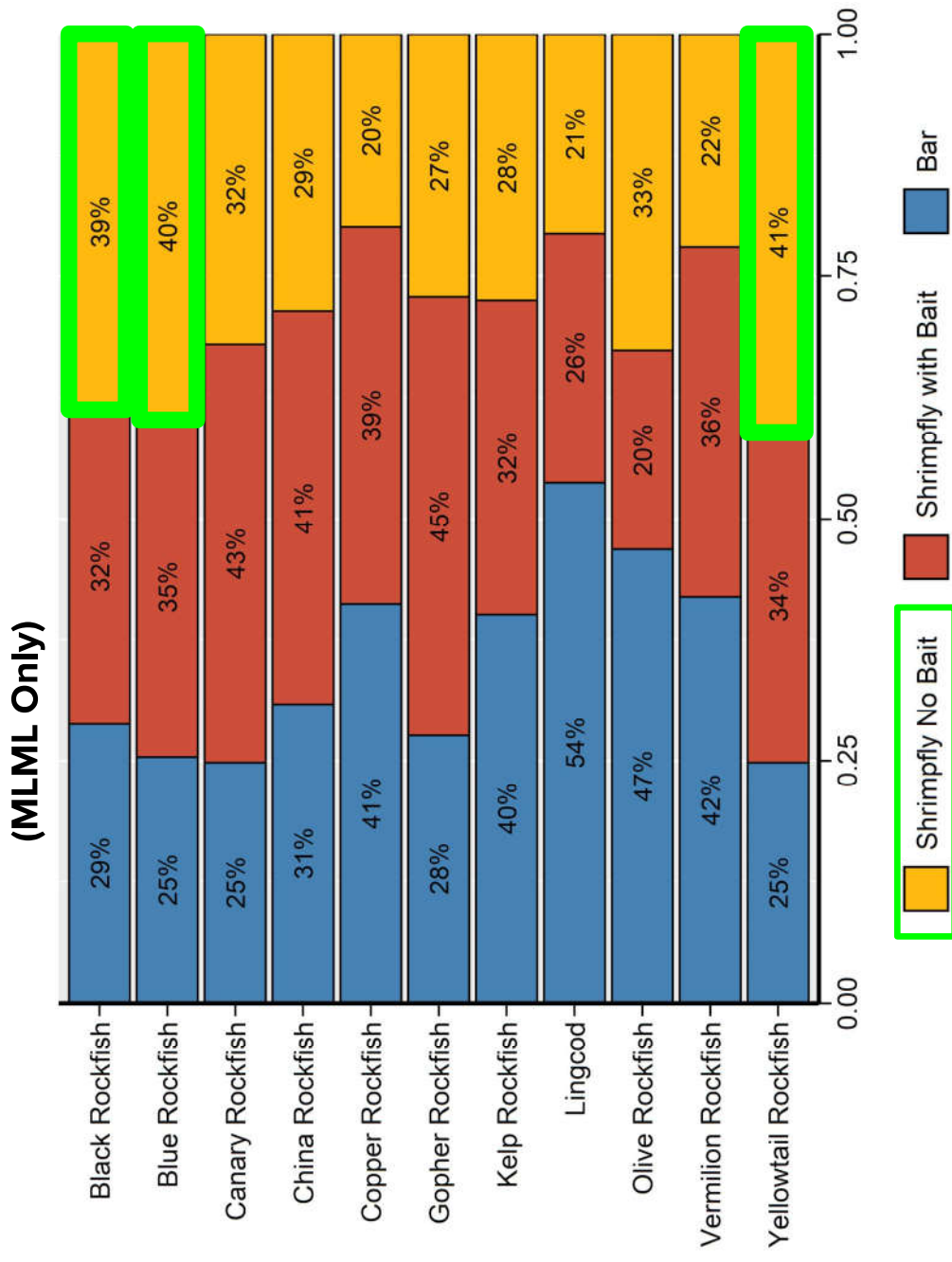
Species Catch by Gear Type: 2007-2020



Species Catch by Gear Type: 2007-2020



Species Catch by Gear Type: 2007-2020



2020 CCERP Updates



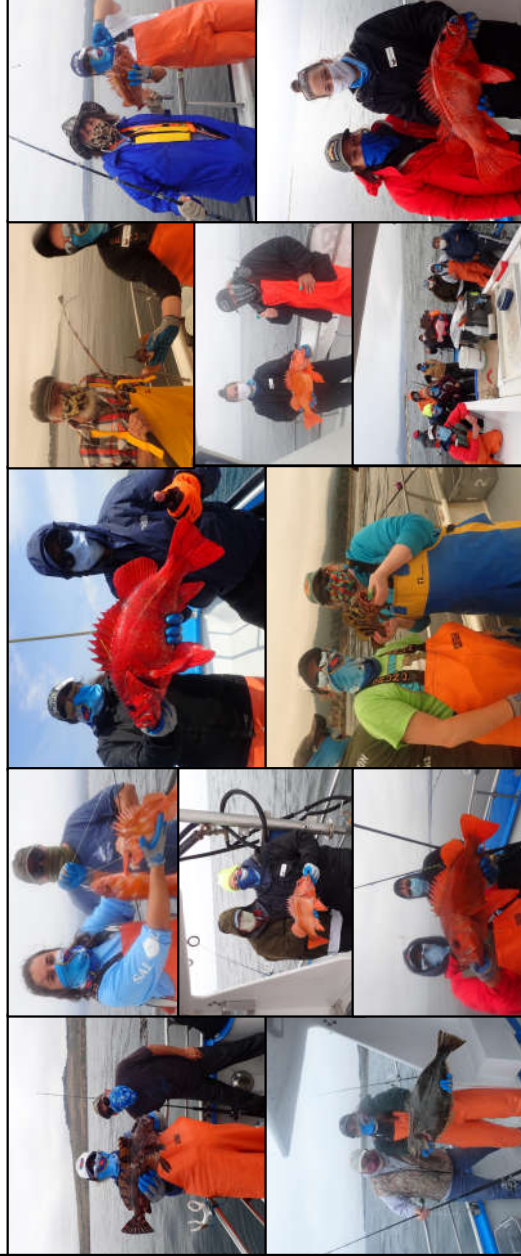
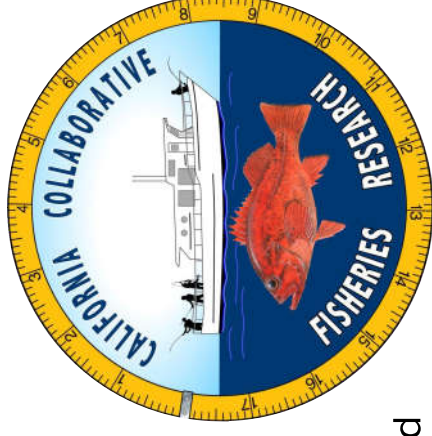
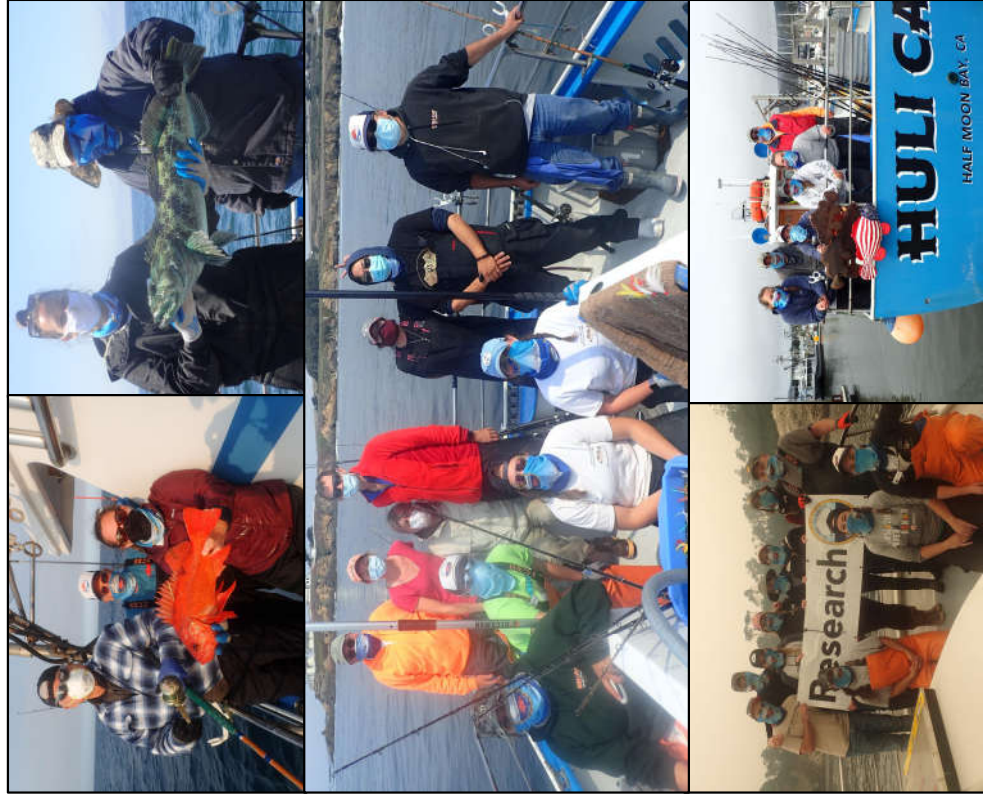
2020 CCFRP Updates

Region	Academic Institution	Marine Protected Area (MPA)/ Reference Sites	Number of Trips	Number of Caught Fishes	Number of Caught Species
North	Humboldt State University	South Cape Mendocino SMR	6	684	15
		Ten Mile SMR	6	714	18
	Bodega Marine Labs	Stewart's Point SMR	5	1,908	19
		Bodega Head SMR	5	897	22
		TOTAL	22	4,203	29
Central	Moss Landing Marine Labs	Año Nuevo SMR	6	1,162	17
		Point Lobos SMR	6	2,155	20
	Cal Poly, San Luis Obispo	Piedras Blancas SMR	6	2,843	21
		Point Buchon SMR	6	1,573	20
		TOTAL	24	7,733	27
South	UC Santa Barbara	Carrington Point SMR	6	2,668	24
		Anacapa Island SMR & SMCA	6	1,417	20
	Scripps Institution of Oceanography	Swami's SMCA	6	299	22
		South La Jolla SMR	6	437	21
		TOTAL	24	4,821	34
STATEWIDE TOTAL			70	16,757	54

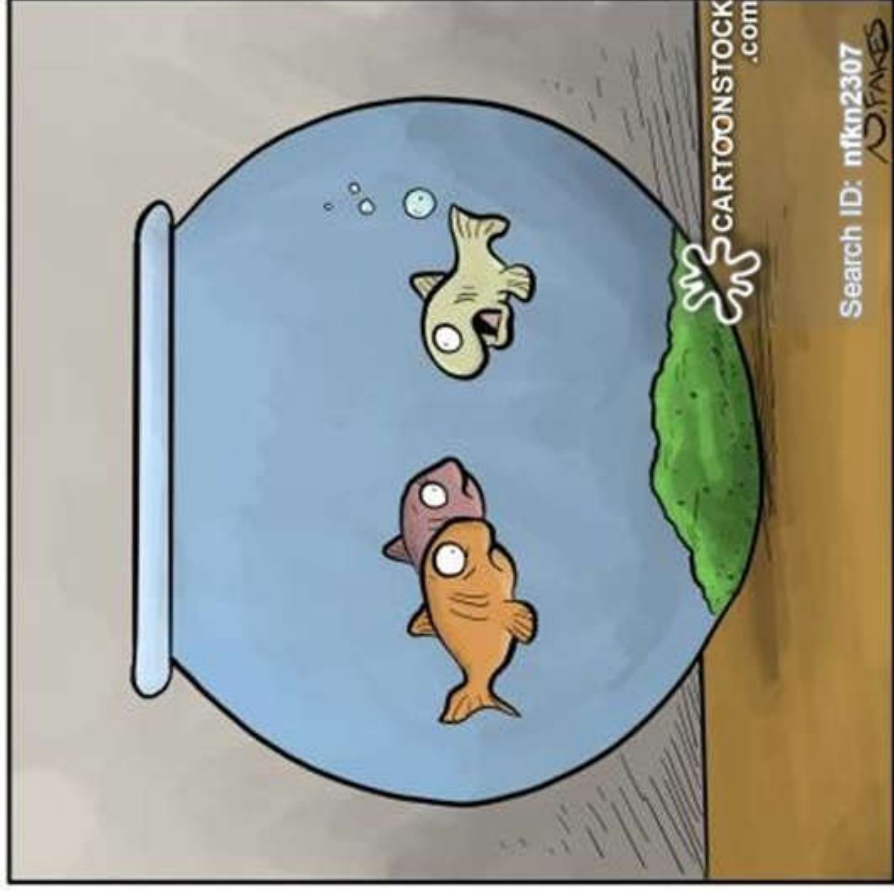


MLMI Summary (2007-2020)

- ❑ 9 CPFV's, 16 skippers, 4 harbors
- ❑ 230 sampling days at sea
- ❑ 851 volunteer anglers
- ❑ 7,000 hours of fishing
- ❑ 76,756 fishes (53 spp.)
- ❑ 23,000+ fishes tagged and released



Questions?



"Do you mind
if I use your restroom?"



Here Comes the Data!



What are CCFRP data used for?

Stock Assessments

The Combined Status of Gopher (*Sebastes carnatus*) and Black-and-Yellow Rockfishes (*Sebastes chrysomelas*) in U.S. Waters Off California in 2019

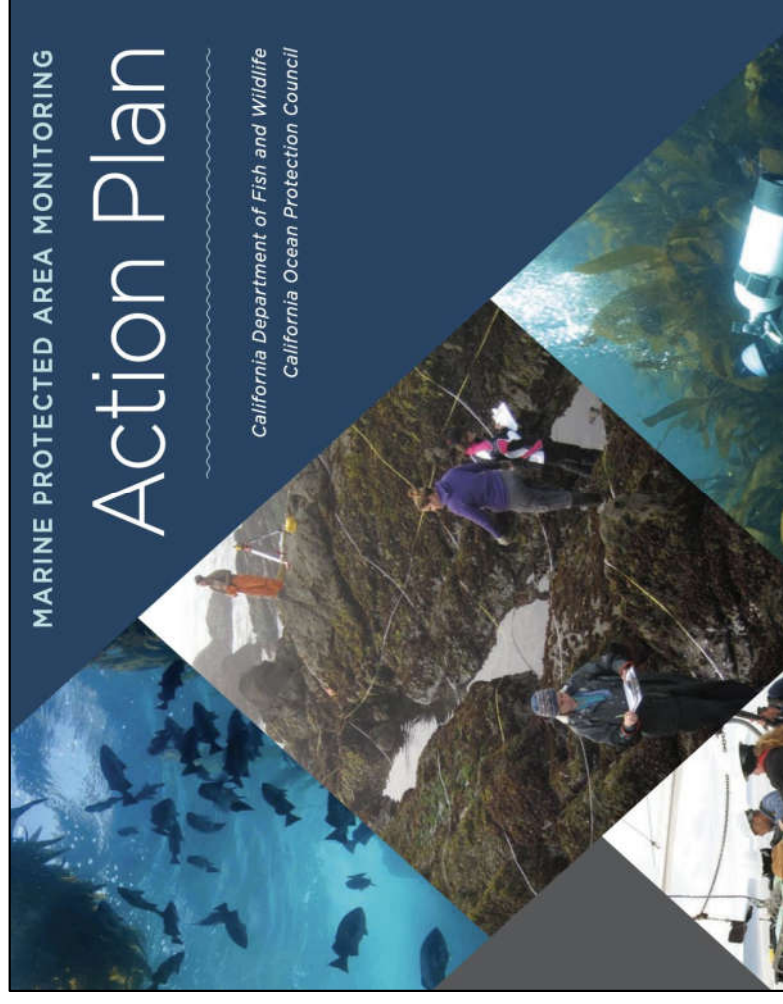


Gopher rockfish (left) and black-and-yellow rockfish (right). Photos by Steve Lonhart.

