



CCFRP

MLML 2022 VOLUNTEER NEWSLETTER A SUMMARY OF THE 2021 SAMPLING SEASON



GREETINGS VOLUNTEERS!

The 2021 sampling season was a great success! We want to thank all our volunteer anglers who helped in this year's surveys as well as the captains and crew of the F/V Huli Cat, F/V Kahuna, and F/V New Horizon. With your help, MLML has successfully completed our 15th year of data collections inside and outside the Año Nuevo and Point Lobos State Marine Reserves (SMR)! Our statewide effort remains strong, and all partner institutions were able to get out for another successful field season. The NOAA National Marine Fisheries Service (NMFS) continues to use the information we collect to improve stock assessments of nearshore fishes and we are excited to say that both the California Department of Fish and Wildlife (CDFW) and the Ocean Protection Council (OPC) are using the information we've collected over the years to understand the effects of MPAs on the nearshore ecosystem. We can't thank everyone enough for their dedication and support! We're already looking forward to the 2022 season!

ANGLER WORKSHOP NEWS

At this time, we would like to invite you to our virtual volunteer angler appreciation event and data workshop. This is an excellent opportunity to hear about the data we have collected over the past fifteen seasons. We welcome your attendance and involvement! The event will be held on:

March 12th from 10 AM to 12 PM (via ZOOM)

If you would like to attend, RSVP through our [new email](mailto:mlml-ccfrp@sjsu.edu) (mlml-ccfrp@sjsu.edu) so we can plan accordingly. An additional email will be sent out soon with more workshop details. Stay tuned for updates through email, our website, Facebook, Instagram, Twitter and YouTube!



2021 HIGHLIGHTS



LARGEST catches from 2021 and smallest



BLACK ROCKFISH
minimum : 8 cm (3 in)
maximum: 54 cm (21 in)



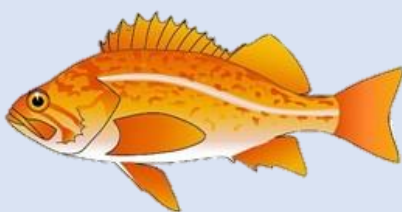
BROWN ROCKFISH
minimum : 17 cm (7 in)
maximum: 48 cm (19 in)



BLUE ROCKFISH
minimum : 10 cm (4 in)
maximum: 39 cm (15 in)



CABEZON
minimum: 35 cm (22 in)
maximum: 56 cm (14 in)



CANARY ROCKFISH
minimum : 18 cm (7 in)
maximum: 40 cm (16 in)



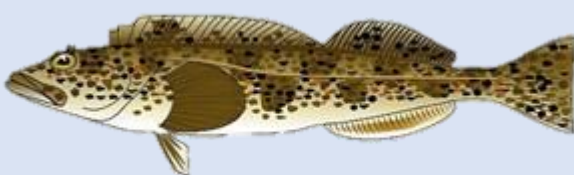
CHINA ROCKFISH
minimum : 23 cm (9 in)
maximum: 36 cm (14 in)



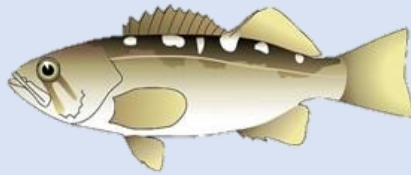
COPPER ROCKFISH
minimum : 21 cm (8 in)
maximum: 51 cm (20 in)



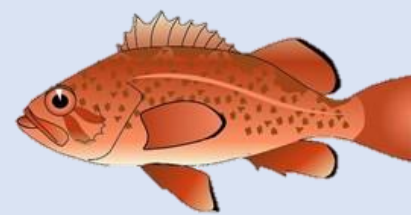
GOPHER ROCKFISH
minimum : 14 cm (6 in)
maximum: 36 cm (19 in)



LINGCOD
minimum : 28 cm (11 in)
maximum: 89 cm (35 in)



OLIVE ROCKFISH
minimum : 15 cm (6 in)
maximum: 49 cm (19 in)



VERMILION ROCKFISH
minimum : 18 cm (7 in)
maximum: 54 cm (21 in)



YELLOWTAIL ROCKFISH
minimum : 12 cm (5 in)
maximum: 41 cm (16 in)

Tag-Recaptures from 2021

Tag returns are an exciting part of our program and one way that we learn about the movements and growth rates of fishes we catch and release on our trips. In 2021, we recaptured 10 fishes from 4 different species, and all were from CCFRP sampling trips!



