California Fish and Game Commission

Marine Resources Committee

Meeting Binder

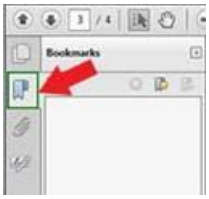
November 16, 2023

San Diego, CA

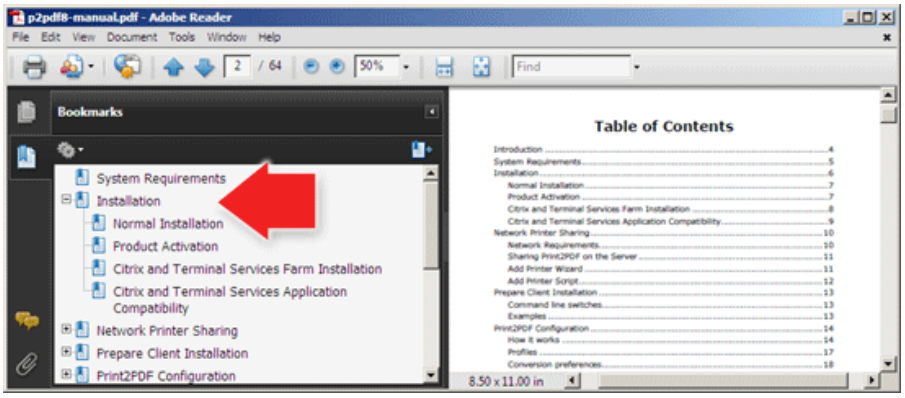
EASY GUIDE TO USING THE BINDER

1. Download and open the binder document using your Adobe Acrobat program/app.

2. If a bookmark panel does not automatically appear on either the top or left side of the screen, click/tap on the “bookmark symbol” located near the top left-hand corner.



3. To make adjustments to the view, use the Page Display option in the View tab. You should see something like:



4. We suggest leaving open the bookmark panel to help you move efficiently among the staff summaries and numerous supporting documents in the binder. It’s helpful to think of these bookmarks as a table of contents that allows you to go to specific points in the binder without having to scroll through hundreds of pages.

5. You can resize the two panels by placing your cursor in the dark, vertical line ↔ located between the panels and using a long click /tap to move in either direction.

6. You may also adjust the sizing of the documents by adjusting the sizing preferences located on the Page Display icons found in the top toolbar or in the View tab.

7. Upon locating a staff summary for an agenda item, notice that you can obtain more information by clicking/tapping on any item underlined in blue.

8. Return to the staff summary by simply clicking/tapping on the item in the bookmark panel.

9. Do not hesitate to contact staff if you have any questions or would like assistance.

OVERVIEW OF FISH AND GAME COMMISSION COMMITTEE MEETING

- Welcome to this meeting of the Marine Resources Committee. The Committee is comprised of up to two Commissioners who co-chair each meeting; members are assigned by the Commission annually.

- Our goal today is informed discussion to guide future decision making, and, we need your cooperation to ensure a lively and comprehensive dialogue.

- We are operating under Bagley-Keene Open Meeting Act, but it is important to note that the Committee chairs cannot take action independent of the full Commission; instead, the chairs make recommendations to the full Commission at regularly scheduled meetings.

- These proceedings are being recorded for reference and archival purposes and are available upon request.

- Items may be heard in any order pursuant to the determination of the Committee Co-Chairs.

- As a general rule, requests for regulatory change need to be redirected to the full Commission and submitted on the required petition form, FGC 1, titled “Petition to the California Fish and Game Commission for Regulation Change” (Section 662, Title 14, CCR). However, at the Committee’s discretion, the Committee may request that staff follow up on items of potential interest to the Committee and possible recommendation to the Commission.

- Committee meetings operate informally and provide opportunity for everyone to provide comment on agenda items. If you wish to speak on an agenda item, please follow these guidelines:
    1. Raise your hand and wait to be recognized by the Committee.
    2. Provide your name, affiliation (if any), and the number of people you represent.
    3. Time is limited; please keep your comments precise to give others time to speak.
    4. If several speakers have the same concerns, please appoint a group spokesperson.
    5. If speaking during public comment, the subject matter you present should <u>not be related</u> to any item on the current agenda (public comment on agenda items will be taken at the time the Committee members discuss that item).

Introductions for California Fish and Game Commission Marine Resources Committee Meeting

California Fish and Game Commissioners

Eric Sklar	MRC Co-chair (Saint Helena)
Samantha Murray	MRC Co-chair (La Jolla)

Commission Staff

Melissa Miller-Henson	Executive Director
Susan Ashcraft	Marine Advisor
Kimi Rogers	Environmental Scientist
David Haug	Regulatory Analyst
Kinsey Mathews	Sea Grant State Fellow

California Department of Fish and Wildlife

Eric Kord	Assistant Chief, Law Enforcement Division
Craig Shuman	Regional Manager, Marine Region
Kirsten Ramey	Environmental Program Manager, State Managed Finfish and Nearshore Ecosystem, Marine Region
Joanna Grebel	Environmental Program Manager, Invertebrate Program, Marine Region
Danny Lengning	Captain, Law Enforcement Division
Kristen Elsmore	Senior Environmental Scientist Specialist, Marine Region

Invited Guests

Pike Spector	Biodiversity Program Manager, Ocean Protection Council

I would also like to acknowledge special guests who are present:
(i.e., key DFW staff, elected officials, tribal chairpersons, other special guests)

STATE OF CALIFORNIA
Gavin Newsom, Governor

Fish and Game Commission

Wildlife Heritage and Conservation
Since 1870

Melissa Miller-Henson
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MARINE RESOURCES COMMITTEE

Committee Co-Chairs: Commissioner Sklar and Commissioner Murray

REVISED* Meeting Agenda
November 16, 2023; 9:00 a.m.

California Department of Fish and Wildlife
3883 Ruffin Road
San Diego, CA 92123

and

Webinar and Teleconference

***To participate in the meeting remotely, you may join* the webinar directly at https://wildlife-ca-gov.zoom.us/j/89925546764. For complete instructions on how to join via Zoom or telephone, click here or visit fgc.ca.gov/meetings/2023.**

*** This agenda is revised to amend item 5C.**

Note: Please see important meeting procedures and information at the end of the agenda. Unless otherwise indicated, the California Department of Fish and Wildlife is identified as Department. All agenda items are informational and/or discussion only. The Committee develops recommendations to the Commission but does not have authority to make policy or regulatory decisions on behalf of the Commission.

Call to order

1. **Approve agenda and order of items**

2. **Evaluation of bycatch in the California halibut set gill net fishery in support of the fishery management review**
   Receive and discuss potential management measures proposed by the Department to address bycatch concerns and information gaps in the California halibut set gill net fishery, provide direction on next steps, and potentially develop committee recommendation.

3. Red abalone recovery plan (north coast)

Receive Department update on process to support development of a recovery plan for red abalone on the north coast.

4. Kelp

(A) ***Tracking restoration and recovery***

Receive Department update on and discuss collaborative kelp restoration efforts and recovery tracking.

(B) ***Developing a kelp restoration and management plan***

Receive Department update on developing a plan for giant and bull kelp.

5. Staff and agency updates

Receive updates from staff and other agencies on topics requested by the Committee.

Note: In an effort to streamline meetings, the Committee will primarily receive updates in writing. However, public discussion may be permitted at the discretion of the Committee and when time permits.

(A) ***California Ocean Protection Council***

(B) ***Department***

I. Law Enforcement Division
   a. 2022 marine protected areas enforcement report

II. Marine Region
   a. Market squid fishery management and fishery management plan review

(C) ***Commission staff***

I. State water bottom leases for aquaculture purposes: Next steps in considering applications for new leases

II. Marine protected areas regulation change petition process following decadal management review

III. Commission policies review: Naming Installations Policy

6. General public comment for items not on the agenda

The Committee may not discuss or take action on any matter raised during this item, except to consider whether to recommend that the matter be added to the agenda of a future meeting [Sections 11125, 11125.7(a), Government Code].

7. Future agenda items

(A) ***Review work plan agenda topics and timeline***

(B) ***Potential new agenda topics for Commission consideration***

Adjourn

California Fish and Game Commission
Meeting Schedule

Note: As meeting dates and locations can change, please visit www.fgc.ca.gov for the most current list of meeting dates and locations.

Meeting Date	Commission Meeting	Committee Meeting
December 12, 2023		**Tribal** Handlery Hotel San Diego 950 Hotel Circle North San Diego, CA 92108
December 13-14, 2023	Handlery Hotel San Diego 950 Hotel Circle North San Diego, CA 92108	
January 18, 2024		**Wildlife Resources** Southern California
February 14-15, 2024	Natural Resources Headquarters Building Auditorium 715 P Street, 2nd Floor Sacramento, CA 95814	
March 14, 2024		**Marine Resources** San Clemente area
April 16, 2024		**Tribal** San Jose
April 17-18, 2024	San Jose	
May 15, 2024	Teleconference	
May 16, 2024		**Wildlife Resources** Yreka
June 19-20, 2024	Mammoth Lakes	
July 18, 2024		**Marine Resources** Santa Rosa area
August 13, 2024		**Tribal** Fortuna
August 14-15, 2024	Fortuna	
September 12, 2024		**Wildlife Resources** San Jose
October 9-10, 2024	Sacramento	
November 7, 2024		**Marine Resources** Sacramento
December 10, 2024		**Tribal** San Diego area
December 11-12, 2024	San Diego area	

Other Meetings of Interest

Pacific Fishery Management Council

- March 5-11, 2024 – Fresno, CA
- April 5-11, 2024 – Seattle, CA
- June 6-13, 2024 – San Diego, CA
- September 18-24, 2024 – Spokane, WA
- November 13-19, 2024 – Costa Mesa, CA

Pacific Flyway Council

- March 26, 2024 – Grand Rapids, MI
- August 2024 – Date and location TBD

Western Association of Fish and Wildlife Agencies

- June 3-7, 2024 – Stevenson, Washington

Wildlife Conservation Board (dates not yet approved)

- February 16, 2024 – Sacramento, CA
- May 23, 2024 – Sacramento, CA
- August 22, 2024 – Sacramento, CA
- November 21, 2024 – Sacramento, CA

Important Committee Meeting Procedures Information

Welcome to a meeting of the California Fish and Game Commission's Wildlife Resources Committee. The Committee is composed of and chaired by up to two Commissioners; these assignments are made by the Commission each year.

The goal of the Committee is to allow greater time to investigate issues before the Commission than would otherwise be possible. Committee meetings are less formal in nature and provide for additional access to the Commission. The Committee follows the noticing requirements of the Bagley-Keene Open Meeting Act. It is important to note that the Committee chairs cannot take action independent of the full Commission; instead, the chairs make recommendations to the full Commission at regularly scheduled meetings.

The Commission's goal is preserving our outdoor heritage and conserving our natural resources through informed decision-making; Committee meetings are vital in developing recommendations to help the Commission achieve that goal. In that spirit, we provide the following information to be as effective and efficient toward that end. Welcome, and please let us know if you have any questions.

Persons with Disabilities

Persons with disabilities needing reasonable accommodation to participate in public meetings or other Commission activities are invited to contact the Department's Equal Employment Opportunity (EEO) Office at (916) 653-9089 or EEO@wildlife.ca.gov. Accommodation requests for facility and/or meeting accessibility and requests for American Sign Language (ASL) Interpreters should be submitted at least two weeks prior to the event. Requests for Real-Time Captioners should be submitted at least four weeks prior to the event. These timeframes are to help ensure that the requested accommodation is met. If a request for an accommodation has been submitted but is no longer needed, please contact the EEO Office immediately.

Submitting Written Materials

The public is encouraged to attend Committee meetings and engage in the discussion about items on the agenda; the public is also welcome to comment on agenda items in writing. You may submit your written comments by one of the following methods (only one is necessary): **Email** to fgc@fgc.ca.gov; **mail** to California Fish and Game Commission, P.O. Box 944209, Sacramento, CA 94244-2090; or **deliver** to California Fish and Game Commission, 715 P Street, 16th floor, Sacramento, CA 95814**;** or **hand-deliver** to a Committee meeting.

Comment Deadlines

The ***Written Comment Deadline*** for this meeting is 5:00 p.m. on **November 3, 2023**. Written comments received at the Commission office by this deadline will be made available to Commissioners prior to the meeting.

The ***Supplemental Comment Deadline*** for this meeting is noon on **November 13, 2023**. Comments received by this deadline will be made available to Commissioners at the meeting.

*The Committee **will not** consider comments regarding proposed changes to regulations that have been noticed by the Commission. If you wish to provide comment on a noticed item, please provide your comments during Commission business meetings, via email, or deliver to the Commission office.*

Note: Materials provided to the Committee may be made available to the general public.

Regulation Change Petitions

As a general rule, requests for regulatory change must be redirected to the full Commission and submitted on the required petition form, FGC 1, *Petition to the California Fish and Game Commission for Regulation Change* (Section 662, Title 14, California Code of Regulations). However, at the Committee's discretion, the Committee may request that staff follow up on items of potential interest to the Committee and possible recommendation to the Commission.

Speaking at the Meeting

Committee meetings operate informally and provide opportunity for everyone to comment on agenda items. If you wish to speak on an agenda item, please follow these guidelines:

- You will be given instructions during the meeting for how to be recognized by the Committee co-chair(s) to speak.
- Once recognized, please begin by giving your name and affiliation (if any) and the number of people you represent.
- Time is limited; please keep your comments concise so that everyone has an opportunity to speak.
- If there are several speakers with the same concerns, please try to appoint a spokesperson and avoid repetitive comments.
- If speaking during public comment for items not on the agenda (Agenda Item 2), the subject matter you present should not be related to any item on the current agenda (public comment on agenda items will be taken at the time the Committee members discuss that item). As a general rule, public comment is an opportunity to bring matters to the attention of the Committee, but you may also do so via email or standard mail. At the discretion of the Committee, staff may be requested to follow up on the subject you raise.

Visual Presentations/Materials

All electronic presentations must be submitted by the ***Written Comment Deadline*** and approved by the Commission executive director before the meeting.

1. Electronic presentations must be provided by email to fgc@fgc.ca.gov or delivered to the Commission on a USB flash drive by the deadline.
2. All electronic formats must be Windows PC compatible.

COMMITTEE STAFF SUMMARY FOR NOVEMBER 16, 2023 MRC

2. EVALUATION OF BYCATCH IN THE CALIFORNIA HALIBUT SET GILLNET FISHERY IN SUPORT OF THE FISHERY MANAGEMENT REVIEW

Today's Item **Information ☐** **Action ☒**

Receive and discuss potential management measures proposed by the Department to address bycatch concerns and information gaps in the California halibut set gillnet fishery, provide direction on next steps, and potentially develop committee recommendation.

Summary of Previous/Future Actions

• Commission referred California halibut management review to MRC	August 19-20, 2020
• Commission referred bycatch evaluation for California halibut management review to MRC	December 15-16, 2021
• MRC received updates on bycatch evaluation	March 24 and July 14, 2022; MRC
• MRC received Department bycatch evaluation report; MRC recommendation to conduct bycatch acceptability evaluation for set gill nets (approved by Commission in December 2022)	November 17, 2022; MRC
• MRC received Department updates on bycatch evaluation for the California halibut gill net fishery	March 14 and 16, 2023; MRC
• MRC received and discussed Department evaluation of bycatch acceptability; MRC recommendation for potential management measures to reduce bycatch (approved by the Commission in August 2023)	July 20, 2023; MRC
• **Today receive and discuss management measures to address gillnet bycatch; potential MRC recommendation**	**November 16, 2023; MRC**

Background

Management review of the California halibut fishery commenced in late 2020, consistent with the requirements of the Marine Life Management Act (MLMA) and using the framework outlined in *2018 Master Plan for Fisheries, A Guide for Implementation of the Marine Life Management Act* (master plan) for meeting those requirements. A key requirement of the fishery management review is evaluating and addressing unacceptable bycatch in a way that limits bycatch to acceptable types and amounts.

The California halibut fishery management review has presented the first opportunity to use the four-step framework for evaluating bycatch laid out in Chapter 6 of the master plan, to: collect information on the type and amount of catch (Step 1); distinguish target, incidental, and bycatch species (Step 2); determine "acceptable" types and amounts of bycatch (Step 3); and address unacceptable bycatch (Step 4). See Exhibit 1 for background information about the development and completion of steps 1 and 2 for the California halibut set gill net and trawl fisheries.

For steps 3 and 4 of the bycatch evaluation framework, MRC recommended and the Commission supported separating set gill nets from trawl fisheries. The Commission is currently focused on completing steps 3 and 4 of the bycatch evaluation framework for set gill nets before transitioning to trawl fisheries.

In July 2023, the Department presented its California halibut set gill net bycatch evaluation report that included analysis of the master plan bycatch inquiries for twelve species, thereby fullfilling Step 3 of the bycatch evaluation framework. See Exhibit 2 for background information about the development and completion of Step 3.

Following in-depth dialogue among diverse partcipants and the Department, MRC recommended the bycatch evaluation framework proceed to Step 4, to develop potential management measures for reducing bycatch within the California halibut targeted fishery, noting the measures would also apply to other set gill net target fisheries. MRC recommended the Department focus on potential management measures in 11 categories: (1) soak time limits, (2) gear marking (to address potential for undocumented entanglements), (3) fisher-suggested bycatch reduction measures (e.g., reduced gill net height [mesh depth]), (4) gear loss reporting, (5) logbook improvements, (6) electronic monitoring technology, (7) observer coverage, (8) potential limits on permit transferability and/or retiring latent permits, (9) non-retention of giant sea bass and white sharks (may require legislative action), (10) temporal closures, and (11) other measures that may reduce bycatch and/or discard mortality of white sharks and tope sharks.

In August 2023, the Commission approved the MRC recommendation and requested that the Department develop the potential measures in consultation with fishery participants and stakeholders. In addition, the Commission requested the Department look into the potential ramifications of leglislative action to prohibit retention of white sharks, such as possible negative effects to white shark researchers who have historically utilized commercial set gill nets to assist with research initiatives.

Update

In response to the Commission's request, Department staff has had meetings with set gillnet fishermen and has met with representatives from environmental non-governmental organizations (ENGOs) to discuss potential management measures that would address bycatch concerns that are congruently feasible for the fleet. Department staff met with set gillnet fishermen in person the week prior to the November MRC meeting, to further discuss management options and Department recommendations. In addition, Commission and Department staff met with staff from the National Marine Fisheries Service to discuss and better understand entanglements of marine mammals within the set gillnet fishery, and met with academics regarding options to reduce byatch mortality of sensitive elasmobranch species (such as certain sharks).

Today's Meeting

The Department will present a summary of outreach efforts to engage the set gillnet fleet and interested stakeholders, present the findings and options for potential management measures, and highlight areas for potential MRC guidance (Exhibit 3). The Department identifies near-

term recommendations, including a proposal for regulation changes (referred to as “Phase 1”) consisting of soak time limits, increased gear markings, and mesh depth limits (management measures 1, 2 and 3), as well as developing a pilot project for electronic monitoring, electronic logbooks, and observer coverage (management measures 5, 6 and 7) intended to improve data collection. The proposed improvements could help fill data gaps and provide information needed to inform the development of other management measures (such as 10 and 11); as a result, the other measures may require more time to fully develop for a potential, subsequent rulemaking once data gaps are filled. The Department currently does not have recommendations for the remaining management measures (4, 8 and 9) but will discuss their exploration at today’s meeting.