Melissa H. Monk¹
Xi He¹

¹Southwest Fisheries Science Center, U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, 110 McAllister Way, Santa Cruz, California 95060

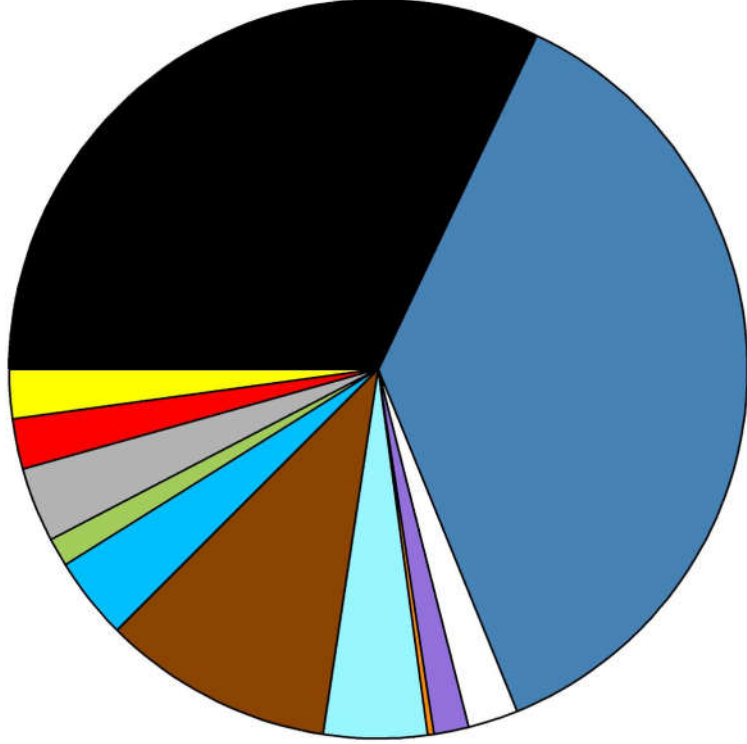
MPA management



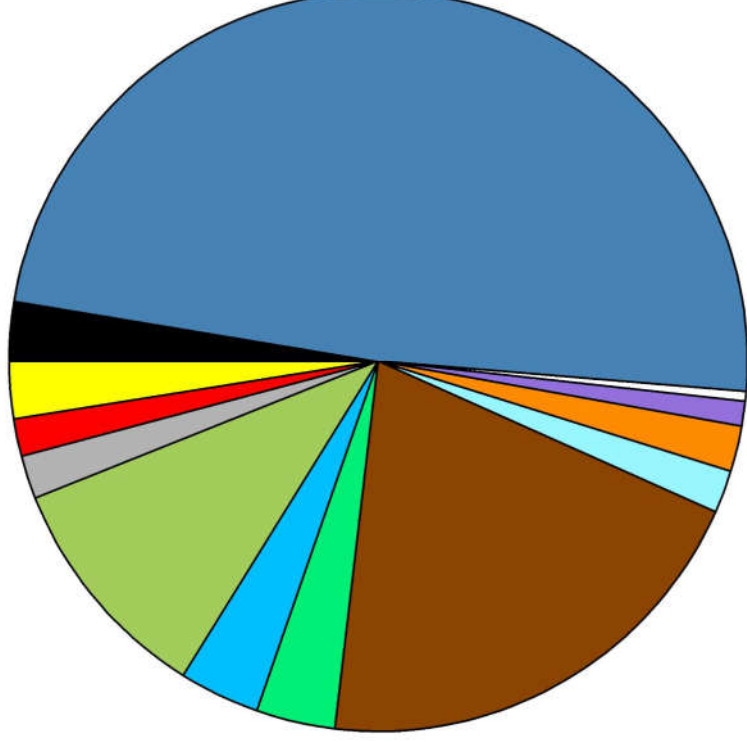
Species Composition by Area

(2007-2020)

Año Nuevo



Point Lobos

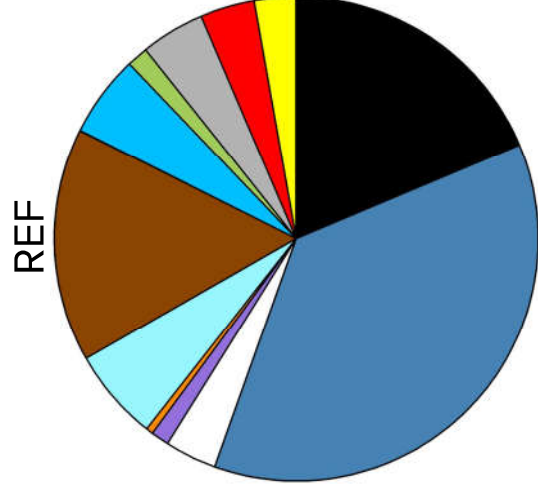
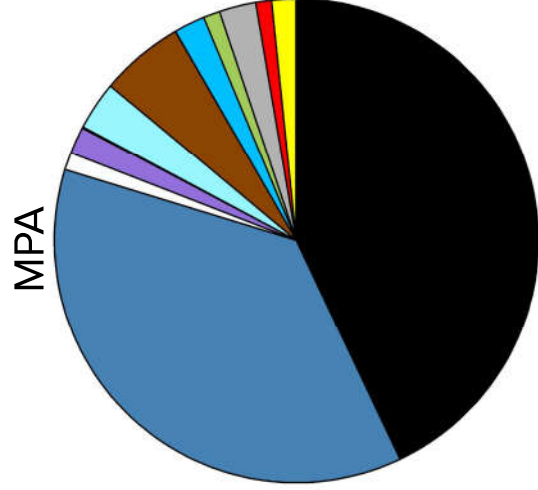


- Other
- Yellowtail Rockfish
- Vermilion Rockfish
- Olive Rockfish
- Lingcod
- Kelp Rockfish
- Gopher Rockfish
- Deacon Rockfish
- Copper Rockfish
- China Rockfish
- Canary Rockfish
- Blue Rockfish
- Black Rockfish

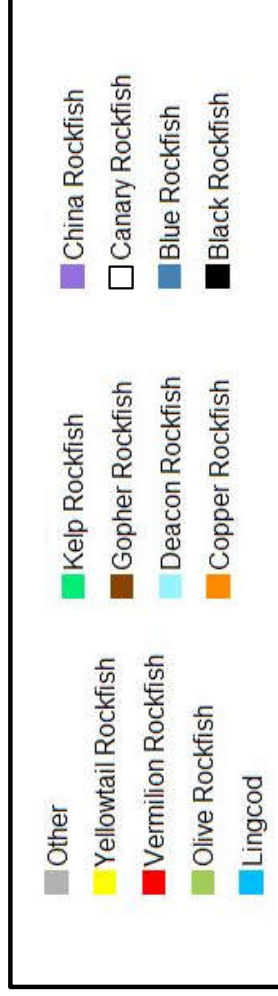
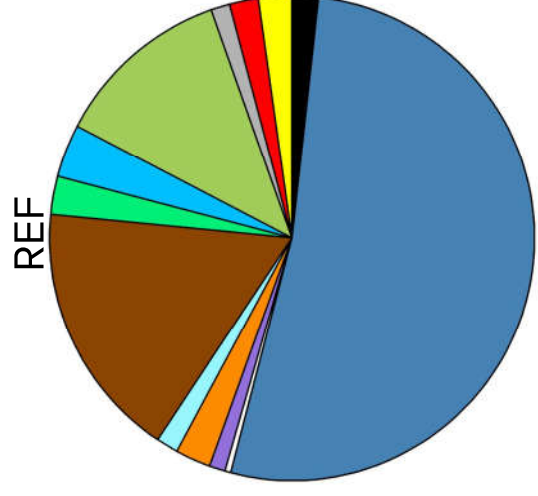
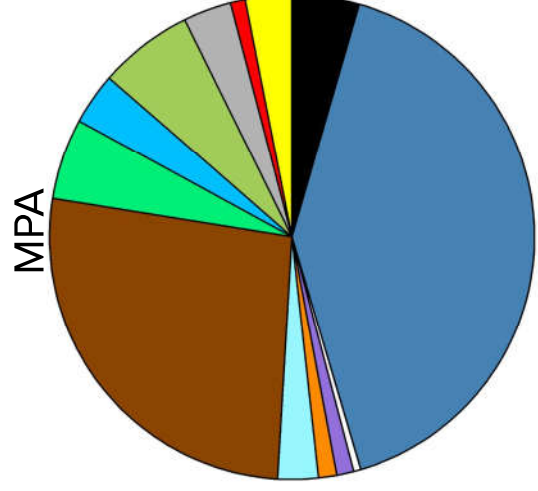
Species Composition by Area and MPA/REF

(2007-2020)

Año Nuevo

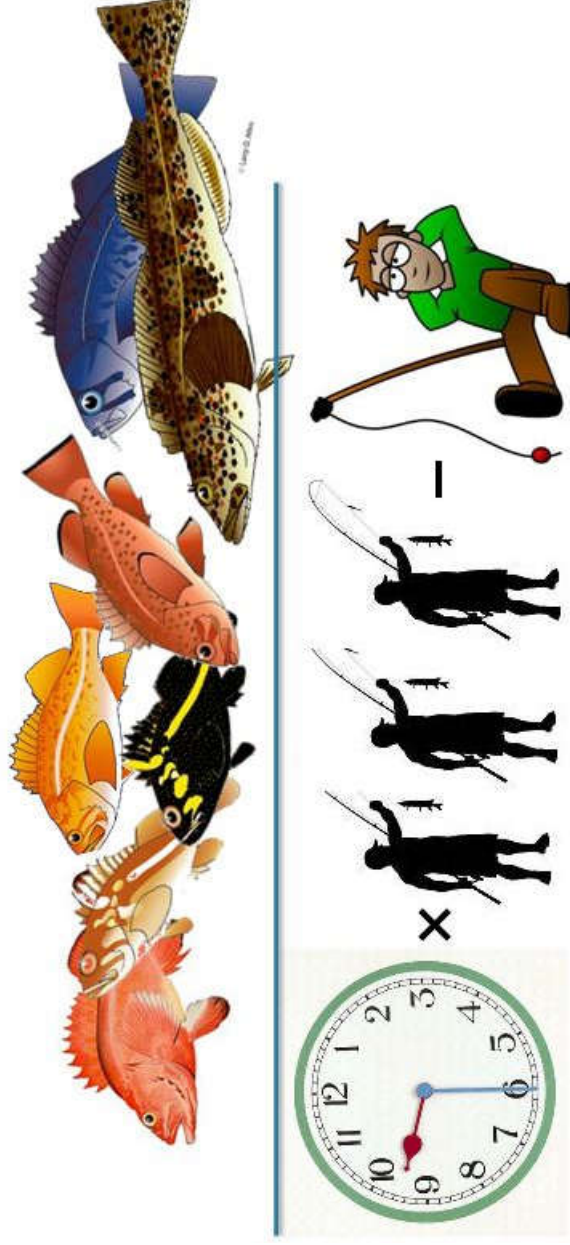


Point Lobos



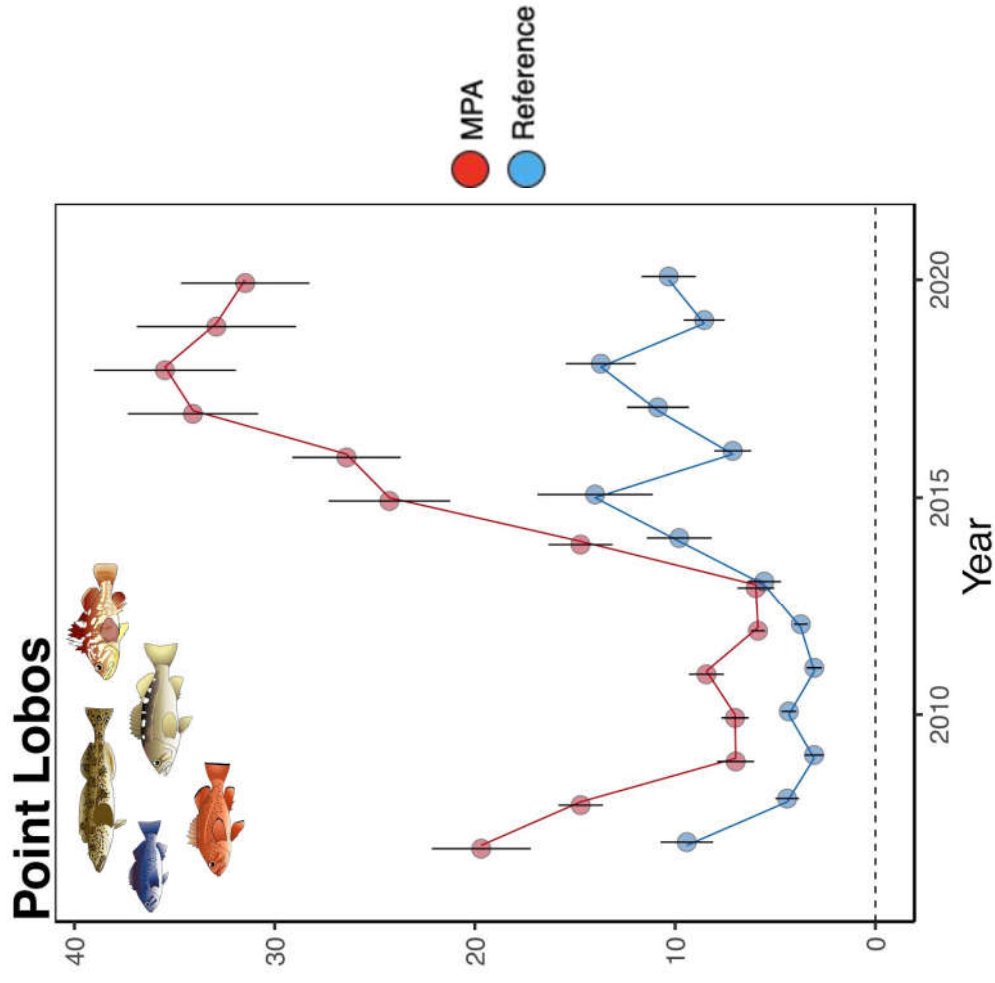
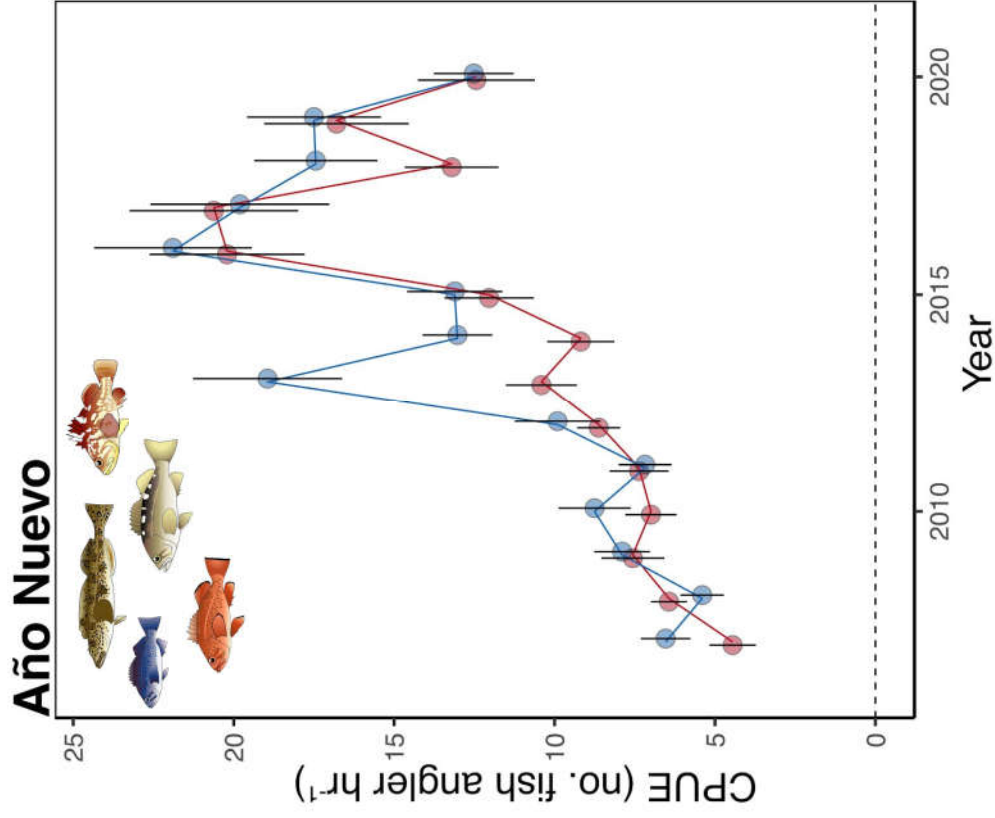
How we measure relative abundance: Catch-Per-Unit-Effort (CPUE)

