

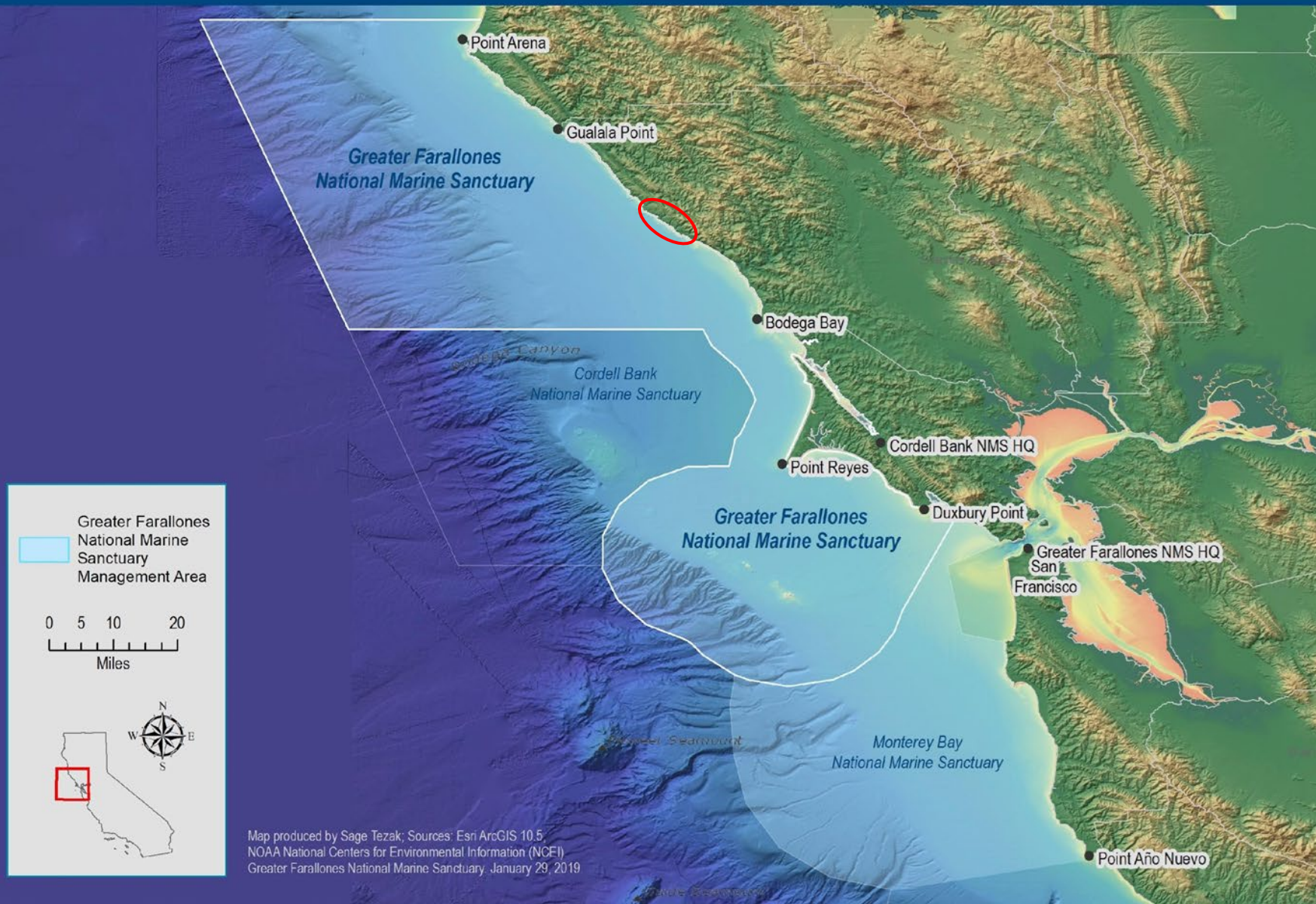


Restoration of Kelp Forest Habitat in Greater Farallones National Marine Sanctuary

Rietta Hohman
Kelp Restoration Manager
Greater Farallones Association
Greater Farallones and Cordell Bank National Marine Sanctuaries
(NOAA Affiliate)