Lastly, consistent with the Commission’s request, the Department will share data on commercial white shark landings and highlight that white sharks caught in set gill nets have not been utilized for research purposes since 2012.

Today’s discussion is intended to help shape a potential MRC recommendation.

Significant Public Comments

1. Four ENGOs (exhibits 4-7) and a joint letter signed by 27 ENGOs (Exhibit 8) support pursing management measures consistent with Commission direction, and offer recommendations for specific measures, including:
    - A 24-hour soak time limit (exhibits 6 – 8)
    - Temporal closures to protect tope (aka soupfin) sharks (exhibits 5 – 8)
    - Area closures for biodiversity hotspots, such as the Channel Islands (exhibits 6 – 8)
    - Robust gear markings (exhibits 4 and 6 – 8)
    - Gear loss reporting (exhibits 6 – 8)
    - Bycatch hard caps (exhibits 6 and, 7)
    - Prohibiting take of giant sea bass and white sharks (exhibits 4 and 7)
    - Phasing out permits (Exhibit 4)
    - Net height restrictions (exhibits 4, 7, and 8)
    - Logbook requirements (exhibits 7 and 8)
    - Observer programs (exhibits 6 – 8), for which one ENGO attached a observer program scoping report (Exhibit 7)
2. One of the ENGOs completed an analysis on the underreporting of marine mammal bycatch within California set gillnet fisheries, which it submitted by the October supplemental comments deadline and resubmitted for today’s discussion (Exhibit 9). The report compares self-reported logbook data to observer-based estimates of marine mammal take in the set gillnet fishery, concluding that only 6% of marine mammal interactions were reported by fishermen. Based on the analysis, the ENGO

advocates for resuming observer coverage, electronic monitoring, and increased logbook requirements within set gillnet fisheries to obtain accurate bycatch data.

Recommendation

Commission staff: Support the Department's near-term recommendations, and request the Department return to MRC in March 2024 with specific details for the proposed management measures and a timeline for initiating in 2024 the Department-recommended rulemaking. In addition, request that the Department continue to explore other long-term management options with fishery participants and stakeholders for a potential future rulemaking.

Department: Pursue near-term recommendations including a Phase 1 rulemaking (including soak time limits, increased gear marking, and mesh depth restrictions), and a pilot project developed to evaluate data improvements, including observer coverage and electronic logbooks and monitoring (Exhibit 3).

Exhibits

1. Staff summary from November 17, 2022 MRC meeting, Agenda Item 5 (for background purposes only)
2. Staff summary from July 20, 2023 MRC meeting, Agenda Item 3 (for background purposes only)
3. Department presentation
4. Letter from Todd Steiner, Executive Director, and Teri Shore, member of the board of directors, Turtle Island Restoration Network, received November 2, 2023
5. Letter from Ben Grundy, Associate Oceans Campaigner, Center for Biological Diversity, received November 3, 2023
6. Letter from Scott Webb, Director of Advocacy & Engagement, Resource Renewal Institute, received November 3, 2023
7. Letter from Dr. Geoff Shester, California Campaign Director & Senior Scientist, and Caitlynn Birch, Pacific Marine Scientist, Oceana, and attached observer scoping report, received November 3, 2023
8. Letter from Scott Webb, Director of Advocacy & Engagement, Resource Renewal Institute, transmitting a joint letter from 27 ENGOs, received November 3, 2023
9. Email from Caitlynn Birch, Pacific Marine Scientist, Oceana, re-submitting a letter and report that were provided to the Commission in October, related to underreporting of set gill net marine mammal bycatch, received November 3, 2023

Committee Direction/Recommendation

The Marine Resources Committee recommends that the Commission (1) support development of a rulemaking to include soak time limits, increased gear marking, and mesh depth restrictions in the set gillnet fishery, (2) add the rulemaking to the rulemaking timetable for 2024 with a specific timeline to be determined, and (3) request the Department return to the next Committee meeting with details for the proposed measures and potential timeline. In addition, support the Department pursuing a pilot project for data improvements, including observer coverage and electronic logbooks and monitoring.

3. RED ABALONE RECOVERY PLAN (NORTH COAST)

Today's Item **Information ☐** **Action ☒**

Receive Department update on process to support development of a recovery plan for red abalone on the north coast and consider potential MRC recommendation.

Summary of Previous/Future Actions

• Commission supported development of recreational red abalone fishery management plan (FMP)	October 8, 2014
• FMP development, peer review, progress updates, administrative team formation and recommendations	2018 – 2020, 2022; various meetings
• Commission approved MRC recommendation to redirect focus from FMP to recovery plan	December 14-15, 2022
• **Today receive Department update on progress of a recovery plan and consider potential MRC recommendation**	**November 16, 2023; MRC**

Background

Between 2014 and 2022, the Department worked to develop an FMP for the north coast recreational red abalone (*Haliotis rufescens*) fishery, providing regular progress updates to MRC. Concurrently, the Department documented precipitous declines in the red abalone population associated with the loss of bull kelp beds, an overabundance of urchin, and the resulting abalone starvation. The Department made significant advances with partners and stakeholders on exploring core FMP concepts, including evaluating harvest control rule options and a potential *de minimis* fishery during recovery; however, at the November 2022 MRC meeting the Department reported that abalone populations were still declining. See Exhibit 1 for background information regarding FMP development, including detailed summary of previous/future actions.

In December 2022, the Commission approved an MRC recommendation to pause FMP development – except for memorializing the harvest control rule and *de minimis* options – and redirect focus toward abalone recovery planning.

In July 2023, the Department provided MRC a written update on recovery planning. The Department plans to create a climate-ready red abalone recovery plan (RARP), to be developed with tribal engagement, technical and stakeholder advisory teams, and agency engagement (Exhibit 2). Note that the Department proposes to develop a statewide plan, rather than for the north coast only. Due to limited time available in July for stakeholders to discuss the Department's proposed approach, MRC supported scheduling a discussion for today's meeting.

Update

Today, the Department presentation will build on materials provided in July. The Department has recently conducted field surveys to assess abalone trends and plans to present the outcomes of the field surveys along with the proposed RARP process and timeline (Exhibit 3).

Significant Public Comments (N/A)

Recommendation

Commission staff: Support the Department's proposed engagement process and timeline for developing a statewide RARP, as reflected in exhibits 2 and 3.

Exhibits

1. Staff summary from November 17, 2022 MRC meeting, Agenda Item 4 (*for background purposes only*)
2. Department written update provided for July 20, 2023 MRC meeting, Agenda Item 6
3. Department presentation

Committee Direction/Recommendation

Support the Department's proposed process and timeline to develop a statewide red abalone recovery plan, including tribal engagement, technical and stakeholder advisory teams, and agency engagement.

COMMITTEE STAFF SUMMARY FOR NOVEMBER 16, 2023 MRC

4. KELP

Today's Item **Information ☒** **Action ☐**

(A) Receive Department update on and discuss collaborative kelp restoration efforts and recovery tracking; and

(B) Receive Department update on developing a kelp restoration and management plan (KRMP) for giant and bull kelp.

Summary of Previous/Future Actions

• Commission referred kelp recovery and restoration tracking to MRC	October 9-10, 2019
• MRC received overview of collaborative kelp recovery and restoration efforts	November 5, 2019; MRC
• Department and California Ocean Protection Council (OPC) update on kelp recovery and restoration and release of interim action plan	March 16, 2021; MRC
• Commission referred KRMP development to MRC	February 16-17, 2022
• MRC received Department overview of a plan and process for KRMP development	March 24, 2022; MRC
• Department presentation on kelp recovery and restoration tracking, and KRMP development	March 14 and 16, 2023; MRC
• **Today's Department update on kelp recovery and restoration efforts and KRMP development**	**Nove**mber **16, 2023; MRC**

Background

(A) Kelp Restoration Efforts and Recovery Tracking

In October 2019, the Commission received an update on the dramatic declines in bull kelp persisting across the northern California coastline and, based on interest in tracking kelp recovery and kelp restoration strategies and efforts, referred the topic to MRC. In November 2019, the Department provided MRC with an overview of collaborative kelp recovery and restoration efforts underway or under development by partners and the Department.

Department and OPC staff provided a joint presentation at the March 2021 MRC meeting, with an update on bull kelp conditions in northern California, in addition to highlighting efforts to track, coordinate on, and plan for kelp recovery, supported by *Interim Action Plan for Protecting and Restoring California's Kelp Forests* (interim action plan), released by OPC in February 2021. The interim action plan, developed in partnership with the Department, was intended to broadly serve as a starting point for discussions and planning amongst natural resource managers, the academic community, California tribes, coastal stakeholders, and members of the public.

The most recent update on the status of kelp canopy coverage was presented to MRC in March 2023, covering both bull kelp and giant kelp trends statewide. Trends reflected

persistent kelp loss in the north and different patterns of kelp loss and recovery across the remainder of the state. The Department also shared progress of collaborative projects exploring kelp restoration.

(B) Developing a Kelp Recovery and Management Plan

In February 2022, the Department reported that, consistent with the interim action plan, it was initiating a process to develop a statewide, ecosystem-based, adaptive KRMP for giant kelp (*Macrocystis pyrifera*) and bull kelp (*Nereocystis luetkeana*), with the ultimate goal of adoption by the Commission. The Commission referred KRMP development to MRC as a work plan topic.

In March 2022, the Department presented an overview of its proposed approach for preparing a KRMP. Developed in partnership with OPC, the KRMP would include three core components: (1) a harvest management framework and other fishery management plan elements required by the Marine Life Management Act; (2) an innovative framework for ecosystem management of kelp forests; and (3) a restoration toolkit. The public engagement process was designed to include tribal engagement, a science advisory committee, and a community working group.

In July 2022, MRC requested that the Department prepare for today's meeting an update on progress pursuing a KRMP as well as more detail about kelp recovery tracking and the range of collaborative restoration projects.

Update

For today's meeting, the Department has provided a comprehensive report, prepared collaboratively with OPC, titled *Status of Research and Monitoring, Restoration Efforts, and Developing Management Strategies for Kelp Canopy Forming Species in California* (kelp report; Exhibit 1). The kelp report provides an update on KRMP development, an overview of bull kelp and giant kelp status and monitoring data, and an overview of research projects across the state exploring kelp restoration techniques.

Today, the Department will make a presentation (Exhibit 2), prepared in collaboration with OPC staff, that highlights key details from the kelp report and efforts to date in KRMP development, including initial outreach and meetings with tribes, the community working group, and a scientific advisory council.

Following today's meeting, the Department and partners will continue to conduct scientific, tribal, and stakeholder engagement; synthesize the state of the science; and identify and address key knowledge gaps.

Significant Public Comments (N/A)

Recommendation (N/A)

Exhibits

1. Department and OPC report: Status of Research and Monitoring, Restoration Efforts, and Developing Management Strategies for Kelp Canopy Forming Species in California, dated November 2023
2. Department presentation

Committee Direction/Recommendation (N/A)

COMMITTEE STAFF SUMMARY FOR NOVEMBER 16, 2023 MRC

5. STAFF AND AGENCY UPDATES

Today's Item **Information ☒** **Action ☐**

Receive verbal and written updates from Commission staff and other agencies, including California Ocean Protection Council (OPC) and the Department.

Summary of Previous/Future Actions (N/A)

Background

This is a standing agenda item for staff and agencies to provide an update on marine-related activities of interest. Updates related to current work plan topics are generally provided in writing. Members of the public will have an opportunity to share their thoughts, although the level of in-meeting discussion will be at the discretion of the MRC co-chairs.

(A) OPC

OPC staff will provide a verbal update on topics of interest to the Committee.

(B) Department

I. Law Enforcement Division (LED)

Marine protected areas (MPAs): Marine law enforcement staff will highlight MPA-related enforcement actions and statistics from 2022 (Exhibit B1).

II. Marine Region

Market squid fishery management and fishery management plan review: In July, Marine Region staff provided an overview of the Department Squid Fishery Advisory Committee (SFAC) process and timeline (Exhibit B2). For today's meeting, Marine Region has provided a written update on progress, including a summary of the first six SFAC meetings, and a timeline for completing the SFAC process and resulting management recommendations for MRC and Commission consideration (Exhibit B3).

(C) Commission Staff

I. State Water Bottom Leases for Aquaculture Purposes

Next steps in considering applications for new leases: In August 2023, the Commission approved the criteria and evaluation framework for evaluating if a new state water bottom lease for aquaculture is in the public interest and approved an overall enhanced leasing process. The Commission directed staff to work with the Department and agency partners to implement the enhanced process. Following the August meeting, staff released an announcement via the electronic mailing list to notify stakeholders about the outcomes of Commission action (Exhibit C1). Staff has prepared a written update on efforts to implement the enhanced leasing process and approved public interest criteria and evaluation framework, which include engaging agencies of jurisdiction and developing next steps for the three existing lease applications (Exhibit C2).

II. Commission Policies Review

Naming Installations Policy: In December 2022, the Commission directed staff to conduct an initial assessment of the Commission's policies and recommend a path forward for reviewing and recommending any changes to the over 60 policies. In June 2023, the Commission endorsed a plan developed by staff in collaboration with Department leadership for a comprehensive assessment of all policies; the Commission provided specific direction to review the policies through a tribal and a justice, equity, diversity and inclusion (JEDI) lens (see Exhibit C3 for additional information).

The Commission Naming Installations Policy (Exhibit C4) is one of the first three policies recommended for further review and revision. The policy states that "No fish hatchery, game refuge, wildlife area or any installation…shall be named for any person, living or dead"; however, it provides a specific exception for MPAs so that "The Commission may commemorate an individual by including that individual's name after the geographic name of an MPA…" if all of the specified criteria are met.

In light of concerns expressed by the Commission regarding the MPA exception and the importance of tribal and JEDI values, potential revisions to the policy may include: (1) removing the MPA naming exception, and (2) adding a provision to consider tribal placenames when naming installations, including MPAs, in collaboration with local tribal leaders. Suggestions for potential revisions will be presented at the December 2023 Commission meeting.

III. Considering Changes to the State's MPA Network

Regulation Change Petition Process: At its August 2023 meeting, the Commission approved an MRC recommendation to initiate a process and timeline for considering proposals for MPA changes as part of the prioritized adaptive management recommendations from the decadal management review. The Commission indicated a priority deadline of November 30, 2023 for MPA petitions to be submitted for receipt at the December Commission meeting.

To support the process, the Commission requested that staff share MPA information with stakeholders, the public, and other agencies to assist in developing MPA petitions for Commission consideration. Importantly, historical documents would need to be compiled from the regional MPA planning, design, and adoption processes and made available to interested stakeholders upon request; the Commission asked staff to make materials available by September to give petitioners 90 days with the materials before the recommended deadline of November 30, 2023.

Following the August meeting, staff assembled numerous historic materials and uploaded them to a site that the public could access upon request. Staff also developed a guidance document explaining the process to consider potential changes to the MPA network, specific details about the regulation change petition process, the Commission's timeline, and availability of historical documents to

provide context about original design considerations for regional MPAs (Exhibit C5). In early October, a public announcement about the MPA petition process was released via the Commission's electronic mailing list with links to the guidance document (Exhibit C6). Staff also presented the process to the MPA Statewide Leadership Team meeting on October 25 (Exhibit C6). Commission staff recognizes that the materials were released later than anticipated, providing approximately 60 days for public use before the December meeting.

IV. *California Sea Grant State Fellowship:*

Sea Grant State fellow for 2024: Commission staff are pleased to announce the selection of our 2024-2025 California Sea Grant state fellow, Devon Rossi! Devon just finished her master's degree at Bren School of Environmental Science and Management at the University of California Santa Barbara. Staff look forward to introducing her at future MRC meetings after she begins in early 2024.

Significant Public Comments (N/A)

Recommendation (N/A)

Exhibits

B1. LED presentation on marine law enforcement in MPAs
B2. Department Squid Fishery Advisory Committee report to MRC, July 20, 2023
B3. Department document: Squid Fishery Advisory Committee Update, received October 31, 2023
C1. Commission mailing list announcement of adopted process for state water bottom leasing for aquaculture and public interest criteria
C2. Commission staff document: Update on state water bottom leases for aquaculture purposes – Next steps in considering applications for new leases
C3. *Background document, available online*: Staff summary for Agenda Item 24, Commission Policies, June 14-15, 2023
C4. Commission Naming Installations Policy
C5. Commission staff document: Overview of process to consider potential changes to California's MPA network: Regulation change petition process, timeline and historical documents
C6. Commission mailing list announcement on prioritization of MPA decadal management review recommendations and Commission initiation of MPA petition process
C7. Commission staff presentation to the MPA Statewide Leadership Team regarding MPA petition process

Committee Direction/Recommendation (N/A)

COMMITTEE STAFF SUMMARY FOR NOVEMBER 16, 2023 MRC

6. GENERAL PUBLIC COMMENT

Today's Item **Information ☒** **Action ☐**

Receive public comment regarding topics that are not included on the agenda.

Summary of Previous/Future Actions (N/A)

Background

MRC receives two types of correspondence or comment under general public comment: (1) requests for MRC to consider new topics and (2) informational items. As a general rule, requests for a regulation change must be submitted to the Commission on petition form FGC 1, *Petition to the California Fish and Game Commission for Regulation Change*. However, MRC may, at its discretion, request that staff follow up on items of potential interest for possible recommendation to the Commission.

Significant Public Comments

1. A member of the public is concerned about the survival of the southern resident killer whale population due to declining salmon populations. They request that the Commission and Department integrate southern resident killer whale salmon take into their analyses when setting quotas for commercial and recreational fisheries. In addition, they express concern about the future of sea otters in Morro Bay due to offshore wind development (Exhibit 1).

Recommendation

Staff recommends any new agenda items—based on issues raised and within the Commission's authority—be held for discussion under Agenda Item 7, Future Agenda Items.

Exhibits

1. Email from Phoebe Lenhart, received November 2, 2023

Committee Direction/Recommendation (N/A)

COMMITTEE STAFF SUMMARY FOR NOVEMBER 16, 2023 MRC

7. FUTURE AGENDA ITEMS

Today's Item **Information ☐** **Action ☒**

(A) Review work plan agenda topics, priorities, and timeline

(B) Potential new agenda topics for Commission consideration

Summary of Previous/Future Actions

• Commission approved MRC agenda and work plan	October 11-12, 2023
• **Today's discussion**	**November 16, 2023; MRC**
• Next MRC meeting	March 14, 2024: MRC

Background

MRC topics are referred by the Commission and scheduled as appropriate; referred topics and their schedule are shown in the MRC work plan (Exhibit 1). MRC has placed emphasis on issues of imminent regulatory or management importance; thus, scheduling current topics and considering new topics for MRC review requires planning relative to existing workload and timing considerations.

(A) ***MRC Work Plan and Timeline***

Topics anticipated to be proposed for the March 2024 MRC meeting are shown in the March column of the work plan in Exhibit 1. Note that Commission staff will assess the readiness of topics and may propose changes to the March 2024 MRC agenda at the Commission's February 2024 meeting. Staff welcomes guidance from MRC regarding scheduling specific topics identified in the work plan.

One topic is identified by Commission staff for potential removal from the MRC work plan:

- *Invasive non-native kelp and algae species*

  This topic was referred to MRC in October 2020 for an informational discussion based on a request from stakeholders. As this discusson was held in November 2020, staff seeks an MRC recommendation to the Commission to remove the topic from the work plan.

(B) ***Discuss and Recommend New MRC Topics***

Today is an opportunity to identify any potential new agenda topics to recommend to the Commission for referral to MRC.