Here, CPUE is catch per angler-hour

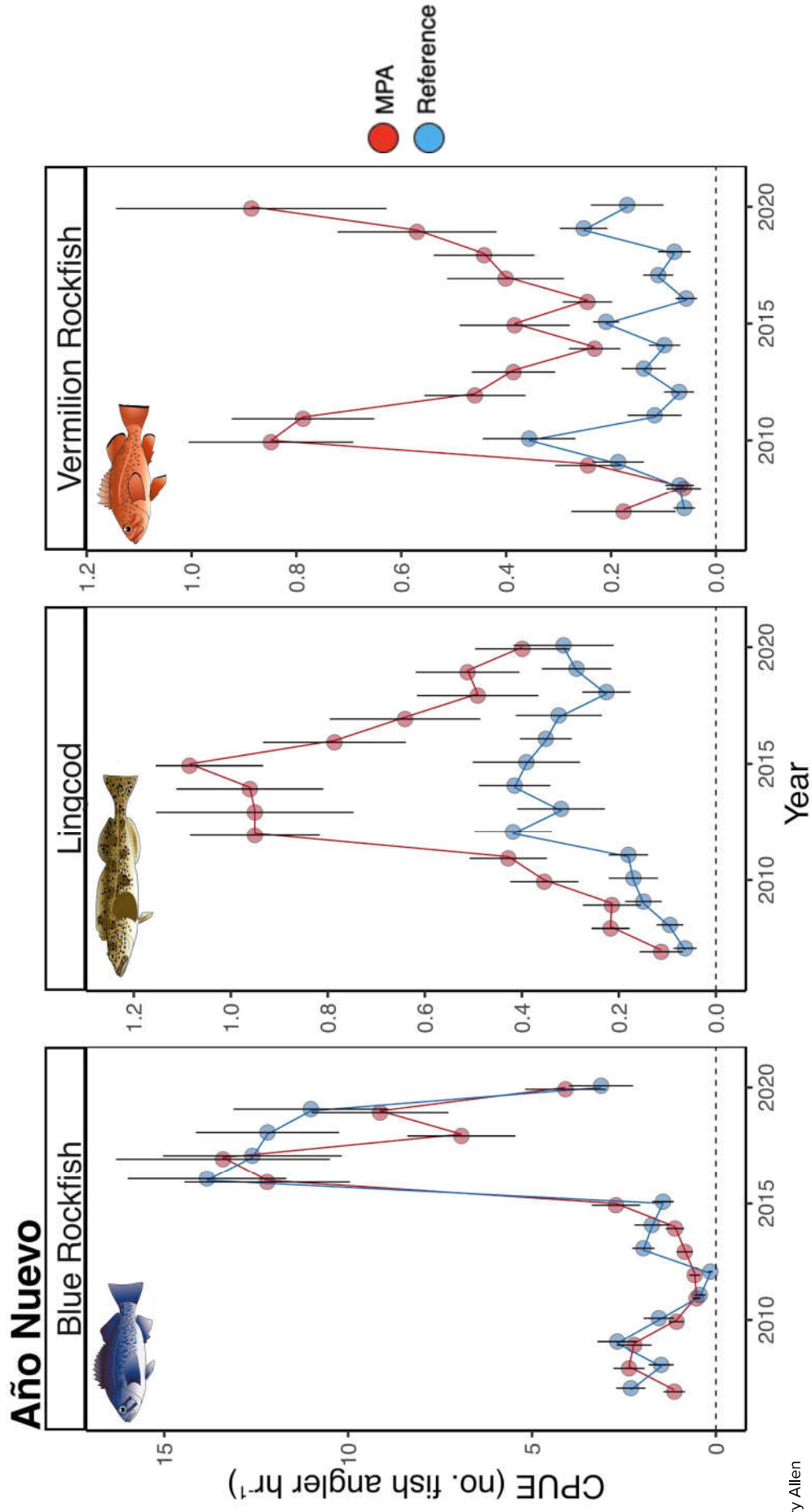


$$\text{CPUE} = \frac{\text{Number of fishes caught}}{[\text{total drift time}] \times [\# \text{ anglers fishing}] - [\text{angler off time}]}$$

On average, more fish in MPAs over time!

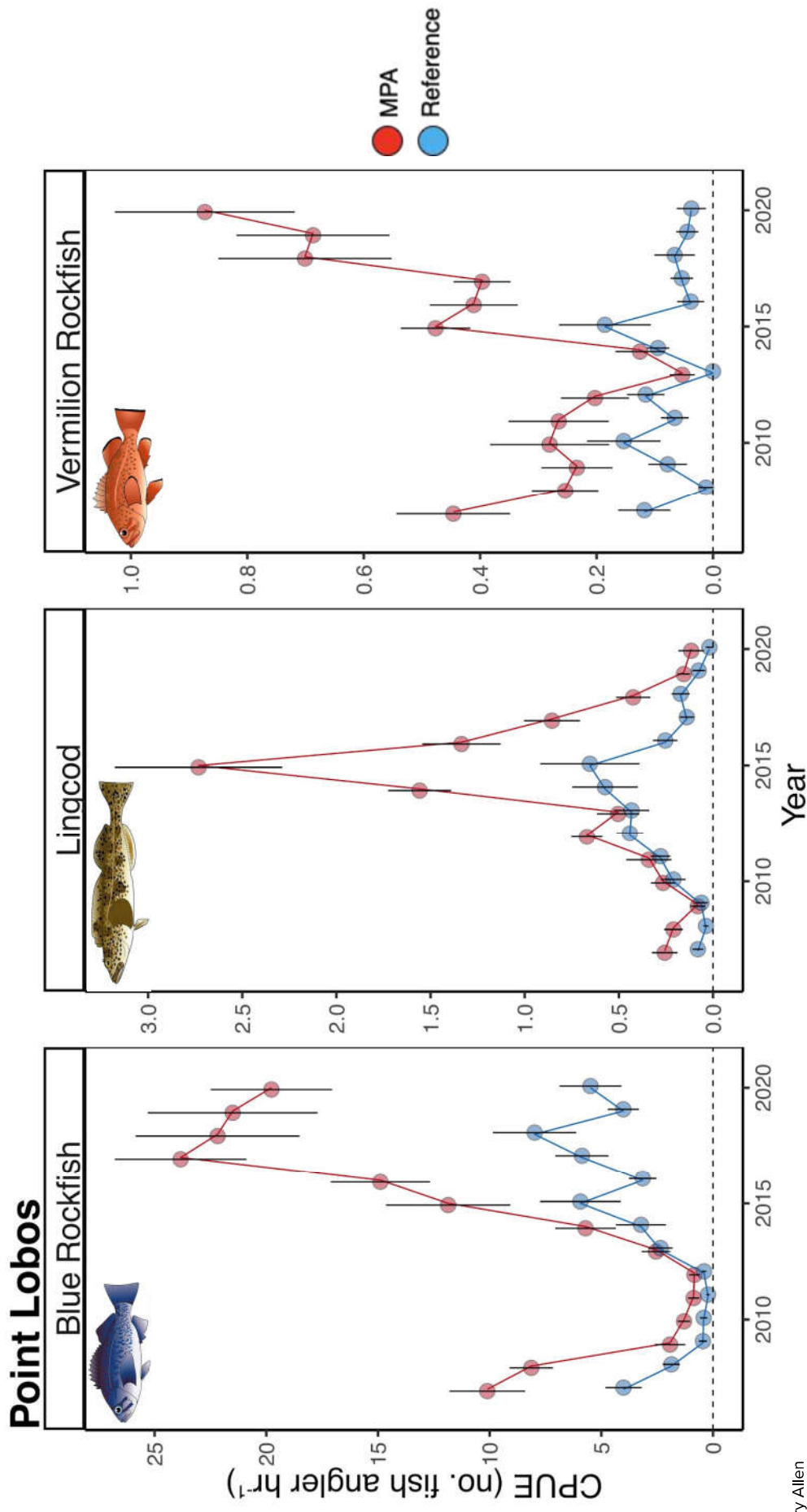


CPUE species-specific trends at Año Nuevo

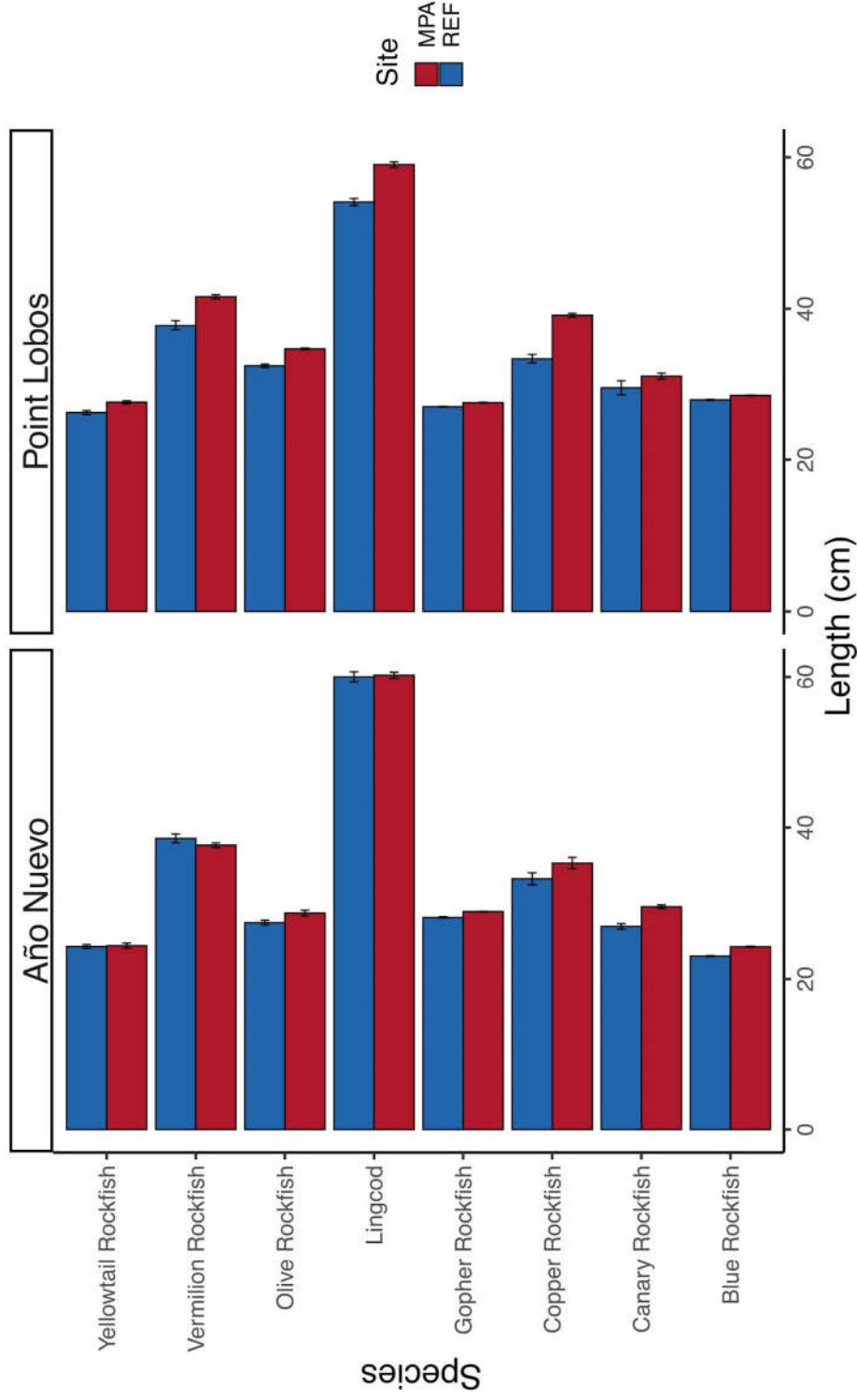
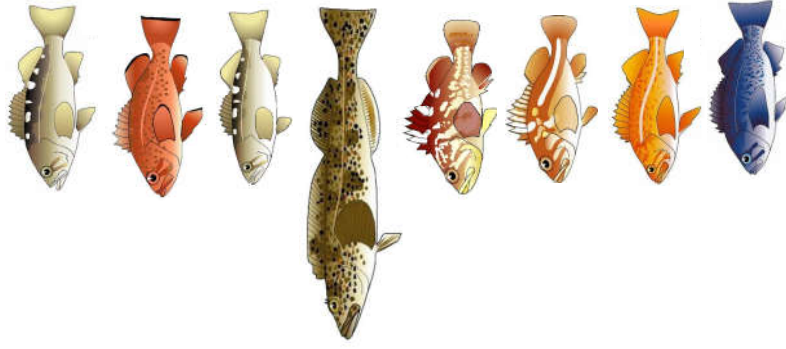