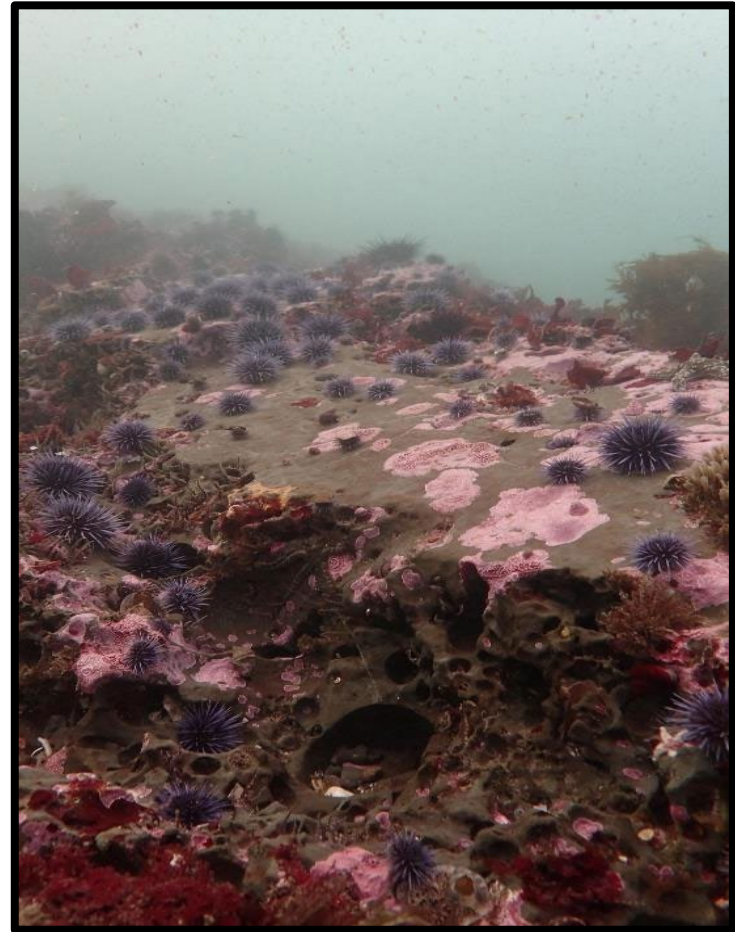


Greater Farallones National Marine Sanctuary Management Area





NOAA



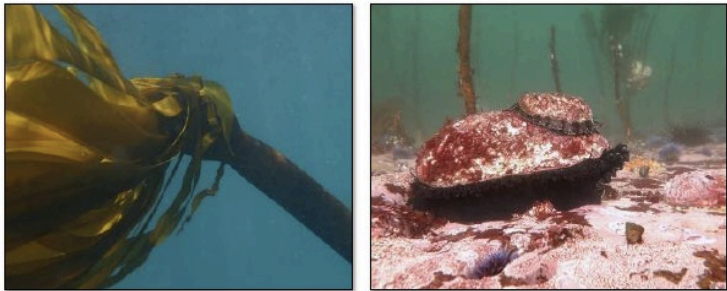
CDFW

>90% decline in kelp forest habitat in the sanctuary

GFA-GFNMS/CBNMS Kelp Restoration Project

Sonoma-Mendocino Bull Kelp Restoration Plan

For Greater Farallones National Marine Sanctuary
and California Department of Fish & Wildlife



April 2019

- Development of Sonoma-Mendocino Bull Kelp Restoration Plan by GFA (2019)
- GFA-GFNMS/CBNMS Kelp Restoration Project established (2019)
- Restoration and research funded by state and federal resources 2022-2024
- Collaboration with California Department of Fish and Wildlife, Sonoma State University, Moss Landing Marine Labs, UC Davis Bodega Marine Lab

Kelp Restoration in Greater Farallones National Marine Sanctuary

Objectives:

- Protect and defend new and existing kelp growth within areas of high historical persistence
- Explore the best methods for outplanting to increase kelp recruitment
- Determine localized impact of environmental conditions on kelp dynamics
- Explore feasibility for scaling up restoration in the sanctuary