One new topic is proposed for potential referral to MRC:

- *Recreational crab trap gear options and separate commercial passenger fishing vessel validation resulting from previous regulation change petitions*

  In June 2023, the Commission acted on two petitions requesting to make several adjustments to recreational crab trap and trap validation provisions adopted by the Commission in 2021 to help minimize marine life entanglements. The Commission

granted a request add a trap validation for commercial passenger fishing vessels, while denying proposed gear changes (e.g., trailer buoys); however, the Commission requested that the Department work with members of the recreational crab fishery on potential management options related to gear changes to address their concerns and further minimize marine life entanglements. The Department is prepared to bring an update on outreach and potential management options to an MRC meeting; they offer March 2024 as suitable timing for scheduling the discussion.

Significant Public Comments (N/A)

Recommendation

Review the list of topics identified for the March 2024 MRC meeting and determine if the list of topics for discussion or an update should be revised. Advance a recommendation to remove the *invasive non-native kelp and algae species* topic and add *trap validation for commercial passenger fishing vessels and recreational crab trap gear options* as a topic for vetting in March, as reflected in Exhibit 1. Provide direction on any other additions or removals.

Exhibits

1. MRC work plan, updated October 31, 2023

Committee Direction/Recommendation

The Marine Resources Committee recommends that the Commission approve the changes to the Committee work plan as proposed by staff in Exhibit 1, and the following additional changes:_____.

COMMITTEE STAFF SUMMARY FOR NOVEMBER 17, 2022 MRC
For background purposes only

5. ASSESSING AND ADDRESSING BYCATCH IN CALIFORNIA FISHERIES

Today's Item **Information ☐** **Action ☒**

(A) ***Overview of process for evaluating and addressing fishery bycatch***
Review the four-step process for limiting bycatch to acceptable types and amounts as outlined in the 2018 Marine Life Management Act (MLMA) master plan for fisheries.

(B) ***Evaluating bycatch in the California halibut fishery***
Receive Department update on analysis of bycatch data for the California halibut fishery to support fishery management review.

(C) ***Determining acceptable bycatch types and amounts***
Discuss potential approaches to completing inquiries for determining what bycatch is "acceptable" within a specific fishery and develop potential committee recommendation.

Summary of Previous/Future Actions

• FGC referred California halibut management review to MRC	Aug 19-20, 2020; Webinar/Teleconference
• DFW update on California halibut stock assessment and management review	Mar 16, 2021; MRC, Webinar/Teleconference
• DFW update; MRC recommendation to schedule bycatch review discussion	Nov 9, 2021; MRC, Webinar/Teleconference
• FGC referred bycatch review to MRC	Dec 15-16, 2021; Webinar/Teleconference
• FGC received update on bycatch evaluation for California halibut management review	Mar 24, 2022; MRC, Webinar/Teleconference
• DFW written update on bycatch evaluation for California halibut	Jul 14, 2022; MRC, Santa Rosa
• **Today's update and discussion on bycatch evaluation for halibut; potential MRC recommendation**	**Nov 17, 2022; MRC, San Diego**

Background

The California halibut fishery is a multi-sector commercial and recreational fishery managed under FGC authority. In 2019, as part of the fisheries prioritization process required by the Marine Life Management Act (MLMA) and outlined in *2018 Master Plan for Fisheries, A Guide for Implementation of the Marine Life Management Act*, California halibut was prioritized for management review. In Aug 2020, DFW recommended that it initiate the management review process for California halibut; FGC concurred and referred the topic to MRC.

One key driver in halibut's high priority ranking included potential risks to bycatch species (including sub-legal-sized halibut) in commercial trawl and set gillnet fisheries. Bycatch, as defined by MLMA for state-managed fisheries, means "…*fish or other marine life that are taken in a fishery but are not the target of the fishery. Bycatch includes discards*" (California Fish and Game Code Section 90.5). MLMA requires that DFW manage every sport and commercial

marine fishery in a way that *limits bycatch to acceptable types and amounts* (Fish and Game Code Section 7056(d)), and specifies information, analysis, and management measures required to accomplish this for each fishery (Fish and Game Code Section 7058).

The master plan established a bycatch evaluation framework in Chapter 6 (“Ecosystem-based objectives") as guidance for achieving the requirements of Section 7058. The framework is detailed in a section titled “Limiting bycatch to acceptable types and amounts” (Exhibit 1). The section draws largely from the work of a group of diverse stakeholders, called the Bycatch Working Group, convened by FGC in 2015 to help inform review of bycatch management. The framework in the master plan is, in part, designed to help determine what constitutes “acceptable types and amounts” of bycatch for each fishery evaluated.

The California halibut fishery management review presents the first opportunity to utilize the master plan’s bycatch evaluation framework. In Dec 2021, FGC requested that MRC pursue the halibut bycatch evaluation as a separate work plan topic from the related fishery management review that the bycatch evaluation will inform, to ensure robust public engagement through this first evaluation process. In Mar 2022, DFW presented MRC with its approach to evaluating halibut fishery bycatch and, in Jul 2022, DFW provided a written update about its continued efforts and hurdles it is facing in analyzing halibut bycatch from the available data.

Today’s meeting is an opportunity to focus on the master plan guidance and discuss options for how to complete the steps in the process.

(A) ***Overview of process for evaluating and addressing fishery bycatch***

FGC staff will recap the four-step process laid out in the master plan framework to identify bycatch and consider its impacts (Exhibit 1):

Step 1 – Collect information on the amount and type of catch

Step 2 – Distinguish target, incidental, and bycatch species

Step 3 – Determine “acceptable” types and amounts of bycatch

Step 4 – Address unacceptable bycatch

Note that today’s meeting is focused on steps 1-3.

(B) ***Evaluating bycatch in the California halibut fishery (steps 1 and 2)***

Consistent with MRC discussion in Jul 2022, DFW has provided the recently-completed bycatch assessment report for the trawl and set gillnet California halibut fisheries that DFW developed in collaboration with an academic partner, which authored the final report (Exhibit 2). DFW believes that the report accomplishes the goals of steps 1 and 2 and is adequate to support the Step 3 analysis. DFW will present an overview of the complex assessment, methods and results—to help build a common understanding of the foundational data that can support the Step 3 evaluation of bycatch acceptability—and potential next steps for MRC consideration (Exhibit 3).

(C) ***Determining acceptable bycatch types and amounts (Step 3)***

The master plan specifies that DFW will determine if the amount and type of bycatch is unacceptable for a particular fishery using four criteria mandated in MLMA (Fish and Game Code Section 7058):

1. Legality of take of bycatch species
2. Degree of threat to the sustainability of the bycatch species
3. Impacts on fisheries that target the bycatch species
4. Ecosystem impacts

The master plan bycatch evaluation framework (Exhibit 1) lays out a detailed series of inquiries and recommended actions for each criterion under Step 3 that would be applied to each species of bycatch. The inquiries provide a structural basis for managers to consistently assess each criterion to determine what is "acceptable" bycatch in the fishery and to articulate the findings. However, given the number of bycatch species and the detailed inquiries that would need to be applied to each, it is necessary to prioritize which species to include in the Step 3 assessment. It is possible that selecting a handful of representative species for the assessment would be sufficient, as the benefit of proposed management actions will likely have benefits across multiple species.

Today's meeting provides an opportunity to explore how DFW might accomplish the bycatch inquiries for California halibut in a manner that is transparent, inclusive and timely. This discussion will inform MRC's direction or potential recommendation regarding an approach.

Significant Public Comments

A joint comment from two environmental non-governmental organizations emphasizes the importance of FGC's commitment to minimize fishery bycatch, with an initial focus on California halibut trawl and gill net gears, consistent with DFW's ecological risk assessment and prioritization. The organizations have conducted their own bycatch assessments of trawl and set gillnet gear in California using federal observer data and request a collaborative approach to implementing the bycatch inquiry. They also request that MRC provide direction on what additional analyses are needed and to outline the public process and timeline MRC will follow to make a recommendation to FGC (Exhibit 4).

Recommendation

FGC staff: (1) Recommend FGC support DFW moving forward with Step 3 of the bycatch evaluation to determine bycatch acceptability, using the bycatch analysis report DFW provided today (Exhibit 2) and a DFW-led workgroup of key communicators representing various interests to provide a forum for discussing responses to the Step 3 inquiries prior to bringing recommendations to MRC. (2) Recommend using MRC as a forum for broader discussion and, ultimately, MRC recommendation to FGC on DFW's findings. (3) Provide guidance on selection of bycatch species to begin Step 3.

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DFW: Move forward with Step 3 of the framework in the master plan analysis based on the information contained in the steps 1 and 2 bycatch analysis report (Exhibit 2), and provide guidance on options for public engagement in determining bycatch acceptability.

Exhibits

1. Chapter 6 – "Ecosystem-based objectives: Limiting bycatch to acceptable types and amounts", extracted from *2018 Master Plan for Fisheries, A Guide to Implementation of the Marine Life Management Act*, dated June 2018
2. Report by Christopher M. Frees, DFW contractor: *Assessment of associated landed species and bycatch discards in the California halibut gill net and trawl fisheries*, received Nov 4, 2022
3. DFW presentation
4. Letter from Geoff Shester, Oceana, and Scott Webb, Turtle Island Restoration Network, received Nov 3, 2022

Committee Direction/Recommendation

The Marine Resources Committee recommends that the Commission (1) support the Department moving forward with evaluation of bycatch acceptability based on the analysis report submitted by the Department at the committee's November 2022 meeting; and (2) request that the Department pursue the following approach for completing the inquiries within the Step 3 evaluation framework and engaging stakeholders in the process: _____
_____.

COMMITTEE STAFF SUMMARY FOR JULY 20, 2023 MRC
For background purposes only

3. EVALUATION OF BYCATCH IN THE CALIFORNIA HALIBUT SET GILLNET FISHERY IN SUPPORT OF THE FISHERY MANAGEMENT REVIEW

Today's Item **Information ☐** **Action ☒**

Receive and discuss Department report summarizing its evaluation of fisheries bycatch and acceptability in the California halibut set gillnet fishery, provide committee direction on next steps, and potentially develop committee recommendation.

Summary of Previous/Future Actions

• Commission referred California halibut management review to MRC	Aug 19-20, 2020
• Commission referred bycatch evaluation for California halibut management review to MRC	Dec 15-16, 2021
• MRC received updates on bycatch evaluation for California halibut	Mar 24, 2022 and Jul 14, 2022
• MRC received bycatch evaluation report from Department; MRC recommendation for initial priorities in bycatch acceptability inquiry	Nov 17, 2022
• MRC received Department updates on bycatch inquiries for the California halibut gill net fishery	Mar 14 & 16, 2023
• **Today receive and discuss Department report on bycatch acceptability; potential MRC recommendation**	**Jul 20, 2023**

Background

Management review of the California halibut fishery commenced in late 2020, consistent with the requirements of the Marine Life Management Act (MLMA) and using the framework outlined in the *2018 Master Plan for Fisheries, A Guide for Implementation of the Marine Life Management Act* (master plan) for meeting those requirements. Steps taken by the Department have included pursuing stock assessments for the northern and southern stocks (2020-2021), exploring a scope and potential process for the multi-sector California halibut management review (2021), and, following Commission direction in December 2021, conducting an evaluation of bycatch in the California halibut fishery.

The California halibut fishery management review has presented the first opportunity to use the four-step framework for evaluating bycatch laid out in Chapter 6 of the master plan, to: collect information on the type and amount of catch (Step 1); distinguish target, incidental, and bycatch species (Step 2); determine "acceptable" types and amounts of bycatch (Step 3); and address unacceptable bycatch (Step 4).

At the November 2022 MRC meeting, the Department presented a report completed by a contracted academic scientist that evaluated and summarized catch and bycatch data compiled for the California halibut sectors with greatest bycatch concern: commercial trawl and

set gillnet halibut fisheries. Utilizing federal observer data provided by the National Marine Fisheries Service (NMFS), the Department and the contracted scientist used fishery expertise along with logbook and landings data to differentiate the subsets of observed sets targeting California halibut from other observed trawl and gillnet fishery sets. The report summarized target catch, top incidentally-caught species landed, top incidentally-caught species discarded, and discard mortality, fulfilling the information needs for steps 1 and 2 of the bycatch evaluation framework. See Exhibit 1 for additional background and context.

MRC supported relying on the Department-presented report as the foundation for completing Step 3 – evaluating acceptability of bycatch types and amounts. MRC discussed priorities for completing the detailed bycatch inquiries based on the new evaluation report, favoring an initial focus on top bycatch species from set gill nets targeting California halibut. In December 2022, the Commission approved an MRC recommendation to request the Department to (1) commence the step 3 evaluation of acceptability of bycatch in the *California halibut set gillnet fishery,* using the inquiries outlined in the master plan; (2) focus on completing bycatch inquiries for the *top ten species*; (3) engage stakeholders (halibut gillnet fishermen and stakeholder groups); and (4) bring results back to MRC in March 2023 for discussion and potential committee recommendation.

March MRC

In March 2023, the Department reported that it had completed Step 3 bycatch inquiries for 12 top bycatch species, as requested by the Commission, to help assess acceptability of bycatch types and amounts against the four criteria specified in the MLMA for determining acceptability: (1) legality of the take of bycatch species; (2) degree of threat to the sustainability of the bycatch species; (3) impacts on fisheries that target the bycatch species; and (4) ecosystem impacts (Fish and Game Code Section 7085(b)). The Department presented a summary of the inquiry results during the meeting, and committed to preparing a written report documenting its responses to inquiries and articulating its findings.

Discussion also centered around a separate evaluation conducted by two non-governmental organizations (NGOs), Oceana and Turtle Island Restoration Network (TIRN), in which they evaluated bycatch acceptability in set nets for all gillnet gear combined, in contrast to the subset of halibut sets analyzed by Department. The MRC co-chairs noticed discrepancies between the NGO and Department approaches, reporting and conclusions, and asked questions to help clarify differences in the differing analyses, and sources of divergent data and findings.

Following public discussion, MRC made four requests of the Department.

1. Look more closely at discrepancies between the NGO bycatch data and the Department data, including in relation to marine mammal and leatherback sea turtle entanglement.
2. Create a more comprehensive list of species that are retained and sold as incidental catch, including:
    (a) the percentage of fish that are caught and marketed, and
    (b) the percentage of species caught and discarded.

3. Clarify the bycatch percentage relative to pounds and number of individuals, to help reconcile the differences between the percentages reported by the NGOs and fishermen.
4. Provide a written report of the Department's evaluation of 12 top bycatch species that were summarized in the presentation, and return to today's MRC meeting with sufficient information to support a recommended determination regarding acceptability of bycatch types and amounts, to allow the process to advance to Step 4 (*addressing unacceptable bycatch types and amounts*) in the bycatch evaluation framework.

MRC also asked that Commission staff, the Department, and the two NGOs work together to reconcile differences in data and interpretations, where possible, to further advance discussions today.

Update

Since March, Commission and Department staff have strived to meet the MRC requests.

Commission, Department, and NGO Meetings

From April to July 2023, staff from the Commission, the Department, Oceana, and TIRN invested significant time through several meetings, covering multiple hours, to discuss and seek a shared understanding of bycatch within the California halibut set gillnet fishery and an analysis on the set gillnet fishery in general. Oceana and TIRN shared their raw data and methodology for several components of their report, including a description of how they extrapolated the combined California halibut and white seabass observer data to obtain fleetwide estimates. The Department summarized its raw observer data to share overall catch and bycatch rates of California halibut-only set gill nets. Each entity independently followed up with NMFS staff, researchers, and the literature to vet conclusions or interpretations or to clarify inconsistencies or uncertainty.

Commission staff completed an in-depth analysis of the NGO report (formally released in April), which included replicating analyses, evaluating assumptions, and reviewing key conclusions. Commission staff verbally shared with the NGOs where it disputed their conclusions due to inconsistencies with what the cited literature stated, flagged areas where there appeared to be erroneous information, and offered potential recommendations that would allow for a more conducive dialogue.

Overall, there was a collective exploration of respective findings and conclusions and, although there remain disagreements in interpretations, the discussions helped to expose limitations with the various sources of data, highlighted areas of concern related to particular species, and facilitated a deeper understanding of the potential impacts of the fishery. In addition, the dialogue identified areas where it may be possible to move forward with potential management measures; although the potential measures have not yet been formally vetted with fishermen – a crucial step in the overall process – staff have discussed potential management measures that could improve understanding of the impacts of this fishery through increased data collection and monitoring, and options intended to reduce bycatch impacts.

Discussions and Opportunities with Fishermen

Several fishermen in the set gillnet fishery who attended the last two MRC meetings reached out to Commission and Department staff to share their knowledge and expertise of the fishery. They are interested in helping shape future management measures and are offering new ideas to explore. In addition, they invited the MRC co-chairs, and Commission and Department staff to join them on the water to observe fishery operations first-hand. To date, staff from the Department has joined one set gillnet fishing trip, while the MRC co-chairs and Commission staff are scheduling potential dates.

Today's Meeting

The Department prepared a bycatch evaluation report that summarizes the information presented in March (Exhibit 2). The report summarizes the methods and results of the California halibut bycatch evaluations in Step 1 (species type and amount of catch) and Step 2 (distinguish target, incidental and bycatch species), as well as the outcomes of completing Step 3 (determine acceptable types and amounts of bycatch) bycatch inquiries from the master plan for 12 species (spreadsheet copies in report appendix). The report offers movement toward considering management measures under Step 4, to help fill significant data gaps that limit information about the actual impacts of gill nets used in the California halibut fishery, and explores others to minimize bycatch types and amounts found to be unacceptable.

In addition, the Department has shared a table with six years of cumulative observed catch data from the NMFS California Set Gill Net Observer Program filtered for California halibut-targeted sets (447 sets of 1,258 observed sets) (Exhibit 3). The data are in the same format as the summary table of unfiltered set gill net observed catch, prepared by Oceana and shared with the Commission in June, derived from the publicly available observed catch data for all set gill net (1,258 sets) for the same years. Together, these tables assist in differentiating between observed catch data attributable to the California halibut set gillnet fishery specifically.

The Department report acknowledges that "…there are significant data limitations and knowledge gaps to determine amounts and types of bycatch and potential risks to sustainability, fisheries, and ecosystems. Lack of data to understand the total amount of bycatch in an individual fishery may potentially be considered 'unacceptable' under the MLMA and could lead to discussions with industry, stakeholders, and managers to address the insufficient and uncertain sources of data. Regardless of an acceptability determination, Department staff continue to move forward towards solutions and have identified potential management measures to address information gaps related to data limitations and interactions with some bycatch species in the set gill net fishery" (from Exhibit 2, page 23).

Staff believes that the Department's analyses of the top bycatch species types and amounts as requested by MRC support responding to provide a solid foundation for addressing bycatch in the California halibut fishery through potential management measures, as well as to set additional goals for enhanced understanding of sustainability in the fishery. MRC may wish to clarify what knowledge gaps remain, and identify areas of uncertainty to pursue (e.g., further partitioning incidental catch species to identify those to be managed by target species standards

and those to be managed under bycatch management standards, defining what constitutes bycatch "types" and "amounts" for purposes of bycatch acceptability evaluations, etc.).

The Department's presentation for today's meeting (Exhibit 4) will highlight species that are caught and landed in the fishery, species that are caught and discarded in the fishery, and potential management measures for MRC and the Commission to consider if they support advancing to Step 4 without additional analyses.