Fish Illustration by Larry Allen

CPUE species-specific trends at Point Lobos

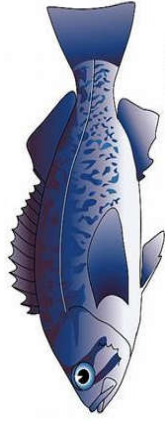


2007-2020 most species are bigger in the MPAs



Calculating Biomass-Per-Unit-Effort with CPUE and Length data

Length (cm)



Published
Length - Weight
Relationships
(cm to kg)

X

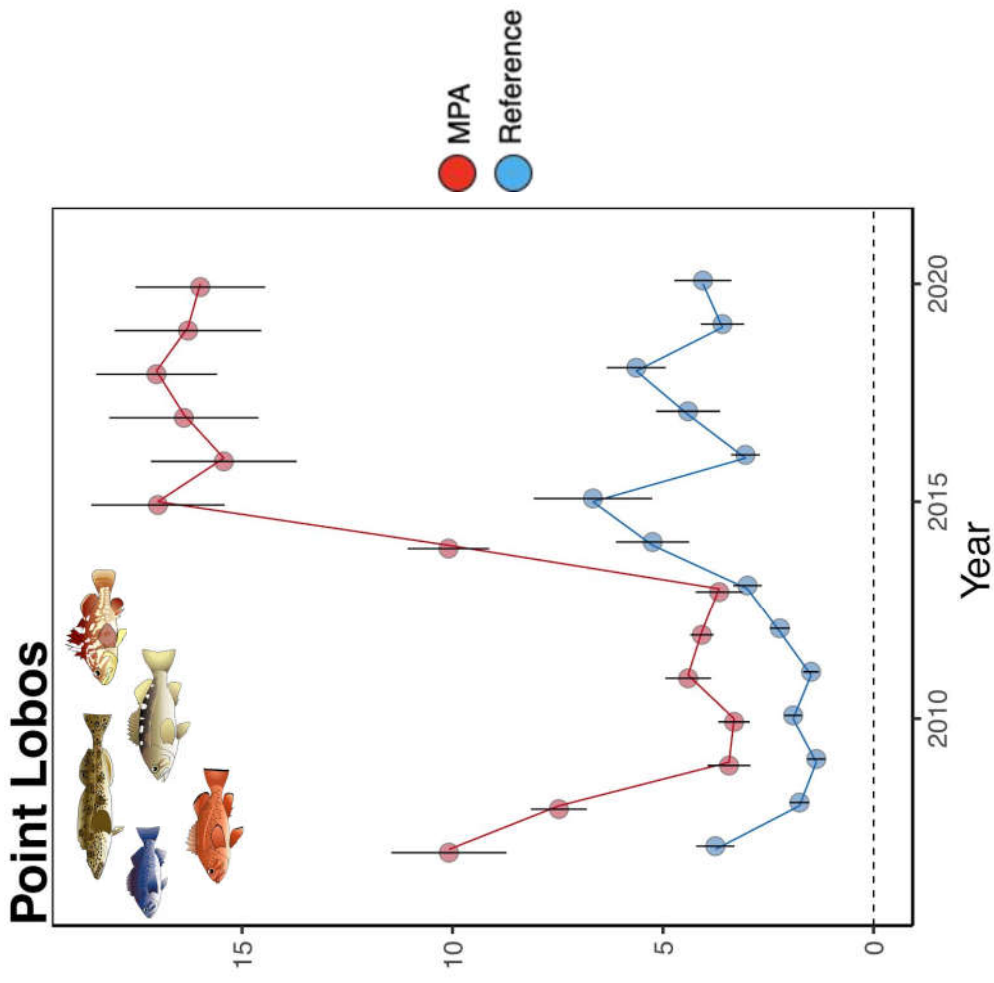
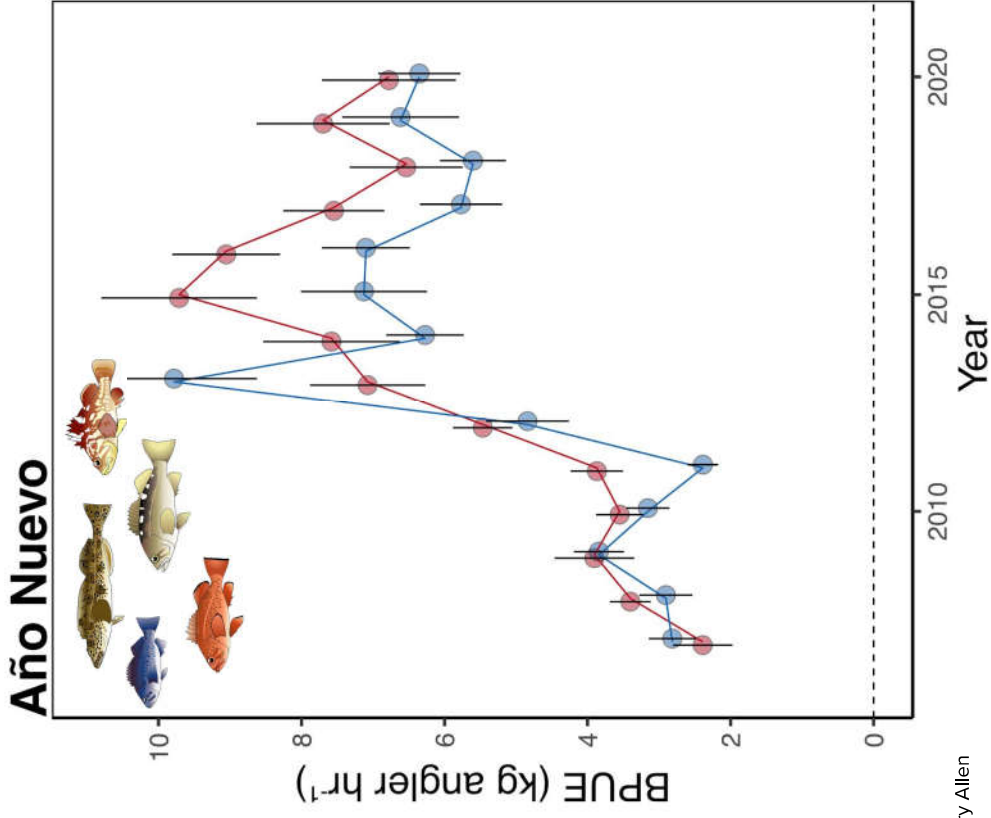


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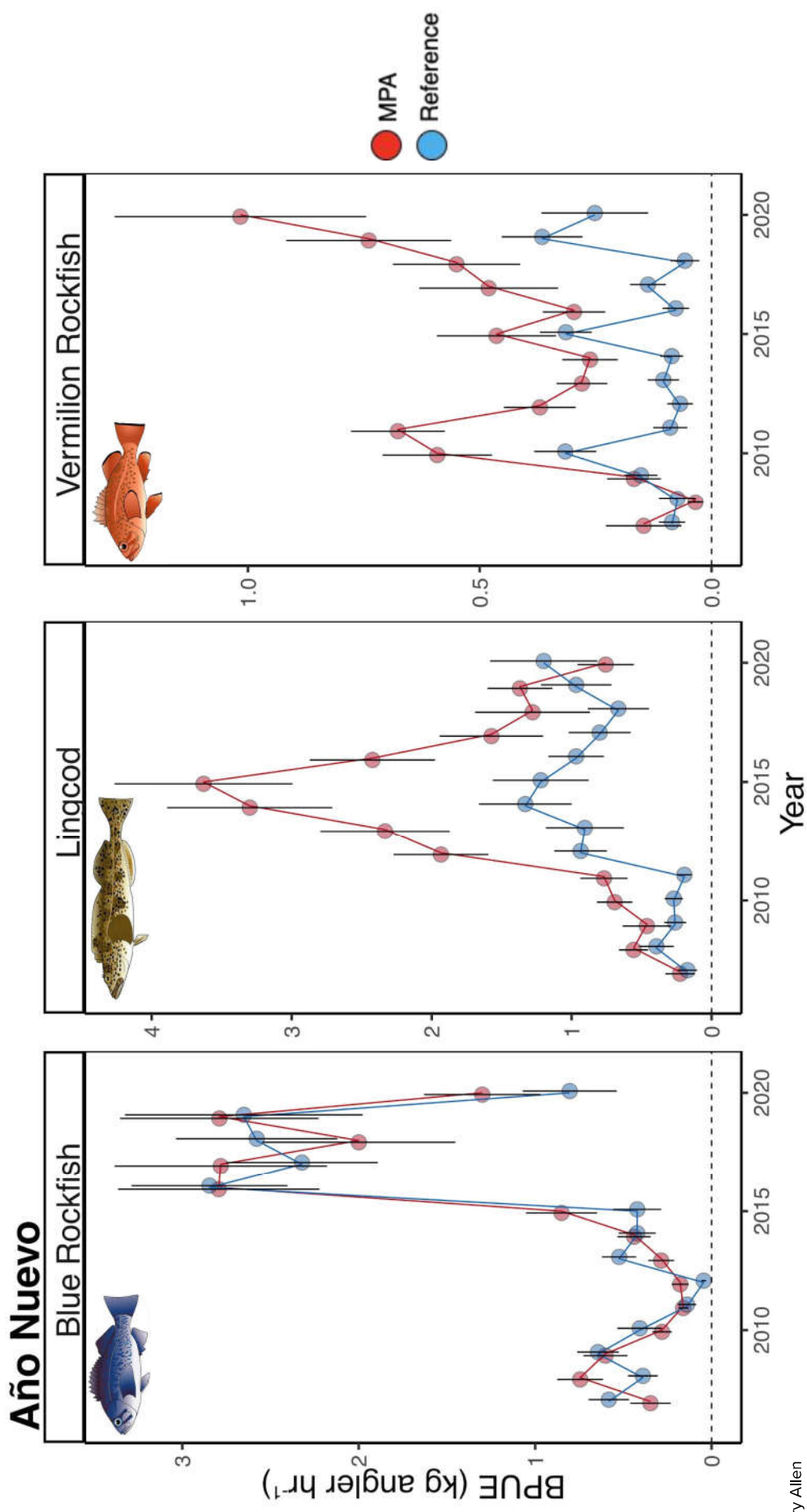
CPUE

BPUE
(kg angler hr⁻¹)

More fish biomass in MPAs over time!