GOPHER ROCKFISH

We had one Gopher Rockfish (*Sebastes carnatus*) recapture this season. **Ed M.** (top photo) recaptured this Gopher Rockfish caught 3 years prior by **Ken Y.** (bottom photo) in the Año Nuevo REF area. During its 1,103 days at liberty, this fish grew approximately 1 cm in length.



2021



2018



COPPER ROCKFISH

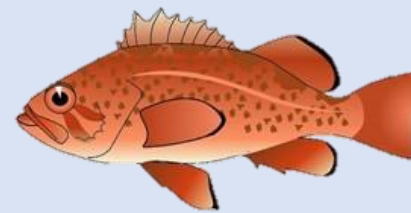
Copper Rockfish (*Sebastes caurinus*) made up the bulk of our recaptures this year, accounting for 6 of the 10 recaptures!



Eddie G. (top left) recaptured two different Copper Rockfish in the same Point Lobos MPA grid cell that they were originally tagged in 30 days prior by **Ron S.** (top right) and **John C.** (top middle).



A Copper Rockfish originally tagged by **Mike I.** in the Point Lobos MPA was recaptured by **Joan B.** almost 4 years later!



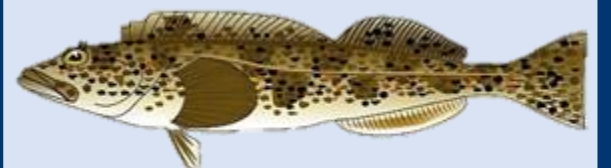
VERMILION ROCKFISH

We had two Vermilion Rockfish (*Sebastes miniatus*) recaptures this season, both within the Año Nuevo MPA. One of the Vermilion Rockfish was recaptured by **Jack H.** (pictured below) this year after originally being tagged in 2018 by **Sarah C.**

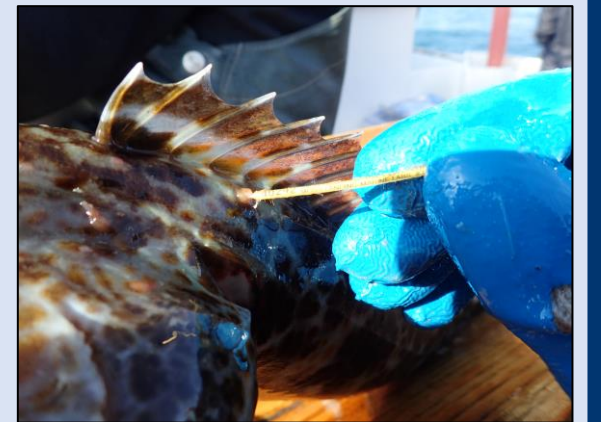
2021



Shawn T. caught the second Vermilion Rockfish recapture in 2021. This Vermilion Rockfish was originally tagged in 2018 by **Beverly S.** and after 1,106 days at liberty grew approximately 1 cm.



LINGCOD



We had one Lingcod (*Ophiodon elongatus*) recapture in 2021. **Alex N.** recaptured this Lingcod caught almost 4 years prior by **EC O.** in the Año Nuevo MPA. During its 1,469 days at liberty this Lingcod grew approximately 7 cm in length.



Please check for tags next time you are out fishing!

We don't get to fish as much as our volunteers (or as much as we'd like to), so we have to rely on the help of the fishing community to gather this important information. Remember that information from a tagged fish is worth \$20! If you happen to catch a tagged fish, please record the species, length, depth, and location, and contact

mlml-ccfrp@sjsu.edu or (831) 771-4479

LARGEST catches of all time (2007-2021)

Below are some of Moss Landing Marine Labs' largest fishes ever caught, by species.
Total Lengths are listed along with angler, area, site (MPA/REF), and year.