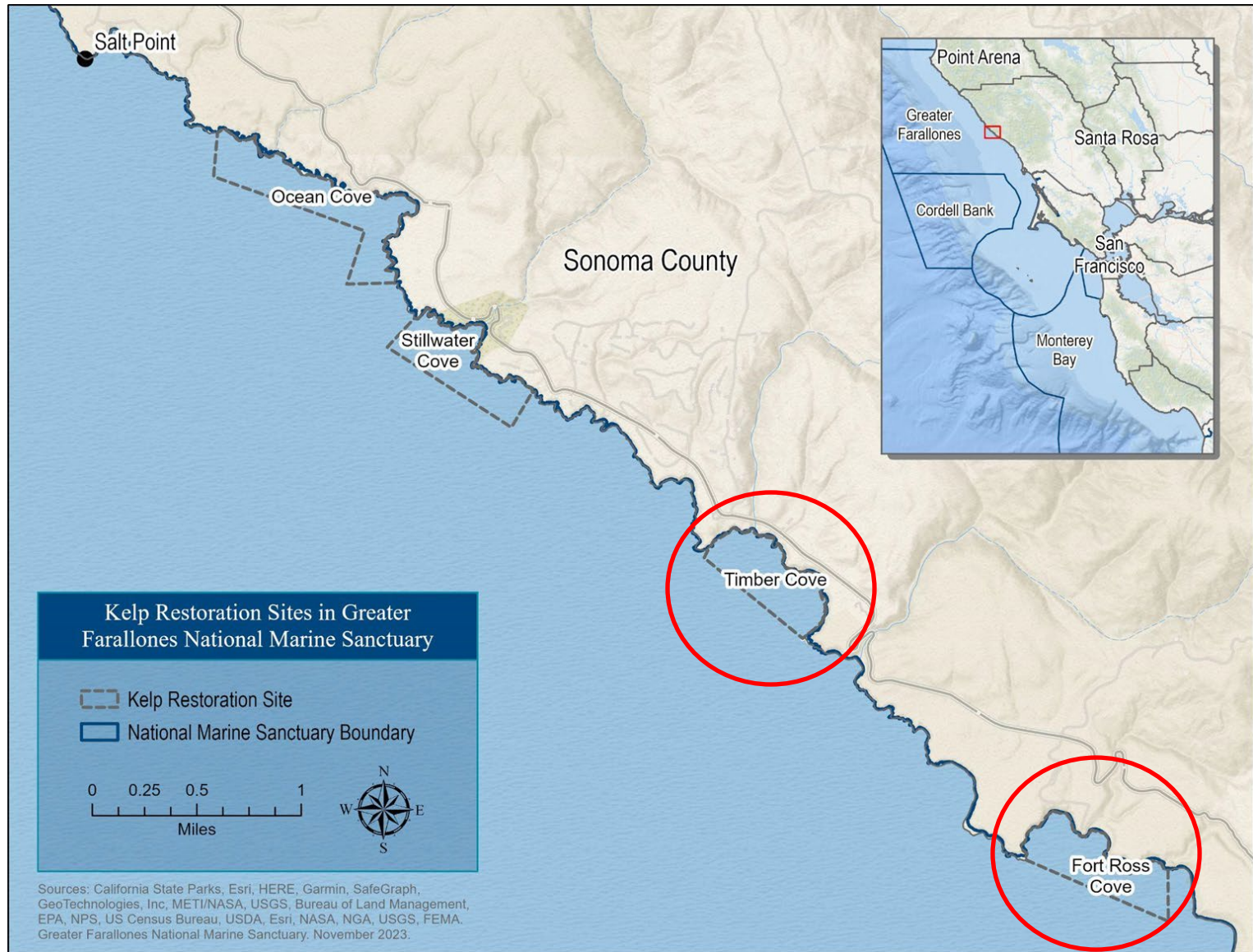


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