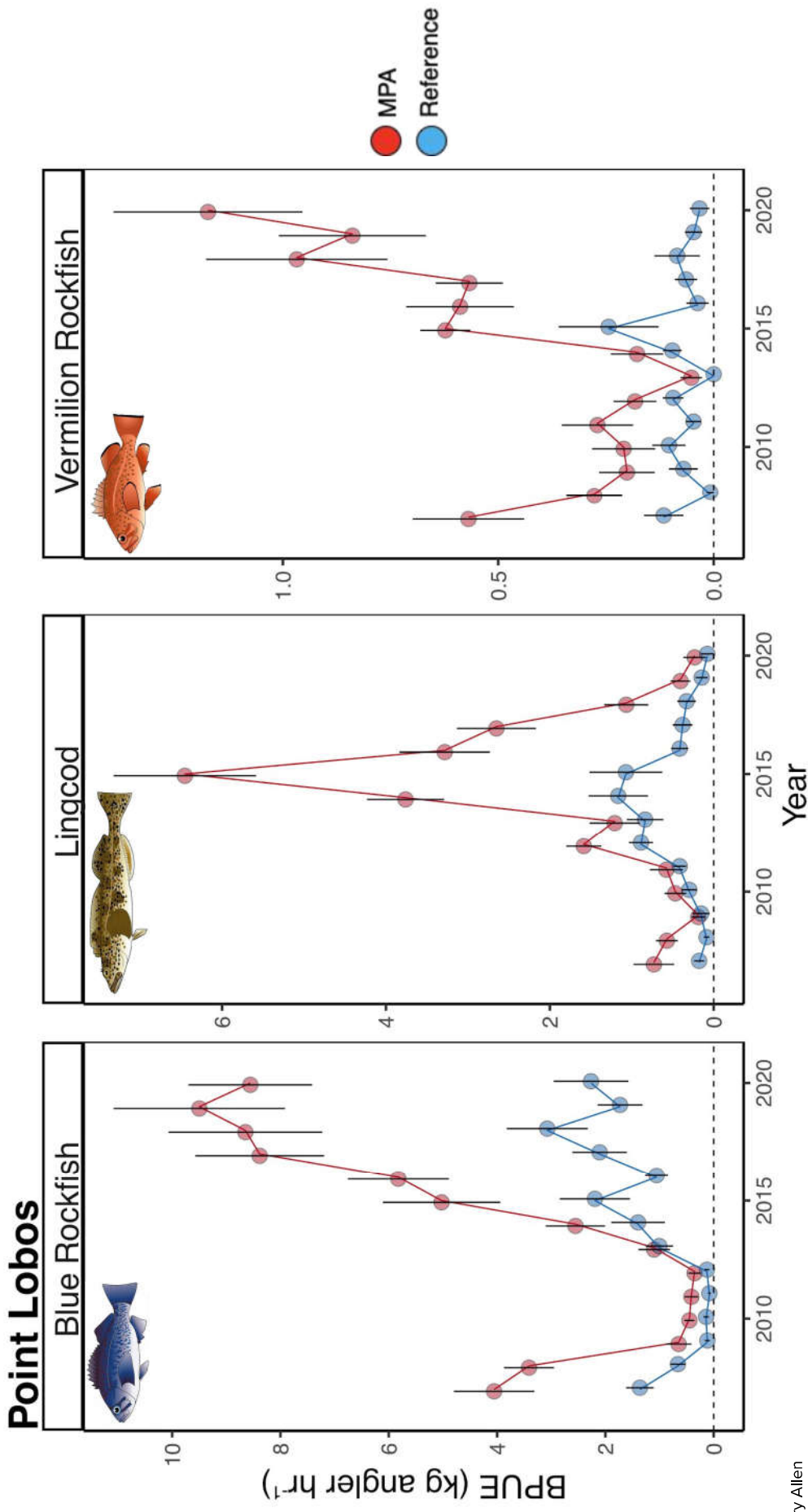


BPUE species-specific trends at Año Nuevo



Fish Illustration by Larry Allen

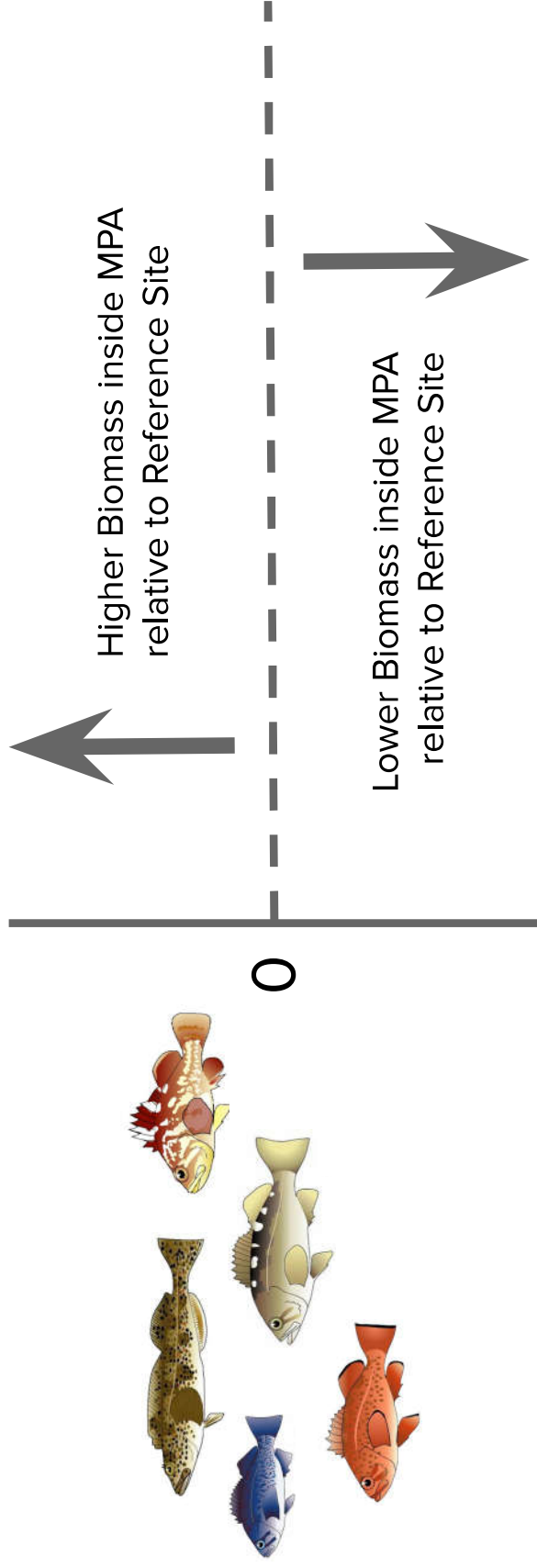
BPUE species-specific trends at Point Lobos



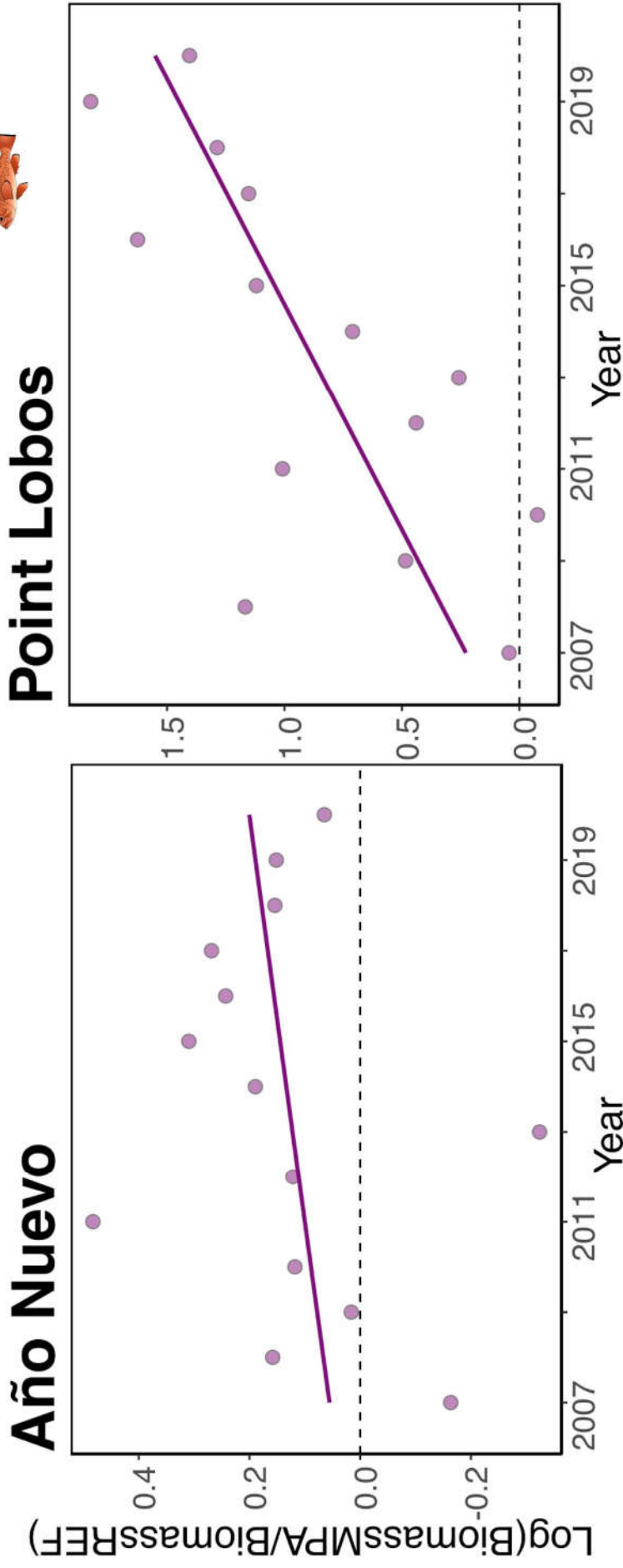
Fish Illustration by Larry Allen

How do we examine responses to MPAs?

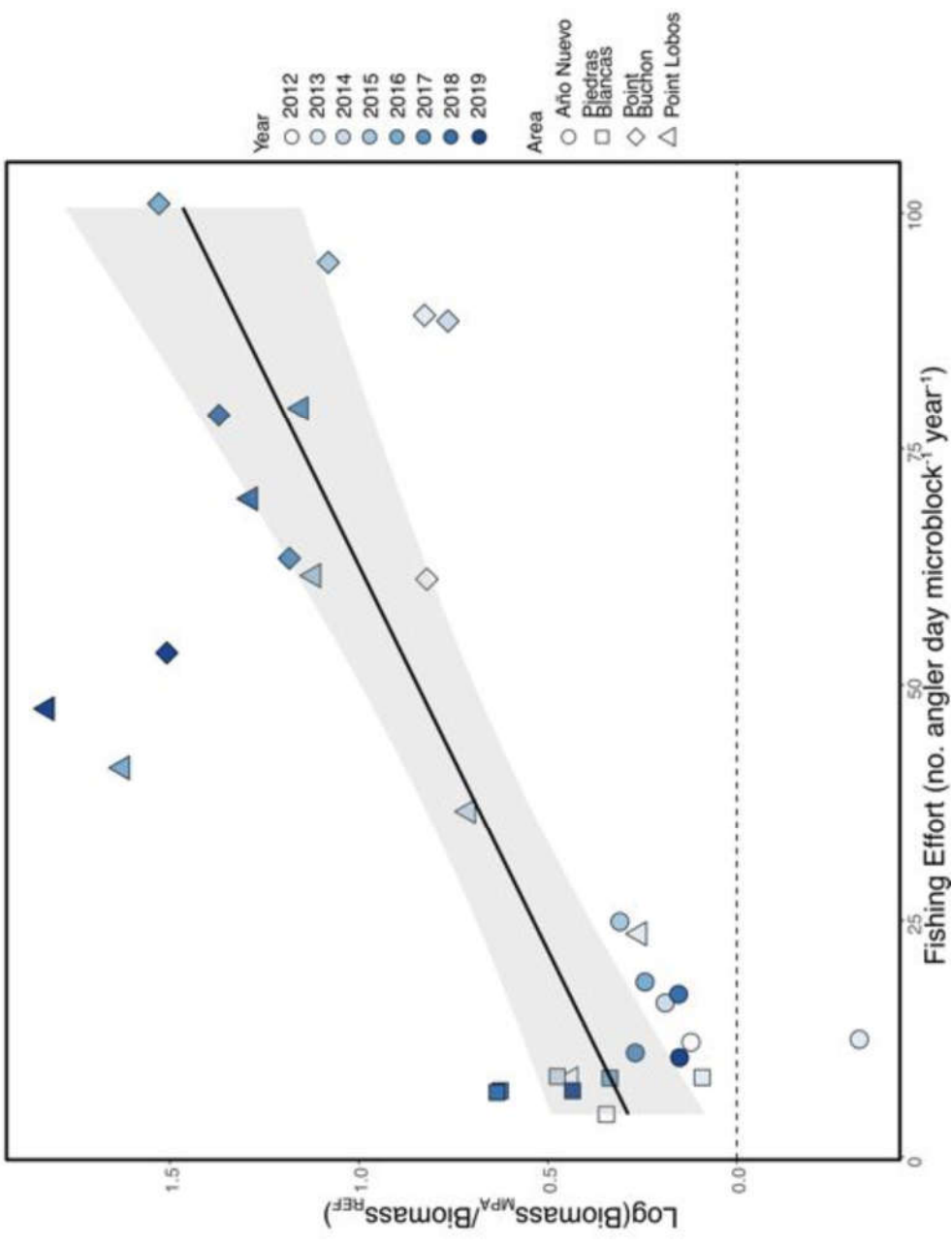
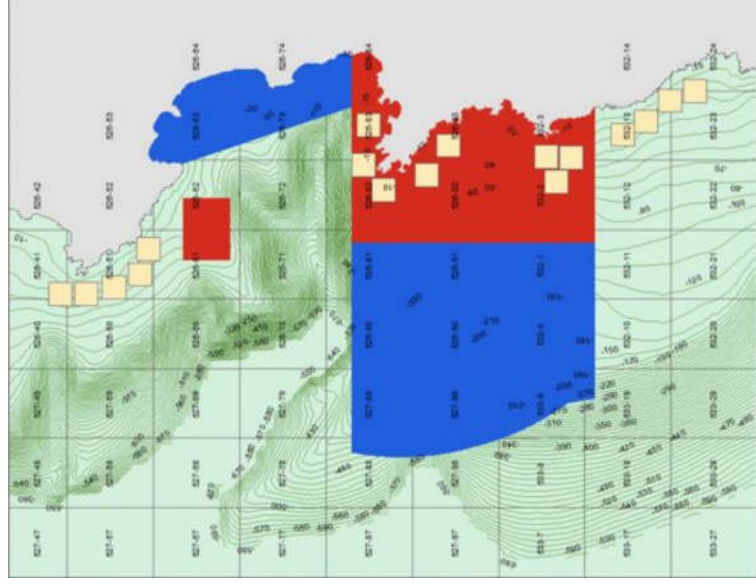
$$\text{Log}\left(\frac{\text{Biomass MPA}}{\text{Biomass REF}}\right)$$



Positive effects of MPAs on fish biomass through time!



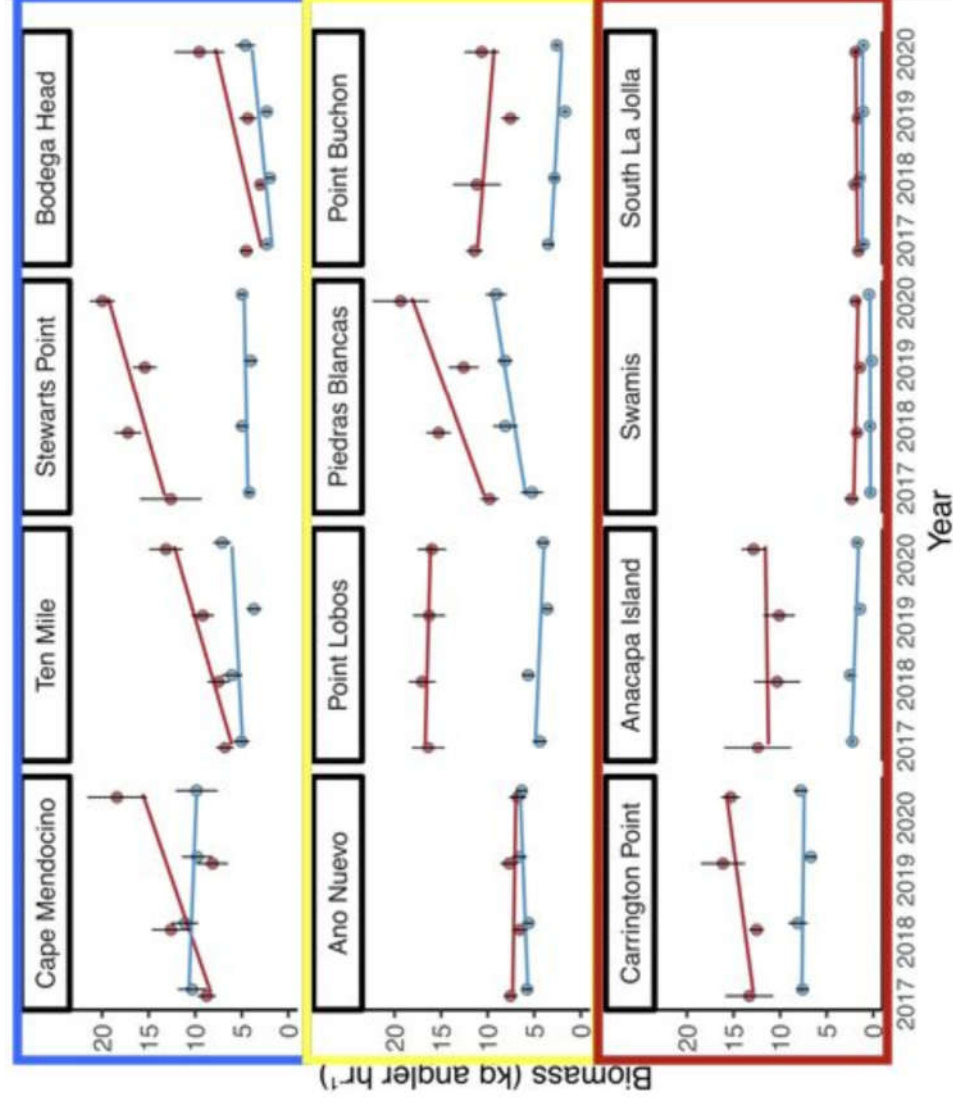
What variables influence fish responses to MPAs?