Significant Public Comments

The Commission received nine comment letters related to bycatch with California set gillnet fisheries. General themes of the comments are summarized below; see Exhibit 5 for all comment letters combined.

Comments about the Department's California Halibut Bycatch Report

1. Oceana and TIRN express appreciation for the amount of work Department and Commission staff and MRC have dedicated to addressing the concerns arising from California set gill nets, including understanding data complexities, listening to stakeholder concerns, and undertaking California's first bycatch acceptability determination. However, they critique several aspects of the Department's recent bycatch evaluation report for California halibut set gill net (in Exhibit 2), expressing concern that it deviates from the MLMA standards and falls short on appropriate and precautionary management actions to reduce unacceptable bycatch. They also recommend three alternatives for potential comprehensive management pathways, which include specific management actions such as full observer coverage, hard bycatch caps, reduced soak time, and temporary or long-term phase-out of permits (see comment letters 3 and 8 in Exhibit 5).

Comments Regarding Bycatch Concerns in Set Gillnet Fisheries (All Targets)

2. Oceana completed a white paper with analysis on bycatch within the set gill net fishery (all targets) using publicly available federal observer data. The report investigates soak time, catch composition, discard mortality, and post-release mortality, and suggests bycatch mitigation measures as options to reduce overall bycatch and discard mortality. In addition, for incidentally caught and retained species, it highlights those species most commonly retained as 'secondary targets' and evaluates which target species have or lack management measures to ensure sustainability. The analysis includes appendices of observer data and extrapolates total estimates of catch, discard, and discard mortality for all observed species across 15 years combined. See comment letter 3 in Exhibit 5.
3. An academic research scientist expresses concern over take with set gill net of two protected species: giant sea bass – a species he actively studies – and juvenile white sharks. He underscores the importance of having management plans and stock assessments that can inform catch limits and sustainable harvests (comment letter 1 in Exhibit 5). An individual also expressed concern over set gill net impacts on highly impaired giant sea bass in Santa Barbara, is concerned that recent observer coverage

has been minimal, and would like to see a transition away from this gear type (comment letter 2).

4. A joint letter from 5 California senators and 14 assembly members expresses concern about the types and rates of bycatch in California's set gillnet gear fishery, and urges the Commission and Department to follow the approach and criteria laid out in the MLMA regarding determining acceptable bycatch. They acknowledge the management measures taken thus far in the fishery but believe further management measures are needed to protect California's biodiversity (comment letter 6).
5. Four comments letters coalesce around similar key points, such as the historical and global threat of set gill nets to regional population levels; the effects of set gill nets on the health and biodiversity of southern California's unique ecosystem; the high discard rate and discard mortality recorded by federal observers; and a request to the Commission to formally determine that the types and amounts of bycatch in set gill nets are unacceptable. One commenter is specifically concerned about the threat to pinnipeds, cetaceans, and elasmobranchs (comment letter 5), while another expresses that ecosystem-based fisheries management should take a precautionary approach (comment letter 4). Two commenters contrast set gill net gear with the lower bycatch rate of California halibut caught with hook and line gear (comment letters 7 and 9).

Recommendation

Commission staff: Initiate discussions about potential management measures that may improve set gill net data collection and fill data gaps, and aid in reducing impacts of bycatch types and/or amounts that the Commission finds to be potentially unacceptable in the California halibut fishery. Request that the Department continue exploring possible management options with fishery participants and stakeholders, and provide an update for discussion at the November 2023 MRC meeting.

Department: Discuss potential improvements to data collection and fill information gaps, and support Department to continue stakeholder discussions and prioritize management actions.

Exhibits

1. Staff summary from November 17, 2022 MRC meeting, Agenda Item 5 (for background purposes only)
2. Department bycatch evaluation report, dated June 21, 2023
3. NMFS observed catch in the set gill net sets targeting California halibut, 2007-2017
4. Department presentation on its evaluation of bycatch in the California halibut set gill net fishery, received July 7, 2023
5. Compilation of comment letters received between June 20 and July 7, 2023

Committee Direction/Recommendation

The Marine Resources Committee recommends that the Commission support the Department exploring potential management measures with fishery participants and stakeholders to improve set gill net data collection, fill information gaps, and aid in reducing unacceptable bycatch

impacts in the California halibut set gillnet fishery; and schedule the topic for discussion at the November 2023 MRC meeting.

Agenda Item 2: Potential Management Measures for the California Gill Net Fishery

16 November 2023

Presented to:

Marine Resources Committee

Fish and Game Commission

Presented by:

Kirsten Ramey

Environmental Program Manager
Marine Region

Outline

- Background
- Potential Management Measures
- Stakeholder discussions
- Recommendations

Background

- Assessing and Addressing Bycatch per the Marine Life Management Act (Act)
  1. Collection of information on types and amounts of bycatch
  2. Distinguishing target, incidental, and bycatch species
  3. Determining “acceptable” types and amounts of bycatch
  4. Addressing unacceptable bycatch

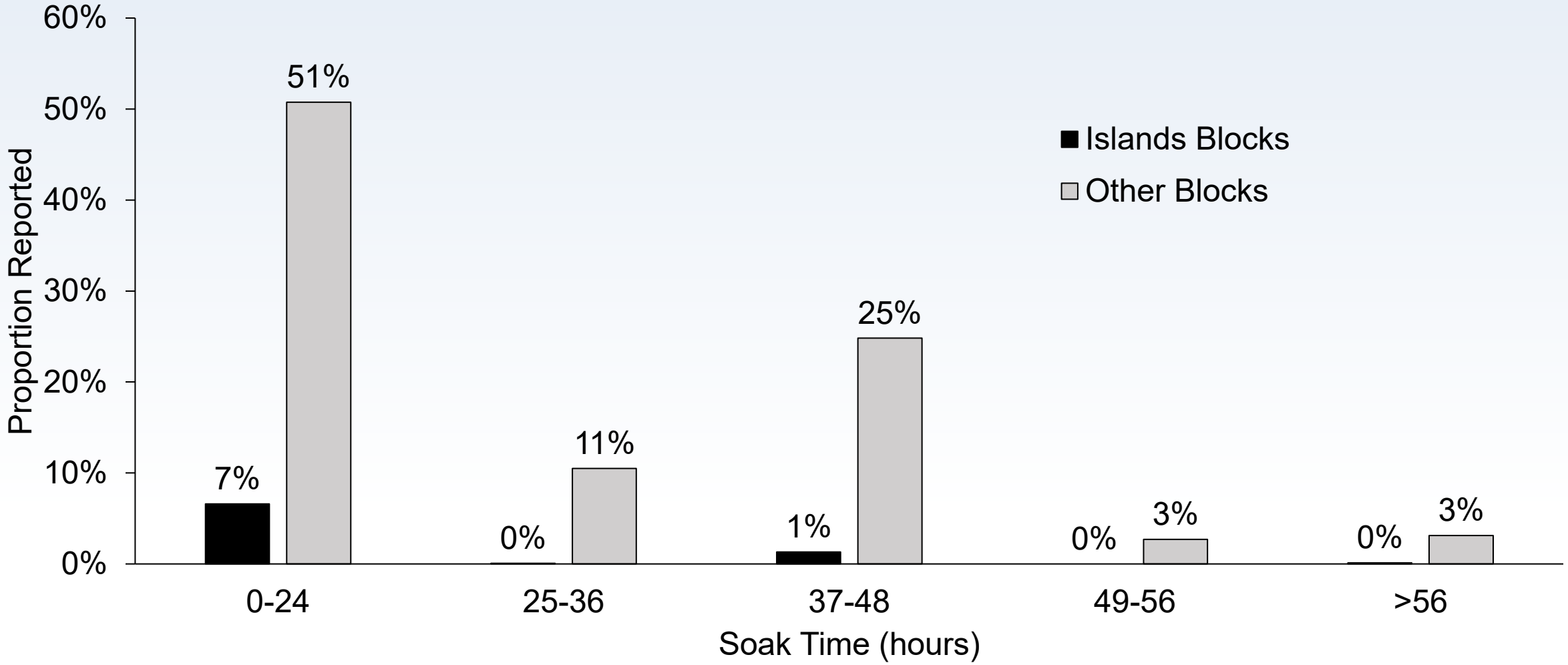
Potential Management Measures

1. Soak time
2. Gear marking
3. Mesh depth
4. Gear loss reporting
5. Logbook improvements
6. Electronic technology
7. Observer coverage
8. Non-transferable permits
9. Non-retention of great white sharks
10. Spatial/temporal closures

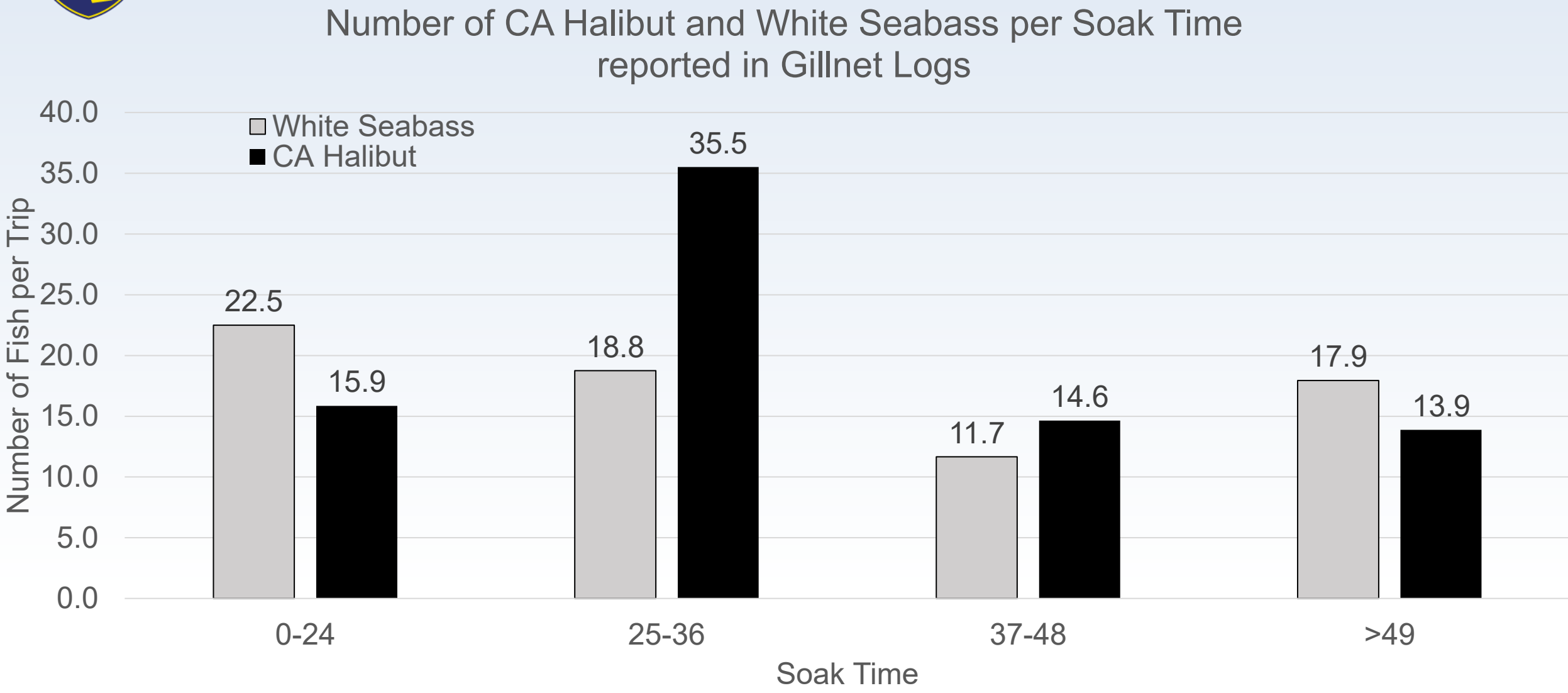

Photo Credit: CDFW

Soak Time

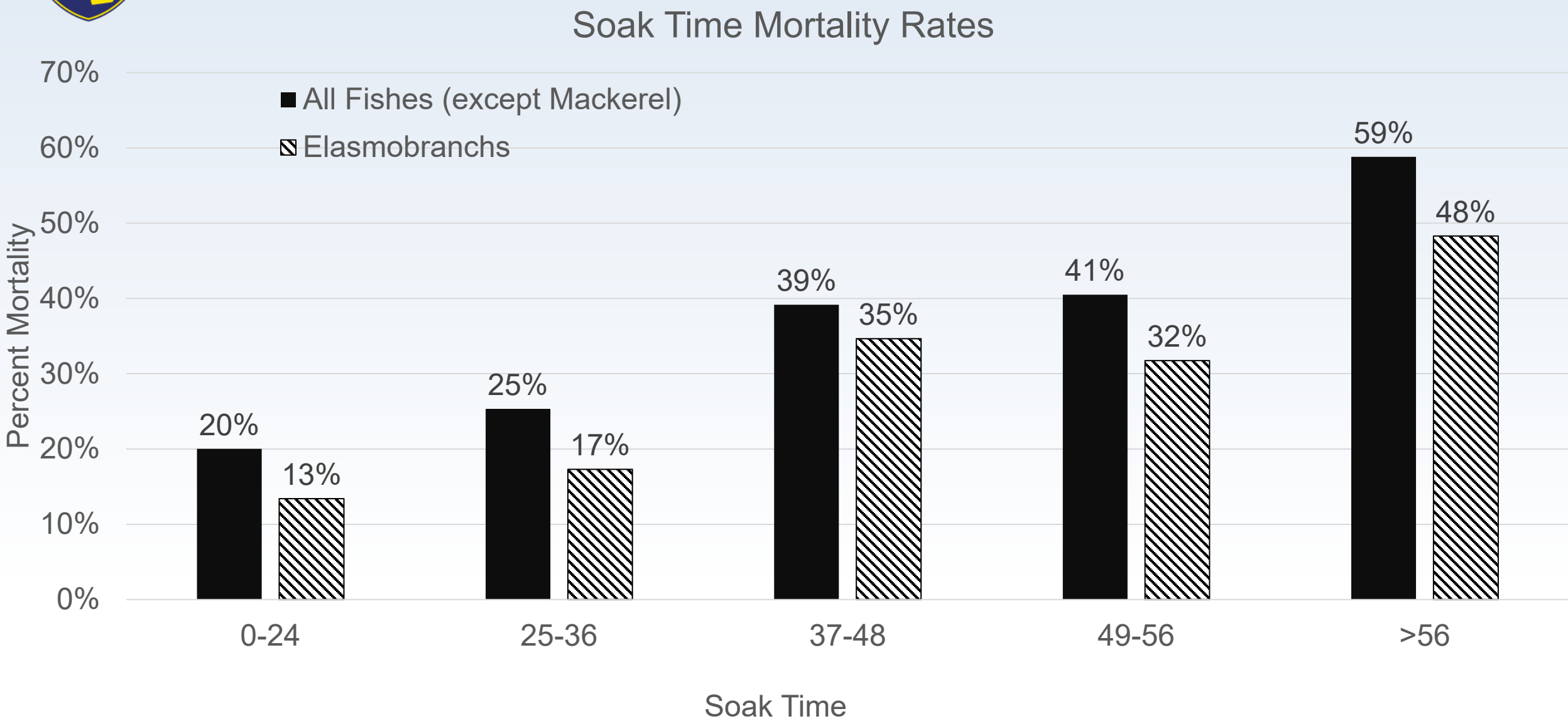
Range of Soak Times and Frequency Reported in the CA Set Gillnet Fishery by Block (2007-2022)



Catch Numbers per Soak Time



Soak Time Mortality



Soak Time Considerations

Considerations:

1. Majority of fleet report less than 24-hr soak
2. Catch numbers:
   a. White seabass catch is greatest 24 hours or less
   b. CA halibut catch is greatest between 25-36 hours
3. < 36-hour soak = lowest mortality rates
4. Costs associated with more frequent gear tending
5. Weather and safety provision
6. Enforcement

Gear Marking Ideas


Photo Credit: Gill net permittee


Photo Credit: Gill net permittee


Photo Credit: Gill net permittee


Photo Credit: Gill net permittee

Gear Marking Considerations

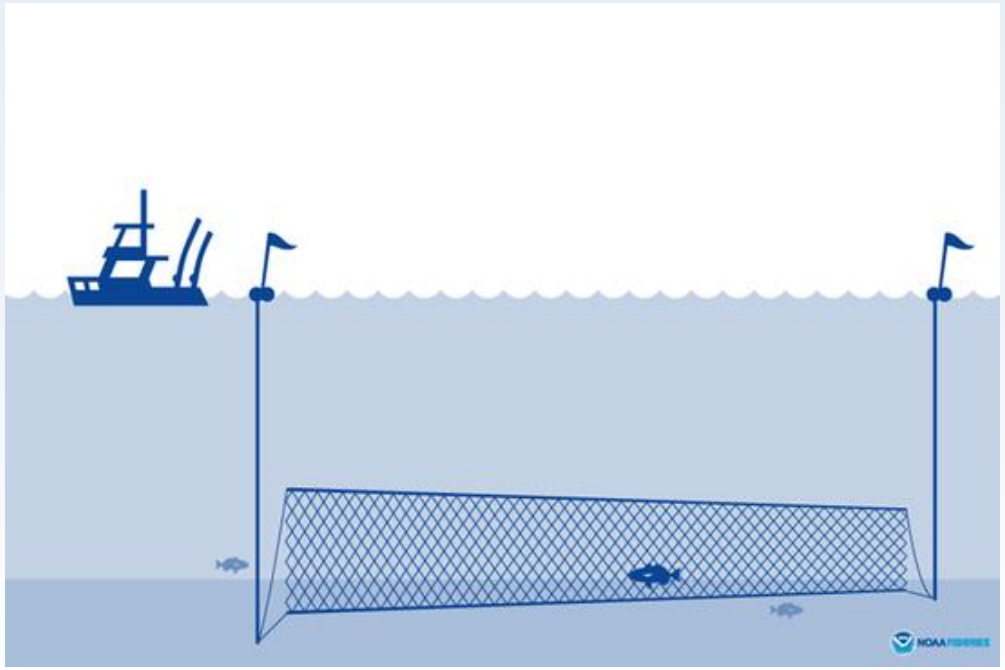
Photo Credit: Amazon.com

Considerations:

1. Functionality of gear
2. Availability of materials
3. Additional costs
4. Color visibility and contrast
5. Uniqueness

Mesh Depth

1. Mesh size:
   a. CA halibut >8.5 inches
   b. White seabass >6 inches
2. Net length for CA halibut:
   a. No more than 9,000 feet in combination
   b. No more than 6,000 feet in specific area in SB County
3. Recommend mesh depth (net height)
   a. No greater than:
      a. 25 meshes for CA halibut
      b. 50 meshes for white seabass