BLACK ROCKFISH

Total Length: 54 cm (21 in)

Randy W., Año Nuevo MPA '21



BROWN ROCKFISH

Total Length: 48 cm (19 in)

Jahnava D., Año Nuevo MPA '21
Scott Y., Año Nuevo MPA '17
Ben S., Año Nuevo MPA '16



BLUE ROCKFISH

Total Length: 45 cm (18 in)

Ray Y., Año Nuevo MPA '08
Mike I., Point Lobos REF '15



CABEZON

Total Length: 64 cm (25 in)

EC O., Año Nuevo REF '16 (x2)



CANARY ROCKFISH

Total Length: 56 cm (22 in)

Amy M., Año Nuevo REF '11



CHINA ROCKFISH

Total Length: 39 cm (15 in)

Kevin M., Año Nuevo REF '10



COPPER ROCKFISH

Total Length: 52 cm (20 in)

Darrell B., Point Lobos MPA '17



GOPHER ROCKFISH

Total Length: 43 cm (16 in)

Scott Y., Año Nuevo REF '20



LINGCOD

Total Length: 102 cm (40 in)

Ed M., Año Nuevo MPA '14



OLIVE ROCKFISH

Total Length: 50 cm (20 in)

David R., Point Lobos MPA '07
Alan B., Point Lobos MPA '08
Nick I., SE Farallon Islands REF '18



VERMILION ROCKFISH

Total Length: 56 cm (22 in)

Daniel S., Point Lobos MPA '11
Ben S., Año Nuevo REF '12



YELLOWTAIL ROCKFISH

Total Length: 44 cm (17 in)

Ken Y., Año Nuevo MPA '15
Matt M., Point Lobos MPA '18













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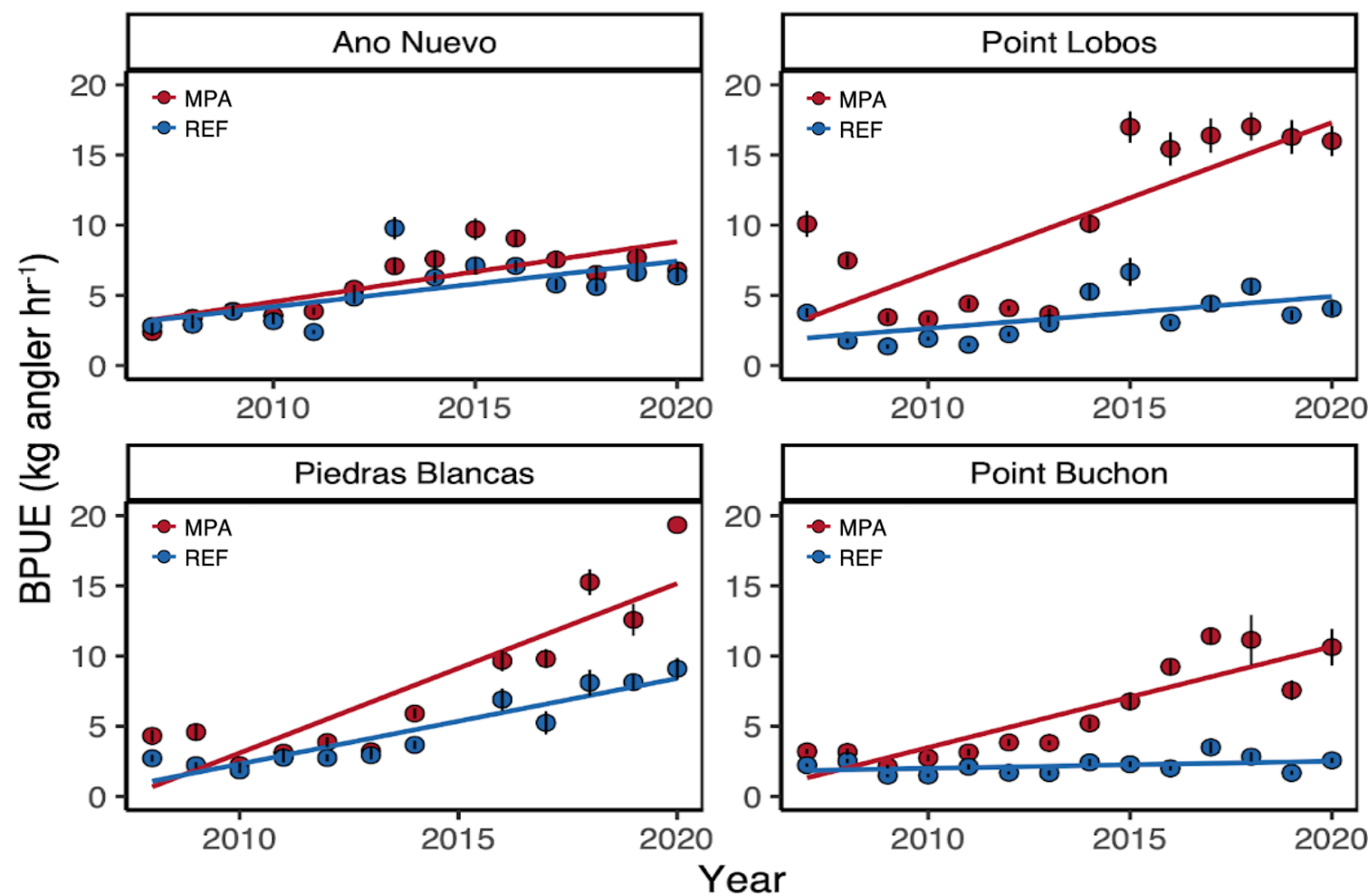