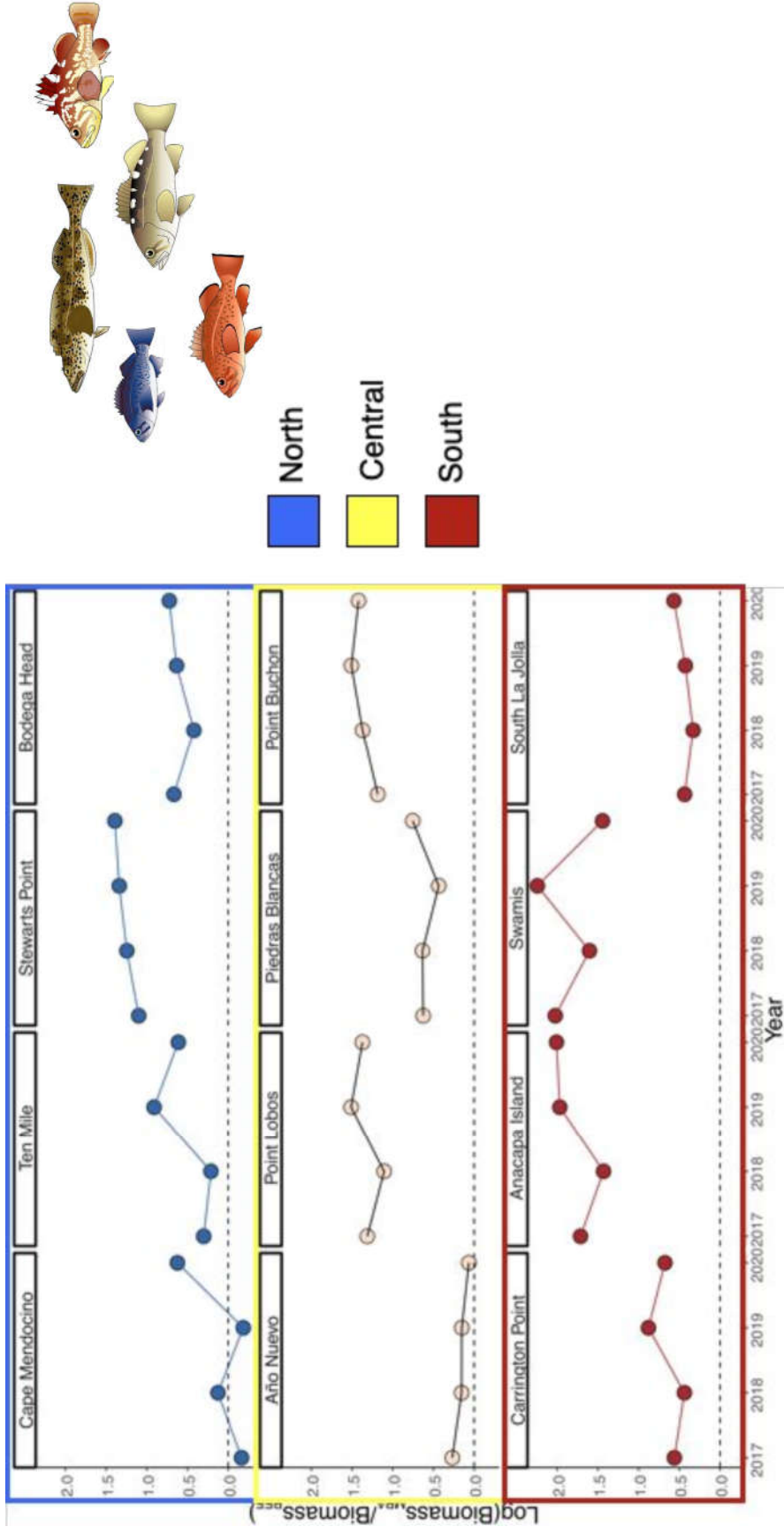
CCERP Statewide Data



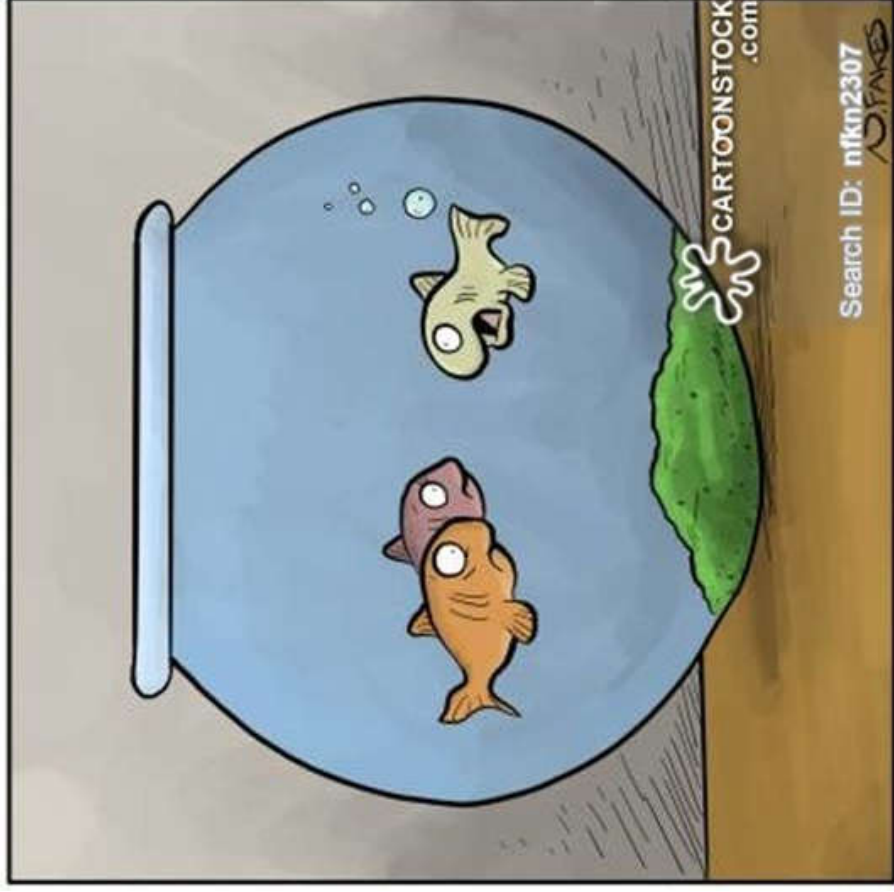
What is going on across the entire state?



Across the entire state, all MPAs have positive effects on fish biomass

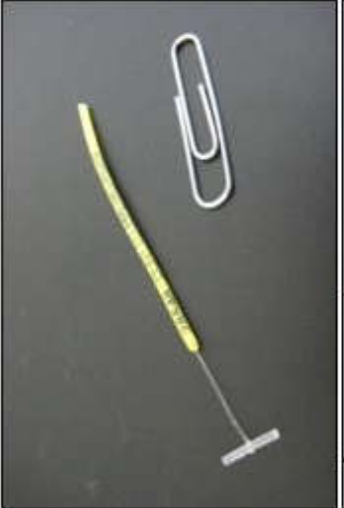


Questions?



"Do you mind
if I use your restroom?"

Tag Returns!





REWARD

for tag return information



Since 2007, Rick Starr (California Sea Grant Extension Program / Moss Landing Marine Laboratories) and Dean Wenat (California Polytechnic State University, San Luis Obispo) have been working with commercial fishermen, charter boat captains and recreational anglers to tag and release nearshore fishes out of Pajar Point, Monterey, Morro Bay and Port San Luis. The objective of this study is to obtain growth, movement and mortality rates of fishes found near Año Nuevo, Point Lobos, Piedras Blancas and Point Buchon MPAs in order to gain a better understanding of these economically important species.

If you catch a tagged fish (whether you keep it or throw it back), please record and report:

- date caught
- species and condition
- total length (snout to end of tail)
- tag number and whether or not it was bio-fouled
- GPS coordinates
- capture depth

Moss Landing Marine Laboratories
 8272 Moss Landing Road
 Moss Landing, CA 95039
 e: seagrant@miml.calstate.edu
 p: (831) 771-4479

San Luis Obispo Science & Ecosystem Alliance
 California Polytechnic State University
 San Luis Obispo, CA 93407
 e: coms-fisheries@calpoly.edu
 p: (805) 756-1419

To learn more about the California Collaborative Fisheries Research Program, visit:
<http://seagrant.miml.calstate.edu/research/ccfrp/> or
<http://www.slosea.org/collaborative/>



CA Collaborative Fisheries Research Program
 Thank you for reporting your tagged fish!



Copper Rockfish

Information about your fish:

Tag No. 13387	Tag	Recapture
Date	21 Jul 2008	14 Nov 2010
Latitude	36.557	36.530
Longitude	-121.941	-121.941
Depth	47 ft	65 ft
Length	31 cm / 12.2 in	44.5 cm / 17.5 in

To learn more about this program, visit:
<http://seagrant.miml.calstate.edu/research/ccfrp/>

Copper Rockfish (*Sebastes caurimus*)

Maximum Length: 67 cm (26.4 in); females get larger than males

Life span: 50 years

Range: Gulf of Alaska (USA) to Ilos San Benito, Baja California (MX)

Life History: A.K.A. "whitebelly" and "chucklehead"; young fish settle around algae and move to the bottom as they grow. Subadults and adults can be found on boulder fields or other rocky habitats, in aggregations or as solitary individuals. Copper Rockfish are relatively sedentary, remaining at a particular rocky outcrop for extended periods of time.

Your fish was tagged and released near Point Lobos State Marine Reserve, spent 846 days at liberty, and moved approximately 0.18 miles (net distance traveled).

Reference: Love, M.S., M. Yoklavich, and L. Thorsteinson. 2002. The Rockfishes of the Northeast Pacific. University of California Press, Berkeley and Los Angeles, CA, p. 204-206.

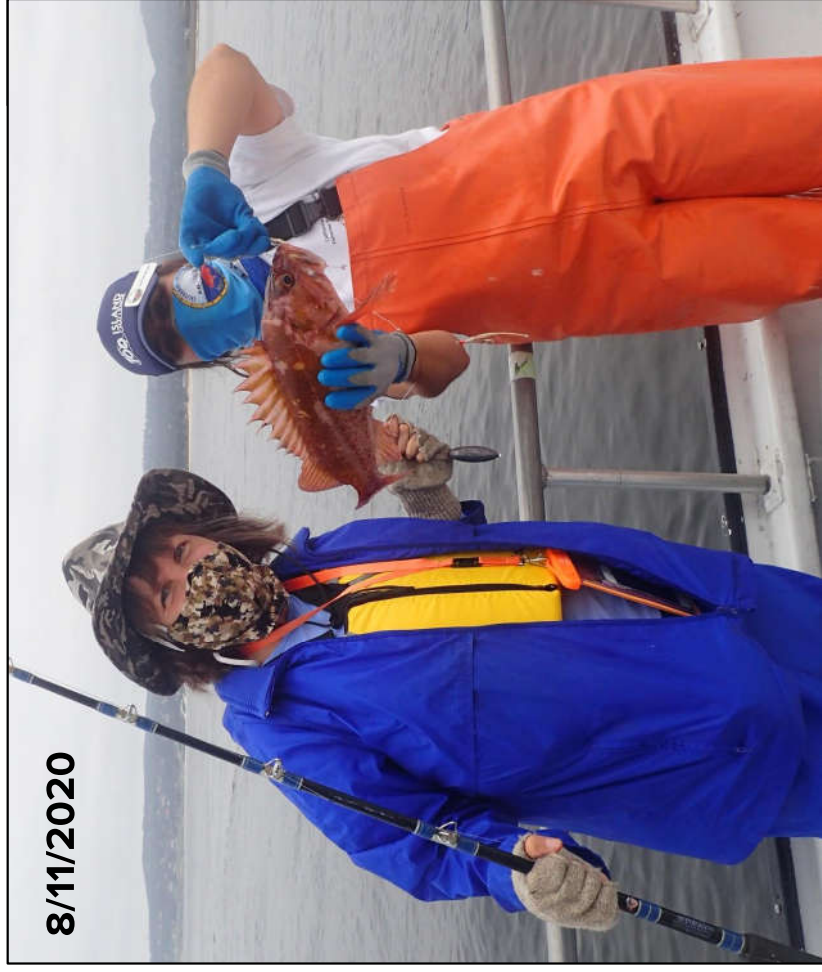
2020 MILMI Tag-Return Data

- In 2020, we **18** recaptured fishes: **1 Black Rockfish**, **1 Vermilion Rockfish**, **11 Copper Rockfish**, **1 Yellowtail Rockfish**, **1 Brown Rockfish**, and **3 Lingcod**
- **12** fishes were recaptured on our CCFRP trips and **6** were reported by anglers on chartered recreational trips!



Tag Return Highlights from 2020!

A Copper RF first caught by Sherrie R. was recaptured within a month by Katie S. in the same cell within the Point Lobos MPA



Tag Return Highlights from 2020!

A Copper RF first caught by Benny R. in 2017 was recaptured in the same Point Lobos MPA cell by Paul B. in 2020 after 1086 days at liberty!



Tag Return Highlights from 2020!

A female Lingcod first caught in 2019 by Kevin G. in the Año Nuevo reference area was recaptured by Jackie M. in the same area, growing 4cm in length after 393 days at liberty!



2019



2020

Tag Return Highlights from 2020!

A Copper RF originally caught by Ken Y. in 2018 was recaptured in the same cell within the Point Lobos MPA by John C. in 2020 growing 2cm during its 706 days at liberty!



Tag Return Highlights from 2020!

A Copper RF first caught by Ross W. in 2019, within the Point Lobos MPA, was recaptured by Raydon S. in the same cell in 2020 growing 1cm during its 328 days at liberty!



Tag Return Highlights from 2020!

- Two Copper RF were both tagged on September 19, 2017 in the same cell of the Point Lobos MPA and subsequently recaptured on August 12, 2020 in the same cell for a total of 1058 days at liberty each!
- A Black RF originally tagged on August 8, 2019 within the Año Nuevo MPA and recaptured August 18, 2020 grew 5 cm during its 376 days at liberty
- A Vermilion RF originally tagged on August 13, 2019 in the Point Lobos MPA was recaptured exactly 365 days later on August 12, 2020!



Tag Return Highlights from 2020!