Gear Loss Reporting

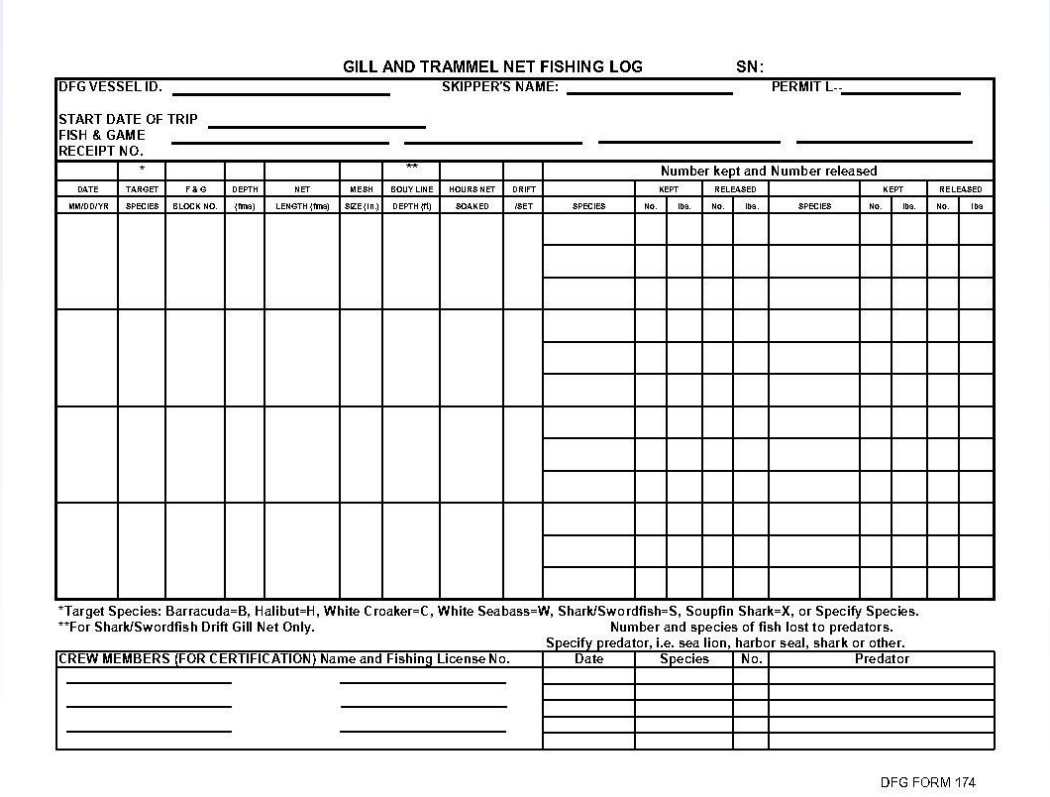
Fish and Game Code 8601.5: mandates notification no later than 72 hours after returning to port following the loss of a set net, including:

- Date and time lost
- Location, including depth
- Description, including mesh size, length, height, target species, and whether anchors are attached
- Name and fisherman's ID number of owner and/or of person fishing the net
- Name and ID number of the vessel

Logbook Improvements and Electronic Technology

Data Objectives:

1. Fishing location and depth
2. Target species
3. Effort: (e.g. fishing duration, gear soak time)
   a. Number of fishing trips and sets
   b. Kept catch per individuals and weight
4. Net type and specifications
5. Bycatch, including discards
6. Protected species interactions



GILL AND TRAMMEL NET FISHING LOG SN:

DFG VESSEL ID. _____ SKIPPER'S NAME: _____ PERMIT L--_____

START DATE OF TRIP _____
FISH & GAME _____
RECEIPT NO. _____

	*					**			Number kept and Number released							
DATE	TARGET	F & G	DEPTH	NET	MESH	BOUY LINE	HOURS NET	DRIFT		KEPT		RELEASED			KEPT		RELEASED	
MM/DD/YR	SPECIES	BLOCK NO.	(fms)	LENGTH (fms)	SIZE (in.)	DEPTH (ft)	SOAKED	/SET	SPECIES	No.	lbs.	No.	lbs.	SPECIES	No.	lbs.	No.	lbs.

*Target Species: Barracuda=B, Halibut=H, White Croaker=C, White Seabass=W, Shark/Swordfish=S, Soupfin Shark=X, or Specify Species.
**For Shark/Swordfish Drift Gill Net Only. Number and species of fish lost to predators. Specify predator, i.e. sea lion, harbor seal, shark or other.

CREW MEMBERS (FOR CERTIFICATION) Name and Fishing License No.		Date	Species	No.	Predator

DFG FORM 174

Electronic Technology Considerations

Considerations and challenges for EM:

1. Regulatory mandate and phase-in period
2. Costs: initial set-up and on-going
3. Equipment functionality (e.g. battery life, limitations)
4. Data collection, flow, confidentiality, timing, and processing
5. Integration with e-logbook

Electronic Technology Options

Pursue a pilot study to test e-logbook, electronic monitoring (EM) and observer coverage

1. EM vendors
    a. Fishery profile
2. Funding opportunities
    a. Bycatch Reduction Engineering Program, Fisheries Innovation Fund or Fisheries Information System Program

Observer Coverage

- NOAA's West Coast Regional Observer Program (WCROP)
  - Mandated by MMPA, ESA and MSFCA
  - Covers CA large mesh drift gillnet, deep-set pelagic longline, shallow-set pelagic longline, deep set buoy gear, and CA set gill net
  - CA set gill net was last observed in 2017
  - Potential re-instatement in 2025
- Pilot project

Non-Transferable Permit

Fish and Game Code:

1. 8681: *shall not be used except under a revocable, nontransferable permit issued by the Department.*
2. 8681.5(b): *any person who has an existing, valid permit may transfer that permit to any person otherwise qualified*

Title 14, CCR:

1. Section 174: Permits to use gill nets or trammel nets for commercial purposes

Commercial White Shark Landings

Year	Drift Gill Net (Large Mesh)	Drift Gill Net (Small Mesh)	Set Gillnet	Portion Used for Research
2000	0	0	4	0
2001	0	0	3	0
2002	0	0	< 3	< 3
2003	0	0	< 3	< 3
2004	0	0	< 3	< 3
2005	0	0	3	< 3
2006	0	0	8	8
2007	0	0	5	4
2008	0	< 3	7	6
2009	0	0	16	11
2010	0	0	13	11
2011	0	0	< 3	< 3
2012	0	0	6	5
2013	0	0	0	0
2014	0	0	0	0
2015	0	0	0	0
2016	0	0	0	0
2017	0	0	< 3	0
2018	0	0	< 3	0
2019	0	0	4	0
2020	0	0	< 3	0
2021	0	0	5	0
2022	0	0	4	0
Total	**0**	**< 3**	**89**	**53**

Spatial/Temporal Closure Considerations

1. Goal: limit interactions between target and bycatch species
    a. Spatial and temporal distribution of target and non-target species
    b. Compliance monitoring and enforcement
    c. Can potentially relocate bycatch impacts
    d. Lead to socio-economic impacts

Stakeholder Discussions

- Key industry representatives
- NOAA Fisheries staff
- Commission staff
- Non-government organizations

Near-Term Recommendations

- Phase I Regulatory Package:
  - Soak time
  - Gear marking
  - Mesh depth
- Pilot Project for data improvements:
  - Fleet profile for e-logbooks and electronic monitoring
  - Observer coverage

Thank You

mlmafisheriesmgmt@wildlife.ca.gov

MLMA Master Plan - Bycatch Criteria

CA Marine Species Portal - California Halibut

November 2, 2023

California Fish and Game Commission
Marine Resources Committee
California Natural Resources Building
715 P Street, 16th Floor
Sacramento, California 95814

Re: Item 2 - Evaluation of bycatch in the California halibut set gill net fishery in support of the fishery management review -- November 16, 2023, Marine Resources Committee

– Support and Expedite New Management Measures

Via Email and Hard Copy

Dear Commissioner Sklar and Commissioner Murray,

Turtle Island Restoration Network (TIRN) supports the 11 new management measures proposed by the Marine Resources Committee (MRC) for the California halibut set gill net fishery to reduce the high levels of bycatch that result in the discard and death of dozens of non-target fish and marine species. We urge you to immediately expedite the implementation of all 11 measures described at the August 2023 meeting and provide specific timelines and mechanisms needed to do so.

First and foremost, urgent consideration and action must be given to MRC's suggested Measure (8) potential limits on permit transferability and/or retiring latent permits. To that TIRN would add a sunset date for all permits. If legislation is required, we urge you to support it.

TIRN recognizes and appreciates the extensive work done to date by the California Fish and Game Commission and the California Department of Fish and Wildlife (CDFW) toward developing a suite of management measures to reduce bycatch and bycatch mortality associated with set gillnet fishing. Addressing the unintended catch and discarding of dead or injured marine life including giant sea bass, white sharks, whales, highly endangered leatherback sea turtles and sea lions is a top priority for California.

We understand that the MRC may be forwarding fewer than the full slate of 11 measures described at the August 2023 MRC meeting for review at the Nov. 16 meeting. That is disappointing given the urgency to improve the sustainability of our fisheries and protect vulnerable marine biodiversity. We see fishing practices, climate change and other factors causing tremendous harm along the California coast and beyond. Now is the time to take bold action to begin to restore our oceans and reverse decades of harm.

If a phasing of the 11 measures is required, please provide a specific timeline for each measure and begin implementation no later than the end of 2024. In addition to reforming in-the-water fishing gear and practices such as soak time, gear marking and net height, it is essential to move quickly forward on observer coverage, E-logbooks, electronic monitoring, seasonal/time-area closures, gear loss reporting.

Finally, and most importantly, to ensure the long-term sustainability of our fishery and marine resources as required by state and federal law, the following must happen asap:

1. Prohibiting the take of giant sea bass and shark and other protected marine species in the set gillnet fishery and;
2. Phasing out permits in the fishery by preventing transfer of permits, retiring latent permits and setting a sunset date for all permits.

Thank you for your time and consideration.

Sincerely,

Todd Steiner, Executive Director

Teri Shore, TIRN Board of Directors

Cc: Susan Ashcraft, Commission Marine Advisor, Chuck Bonham, Executive Director, Kirsten Ramey, Department staff

November 3, 2023

Marine Resources Committee
California Fish and Game Commission
California Natural Resources Building
715 P Street, 16th Floor, Sacramento, California 95814

Re: Agenda Item 2: Evaluation of bycatch in the California halibut set gillnet fishery in support of the fishery management review

Dear President Sklar and Commissioner Murray,

The Center for Biological Diversity supports the full suite of management measures that the Commission asked the Department to review and wishes to see them moved forward in a timely manner to reduce bycatch in the California halibut set gillnet fishery.

Implementing temporal closures, soak time limits, and other key bycatch mitigation regulations will minimize the incidental catch of species of concern including the tope shark.

Background on the Set Gillnet Fishery and Depletion of Tope Shark

Previous state regulations on gillnet usage in coastal waters have proven to be effective in reducing harm to non-target species. In 1994, California banned gill nets in some state waters - within 3 nautical miles of the mainland and within 1 mile of the Channel Islands - in response to a collapse in white seabass stock.[1] Quickly following the implementation of the ban, the numbers of tope sharks increased significantly.[2] In contrast, the number of tope sharks did not increase from 1950-94. This suggests the increase in tope abundance was caused by the gillnet closure. Researchers saw an increase from 0 topes caught per test station to 0.48 individuals caught per test station.[3] This increase was also seen for giant sea bass and leopard sharks.[4]

In 2020 the IUCN listed tope sharks as critically endangered. Scientists found an 88% decline in global populations of topes over the last three generations (79 years).[5] The authors of the IUCN report found that there is no reliable estimate of the tope numbers for the northeastern Pacific population (Baja to British Columbia).[6] This species is an ecologically important predator that

[1] Cal. Fish & G. Code §§ 8610.2, 8610.3
[2] Pondella, D.J. and Allen, L.G. (2008) The Decline and Recovery of Four Predatory Fishes from the Southern California Bight. Marine Biology, 154, at 307.
[3] *Id.* at 310.
[4] *Id.* at 307-313.
[5] Walker, T.I. et al., *Galeorhinus galeus*, The IUCN Red List of Threatened Species 1, 4 (Feb. 14, 2020).
[6] IUCN classified the *Galeorhinus galeus* as "Critically Endangered," or "facing an extremely high risk of extinction in the wild," on Feb. 14, 2020 (IUCN Red List Categories and Criteria Version 3.1)

has not recovered from historic depletion several decades ago when it was targeted by the Vitamin A fishery.[7]

Last year, NMFS found that listing may be warranted for the tope shark under the ESA.[8] The listing factor that weighed most heavily for listing the tope shark was its exploitation for commercial purposes. This 90-day finding was in response to a petition filed by the Center in 2022.[9]

Conclusion

The Center for Biological Diversity supports the full suite of management measures and thanks the Committee for its work to protect marine life by reducing bycatch in California fisheries.

Sincerely,

Ben Grundy
Center for Biological Diversity

[7] Muñoz, Sebastián Ignacio Hernández, Population genetics of the school shark (*Galeorhinus galeus*) in New Zealand, Australian and Chilean Waters, Ph.D Thesis, Victoria Univ. Wellington 11 (2013); Walker et al. 2020, at 8, 9; Nosal et al. 2021, at 1579.

[8] *Endangered and Threatened Wildlife; 90-Day Finding on a Petition To List the Tope Shark as Threatened or Endangered Under the Endangered Species Act*, 87 Fed. Reg. 25,209 (Apr. 28, 2022).

[9] Center for Biological Diversity & Defend Them All Foundation, Petition to List the Tope Shark (*Galeorhinus galeus*) As Endangered or Threatened Under the Endangered Species Act (February 15, 2022), available at https://s3-us-west-2.amazonaws.com/s3-wagtail.biolgicaldiversity.org/documents/Tope_Shark_ESA_Listing_15_February_2022_FINAL.pdf.

From: Scott Webb <swebb@rri.org>
Sent: Friday, November 3, 2023 5:00 PM
To: Ashcraft, Susan@FGC
Cc: Matthews, Kinsey-Contractor@fgc Ramey, Kirsten@Wildlife Chance Cutrano FGC <FGC@fgc.ca.gov>
Subject: Public Comment for MRC Agenda Item 2: RRI Public Comment

Hi Susan,

I also want to submit the attached Public Comment on behalf of the Resource Renewal Institute under MRC Agenda Item 2: "Evaluation of bycatch in the California halibut set gill net fishery in support of the fishery management review," to be available for the briefing booklet.

All the best,

Scott
--
Scott Webb (he/him)
Director of Advocacy & Engagement
Resource Renewal Institute

Resource Renewal Institute
40 Years. Innovation for a Sustainable Future.

November 3, 2023,

President Eric Sklar, Commissioner Murray
California Fish and Game Commission
P.O. Box, 944209
Sacramento, CA 94244-2090

RE: Marine Resource Committee Agenda Item 2: Evaluation of bycatch in the California halibut set gill net fishery in support of the fishery management review

Dear President Skalr and Commissioner Murray,

The Resource Renewal Institute (RRI) would like to extend our appreciation to the Marine Resource Committee (MRC) and the Department of Fish & Wildlife (CDFW) for the time and resources spent analyzing the bycatch associated with California set gillnets. After an extensive, multi-year review of the data associated with this fishery, stakeholders are ready for action.

RRI urges the MRC to recommend a robust management package comprised of the management measures and data collection improvements the Commission directed CDFW to bring forward to the MRC at the August 2023 Fish and Game Commission meeting.[1] This package should meaningfully reduce bycatch and establish data collection methods that do not rely on commercial gillnet-reported data. While we do wish to express our gratitude to the Department for presenting short-term management measures, there exists an opportunity to enhance the proposed package through strengthening the recommendations and formulating clear timelines for the implementation of management measures not included in the short-term package. Achieving this would represent a promising first step, positioning the Commission on a trajectory toward the reduction of bycatch to acceptable types and amounts in this fishery.

<u>Management and Workload Recommendations</u>

In addition to ensuring management measures apply to all gillnet permits, making improvements to self-reported logbooks, and implementing the Gillnet fleet suggested net height restrictions, RRI would like to see the following regulations and workload planning be recommended for adoption by the whole Fish & Game Commission during the November MRC meeting:

1. *A Maximum 24-Hour Soak Time*

[1] Ashcraft, Susan; Mathews, Kinsey. "Staff Report for August 22-23, 2023 Item 23 A Marine Resource Committee." California Fish and Game Commission, https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=214928&inline

RRI believes having nets in the water for less time is the most pragmatic measure to reduce bycatch mortality. Not only will it minimize overall bycatch mortality and limit interactions with vulnerable and nontarget species, but it will also result in fresher seafood. According to the CDFW presentation prepared for Agenda Item 2 at the November MRC, close to 60% of trips, when distributed by fishing block, are already under 24 hours.[2] Set gillnet fishery logbook data from 2007 to 2022 show that approximately 72% of sets' soak times are already less than 24 hours.[3] The best available science indicates that a 24-hour soak time is an effective way of reducing bycatch mortality for elasmobranchs in the Southern California Gillnet fishery,[4] and the CDFW presentation indicates that trips with 0-24 soak time have the lowest bycatch mortality rate in trips targeting White Seabass and California Halibut. With the exception of weather-related events, we firmly believe that 24 hours should be the absolute maximum soak time allowed for set gillnets trips.

2. *Robust Gear Marking and Lost Gear Reporting*

While we applaud the Department for beginning to test gear marking for gillnets, we request that the markings not only be distinguishable but durable and have similar standards as other California fisheries that use unique gear markings. Line markings must go beyond attaching nylon rope to current gillnets and should consist of a standardized mesh net color to identify a California from a Mexico gillnet easily.

RRI also believes that Fish and Game Code 8601.5 alone is not enough to efficiently report lost gillnets. Lost gear can result in unreported bycatch of vulnerable species as well as another source of pollution in the ocean. RRI is in favor of CDFW moving to a more proactive approach of monitoring lost gear that does not rely exclusively on commercial gillnet self-reporting.

3. *Establish a Timeline for Closure of Biodiversity Hotspots and Nursery Grounds of Vulnerable Species*

In 2022, the United Nations Biodiversity Conference (COP 15) provided California with a significant international platform to demonstrate its steadfast commitment to biodiversity conservation leadership.[5] However, other nations have taken more proactive measures to safeguard their areas of marine biological importance from indiscriminate fishing gear. This past summer, the Australian government took a commendable step by banning gillnet fishing in the Great Barrier Reef, a UNESCO World Heritage

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[2] Ramey, Kirsten. *Presenation for Agenda Item 2: Potential Management Measures for the California Gill Net Fishery*. California Department of Fish & Wildlife.

[3] Birch, Caitlynn, and Geoff Shester. Marine Resources Committee Agenda Item 3: Set Gillnet Bycatch Evaluation. Oceana, 7 July 2023, https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=214928&inline

[4] Lyons, K., et al., The degree and result of gillnet fishery interactions with juvenile white sharks in southern California assessed by fishery-independent and -dependent methods. Fish. Res. (2013) http://dx.doi.org/10.1016/j.fishres.2013.07.009

[5] California Natural Resources Agency. “Press Release: California Action Protect Biodiversity UN.” 19 December 2022, https://resources.ca.gov/Newsroom/Page-Content/News-List/California-Action-Protect-Biodiversity-UN.

site, due to the substantial bycatch of vulnerable species.[6] The parallels between the Great Barrier Reef and our own Channel Islands, some of the most productive and diverse marine ecosystems globally, cannot be ignored.

The Santa Barbara Channel, which encompasses the Channel Islands, is a refuge for one-third of the world's cetacean species, emphasizing the international significance of these waters. Additionally, the Channel Islands are the sole UNESCO Biological Reserve on the California coast and serve as important pupping and nursery grounds for numerous vulnerable species, including the Tope Shark, an Endangered Species Act (ESA) candidate species.[7] The IUCN categorizes the tope shark as Critically Endangered, estimating a decline of 88% of the global population, with one of the leading causes attributed to bycatch.[8,9] There has not been a formal stock assessment for tope sharks in the last 70 years,[9] but recent scientific studies indicate there is cause for concern for tope shark stock on the West Coast.[10] Federal observer data from 2007 -2021 indicate Tope sharks have been discarded in relatively high numbers and have a 64% mortality rate when caught.[11] In light of these concerning trends, it is imperative that the California Fish and Game Commission adopt a precautionary approach in line with the Marine Life Management Act (MLMA). What's more, the Commission must establish a timeline for implementing strategic area closures around regions of biological significance, such as the Channel Islands.