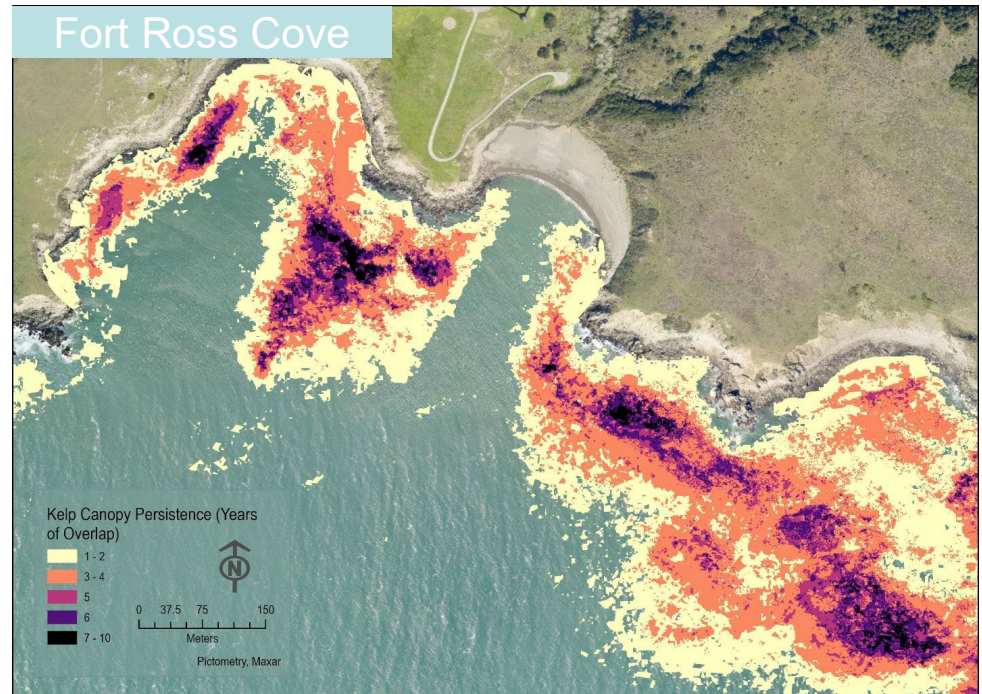
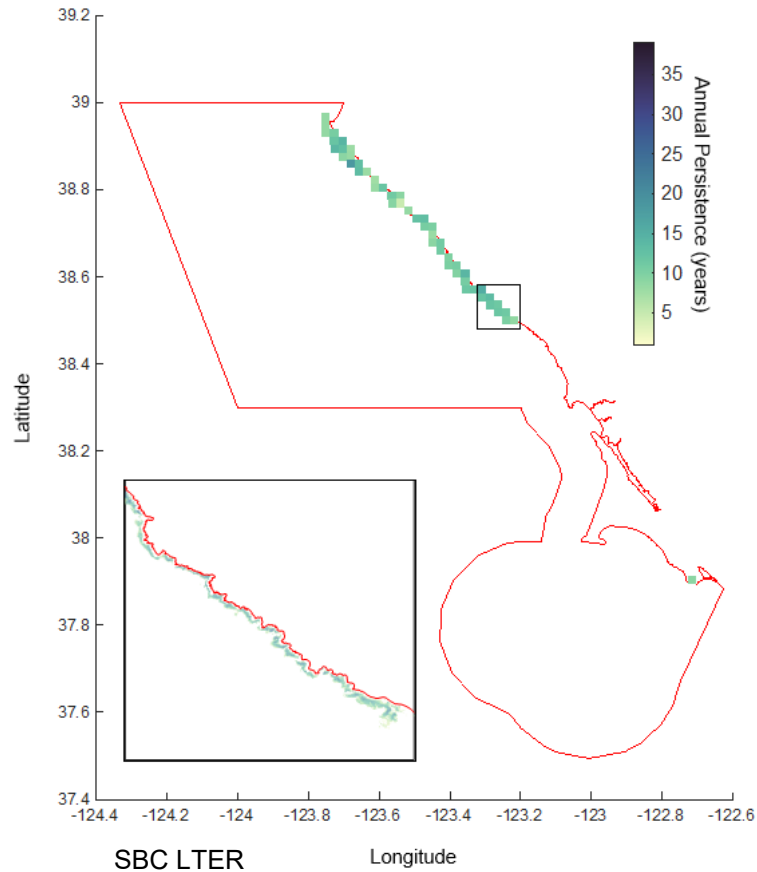