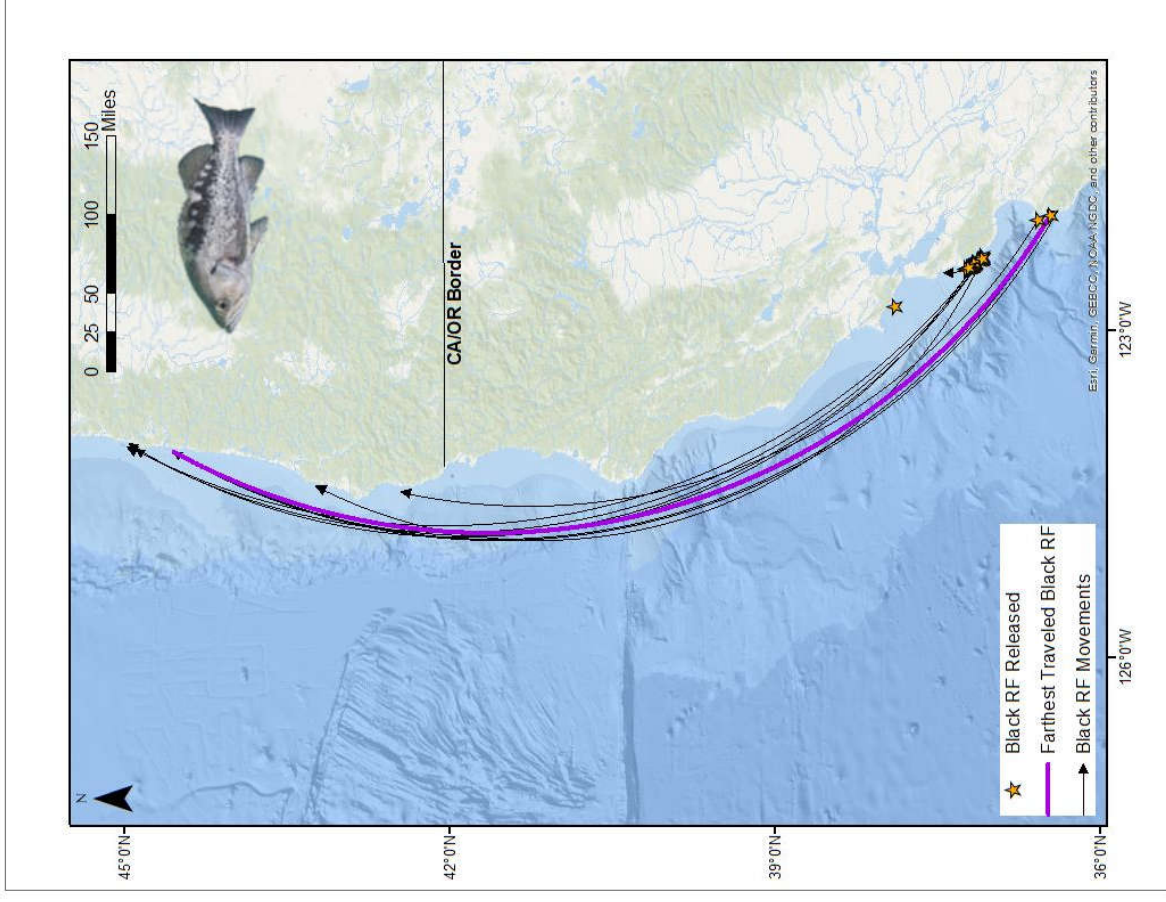
- A Yellowtail RF originally tagged in 2017 was recaptured on a charter boat in 2020 and traveled 6 miles from Cypress Point to Pacific Grove during its 1159 days at liberty
- A Copper RF first tagged in the Point Lobos reference area in 2016 was recaptured on a charter boat in 2020, within the same area. Its 1501 days at liberty makes this fish our longest at-liberty recaptured fish of our 2020 season!



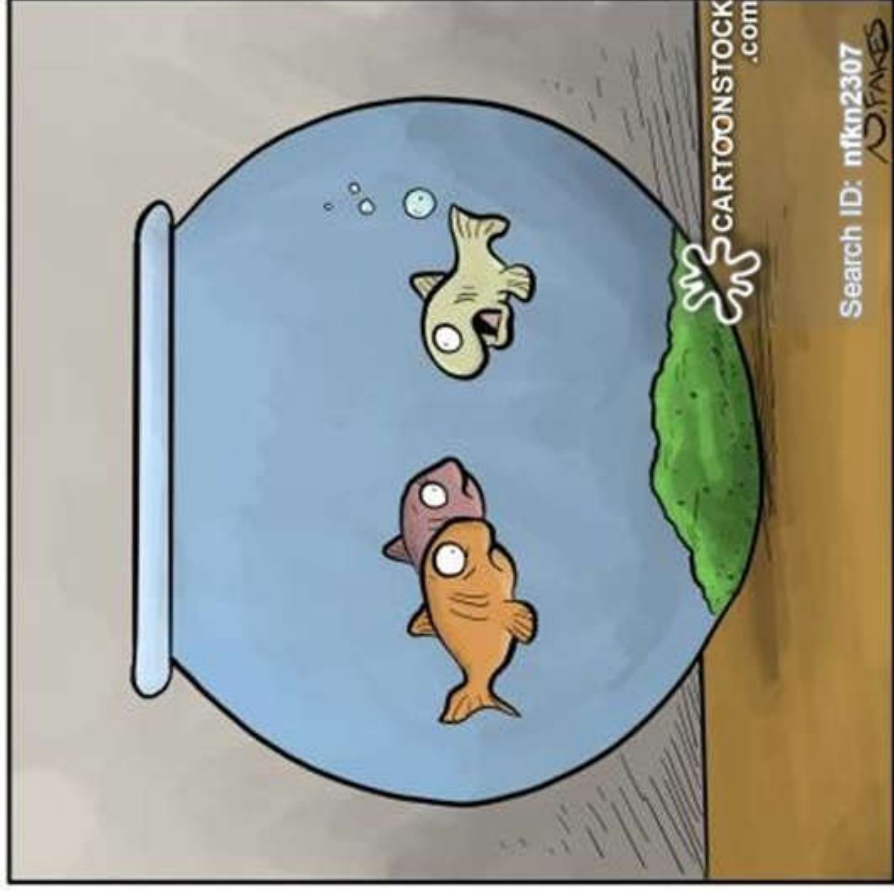
Uses of CCFRP Tag-Return Data

- Movement patterns are species specific
- Black RF tagged at Point Lobos recaptured 611 miles north off Heceta Bank, OR
- All tagged Black RF shown here moved north
- Accurate reporting of recapture location very important!
- These data will help us to assess how much spillover from MPAs is happening to benefit fisheries

Black RF Photo Credit: Scott Stevenson



Questions?



"Do you mind
if I use your restroom?"



How will CCERP data be used?





MPA Management Program



Photo: MPA Collaborative Network

Outreach and Education



Photo: CDFW, A. Van Diggelen

Research and Monitoring



Photo: CDFW, A. Van Diggelen

Enforcement and Compliance

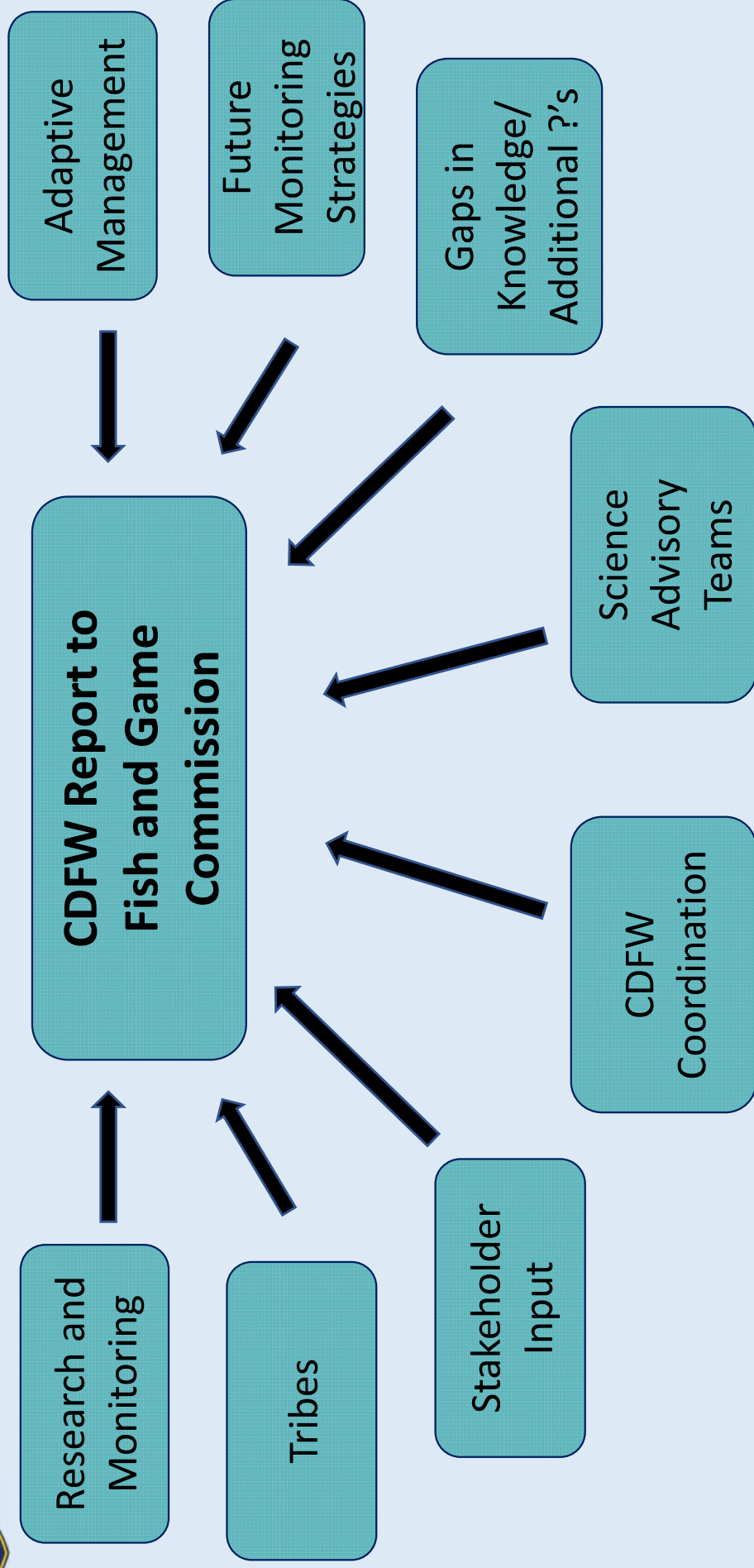


Photo: Jeff Landesmark

Policy and Permitting



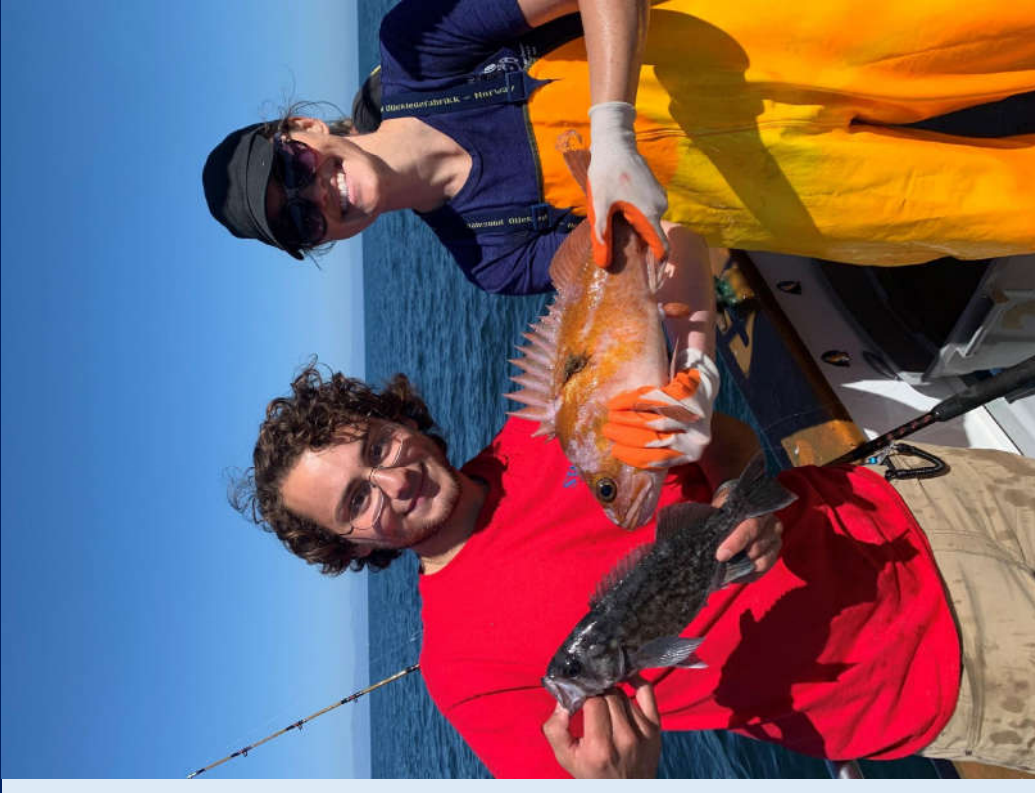
Decadal Management Review: 2022





Resources to stay up to date

- Fish and Game Commission meetings: fgc.ca.gov for meeting schedules
- Communications Plans
- MPA Collaboratives: mpacollaborative.org
- CCFRP involvement
- Marine Management News: cdfmarine.wordpress.com
- Send your questions to: AskMarine@wildlife.ca.gov

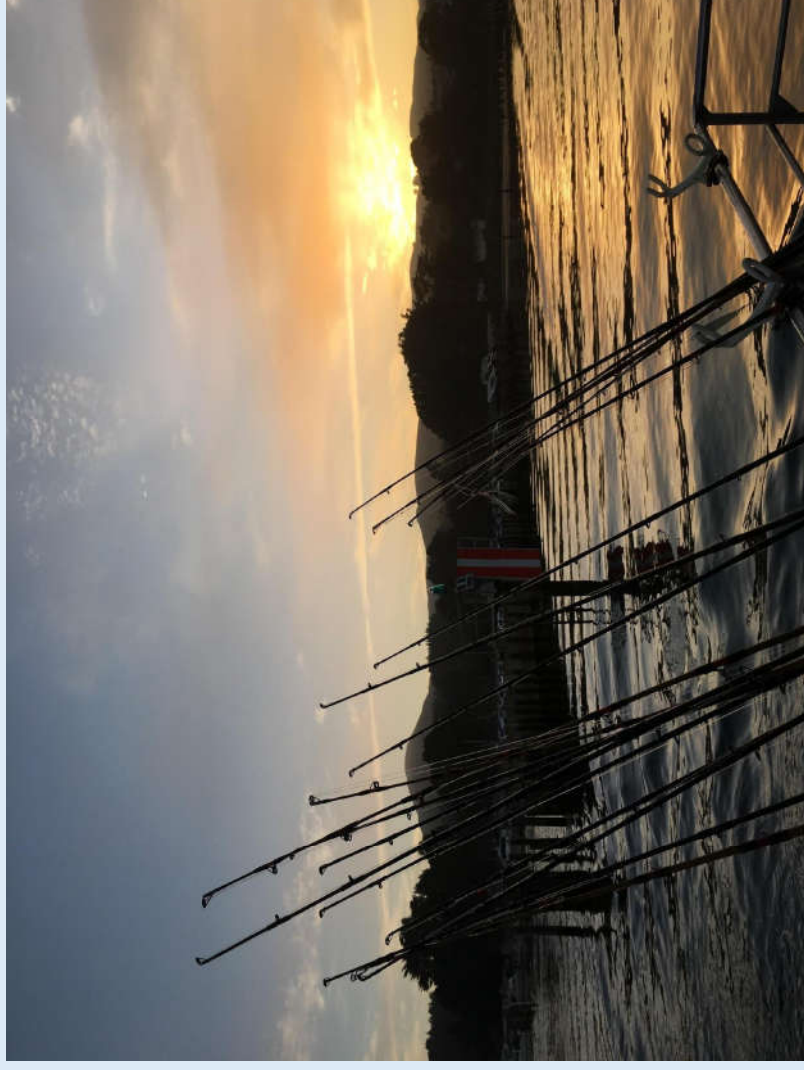




Questions?