4. *Establish a Timeline for the Pilot Observer Program, Independent Data Collection Methods, and Enforcement Mechanisms.*

There currently are no independent enforcement mechanisms to monitor the discard of species in the set gillnet fishery. The lack of independent data has hindered consensus between concerned stakeholders, regulatory agencies, and the commercial gillnet fleet. Relying exclusively on gillnet self-reported data leaves room for bias and will continue to prove insufficient when monitoring the scale of the bycatch, as well as measuring the efficacy of any adopted regulations. The state must mandate independent data collection, including a pilot state-run observer program and consistent electronic

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[6] Jaynes, Cristen Hemingway. "'Globally Significant Moment for Ocean Conservation': Australia to Phase Out Gill Net Fishing in Great Barrier Reef." *EcoWatch*, 5 June 2023, https://www.ecowatch.com/gill-net-fishing-great-barrier-reef.html

[7] Nosal, Andrew P. et al., Triennial Migration and Philopatry in the Critically Endangered Soupfin Shark Galeorhinus Galeus, 58 J. APPLIED ECOLOGY 1570 (2021), available at https://besjournals.onlinelibrary.wiley.com/doi/pdf/10.1111/1365-2664.13848

[8] IUCN classified the Galeorhinus galeus as "Critically Endangered," or "facing an extremely high risk of extinction in the wild," on Feb. 14, 2020 (IUCN Red List Categories and Criteria Version 3.1)

[9] CDFW. 2001. California's Living Marine Resources: A Status Report. Chapter 6. Soupfin Shark. Available: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=34352

[10] Walker, T. I. et al., Galeorhinus galeus, THE IUCN RED LIST OF THREATENED SPECIES (Feb. 14, 2020), https://dx.doi.org/10.2305/IUCN.UK.2020-2.RLTS.T39352A2907336.en

[11] National Marine Fisheries Service. Accessed 2022. California Set Gillnet Observer Program, Observed Catch 2007-01-01 to 2017-12-31. Available: https://media.fisheries.noaa.gov/2022-01/setnet-catch-summaries-2007-2010-2013-2017.pdf

monitoring. This observer program should also measure the soak time of each set length of each set, how many set net panels are cast, the mesh size for each set, and where the effort is located. This information will provide the Department and stakeholders with adequate data to understand the total effort and accurately estimate total catch and discards as was required in Step 2 of the bycatch inquiry.

Considering the magnitude of species caught, the minimal monitoring over the last 15 years, and the innate sustainability concerns with set gillnets, 100% observer coverage must be required. Fisheries with similar bycatch concerns, such as the West Coast groundfish trawl fishery and the Hawaii shallow-set pelagic longline fishery, both require 100% observer coverage to track interactions with vulnerable species [12,13]. In conjunction with 100% observer coverage, the Department should adopt hardcaps to enforce individual quotas upon catching a vulnerable or endangered species. These hard caps should apply to species currently and historically at risk of entanglements from gillnets, such as marine mammals, seabirds, sea turtles, giant seabass, white sharks, and the aforementioned tope shark. Hardcaps coupled with 100% observer coverage.

We applaud CDFW for engaging with the National Marine Fishery Service West Coast Gillnet Observer Program to reinitiate the federal observer coverage. We request that a timeline for implementing a state-run pilot observer program be established to ensure the state has independent data collection sources that do not depend on NMFS funding and can become an asset to other data-deprived state-managed fisheries.

Statutory Changes and Funding

As mentioned in the ENGO sign-on letter to the Commission, we understand there are management measures that we support that may require statuary change and may be outside the Commission's authority, including the sale of protected species, time, and/or area closures, or changes to gillnet permits. RRI does not intend for new programs associated with management from set gillnets to divert resources from the Department and strongly supports additional funding necessary for the Department to effectively manage this fishery.

We again extend our appreciation to both the MRC and CDFW for their dedication to developing this regulatory management package. While the proposed measures hold promise, there is an opportunity to enhance the short-term management package and establish a clear pathway with an associated timeline for the full management suite for this gear type. We look forward to a constructive dialogue at the upcoming MRC and to showcasing California's leadership in biodiversity protection under the MLMA.

[12] "Overview of Observed West Coast Fishery Sectors." NOAA Fisheries, 25 January 2023, https://www.fisheries.noaa.gov/west-coast/fisheries-observers/overview-observed-west-coast-fishery-sectors.

[13] Van Niekerk, Jody. "West Coast Region Observer Program | NOAA Fisheries." NOAA Fisheries, 17 April 2023, https://www.fisheries.noaa.gov/west-coast/fisheries-observers/west-coast-region-observer-program.

Sincerely,

Scott Webb
Director of Advocacy
Resource Renewal Institue

Chance Cutrano
Director of Programs
Resource Renewal Institute

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November 3, 2023

Mr. Eric Sklar, President
California Fish and Game Commission
P.O. Box 944209
Sacramento, CA 94244-2090

RE: MRC Agenda Item 2: Evaluation of Bycatch in the California Halibut Set Gillnet Fishery in Support of the Fishery Management Review

Dear President Sklar and members of the Commission:

Oceana appreciates the investments made by the Marine Resource Committee (MRC), California Fish and Game Commission (Commission), and California Department of Fish and Wildlife (Department) to improve California state fisheries under the Marine Life Management Act Master Plan for Fisheries. We support the suite of management measures for the set gillnet fishery that the Commission tasked the Department with scoping last August.

We are encouraged that the near-term regulatory package is ready for MRC approval at this meeting and thank the Department and members of the fleet who have helped develop options to improve data and reduce bycatch. While this agenda item is focused on the California halibut set gillnet fishery, we support the Department's recommendation that new regulations to reduce bycatch and improve data collection should apply to all set gillnets, including those targeting white seabass. This is consistent with our previous requests, the National Marine Fisheries Service List of Fisheries, and the Commission's discussion of the need to address bycatch during the most recent White Seabass Fishery Management Plan annual review. We support updating the management of the set gillnet fishery through three mechanisms:

1) Near-term regulations that include measures to substantially reduce bycatch and bycatch mortality, and improve data collection;
2) Regulations that focus on long-term data streams including observer coverage and electronic monitoring, along with bycatch reduction measures based upon that data; and
3) Legislation that addresses issues outside of the Commission's authority.

Detailed below are Oceana's recommendations for robust and reasonable measures that reduce bycatch, bycatch mortality, and improve data collection.

1. Phase 1 Regulatory Package (Implementation Goal 2024)

The suite of proposed management measures for Phase 1 provides a step toward the needed improvements of the set gillnet fishery. However, to directly and meaningfully reduce bycatch and bycatch mortality and address identified data needs, we recommend additional alternatives be included along with the Department's recommendations.

A. Maximum Soak Time

Limiting soak times for set gillnets is the only measure in the Phase 1 package that will reduce bycatch mortality. Numerous data sources demonstrate that any duration longer than 24 hours does not meaningfully reduce bycatch mortality. This means a maximum soak time of no greater than 24 hours, and soak times of 8 and 12 hours should be considered in the regulatory package in addition to the 36-hour soak time proposed by the Department. Maximum soak times are standard in many other commercial gillnet fisheries, generally ranging from 6-24 hours in regions with high shark and sensitive species bycatch.[1,2,3,4] Because gillnets are non-selective gear, soak time limits are one of the only measures that can be implemented to reduce ecosystem impacts and bycatch mortality. It is an essential management tool; and we strongly support implementation of a robust soak time limit in the set gillnet fishery.

Extensive research in gillnet fisheries concludes soak time has significant impact on bycatch mortality, and across the board most species benefit from decreased soak durations,[1,4,5] particularly sharks and rays,[6,7] which experience high rates of discard in the set gillnet fishery. Reducing soak time will likely have varying degrees of benefits depending on the physiology of each species, however those that do not experience near 100% initial mortality upon capture will benefit from increased survivorship by limiting soak times. Across various studies, shorter soak times result in higher survivorship, with soak times of 6 to 12 hours having highest survivorship, and little to no benefit for soak times greater than 24 hours. Many of the sharks and rays recorded as bycatch in the NMFS observer data (for white seabass and halibut sets) are vulnerable,[8,9] and the Department's bycatch evaluation states: "the majority of the elasmobranchs evaluated are considered to have moderate or unknown risks of threats to sustainability, fisheries, and ecosystems." [10] The discard mortality rates of nearly all shark species indicate they would benefit from limiting soak times to less than 24 hours. Some example species include the tope (soupfin) shark, pacific angel shark, brown smoothhound shark, bat ray, California skate, spiny dogfish, and white shark, amongst others.

A 48-hour or 36-hour maximum soak time will not significantly reduce mortality of bycatch of key sensitive species. Aggregating mortality rates across species groups (e.g., all elasmobranchs) may

[1] Bell JD, Lyle JM. Post-Capture Survival and Implications for By-Catch in a Multi-Species Coastal Gillnet Fishery. PLoS One. 2016 Nov 18;11(11):e0166632. doi: 10.1371/journal.pone.0166632. PMID: 27861602; PMCID: PMC5115765.

[2] BUCKEL, J.A., HINES, R.J. And MCARTHUR, T.C., JR (2006), Incidental catch and discard of red drum, Sciaenops ocellatus, in a large mesh Paralichthyidae gillnet fishery: experimental evaluation of a fisher's experience at limiting bycatch. Fisheries Management and Ecology, 13: 113-119. https://doi.org/10.1111/j.1365-2400.2006.00485.x

[3] Buchanan, Seana & Farrell, Anthony & Fraser, Jake & Gallaugher, Patricia & Joy, Ruth & Routledge, Rick. (2002). Reducing GillNet Mortality of Incidentally Caught Coho Salmon. North American Journal of Fisheries Management - NORTH AM J FISH MANAGE. 22. 1270-1275. 10.1577/1548-8675(2002)022<1270:RGNMOI>2.0.CO;2.

[4] Lyle, J.M., Bell, J.D., Chuwen, B.M, Barrett, N., Tracey, S.R., and Buxton, C.D., Institute for Marine and Antarctic Studies, University of Tasmania, 2014, Assessing the impacts of gillnetting in Tasmania: implications for by-catch and biodiversity, Hobart, August, CC BY 3.0

[5] Murray KT. 2009. Characteristics and magnitude of sea turtle bycatch in US mid-Atlantic gillnet gear. Endangered Species Research 8: 211–224.

[6] Braccini M, Van Rijn J, Frick L (2012) High Post-Capture Survival for Sharks, Rays and Chimaeras Discarded in the Main Shark Fishery of Australia? PLoS ONE 7(2): e32547. https://doi.org/10.1371/journal.pone.0032547

[7] Lyons, K., et al., The degree and result of gillnet fishery interactions with juvenile white sharks in southern California assessed by fishery-independent and dependent methods. Fish. Res. (2013), http://dx.doi.org/10.1016/j.fishres.2013.07.009

[8] NMFS. 2022. California Set Gillnet Observer Program Observed Catch Summary, January 1, 2007, through December 31, 2017. Available: https://media.fisheries.noaa.gov/2022-01/setnet-catch-summaries-2007-2010-2013-2017.pdf

[9] Pacoureau N, et al. 2021. Half a century of global decline in oceanic sharks and rays. Nature. 2021 Jan;589(7843):567-571. doi: 10.1038/s41586-020-03173-9. Epub 2021 Jan 27. PMID: 33505035.

[10] CDFW. 2023. Evaluating Bycatch in the California Halibut Set Gill Net Fishery. Available: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=213567&inline

obscure the fact that particular species, such as white sharks and tope sharks, are unlikely to benefit from soak times greater than 24 hours. For example, a study investigating white shark mortality in California set gillnets, Lyons et al. 2013, illustrates the difference between a 24-hour soak time (probability of mortality ~ 0.5) and a 48-hour soak time (probability of mortality ~ 0.9) to be the difference between releasing the shark alive and dead.[11] As illustrated in the Lyons study, the survivorship benefits occur mainly prior to 24 hours and drop off steeply past that point. In addition, bycatch mortality of tope sharks is relatively high (64%) based on observer data. So, in evaluating bycatch mortality, the Commission should ensure that its soak time would benefit key species of concern.

Although an 8-to-12-hour soak time would be ideal for minimizing bycatch mortality for key sensitive species, we could support a 24-hour soak time because it is largely consistent with the current patterns of fishing in the set gillnet fleet. According to CDFW logbooks, ~72% of self-reported sets are under 24 hours.[12] This would improve upon the "best practices" already occurring within the fleet and reduce the number of sets that have greater physiological impacts and entanglement risks. Regarding enforcement of a 24-hour soak time, we support an explicit exception be made for weather, illness, or injury, consistent with gear tending requirements for other gear-types. We support the Commission requiring electronic net sensors to better enforce a 24-hour soak time.

If the Commission recommends a maximum soak time greater than 24 hours, we recommend new time and/or area closures be implemented in the near-term package to reduce bycatch and bycatch mortality (discussed below).

B. Time and Area Closures

We request the Commission implement time and area closures to reduce bycatch and bycatch mortality, address specific bycatch concerns, and increase protection of important areas of biodiversity in the Southern California Bight. Specific species of concern that would benefit from time/area closures include:

- *Tope (soupfin) sharks:* We support strong measures to protect the critically endangered tope shark from set gillnet bycatch. We understand the Department is analyzing potential options to protect tope sharks. For example, a seasonal closure to California halibut set gillnets to protect tope sharks during their spring spawning period, which aligns with the existing March 15-June 15 closure to white seabass set gillnets. This would protect tope sharks during their sensitive spawning period and would also reduce overall set gillnet fishing effort, reducing mortality on the Southern California halibut stock and directly reducing bycatch. Recent tagging work by Nosal et al. 2021[13] also identified gestation and nursery grounds for female sharks, which could inform area closures.
- *Great white sharks*: The Lyons et al. 2013 study identified areas of high white shark captures and found white sharks were captured in greater numbers in blocks where target species (CA Halibut and white seabass) CPUE was low.
- *Giant seabass*: these iconic fish often aggregate in specific known areas. We recommend the

[11] Lyons, et al. 2013, "Average net soak times for live and dead sharks were also significantly different 29.5 ± 22.6 and 40.7 ± 11.3 h; W = 961, p<0.001)."

[12] CDFW, pers. comms. 2023. Self-reported Soak Times in the California Set Gillnet Fishery.

[13] Nosal, AP, Cartamil, DP, Ammann, AJ, et al. Triennial migration and philopatry in the critically endangered soupfin shark Galeorhinus galeus. J Appl Ecol. 2021; 58: 1570–1582. https://doi.org/10.1111/1365-2664.13848

Department consult with giant seabass researchers to identify and consider time/area closures in such areas.

We support the Commission prohibiting set gillnet fishing within all waters of the Channel Islands National Marine Sanctuary and around Cortes and Tanner Banks. The Channel Islands National Marine Sanctuary is a special area renowned for its biodiversity that contains critical grounds for sensitive species of concern, such as tope sharks.

Cortes and Tanner Banks are incredible offshore banks boasting some of the best and most iconic important sportfishing opportunities on the US West Coast, sensitive seafloor habitats, and highly migratory species. Due to their ecological and recreational importance, the Commission should prohibit gillnets in these areas.

C. Gear-marking

All elements of the set gillnet gear should be frequently and uniquely marked in a way that will allow future entanglements to be negatively or positively attributed to the California set gillnet fishery. Based on records of large whales and pinnipeds entangled in unidentified gillnets off the West Coast, the lack of unique gear marking has prevented a definitive positive or negative fishery attribution. In many cases, only a small section of net, buoys, or line may be visible.[14,15,16] We would like to acknowledge and thank members of the fleet for their engagement with the Department in testing proposed gear-marking options. We understand the Department is currently considering adding a piece of unique line every several fathoms on the headrope containing fishermen's L-numbers. However, based on our discussions with NMFS and our experience with evaluating entanglements in the Dungeness crab fishery, these improvements do not go far enough to accomplish the goal of enabling positive or negative attribution of gillnet entanglements. Thus, these new markings are unlikely to solve the problem of "unidentified gillnet fishery" entanglements.

At a minimum, we recommend the Department mandate the use of a standardized mesh color across the California set gillnet fleet, a unique color combination for the headrope (corkline) and footrope, and a unique color, stripe, or pattern on the standard black corkline floats. CDFW is currently working on a unique bicolor pattern for its Dungeness crab fishery in combination with other states (see examples below). We recommend the Department implement this same approach of requiring a unique 2-color combination throughout the entire line (using different colors) for California set gillnets. We note that fishermen ideally should weigh in on the exact colors, and these must be different from other colors and patterns being developed for gear marking currently underway in trap fisheries. All improvements should be standardized across the fleet and include input from the NMFS entanglement response team.

[14] Pacific Marine Mammal Center, Orange County, pers comm. 2022.

[15] Stock Assessment Report: Long-beaked Common Dolphin, California Stock. 2008. Table 1. "Undetermined Strandings". Available: https://media.fisheries.noaa.gov/dam-migration/po2008docl-ca-508.pdf

[16] NMFS. 2023. West Coast Whale Entanglement Summary, 2022. Available : https://media.fisheries.noaa.gov/2023-04/2022-whale-entanglements-report.pdf

Unique line markings as currently proposed for each West Coast state's Dungeness crab fishery. The black line indicates it is a Dungeness crab fishery, and each of the three colors identifies the gear to a state. California's Dungeness crab fishery color combination is shown in purple and black.

D. Gear-loss Tracking

We recommend the Commission establish a gear tag monitoring program that would require gear tags distributed by the Department to be present on each gillnet buoy during fishing and returned to CDFW at the end of each year. Any tags issued but not returned would indicate gear lost or abandoned gear and should result in a fee or penalty. This is a reasonable and effective interim solution in the near term, while the Department considers new technologies such as electronic net sensors that could provide more definitive tracking of gear location and gear loss.

With no incentive or accountability measures to accurately report lost gear, we do not support self-reported tracking of set gillnet loss as the primary means for quantifying and tracking gear loss. Set gillnets are among the most common fishing gears collected by the California Lost Gear Recovery Project.[17] The Commission recommended the Department explore ways to improve gear loss reporting. Permittees are already required to self-report lost gear under California Fish and Game Code Section 8601, which also authorizes the Commission to require the owner of lost or abandoned gear to pay for all recovery costs. However, we understand from the Department that this self-reporting is not happening, and the provisions are not being enforced.

E. Maximum Mesh Depth (Net Height)

We support the fishermen's recommendation to enshrine current mesh depths as maximum net heights for nets targeting white seabass and nets targeting halibut as a new regulatory requirement. We note enshrining current fishing practices in regulation is not a bycatch reduction measure, but is good practice, and we appreciate fishermen proposing measures to improve upon management of their fishery.

F. Reinstating Federal Observer Coverage

We are encouraged that the Department is engaging with the federal NMFS West Coast Region Observer Program to explore opportunities to resume federal observer coverage of the California set gillnet fishery. Federal observer coverage is allocated based on funding available and priorities across fisheries. We urge the Commission to work with and support the Department's efforts to push NMFS for resumed set gillnet observer coverage as a high near-term priority. This does not require changes to California regulations but can be considered a key element of the Commission's near-term efforts to improve bycatch data.