CENTRAL CALIFORNIA MPA PERFORMANCE (2007-2020)

Top 10 most abundant species (average 2007-2020)

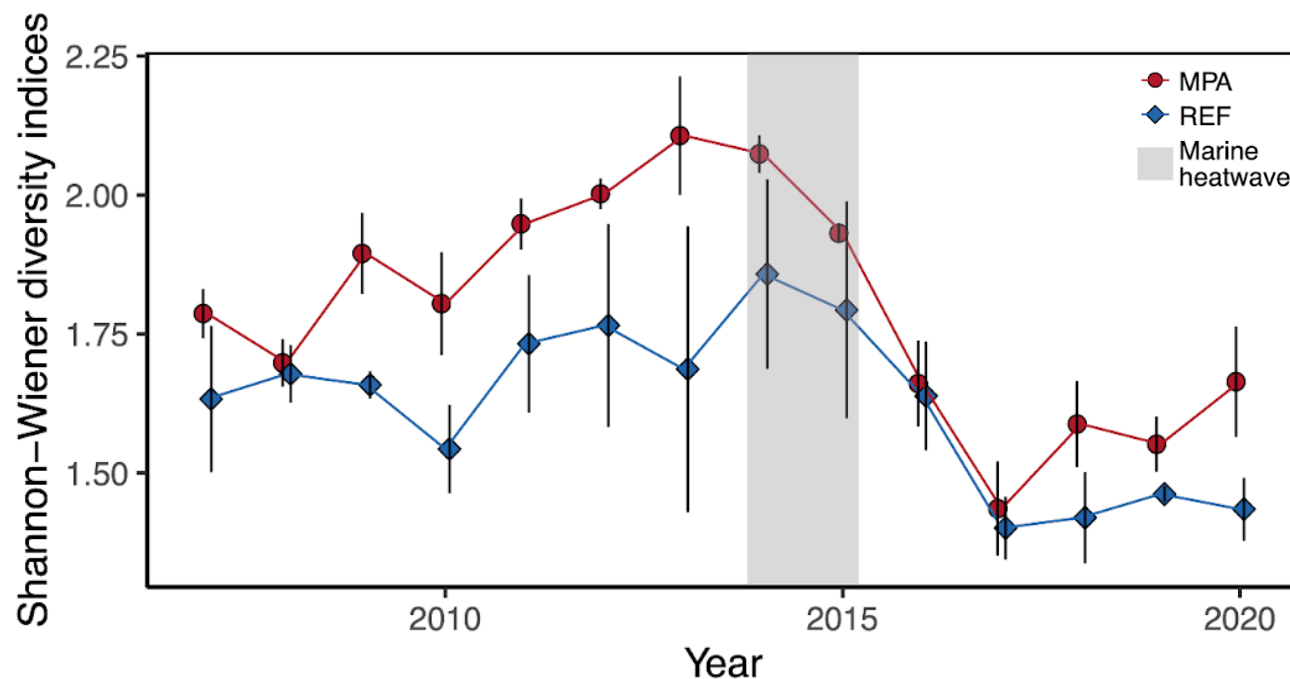
↑ Greater in MPA
↓ Greater in REF

Common Name	Abundance	Length	Biomass
 Black Rockfish	↓	↑	↓
 Blue/Deacon Rockfish	↑	↑	↑
 Canary Rockfish	↑	↑	↑
 Copper Rockfish	↑	↑	↑
 Gopher Rockfish	↑	↑	↑
 Kelp Rockfish	↑	↑	↑
 Lingcod	↑	↑	↑
 Olive Rockfish	↑	↑	↑
 Vermilion Rockfish	↑	↑	↑
 Yellowtail Rockfish	↑	↑	↑



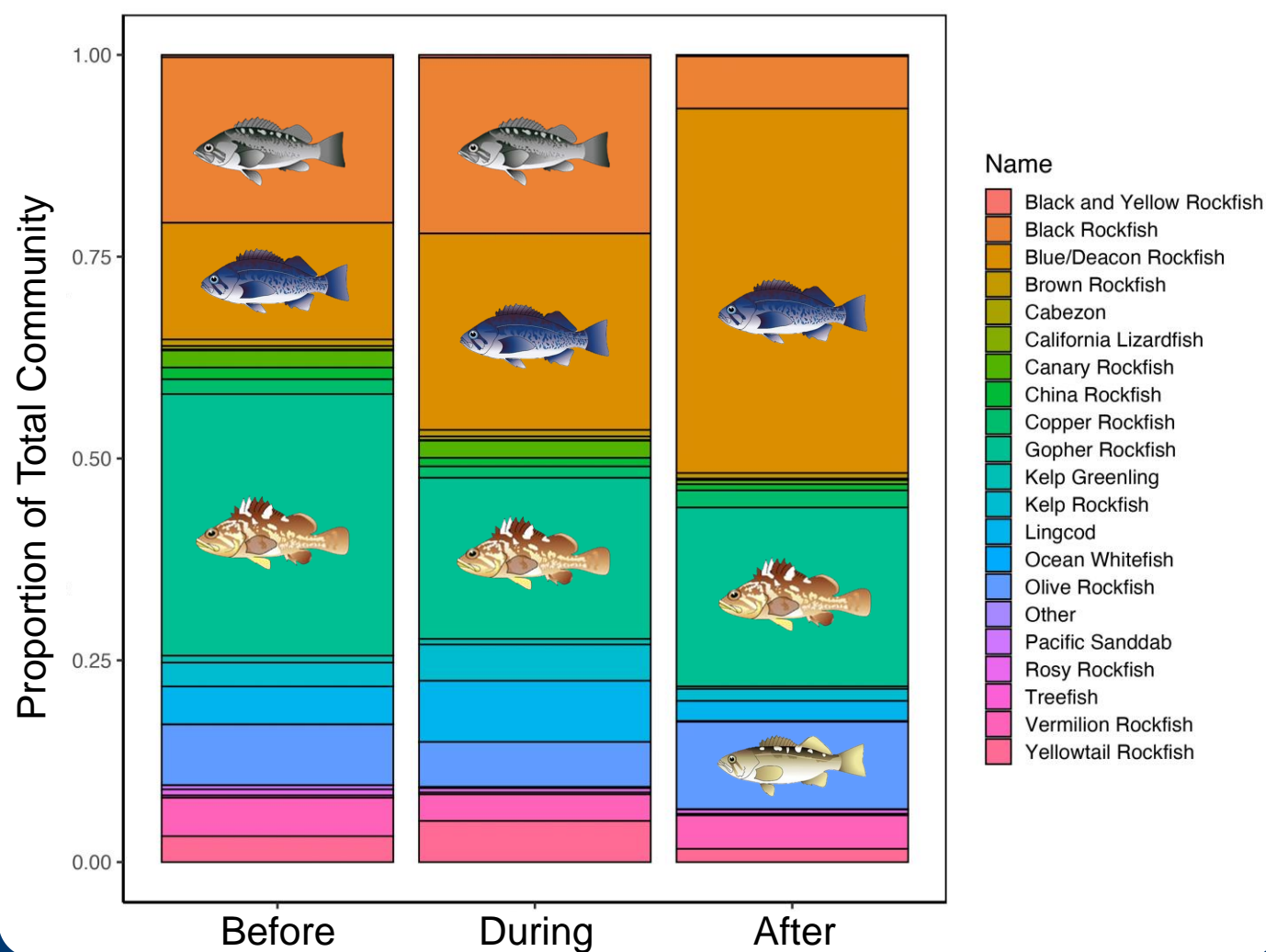
By using the number of fishes caught, and fish lengths from the measurements we collect, we can calculate the weight (biomass) of all fishes caught for each site. The figure above shows the trends in biomass per unit effort (BPUE), represented as the weight of total fishes caught per angler hour for the 4 central coast locations through time. Overall, we see that total fish biomass is increasing through time at all sites, but the difference in fish biomass between the MPA and REF varies by location.