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Sonoma Kelp Restoration Sites



Restoration Site Selection



Urchin Removals in 2023-2024

- Urchins removed from restoration sites by five local commercial urchin divers
- GFA purchases urchins with a fish buyer's license
- Dandy Fish Company offloads and transports them to compost facility
- Over 67,000 lbs of urchins removed from two sites since September 2023



Gina Contolini GFA-GFNMS/CBNMS

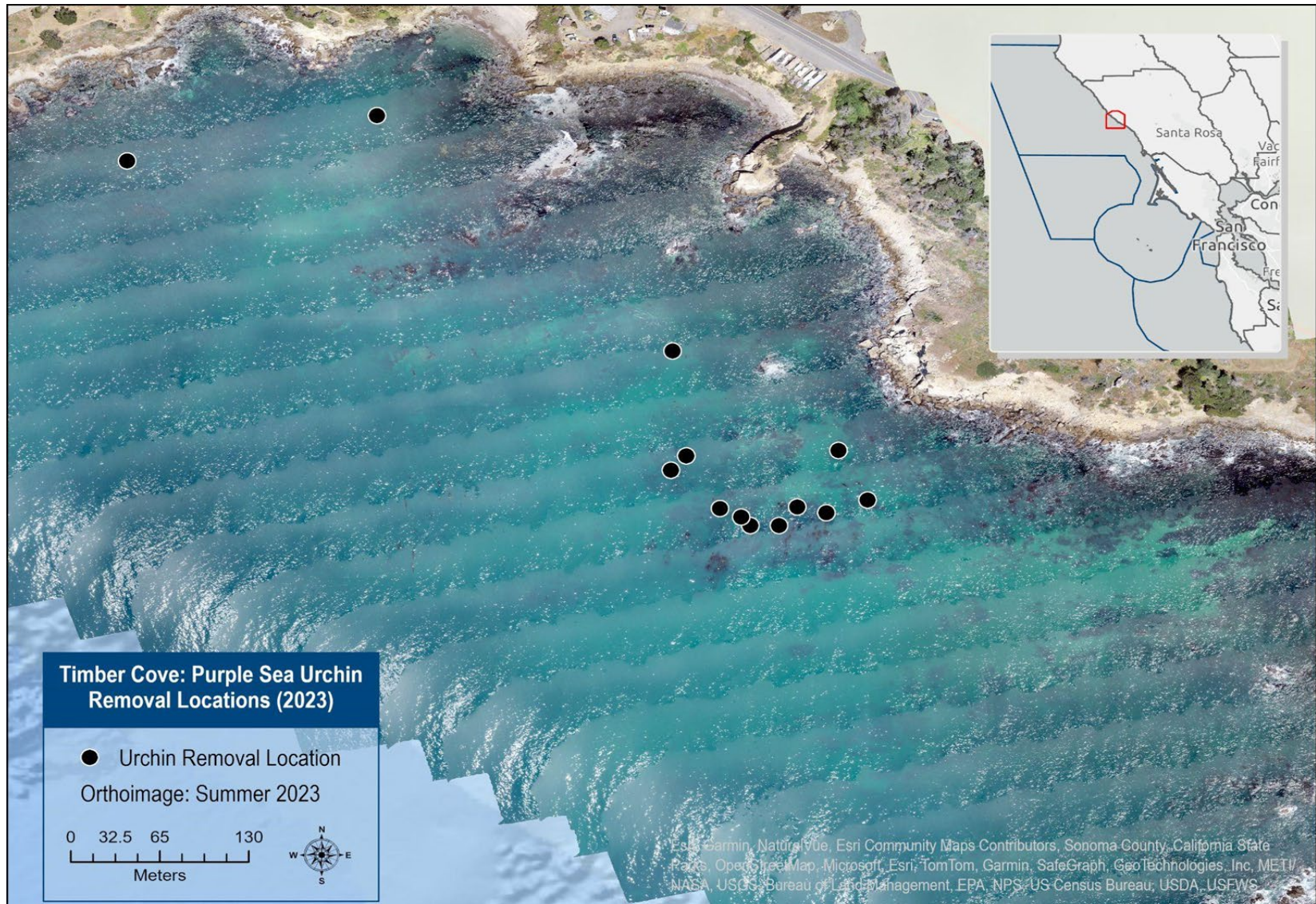


Rietta Hohman GFA-GFNMS/CBNMS

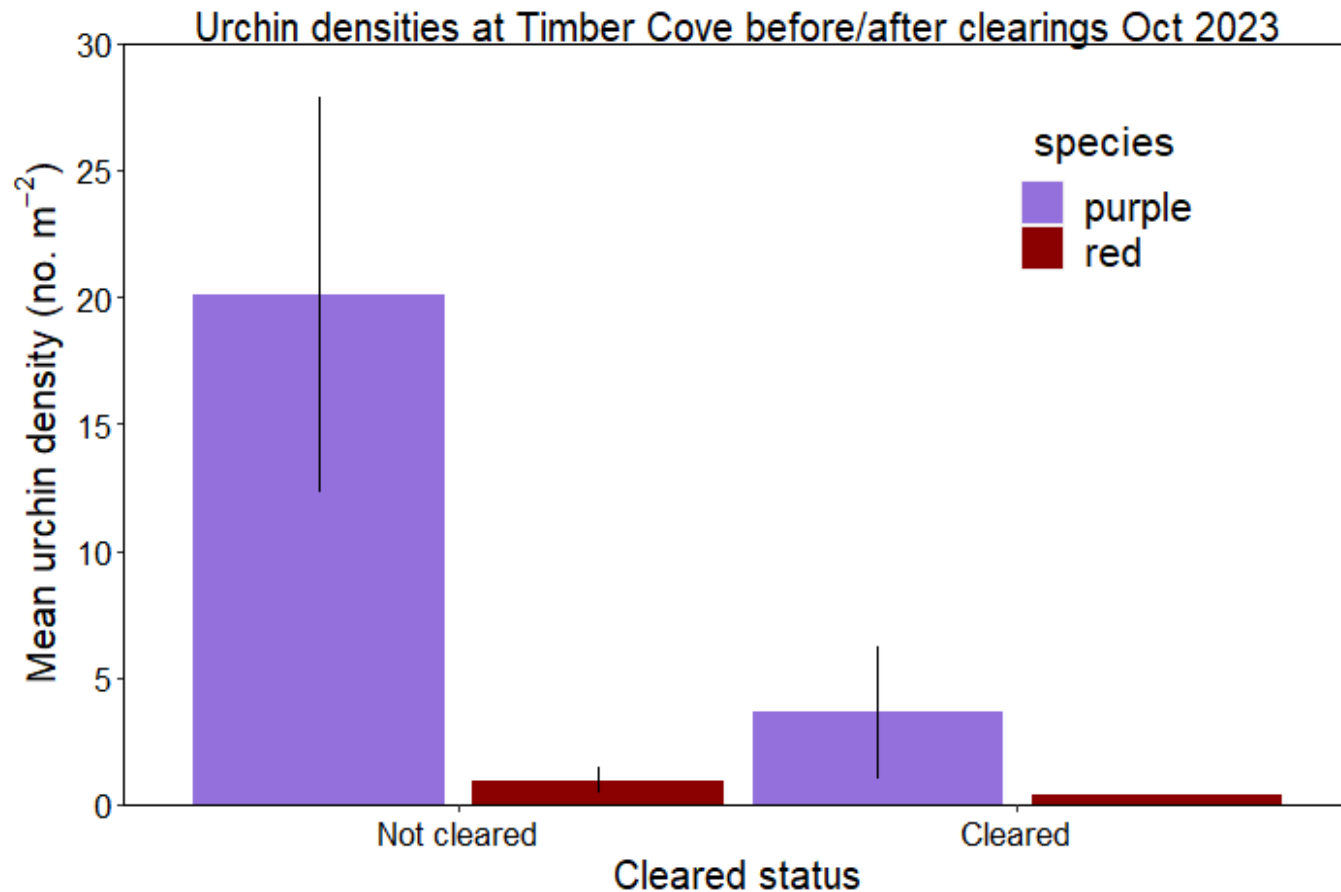


Gina Contolini GFA-GFNMS/CBNMS

Purple sea urchin removals at Timber Cove



Purple sea urchin removals at Timber Cove

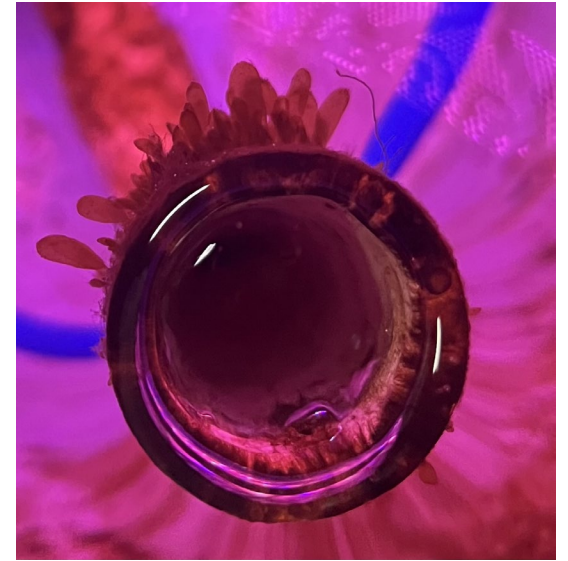




Culturing Bull Kelp at Bodega Marine Lab