Sara Worden, CDFW
Sara.worden@wildlife.ca.gov

Mike Esgro, OPC
Micheal.esgro@resources.ca.gov





But one metric is clearly very important...



Total Number of Caught Fishes (1,000+)

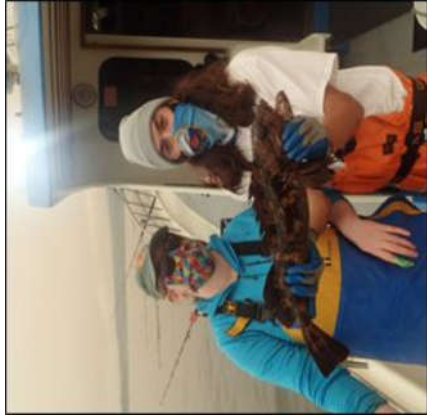
(MLML Trips Only)



Rank	Name	Total # of Caught Fishes
1	David K.	3,632
2	Darrell B.	3,357
3	Lester Y.	2,587
4	Nick I.	2,432
5	Ken Y.	2,227
6	Mike I.	1,811
7	Ben R.	1,659
8	Matt M.	1,642
9	Ron G.	1,495
10	Frank P.	1,346
11	Bob S.	1,287
12	Scott Y.	1,260
13	Ed M.	1,258
14	Jeremy H.	1,242
15	Bill S.	1,229
16	Jim R.	1,222
17	Gary A.	1,176
18	Paul R.	1,140
19	Bonnie R.	1,113

Who Caught the Most Fish

(MLML 2020 Only)



Rank	Name	Avg. # of Fishes/Trip
1	Sherrie R.	124
2	Tim S.	97
3	Michaela M.	89
4	Rick S.	86
5	Matthew W.	85
6	Raydon S.	83
7	Katie S.	79
8	Whitney B.	77
9	David O.	75
10	Jenn E.	72

Top 10: Average No. Fishes Caught per Trip

(All MLML Locations - 5 trips min.)



Rank	Name	Avg. # of Fishes/Trip
1	Bill S.	68.23
2	Joshua A.	59.9
3	Manuel P.	59.4
4	Victor A.	58.3
5	Richard K.	56.7
6	Chris A.	53.0
7	Keri C.	52.0
8	Kris H.	51.4
9	Gary K.	49.0
10	Stanley S.	49.0

Top 10: Average No. Fishes Caught per Trip

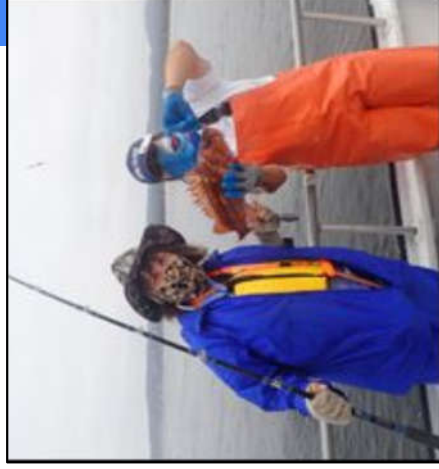
(Año Nuevo Only - 5 trips min.)



Rank	Name	Avg. # of Fishes/Trip
1	Manuel P.	57.2
2	Richard K.	55.6
3	Bill S.	49.9
4	Manny L.	47.8
5	Andy Y.	43.4
6	Ben S.	40.5
7	Bill D.	39.6
8	Dayton L.	39.5
9	Keri C.	39.4
10	Chris A.	35.6

Top 10: Average No. Fishes Caught per Trip

(Point Lobos Only - 5 trips min.)



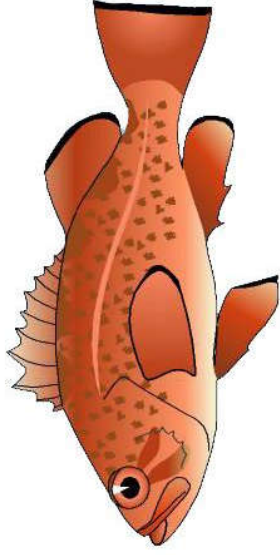
Rank	Name	Avg. # of Fishes/Trip
1	Joshua A.	69.8
2	Ben E.	54.0
3	John C.	43.17
4	Victor A.	42.3
5	Sherrie R.	40.8
6	Joan B.	39.9
7	Katie S.	39.9
8	Frank P.	39.6
9	Darrell B.	37.3
10	Paul R.	36.32

**Who caught the
LARGEST
fish?**

—

Largest Vermilion Rockfish

Sebastes miniatus



Gary K.: 58 cm (22.8 in)
Año Nuevo REF '19

Ben S.: 56 cm (22 in)
Año Nuevo REF '12

Gary K.: 56 cm (22 in)
Año Nuevo REF '19

Gary K.: 56 cm (22 in)
Año Nuevo REF '19

Daniel S.: 56 cm (22 in)
Point Lobos MPA '11

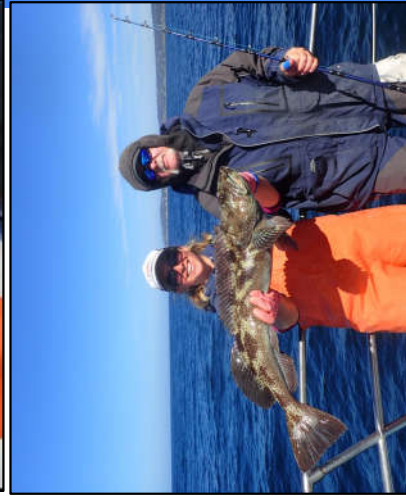
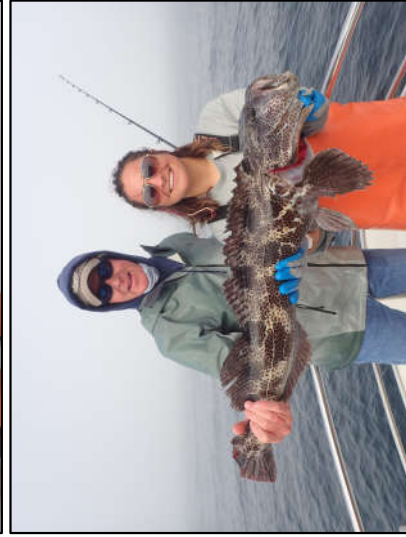
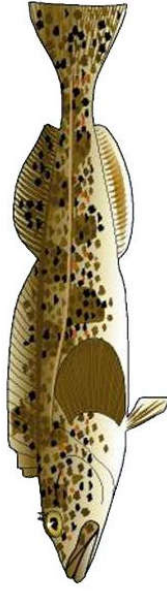
Darrell B.: 55 cm (21.7 in)
Point Lobos REF '14

Lester Y.: 55 cm (21.7 in)
Año Nuevo MPA '20

Ben R.: 55 cm (21.7 in)
Año Nuevo REF '16

Largest Lingcod

Ophiodon elongatus



Ed M.: 102 cm (40.2 in)
Año Nuevo MPA '14

Ed M.: 100 cm (39.37 in)
Año Nuevo MPA '16

Nick I.: 99 cm (39.0 in)
Año Nuevo REF '14

Scott Y.: 99 cm (39.0 in)
Año Nuevo REF '18

Andrew T.: 97 cm (38.1 in)
Año Nuevo MPA '16

Ken Y.: 96 cm (37.8 in)
Año Nuevo MPA '19

Matt M.: 94 cm (37 in)
Point Lobos MPA '17

Dayton L.: 93 cm (36.6 in)
Año Nuevo MPA '15

Fish Illustration by Larry Allen

Who caught the smallest fish?

—

Smallest Fishes



Phil E.: Gopher Rockfish, 5 cm (2.0 in)
Point Lobos MPA '14

Dave K.: Gopher Rockfish, 6 cm (2.4 in)
Point Lobos REF '15

Darrell B & Michael C.: Blue Rockfish, 6 cm (2.4 in)
Point Lobos REF '13

Paul R.: Scalyhead Sculpin, 6 cm (2.4 in)
Point Lobos REF '12

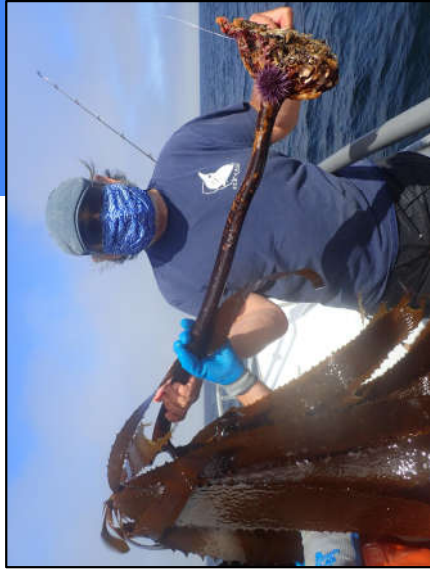
Bonnie R.: Blue Rockfish, 7 cm (2.8 in)
Point Lobos REF '12

Matthew D.: Scalyhead Sculpin, 8 cm (3.1 in)
Año Nuevo MPA '18

Andrew V.: Unknown Rockfish, 8 cm (3.1 in)
Año Nuevo MPA '20

Joan B.: Yellowtail Rockfish, 8 cm (3.1 in)
Point Lobos REF '14

Unique Catches From 2020



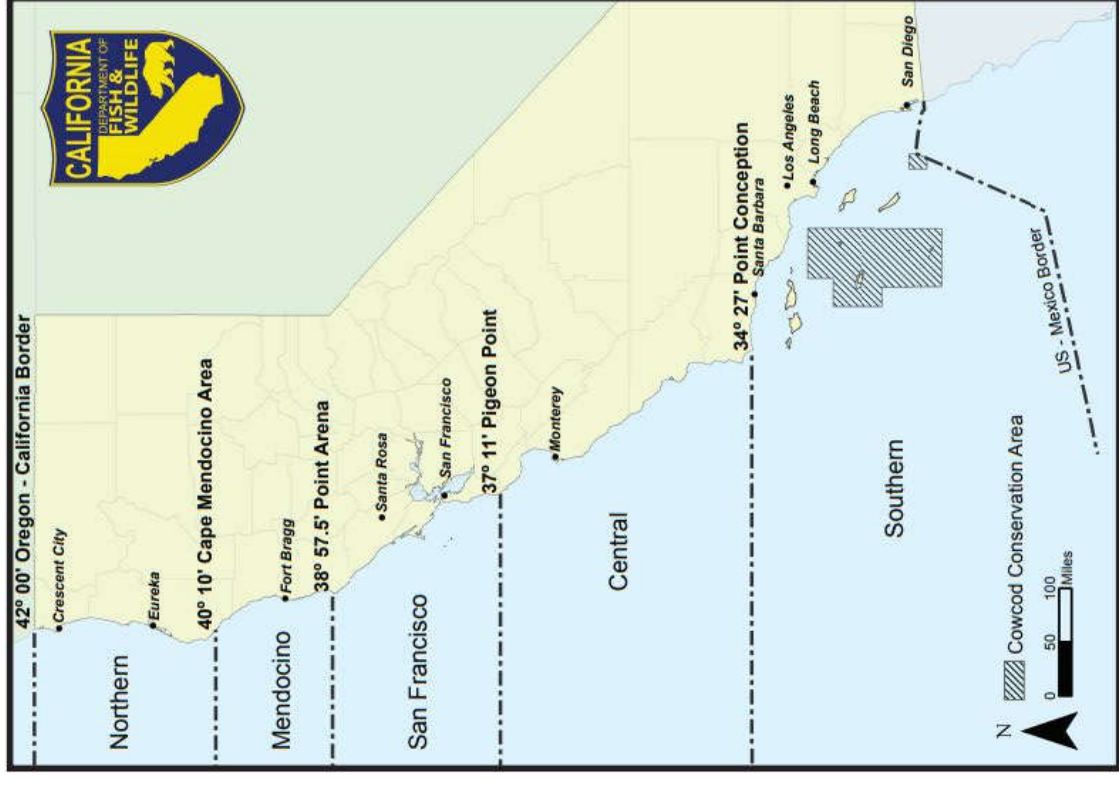
Want to know your fish stats from the MILLMI 2020 sampling season?

Send us an email at
ccfrp@miml.calstate.edu



CDFW Regulations 2021

- **Central Management Area**
- Rockfish, cabezon, kelp/rock greenling, lingcod
 - Closed between January 1 – March 31
 - Cannot fish seaward of the 50 fathom depth contour (300 feet)
 - See CDFW website for 2021 ocean sportfishing regulations pamphlet



CDFW Regulations 2021

NO RETENTION:

Bronzespotted RF



Yelloweye RF



Cowcod



Photos: Milton Love, ODFW, Bonnie Brown

CDFW Regulations 2021

- RCG Complex (Rockfish, Cabezon, Greenlings)
 - Daily Bag Limit- 10 fish in combination/person
 - No sub bag limits
 - EXCEPT: Vermilion Rockfish- 5 fish/person
- Cabezon- 15” total length
- Kelp/Rock Greenling- 12” total length
- Lingcod- 2 fish/person, 22” total length

CDFW Regulations 2021

CDFW Office & Regulation Booklet

CDFW Website

Recreational Groundfish Fishing Regulations Hotline:

831-649-2801

Californians Turn in Poachers and Polluters (CaTIP):

1-888-334-2258



**Find us on Social
Media!
@CCFRP**



Photo: Fisheries and Conservation Biology Lab

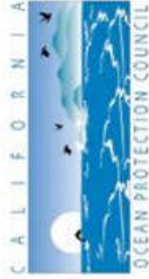
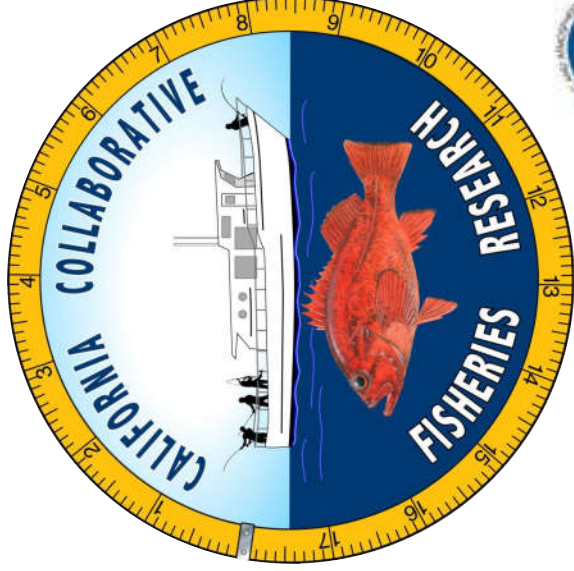


Thank You!

CA Collaborative Fisheries Research Program

8272 Moss Landing Road | Moss Landing, CA 95039

p: (831) 771-4443 e: CCFRP@mlml.calstate.edu f: (831) 632-4403



The California Collaborative Fisheries Research Program is a collaborative effort among researchers

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For more information, like us on Facebook and Instagram, or visit us at <https://www.mlml.calstate.edu/ccfrp/>