[17] Bond, Amy. 2022. Lost Fishing Gear Recovered off Southern California Coast. UC Davis. Available: https://www.ucdavis.edu/climate/news/tons-lost-fishing-gear-recovered-southern-california-coast

2. Phase 2 Regulatory Package (Implementation Goal 2025)

Efforts to develop a Phase 2 regulatory package should continue concurrently with the Phase 1 process with the management and monitoring measures described below slated for a 2025 implementation.

A. State Pilot Observer Program

Based on the needs of the set gillnet fishery and the potential to improve data collection in other state fisheries, we recommend the Department develop a state observer program starting with a 3-year pilot program. The pilot program should involve electronic monitoring and human observers, and ideally identify areas of data and technology needs, and logistical and regulatory authority issues to inform a longer-term state observer program. Contracting with NMFS's current observer contractor, Frank Orth & Associates, may be an easier lift logistically to get state observers on boats. At the conclusion of the 3-year pilot, the Department could transition to a long-term permanent observer program based on the results and lessons learned from the pilot. This approach could be adapted to other fisheries in the future. For more information, please see our attachment to this letter: *Scoping a California State Fishery Bycatch Monitoring Program.* We note that new statutory and regulatory authority may be needed to implement an effective state program and are ready to assist the Department to ensure adequate authority exists to carry out the needed management activities.

B. Electronic Monitoring and Logbooks

We support the Department developing a regulatory package requiring electronic logbooks and electronic monitoring of the set gillnet fishery as part of a broader effort to modernize California fisheries data collection. We recommend consideration of the following components: cameras and sensors, vessel tracking (including Automatic Identifications Systems [AIS]), remote monitoring centers, electronic reporting, remote sensors, integrated data platforms, and compliance monitoring. As noted in our attached report, electronic monitoring should be tested in concert with human observers to evaluate its accuracy and determine ways that electronic monitoring can best complement human observers.

C. Bycatch Caps

Setting hard caps on bycatch for protected and vulnerable species is essential to ensuring bycatch stays within sustainable limits. The regulatory package should include bycatch caps based on observer data species of concern such as tope shark, giant seabass, white sharks, and all marine mammals, and sea turtles. Consistent with bycatch hard caps in other fisheries, reaching or exceeding the cap should automatically result in fishery closures for a pre-determined duration (e.g., one year or one season). This should include hard caps for gray whales and humpback whale entanglements in gillnets that are or may be California set gillnets using a precautionary approach as is done under the Dungeness crab fishery RAMP regulations.

3. Legislative Action in 2024

For proposed statutory changes outside of the scope of the Commission's authority, we look forward to engaging further with the Department and the Commission as the legislature addresses exemptions that currently allow the sale of protected species, makes changes to gillnet permits, and finds creative solutions to reduce bycatch.

We appreciate the productive dialogue with the Department and Commission, and the proactive work by the Department to put together a thoughtful suite of management and data improvement measures. We look forward to continued discussions with the Commission, Department and other interested and affected parties at the November 2023 Marine Resources Committee.

Sincerely,

Geoffrey Shester, Ph.D.
California Campaign Director & Senior Scientist

Caitlynn Birch
Pacific Marine Scientist

Attachment: "Scoping a California State Fishery Bycatch Monitoring Program"

OCEANA Protecting the World's Oceans

Scoping a California State Fishery Bycatch Monitoring Program

November 2023

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Executive Summary

Monitoring and accurately quantifying fishery bycatch are essential components of modern fishery management, especially for fisheries with unselective gear types and/or high ecological risk. This initial scoping document explores the potential development of a state-managed California fishery bycatch monitoring program using a combination of human observers and electronic monitoring (EM). The immediate purpose of this document is to provide a resource to the California Department of Fish and Wildlife (CDFW) and California Fish and Game Commission (Commission) outlining key background information required to build a successful observer program for the California set gillnet fishery as an initial pilot program that could then be expanded to other state fisheries as needed. This report does not detail the internal staffing and infrastructure costs of building a new program within CDFW – as these costs are highly variable – and acknowledges a critical aspect of implementing such a program is dedicated, long-term funding.

Section I summarizes the elements of an observer program, including an overview of existing federal observer programs. These elements include qualifications for observers, observer contracts, the funding and costs of existing observer programs, methods to ensure random sampling of fishing trips under partial observer coverage, and safety and data collection protocols.

Sections II and III summarize federal Alaska observer programs, the West Coast Groundfish Observer Program, and the West Coast Region Observer Program and how they are structured and funded.

Section IV explores case studies of state-developed observer programs, including the California state set gillnet observer program of the 1980s, the Massachusetts state sampling program, and the North Carolina state observer program.

Section V discusses EM and examines the extent to which EM can complement or substitute human observers. This section of the report provides information on 1) how EM works, 2) leading EM systems, 3) current EM usage nationally, 4) the advantages and disadvantages of EM, 5) electronic logbooks in fisheries, and 6) a discussion of costs of systems, installation, video review, and program management. This section also discusses how EM could be implemented in California fisheries in combination with human observers.

Section VI presents recommendations for reinstating federal observer coverage in the immediate term and developing a new state-managed observer program through a pilot project for the California set gillnet fishery. It also provides specific recommendations for improving observer data collection protocols for set gillnets.

Introduction – The Need for a California State Fishery Observer Program

The Need for Data on Fisheries Bycatch in California

Under California law, "Bycatch" means fish or other marine life that are caught in a fishery, that are either not the target of the fishery or not retained. "Bycatch" includes discards of target species as well as retained non-target species.[1] Primary conservation concerns with bycatch include discarded animals that do not survive and retained catch of species not managed in Fishery Management Plans (FMPs) or without current stock assessments. These types of bycatch present significant risks to sustainable fisheries because they can contribute to overfishing and population declines.[2] California's marine ecosystems are a center for biodiversity and many marine species are regularly targeted in fishing.

A key data gap in many state-managed fisheries, including those in California, is the species composition and quantity of the catch, including retained and discarded species. California fishery managers are currently reviewing bycatch in California halibut gillnet and bottom trawl fisheries. Some observer data is available for the California set gillnet fishery (Table 1); however, data gaps remain – specifically, limited sporadic coverage and a lack of comparable total effort data. A key management need is to improve bycatch estimates through regular, standardized collection of data on catch and discards, and fishing effort.

Year	Annual Percent Observer Coverage
2007	17%
2008	0%
2009	0%
2010	12.5%
2011	8%
2012	Unknown
2013	Unknown
2014	0%
2015	0%
2016	0%
2017	Unknown
2018	0%
2019	0%
2020	0%
2021	0%
2022	0%

Table 1. NMFS California set gillnet observer coverage levels from 2007 to 2022.[3] The observer program ceased observing the fishery in 2017. In years 2012, 2013, and 2017, percent coverage is unknown because the total number of fishing sets during those years is unknown.

[1] California Fish and Game Code Section 90.5. Available: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=178840
[2] NMFS. 2011. U.S. National Bycatch Report (W. A. Karp, L. L. Desfosse, S. G. Brooke, Editors). U.S. Dep. Commer., NOAA Tech. Memo. NMFS-F/SPO-117E, 508 p. https://spo.nmfs.noaa.gov/sites/default/files/tm117E.pdf
[3] NMFS. 2022. California Set Gillnet Observer Program Observed Catch Summary, January 1, 2007, through December 31, 2017. Available: https://media.fisheries.noaa.gov/2022-01/setnet-catch-summaries-2007-2010-2013-2017.pdf

Under the California Marine Life Management Act (MLMA), state FMPs must include information on amount and type of bycatch, analysis of bycatch and its legality, and the effect of the bycatch on other fisheries and the ecosystem. If the California Fish and Game Commission deems bycatch unacceptable under the MLMA standards, they must seek solutions to minimize the bycatch. This process is guided by a bycatch inquiry detailed in the MLMA Master Plan for Fisheries.[4]

Currently, there is no state program to collect bycatch information for state fisheries, and the state must rely upon landings data, logbooks, and federal observer data to assess bycatch impacts. Landings data provides information on the species that are retained, but does not provide information on catch that is discarded at sea. The state also relies upon logbook reporting requirements and resulting data, which requires fishermen to log all fishing activity under a given permit. All fisheries, state and federally managed, are required to report protected species interactions to the National Marine Fisheries Service (NMFS), which provides some information on protected species bycatch. However, such self-reporting may not be accurate especially if there are incentives to misreport or underreport. An Oceana analysis of self-reporting data obtained via the Freedom of Information Act found that approximately 94% of marine mammal interactions in the California set gillnet fishery are not self-reported, despite this reporting being required by law.[5]

Fishery Observers and Electronic Video Monitoring

Observers, or trained biological technicians that work aboard fishing vessels to quantify total catch, estimate bycatch, and monitor fishery interactions with marine mammals and other protected species, are currently the best method for tracking bycatch.[6,7,8] NMFS deploys observers on fishing fleets to monitor federally managed species under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the Marine Mammal Protection Act (MMPA), and/or the Endangered Species Act (ESA).

At its discretion, the federal government may deploy observers for state-managed fisheries that interact with federally managed fish or protected species. However, outside of these critical species, federal observer programs do not have authority over many state fisheries, and observing a specific state fishery may not be a federal priority. From 2007-2022, NMFS observed 6 years of fishing in the California set gillnet fishery, with a coverage level less than

[4] See CDFW. Master Plan for Fisheries. Chapter 6. Available at: https://wildlife.ca.gov/Conservation/Marine/MLMA/Master-Plan/Ecosystem-based-Objectives
[5] Oceana. 2023. Underreporting of Marine Mammal Bycatch in the California Set Gillnet Fishery. Available: https://usa.oceana.org/wp-content/uploads/sites/4/2023/10/Oceana_CA-set-gillnet-self-reporting-analysis.pdf
[6] Karp, W.A., McElderry, H. and Nolan, C.P., 1999. Catch monitoring by fisheries observers in the United States and Canada. https://www.fao.org/3/x3900e/x3900e13.htm
[7] Davies, S.L., Reynolds, J.E. (eds.), 2002. Guidelines for developing an at-sea fishery observer programme. FAO Fisheries Technical Paper, No. 414. FAO, Rome 116p. https://www.fao.org/3/y4390e/y4390e.pdf
[8] Perez Roda, M.A., Gilman, E., Huntington, T., Kennelly, S.J., Suuronen, P., Chaloupka, M., Medley, P., 2019. A Third Assessment of Global Marine Fisheries Discards. FAO Fisheries and Aquaculture Technical Paper. No. 633. FAO, Rome 79 pp.
https://www.researchgate.net/publication/330400691_A_third_assessment_of_global_marine_fisheries_discards

20% in those years (Table 1). This means 10 of those years were left unobserved, despite the NMFS 2011 National Bycatch Report recommendation for this fishery "…to increase observer coverage to at least 20% to better document bycatch of key species with low abundance."[9] An increase in coverage would require a substantial increase in program funding to implement. NMFS has not observed the fishery since 2017 and California has no control over the level of federal observer coverage in this fishery.

Curtis and Carretta (2020) found that high levels of observer coverage (as high as 100%) are needed to detect bycatch of rare or infrequently caught species,[10] so observer programs should consider what the appropriate coverage is needed based on management needs. Quantifying total amounts of bycatch with precision requires both observer data and total fishing effort. A key data gap in the California set gillnet fishery is the inability to estimate total bycatch, as the federal observer program measures fishing effort differently than the state of California. The state has been tracking the number of times a permitted vessel lands fish, also called the number of trips. The observer program has recorded catch data per "set", or every time a net is deployed and retrieved. Incomparable units of fishing effort between the observer program and total fleetwide effort prevent fishery managers from quantifying the scope of bycatch and total catch, making it difficult to assess potential impacts to fish stocks and bycatch species.

To address these issues, an effective solution would be to set up a California state-run fishery observer program. Rather than relying on the federal government to provide observers, California would create a program that ensures an effective amount of observer coverage and data collection that meets the management needs. Implementing a state-run observer program is a complex and costly undertaking and requires coordinated effort among federal and state fishery managers. The California halibut set gillnet fishery has been prioritized as the first state fishery to be run through the updated management process outlined in the MLMA Master Plan for state fisheries.[11] Considering the bycatch monitoring needs of the California set gillnet fishery and the moderate fleet size, this fishery is ideal for a pilot state-run observer program.

This report discusses several existing federal observer programs, as well as case studies on state-run observer programs and examines the potential of EM in fisheries management.

[9] NMFS. 2011. U.S. National Bycatch Report [W. A. Karp, L. L. Desfosse, S. G. Brooke, Editors]. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-F/SPO-117E, 508 p. https://repository.library.noaa.gov/view/noaa/31335
[10] Curtis, K Alexandra, and James Carretta. 2020. Assessing Observer Coverage Needed to Document and Estimate Rare Event Bycatch. Fisheries Research (May 1, 2020): 105493. https://doi.org/10.1016/j.fishres.2020.105493
[11] "Prioritizing Management Efforts: Chapter 2 of the Marine Life Management Act." MLMA Master Plan. Available: https://mlmamasterplan.com/2-prioritizing-management-efforts/. Accessed 23 June 2023.

Section I. Elements and Considerations for Observer Programs

There are many different observer programs that can be implemented for fishery observation; the type of program is dependent on which questions the observer program is trying to answer. When setting up a fishery-specific observer program it is important to consider how human observation can provide the data needed to ensure bycatch is tracked and accounted for as much as possible. This section explores critical aspects of existing federal observer programs to inform a potential state-run pilot observer program.

Images courtesy of NOAA Fisheries. Fishery observers on vessels recording fish length.

Observer Qualifications

Any observer program must develop qualification requirements and training for its observers. Across federal observer programs, there are generally two levels of observers. The first level of observers are at-sea monitors, who require less training and no Bachelor of Science. These observers generally record their observations of total observed catch counts on the vessel. The second level of observers are biological technicians who collect samples and measurements of species along with additional data. These fishery observers are required to have a Bachelor of Science, specialized training, and knowledge of species identification. Biological technician observers tend to cost more, as they require higher education and extensive training; and because they collect more data.

Contracting Observers

Federal observer programs contract observers through third-party organizations. NMFS uses many different third-party contractors to provide observers throughout the United States. In the Atlantic, the Gulf of Mexico, the Caribbean, and the Southeast United States, NMFS uses A.I.S., Inc. to provide observers. In the Northeast, NMFS utilizes A.I.S., Inc., East West Technical Services LLC, and Fathom Resources LLC to provide observers to eight different fisheries. In the Pacific Islands, NMFS uses FLOAT partners to provide observers to the fisheries, and in the North Pacific, NMFS utilizes A.I.S., Inc., Alaskan Observers, Inc., Saltwater, Inc., and TechSea International, Inc. to provide observers to the region. On the West Coast, NMFS uses Alaskan Observers, Inc., Frank Orth & Associates, Saltwater, Inc., and TechSea International, Inc. to

provide observers.[12] The NMFS West Coast Regional Observer Program, which has observed the California set gillnet fishery in the past, contracts observers through Frank Orth & Associates.

Assigning Observers to Ensure Random Coverage

Unless 100% of fishing effort is observed, random sampling of effort in a fishery is critical to obtain accurate representative estimations of total bycatch. Under this randomized sampling system, fishermen must be prepared for an observer to be on their vessel during any given fishing trip. If observers are a part of a direct contract, congressionally mandated system, fishermen are required to give 48-hour notice of their fishing trips. All reported fishing trips are then placed in a pool and are randomly selected for observer coverage. This ensures the most fair and equal randomized selection system. However, if an observer program is not a regulatory requirement, fisherman approval is needed before putting observers on a vessel, which may affect the randomness of the observer sample.

Some vessels may be deemed unobservable due to the size of the vessel, weather conditions, or the safety of the observer. To ensure random, unbiased, sampling in this situation, there either needs to be an elimination of the unobservable exemption (i.e., prohibit fishing without an observer) or require equivalent data collection through EM on vessels that cannot host an observer.

Data Collection Protocols

A key element of managing an observer program is training observers to use consistent data collection protocols. Data collection by observers depends both on the management needs of the fishery as well as the fishing technique. There are different methods for observing and counting bycatch for different gear types, such as trawl fisheries or gillnet fisheries. Some observer programs count bycatch and catch via the weight of the catch, rather than individual species. For example, the observed catch and bycatch in the West Coast Groundfish trawl fishery is recorded by weight to enable management of weight-based individual fishing quotas by species. Conversely, the California set gillnet fishery is observed based on counts of individuals because the primary purpose is to estimate how many individual marine mammals are taken.

Counting catch via different units creates challenges in comparing across fisheries or making extrapolations if fish are counted in different units than are recorded during landing. For the California set gillnet fishery, where landed catch is reported via weight, recording observed catch and bycatch in a method that is easily transcribed to weight would allow for comparison and extrapolation based on total landing weight. One way to accomplish this is to record the length of each individual fish, or a subsample of each species, which can be converted to estimated weight using known length-weight ratios. Standardizing bycatch reporting enables comparison across fisheries and improved accuracy of total bycatch estimates.

[12] NMFS. 2021. Observer Providers. Available: www.fisheries.noaa.gov/national/fisheries-observers/observer-providers. Accessed June, 2023.

Observer Coverage

One hundred percent observer coverage requires an observer on every single fishing trip. This method removes the operational complexities of ensuring random sampling and eliminates uncertainties in estimating total bycatch from partial sampling, but it is more expensive. The closer to 100% observer coverage of the fleet the higher the chance rare event or infrequently caught species are detected.[13] This method is also employed to enforce strict limits on protected species interactions such as sea turtle interactions in the Hawaii shallow-set longline fishery, or individual vessel quotas on fish species such as the West Coast trawl fishery.

Partial observer coverage (i.e., less than 100%) is less expensive than full coverage but increases uncertainty in total bycatch estimates, and requires additional methods to ensure representative sampling. Higher coverage rates offer more accurate depictions of bycatch in the region by increasing awareness of rare species catch, providing better knowledge of total catch, and allowing more opportunity for biological sampling.[13]

The Funding and Costs of a Human Observer Program

Current federal observer programs are either funded by congressionally mandated funds via direct contract with the observers, or by the industry, when an industry pays for observer coverage of a certain number of trips. Most observer programs fall under the direct contract category, with the exception of several industry-funded programs in Alaska. Congressional funds also pay for all observer training. The cost of maintaining observer programs changes depending on the size of the fleet that needs monitoring, the distance of the fishery from the coast, the percentage of the fleet covered by observers, and the time observers need to be on the vessel.

Observation costs can be dependent on fishing vessel and gear type as well, which impacts cost estimates. Estimating costs is challenging, as there are fixed costs upon initially establishing the program, and variable costs depending on the level of observer coverage. Fixed costs include the training of observers, management of the program and its data, regulatory costs, insurance for observer maritime safety, and payment of the observer contractor. Variable costs depend on the number of observers, the number of observed trips, observer transportation, housing, and wages.