Julieta Gomez GFA/GFNMS



Rachael Karm SSU

Outplanting



1. Control —————
2. Seeded line —————
- 3a. Spore bags —————
- 3b. Invert Recruitment modules (scrubbies) —————
4. Kelp spliced line —————

Outer coast

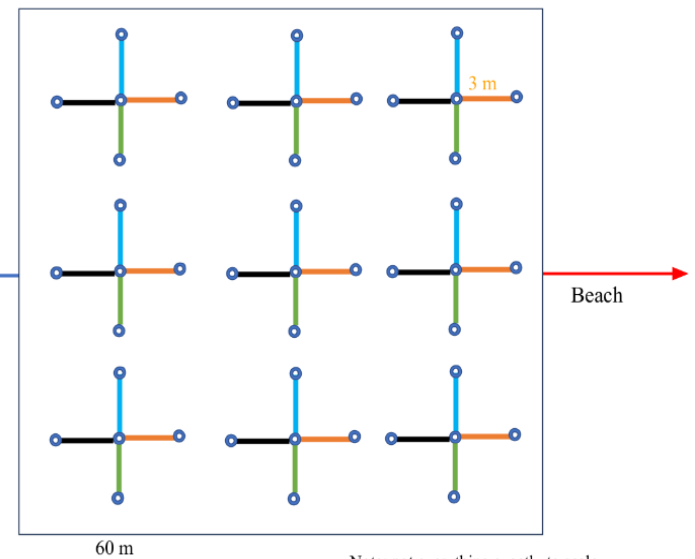
Treatment sizes per block

-Each green line gets 2 of each:
brushes (n = 18), Scrubbies (n = 18),
and spore bags (n = 18);
replenished monthly.

-Each blue line receives
10-20 juvenile (~10 cm) bull kelp annually
(n = 100 – 200)



Eyebolts, N = 45



Note: not everything exactly to scale

Brent Hughes, SSU

Outplanting



Abbey Dias, SSU

GFNMS-2023-002-A1

Monitoring and Assessment

- Subtidal ecosystem and restoration assessment surveys
- Urchin morphometrics and gonad health
- Kelp canopy surveys
- Beach wrack surveys
- Intertidal surveys