CHANGES IN COMMUNITY STRUCTURE after 2014-2015 marine heatwave



Diversity declined after the 2014-2015 **marine heatwave** in both MPAs and reference sites, however, MPAs have started to recover faster

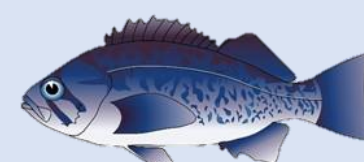
Fish communities became more homogenous after the 2014-2015 **marine heatwave** dominated by the Blue/Deacon Rockfish complex.



Species driving changes in community composition after 2014-2015 **marine heatwave**



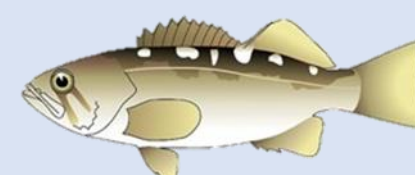
BLACK ROCKFISH



BLUE/DEACON
ROCKFISH COMPLEX



GOPHER ROCKFISH



OLIVE ROCKFISH



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UPDATES FROM MLML CCFRP CREW!

We would like to extend a warm welcome to our new graduate students, **Molly** and **Konnor**! Konnor is joining us from the University of Miami where he majored in marine science and minored in math. Molly is joining us from Northeastern University where she majored in marine biology. Both have strong backgrounds studying elasmobranchs and are currently exploring thesis ideas. We would also like to congratulate **Bonnie** and **Rachel** for successfully defending their theses this past spring/summer! We're all working hard behind the scenes analyzing data collected by CCFRP in preparation for CDFW's 2022 decadal review of California's MPA Network.

WELCOME MOLLY & KONNOR!



PLEASE TAKE A MINUTE TO LIKE
CCFRP ON FACEBOOK AND FOLLOW
US ON INSTAGRAM, YOUTUBE, AND
TWITTER (@CCFRP)



MLML's fearless leaders, **Dr. Rick Starr & Dr. Scott Hamilton**, continue to seek out funding, find innovative applications for our data, and offer useful advice to our team. Both have a very busy schedule that prevent them from getting out on the water as often as they would like, but we were excited to have Rick and Scott on a few trips this season!



CONGRATULATIONS BONNIE & RACHEL!



Bonnie defended her thesis entitled "Geographic and Ontogenetic Variation in the Trophic Ecology of Lingcod (*Ophiodon elongatus*) Along the U.S. West Coast"



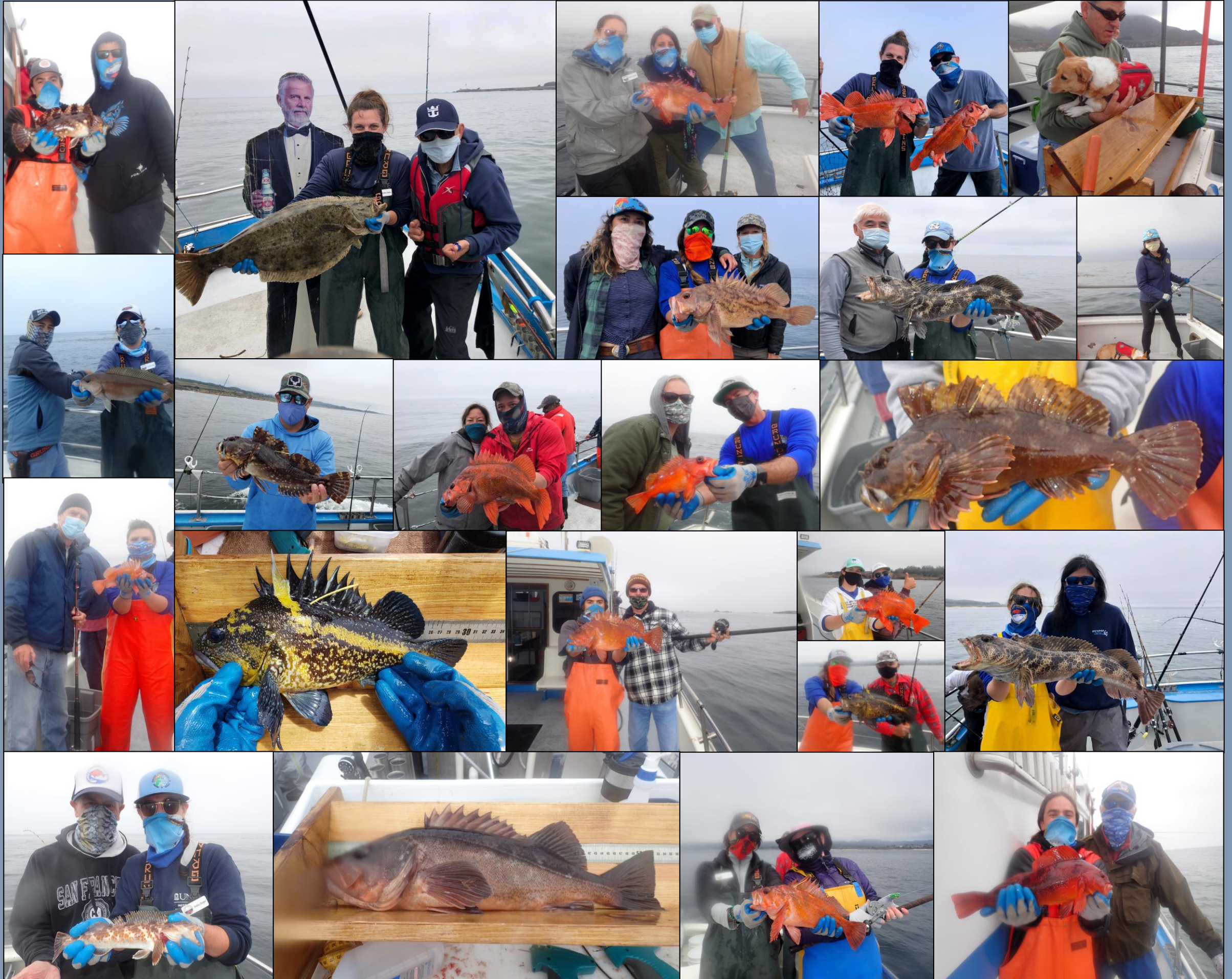
Rachel defended her thesis entitled "Geographic variation in the life history and demography of Canary Rockfish, *Sebastes pinniger*, along the U.S. West Coast"



WE ALL THOROUGHLY
ENJOYED WORKING WITH
YOU THIS SEASON AND
CAN'T WAIT FOR 2022!

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THANK YOU FOR YOUR CONTINUED SUPPORT!



We would like to extend a big thanks to our program partners and research affiliates this season: The Ocean Protection Council, NOAA National Marine Fisheries Service, Santa Monica Seafood, California Department of Fish and Wildlife, Humboldt State University, Bodega Marine Laboratories, Cal Poly San Luis Obispo, UC Santa Barbara, and Scripps Institution of Oceanography. Most importantly, we would like to thank the crew and captains of the F/V Huli Cat, F/V Kahuna, and F/V New Horizon.



NOAA FISHERIES

SJSU

SAN JOSÉ STATE
UNIVERSITY



OCEAN
PROTECTION
COUNCIL



The Nature
Conservancy



<https://mlml.sjsu.edu/fisheries/ccfrp/>