GFA-GFNMS/CBNMS Kelp Restoration Team in the Field

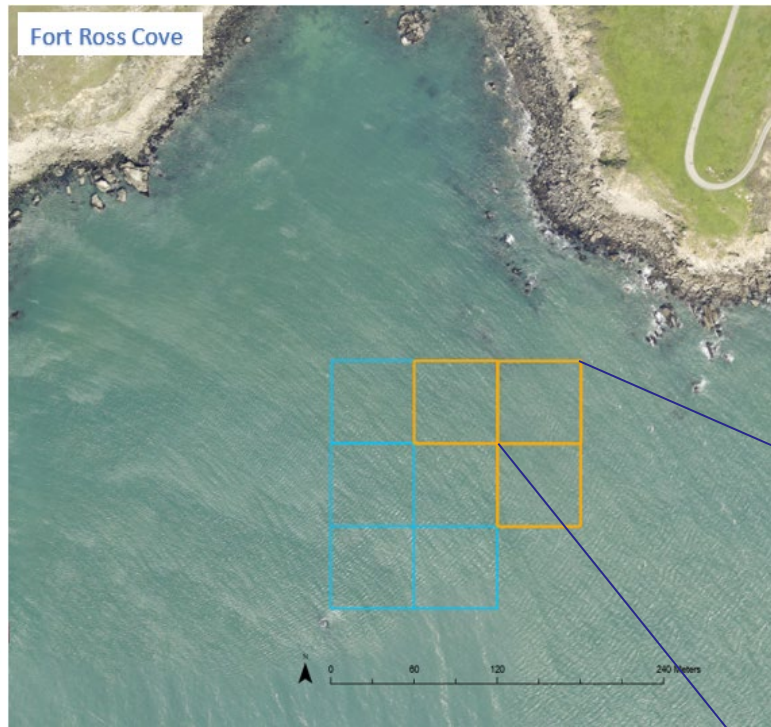


Rietta Hohman GFA-GFNMS/CBNMS

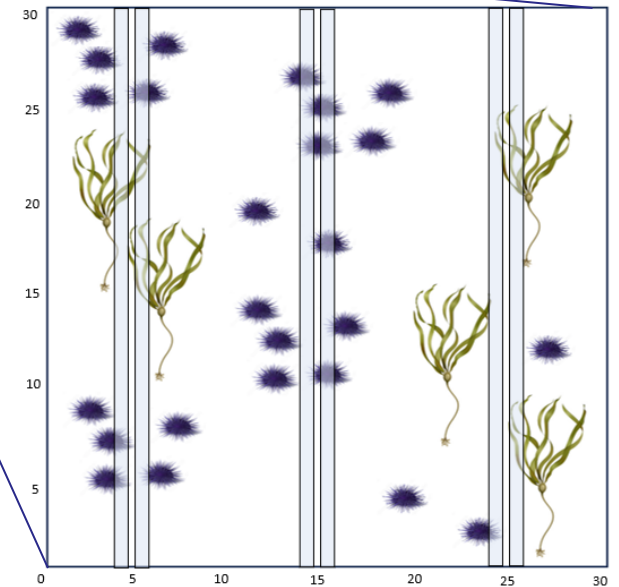
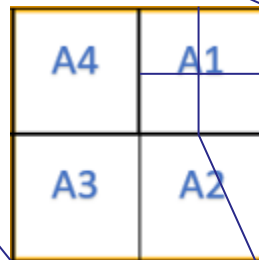


Gina Contolini GFA-GFNMS/CBNMS

Fort Ross Cove



Subtidal Surveys



Kelp Canopy Surveys



Conclusions

Successes

- Over 600,000 urchins removed from restoration areas
- Established positive and productive relationships with local divers and fish processors
- Developed and implemented culturing and outplanting techniques

Challenges

- Accessibility – vessels, conditions, remote locations
- Contracts and liability
- Permitting

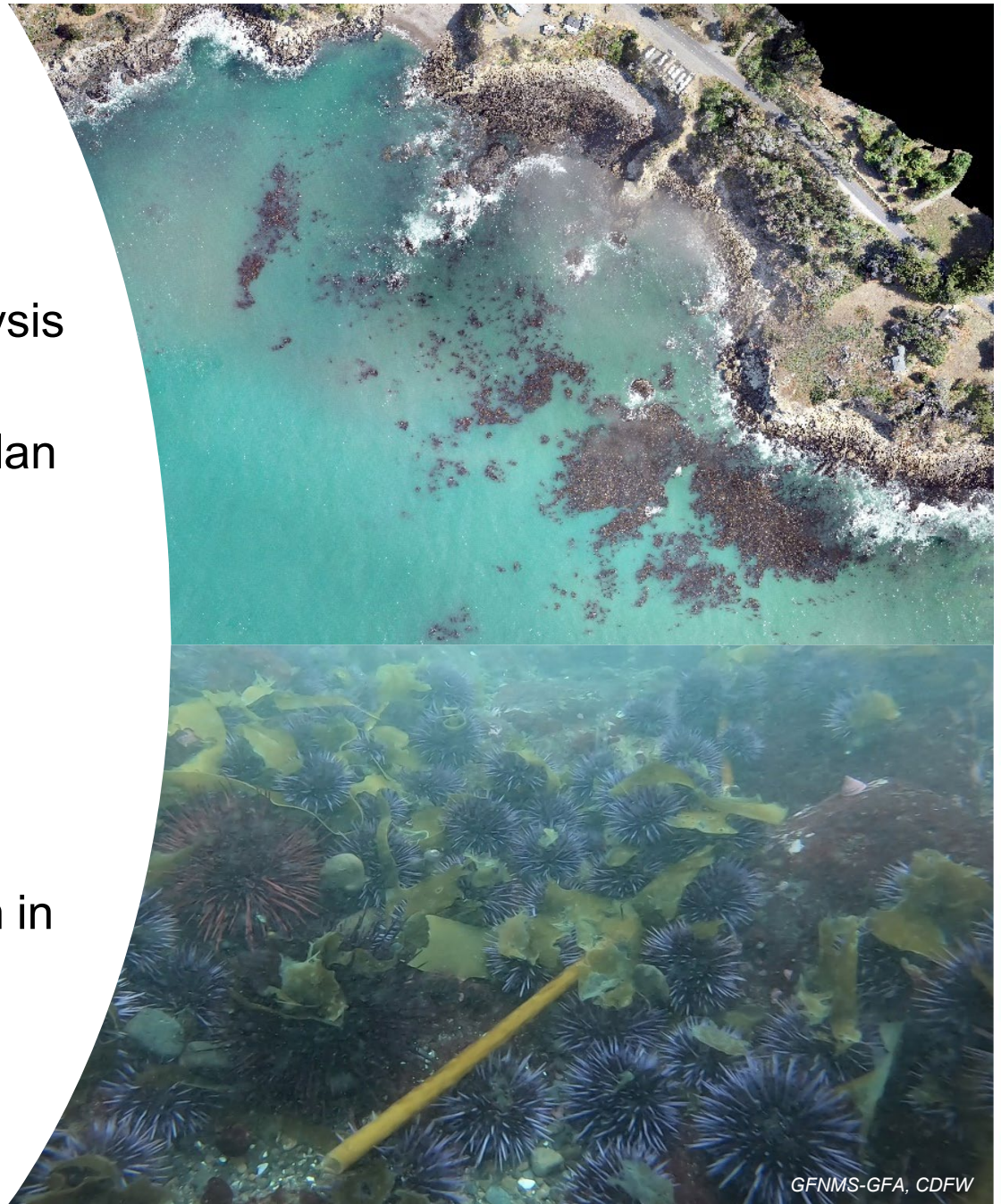
Needs

- Refine urchin removal and encroachment rates
- Apply outcomes and lessons learned to explore scalability



Next Steps in 2024-2025

- Data management & analysis for 2024 activities
- Develop implementation plan for 2025
- Continue strengthening relationships with local community
- Deploy oceanographic moorings
- Explore scaling restoration in the sanctuary
- Develop more outreach & engagement materials





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**National
Marine Sanctuary
Foundation**



Thank you!

Steve Lonhart NOAA MBNMS

Acknowledgements

GFA-GFNMS Kelp Restoration Team – Angela Zepp, Julieta Gómez, Tyler Mears and Dr. Gina Contolini
GFA - Deb Self, Alayne Chappell, Monika Krach, Kirsten Lindquist, Sage Tezak
GFNMS/CBNMS – Maria Brown, Danielle Lipski, Karen Reyna, Darrell Gregg, Max Delaney, Michael Carver, Brian Johnson, Jenny Stock, Lilli Ferguson
Monterey Bay NMS – Dr. Steve Lonhart, Chad King
R/V Fulmar Crew and WCR – Andrea Hammond, Ivy Armijo, Jean de Marignac
California Department of Fish and Wildlife – Dr. Kristen Elsmore, Shelby Kawana, Sara Briley, Katie Grady
Sonoma State University – Dr. Brent Hughes, Abbey Dias, Rachael Karm, Maria Velazquez, Vini Souza
Moss Landing Marine Labs - Dr. Scott Hamilton, Andrew Kim, Bennett Bugbee
Commercial Urchin Divers - Grant Downie, Erik Owen, Mark Gmeiner, Jeremy George Petty, Tad Thompson, Jeffrey Gritsch
Dandy Fish Company - Rachel Thomsson, Craig Thomsson
The Spore Solution Team – Elizabeth Ramsay (FISHBIO) and Dan Gossard (Monterey Bay Seaweeds)
California State University Monterey Bay – Dr. Corey Garza, Pat Iampietro, Olivia Bible
Woods Hole Oceanographic Institution – Dr. Tom Bell
University of California Los Angeles – Dr. Kyle Cavanaugh, Kate Cavanaugh
The Nature Conservancy – Vienna Saccomanno, Tristin McHugh
Bodega Marine Lab – Dr. John Largier, Robin Roettger



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