In direct contract programs, the programs ask for a certain number of sea days covered. The hiring company of third-party observers determines how many observers to hire to ensure there is enough availability. In a year where the California set gillnet fishery was observed in the West Coast Region Observer program, fiscal year 2013, the WCROP received the majority of its observer program funds ($899,357) through the National Observer Program (NOP) budget line.[14] These funds cover all annual costs of running the program. The program observed a total of 391 sea days in 2013 using 5 observers for the California large-mesh drift gillnet, the California set gillnet, and the California deep-set pelagic longline fisheries. In 2013 the program observed 169

[13] Curtis, K Alexandra, and James Carretta. 2020. Assessing Observer Coverage Needed to Document and Estimate Rare Event Bycatch. Fisheries Research (May 1, 2020): 105493. https://doi.org/10.1016/j.fishres.2020.105493
[14] NMFS. 2017. National Observer Program FY 2013 Annual Report. NOAA Tech. Memo. NMFS F/SPO-178, 34 p. https://media.fisheries.noaa.gov/dam-migration/fy2013_nop_annual_report.pdf

sets in the California set gillnet fishery, however it is unknown what annual percent coverage this provided (Table 1). For context, NMFS estimates fleetwide effort in the California set gillnet fishery has ranged from 1,387 to 2,123 sets from 2007 – 2011.[15]

Lack of direct data on past program costs specifically for the California gillnet fleet make estimating observer costs difficult. Comparing potentially similar programs may provide a general estimate of annual program costs. For example, an annual estimate of at-sea monitoring for a single gillnet vessel in the New England Groundfish fishery is ~ $28,500 per year.[16] This estimate comes from a projected costs estimates report for the Groundfish fishery, and is based on an example gillnet vessel of 40ft, that fished 50 days/trips (3 sets/trip), assuming each trip was18-24 hours. The estimate includes all program management, data processing, overhead and observer costs accrued annually for an established 100% coverage program. Annual costs of an observer program are based on a number of assumptions that may not necessarily reflect the fishing and observer needs of the California gillnet fleet, but do provide an idea of what a 100% coverage observer program may cost annually.

Challenges

There are challenges to consider in designing and managing an observer program. Observers require additional space on a vessel that may not be available on certain vessels. Additionally, harassment on fishing vessels in the form of physical, emotional, and sexual abuse has occurred. Fishermen may feel threatened having an observer document their catch. Therefore, NMFS has ensured specific training for observers to mitigate harassment and put a protocol in place to report incidents. In addition to training, NMFS provides a debriefing session and in-season advising for observers placed on fishing vessels. Observers are encouraged to report inappropriate behavior and are provided training to identify inappropriate behavior.[17]

In partially observed fisheries, the "observer effect" is a well-documented phenomenon, where fishermen behave and fish differently with observers onboard.[18] This effect can impact the

[15] NMFS. California Set Gillnet Observer Program Observed Catch Summary, January 1, 2007, through December 31, 2017. https://media.fisheries.noaa.gov/2022-01/setnet-catch-summaries-2007-2010-2013-2017.pdf
[16] CapLog Group LLC. 2019. Projected Cost of Providing Electronic Monitoring to 100 Vessels in New England's Groundfish Fishery. Commissioned by the Nature Conservancy. Available: https://em4.fish/wp-content/uploads/2019/04/TNC-EM-Cost-Assessment-Report-Submission-to-NEFMC-4_10_19.clean_.pdf
[17] NMFS. "Keeping Fishery Observers Safe from Harassment." *NOAA*, 11 Dec. 2019, www.fisheries.noaa.gov/feature-story/keeping-fishery-observers-safe-harassment.
[18] Faunce, C. and Barbeaux, S. "Deployment and Observer Effects as Evidenced from Alaskan Groundfish Landing Reports." [Poster] Seattle, WA. (2008). Available at: https://access.afsc.noaa.gov/pubs/posters/pdfs/pFaunce02_deployment-observer.pdf

precision and accuracy of fishery-level inferences drawn from observer data, though this is rarely addressed when extrapolating up to total catch and discard estimates.[19,20,21]

Another challenge that must be considered when creating a partial coverage observer program is the difficulty of setting up a program for random sampling. Random sampling is difficult to achieve on both operational and conceptual levels because observer data must be random on multiple levels. For example, there must be a random sample of the vessels, a random sample of the fishing effort (in number of trips or number of sets), as well as a random sample of the catch and bycatch being recorded.[22] One issue for random sampling design is that some vessels may be deemed unobservable due to the size of the vessel, weather conditions, or safety of the observer.

Partial coverage observer programs rely upon fishermen to notify the observer program in advance when they are going fishing. Unless there is careful monitoring of fishing activities and accountability for failing to provide notification, fishermen may be able to avoid being observed. Even if fishermen do call to give notice of their upcoming fishing trip, there are questions of whether an observer is available, if there is enough funding for the ideal number of at-sea days covered, and the complexities of getting observers to a certain location.

Section II. Overview of US and Alaska Federal Observer Programs

There are many observer programs already in place all over the country, most managed by NMFS under the authority of the MSA or the MMPA.[23] Table 2 provides an overview of existing federal observer programs in Alaska and West Coast, the number of observers, and the percent coverage for a given fleet.

[19] Benoît, Hugues & Allard, Jacques. (2009). Can the data from at-sea observer surveys be used to make general inferences about catch composition and discards? Canadian Journal of Fisheries and Aquatic Sciences. 66. 2025-2039. 10.1139/F09-116. https://cdnsciencepub.com/doi/10.1139/F09-116

[20] Mucientes, Gonzalo, Marisa Vedor, David W. Sims, and Nuno Queiroz. (2022) "Unreported Discards of Internationally Protected Pelagic Sharks in a Global Fishing Hotspot Are Potentially Large." Biological Conservation 269: 109534. https://doi.org/10.1016/j.biocon.2022.109534

[21] Walsh, W. A., Kleiber, P., and McCracken, M. (2002). Comparison of logbook reports of incidental blue shark catch rates by Hawaii-based longline vessels to fishery observer data by application of a generalized additive model. Fish. Res. 58, 79 –94. doi: 10.1016/S0165-7836(01)00361-7. http://www.soest.hawaii.edu/pfrp/reprints/walsh_logbook_blue_shark.pdf

[22] Cahalan, Jennifer & Faunce, Craig. 2020. Development and implementation of a fully randomized sampling design for a fishery monitoring program. Fishery Bulletin. NOAA. 118. 87-99. 10.7755/FB.118.1.8. https://spo.nmfs.noaa.gov/sites/default/files/pdf-content/fish-bull/cahalan_0.pdf

[23] Benaka, L. (editor). 2023. National Observer Program FY 2021 Annual Report. NOAA Tech. Memo. NMFS-F/SPO-241, 32 p. https://spo.nmfs.noaa.gov/tm.htm.

Location	Authority to Place Observers	Fisheries Observed	Number of Vessels	Funding Sources	Target Coverage	Actual Coverage	Number of Observers
Alaska	MSA	Bering Sea & Aleutian Islands (BSAI) Groundfish Trawl BSAI and Gulf of Alaska Catcher Processors Longline Pacific Cod GOA Groundfish Program and Catcher Processors	1,418	North Pacific Marine Resource Observers National Observer Program Reducing Bycatch Congressional Funding Industry Funding	100%	100%	378
Alaska	MSA	BSAI and GOA Groundfish, Trawl, Longline, and Pot Fisheries US Pacific Halibut Fishery	1,418	North Pacific Marine Resource Observers National Observer Program Reducing Bycatch Congressional and Industry Funding	Pot: 15 - 18% Hook/ Line: 15-18% Trawl: 16 - 21%	Pot: 16.5 – 20.5% Hook/Line: 12.4 – 17.4% Trawl: 19.9 – 28.2%	378
TOTAL ALASKA REGION OBSERVER PROGRAM FUNDING (CONGRESSIONAL): $8,951,381 TOTAL ALASKA REGION INDUSTRY EXPENDITURES: $16,029,415 TOTAL ALASKA REGION OBSERVER PROGRAM FUNDING (ALL SOURCES): $ 24,980,796							
West Coast	MSA MMPA	California Large Mesh Drift Gillnet Fishery	7	National Observer Program	20%	22.8%	9
West Coast	MSA MMPA	Deep Set Buoy Gear Exempted Fishing Permit (EFP)	30	National Observer Program	10 – 30%	24.7%	9
West Coast	MMPA	California Deep-Set Pelagic Longline	3	National Observer Program Industry Funded	20%	26.7%	9
West Coast	MSA	**West Coast Trawl Catch Share** **Catch Share Using Electronic Monitoring**	140	National Catch Share Program West Coast Observers Industry Funding National Observer Program Cost Recovery National Catch Share Program	100%	100%	95 47
West Coast	MSA	**West Coast Groundfish Non-Catch Share Fisheries**	LE Long-line 190; trap 33 OA Permits: ~1,000	National Observer Program West Coast Observers Reducing Bycatch	10%	LE: 34% OA: 2-18%	56
TOTAL WEST COAST REGION OBSERVER PROGRAM FUNDING (CONGRESSIONAL): $8,931,781 ($1,219,173 of which funds the West Coast Region Observer Program – DGN, DSBG, Pelagic Longline) TOTAL WEST COAST REGION INDUSTRY EXPENDITURES: $2,918,664 TOTAL WEST COAST REGION OBSERVER PROGRAM FUNDING (ALL SOURCES): $11,850,445							

Table 2: NOAA federal observer programs in Alaska and West Coast, according to the NMFS National Observer Program Annual Report 2021. Table provides location in the United States, the authority through which the observers are placed on vessels, fisheries observed, the number of vessels in the fishing fleet, the source of funding, target coverage, actual coverage, number of observers in the program, and observer program funding. Bolded programs are described in Federal Case Studies.[24]

[24] Benaka, L. (editor). 2023. National Observer Program FY 2021 Annual Report. NOAA Tech. Memo. NMFS-F/SPO-241, 32 p. https://spo.nmfs.noaa.gov/tm.htm

Section III. Federal West Coast Observer Programs

There are two main federal observer programs on the U.S. West Coast: The West Coast Groundfish Observer Program and The West Coast Region Observer Program.

West Coast Groundfish Observer Program

The West Coast Groundfish Observer Program is overseen by NMFS' Northwest Fisheries Science Center, and places observers on both Catch Share Groundfish fisheries and Non-Catch Share Groundfish fisheries. [25] The goal of this program is the collection of coast-wide, year-round catch and discard amounts by species for groundfish fisheries along the West Coast to manage individual quotas for federally managed trawl groundfish fisheries. The program also tracks and estimates protected species bycatch, including threatened and endangered fish, seabirds and marine mammals. NMFS works with third-party private companies to train and provide at-sea observers to quantify the discard rate and ensure it does not result in excessive overfishing of groundfish species. The program measures catch via weight. This program currently observes a number of West Coast fishing sectors, including the West Coast Groundfish Trawl Catch Share, the Limited Entry Bottom Trawl, the West Coast Fixed Gear, the West Coast Pink Shrimp Trawl, the California Halibut Trawl, and the West Coast Nearshore Groundfish fisheries.[26] Occasionally, the West Coast Groundfish Observer Program observes state-managed fisheries and fisheries operating under an exempted fishing permit.

Observers in this program work on vessels fishing with a variety of gear types, including longline, pot, and shrimp trawls. During their time at sea, which can last up to three weeks, observers gather fishing effort and location information, sample species composition, and collect biological data from both target and non-target species. This program is all-encompassing: it trains observers, devises sampling plans, manages observer resources, notifies vessels when they are required to have observers onboard, outfits observers with safety and sampling gear, stores and manages collected data, and debriefs observers. This program is essentially divided into two components: catch share and non-catch share.

The Catch Share Program requires 100% observer coverage while the vessel is active in the catch share fishery. Full coverage is needed to enforce individual vessel catch limits. The Non-Catch Share Groundfish Observer Program uses partial observer coverage, and NMFS has developed a vessel selection process to ensure random sampling coverage. The Non-Catch Share Program is paid for via federal funds, whereas the Catch Share Program is paid in part by industry in addition to congressional funds.

[25] NMFS. 2023. West Coast Groundfish Observer Program. https://www.fisheries.noaa.gov/west-coast/fisheries-observers/west-coast-groundfish-trawl-catch-share-observer-program
[26] Benaka, L. (editor). 2023. National Observer Program FY 2021 Annual Report. NOAA Tech. Memo. NMFS-F/SPO-241, 32 p. https://spo.nmfs.noaa.gov/tm.htm

West Coast Region Observer Program

The West Coast Region Observer Program (WCROP) is managed by NMFS, and places trained fishery observers aboard fishing vessels primarily to monitor the incidental catch of marine mammals, sea turtles, and seabirds.[27] In addition to protected species, observers also collect data on target and non-target fish species and selected biological specimens. The program is run by NMFS West Coast Regional Office in Long Beach, California, and monitors California fisheries, including the California large-mesh drift gillnet fishery, California deep-set buoy gear, and the California deep-set pelagic long-line fishery. In 2021, the WCROP received $1,219,173 in funding to monitor these 3 fisheries, which covered all annual costs of running the program.[26] This funding employed 9 WCROP observers, which covered a total of 456 at-sea days (approximately 25% of fishing effort) observing the 3 California fisheries in 2021 (Table 2). The program once also monitored the California set gillnet fishery and began placing observers on vessels in the 1990's but ceased in 2017.

When in place, the goal of the California set gillnet observer program was to monitor and estimate marine mammal take by the number of individual animals under the MMPA. Because the California set gillnet fishery is managed by the state, NMFS authority to observe the fishery is based on the take of federally protected marine mammals under the MMPA. While observers were on vessels, they collected data on all species in addition to protected species. This fishery is a limited entry fishery primarily conducted in federal waters (3 to 200 nautical miles from shore) in southern California that targets a multi-species assemblage including California halibut, white seabass, California barracuda, and yellowtail. Between 2007 and 2017, 6 years were observed.[28] The observer program is not currently active in the California set gillnet fishery. There are currently 35 active set gillnet vessels from Santa Barbara to San Diego, and 90 existing permits. Observers of the California set gillnet fishery were contracted exclusively through Frank Orth & Associates.[29] The observer program requests a certain number of at-sea days annually for all its observer fisheries, and Frank Orth hires the appropriate number of observers. On average, the company hires 7 to 10 observers in a season.

Section IV. State-Managed Observer Programs

While there are many federal observer programs run by NMFS, there are very few state-managed observer programs. The most comprehensive and long-lasting state program is in North Carolina. Massachusetts also has a small-scale sampling program. Rather than relying on observers provided by NMFS, states provide and contract the observers; however, in some state programs funding is partially provided by the federal government.

Historic State Observer Program in the California Set Gillnet Fishery

[27] NMFS. 2023. West Coast Region Observer Program. Available : https://www.fisheries.noaa.gov/west-coast/fisheries-observers/west-coast-region-observer-program. Accessed June 2023.
[28] NMFS. California Set Gillnet Observer Program Observed Catch Summary, January 1, 2007, through December 31, 2017. Available: https://media.fisheries.noaa.gov/2022-01/setnet-catch-summaries-2007-2010-2013-2017.pdf
[29] NMFS. 2023. West Coast Region Observer Program. Available : https://www.fisheries.noaa.gov/west-coast/fisheries-observers/west-coast-region-observer-program. Accessed June 2023.

The historic state observer program for the California set gillnet fishery ran from 1987 to 1990 before NMFS began monitoring the fishery from 1990 onward. It was created by the California Department of Fish and Wildlife (CDFW), then called the California Department of Fish and Game, and was a voluntary program. The program's goal was to assess retained and discarded catch, as well as data on discarded bird and marine mammal species such as the common murre, harbor porpoise, and southern sea otter.[30] The funding for this program came from CDFW and private sources.

Observers were not always placed on the same vessel as the fishermen; instead, they often followed and counted catch aboard a separate vessel. This program had approximately 5% coverage during the 3 years of operation.[30]

North Carolina State Observer Program

The North Carolina State Observer Program first began in 2009 when NMFS informed North Carolina that its estuarine gillnet fisheries would be subject to federal closures under the ESA unless the state found a solution to address unauthorized takes and discards of endangered sea turtles. [31] The request from NMFS expanded to Atlantic sturgeon in January 2012.

In response to these requests, the North Carolina Division of Marine Fisheries (DMF) applied for and obtained two Incidental Take Permits for sea turtles and Atlantic sturgeon in its fisheries using anchored gillnets in estuarine waters. The reason the state applied for these permits was to ensure they could continue to allow fishing in these estuarine gillnet fisheries while minimizing bycatch of sea turtles and sturgeon. The Incidental Take Permits require these fisheries to have observers from the DMF. The minimum amount of observer coverage under this permit is 7% of large mesh fishery and 1% of small mesh fishery, and observers must collect data from every moment they are onboard to stay in compliance with the federal Incidental Take Permit that the state requested from the federal government.[32]

The DMF works with an observer contractor that provides observers for the North Carolina State Observer Program. All observers are trained in protected species interactions, fishing effort, gear characteristics, and fish populations. Because observers cannot be on all fishing trips, the DMF uses a federally approved statistical system to observe a portion of trips and provide an extrapolated estimate on takes. Observers are therefore put on trips with fishermen randomly selected from the permit pool.

[30] CDFG. 1986. Progress Report: California Gill and Trammel Net Investigations (Northern Area). Prepared by P.W. Wild. (pers. comms. Burr Heneman)
[31] North Carolina Division of Marine Fisheries. 2023. North Carolina Observer Program. Available: https://www.deq.nc.gov/about/divisions/marine-fisheries/science-and-statistics/observer-program#ProgramDetails-4364
[32] Register, Rhett. 2015. The Power of Observation. North Carolina Sea Grant, Coastwatch. Available: https://ncseagrant.ncsu.edu/coastwatch/previous-issues/2015-2/autumn-2015/the-power-of-observation/

The North Carolina State Observer Program was appropriated $1.1 million in 2013 for the fiscal year of 2013-14 to maintain the observer program.[32] In addition, the DMF approved a 25% increase in commercial fishing license fees starting in the fiscal year of 2014 to 2015 to fund the program in the future. After seeking further public input for additional funding for the program, the North Carolina Fisheries Association suggested that the North Carolina Marine Fisheries Commission establish a Commercial Fishing Resource Fund, which receives revenues from a 100% increase in fees for six of the different commercial fishing licenses. This fishery has over 2,600 participants, so such an approach may not work for smaller fisheries like California set gillnet fishery with fewer than 40 active participants. The fee money contributed to the fund to pay for observer coverage to fulfill the state's Incidental Take Permit. The North Carolina Incidental Take Permit program is scheduled for renewal in late 2023.

In addition to the observer program, self-reporting by fishermen is required. Fishermen have guidelines to follow for each protected species caught. For example, regulations are in place for both sea turtle bycatch prevention and protocol for commercial or recreational fishermen when a sea turtle is caught. Recreational and commercial fishermen are required to self-report unobserved interactions with sea turtles and Atlantic sturgeon to the DMF. While this data is likely incomplete, it helps the DMF biologists improve their understanding of impacts to protected species so they can work with fishermen to avoid hotspot areas. However, self-reporting is widely understood to be biased and vastly under-represents bycatch. Self-reports should therefore not be used in management or for estimating bycatch.

Massachusetts State Sampling Program

The smaller scale Massachusetts State Observer Program also has a program entitled Fisheries Dependent Investigations (FDI), which works with fishermen to collect data to inform stock assessments and fishery policy to avoid excess bycatch in the fishery.[33] The agency also completes sampling requests submitted by biologists and collaborators and conducts long-term monitoring research projects. Yearly funding is provided by the National Fish and Wildlife Foundation and the Nature Conservancy.

FDI conducts fisheries sampling on docks and commercial vessels. The agency employs a sampling methodology consistent with the NMFS Northeast Fisheries Observer Program. FDI priorities include sampling for the agency's Lobster Investigations Project and experimental fisheries. These data support commercial trawl, gillnet, longline, and dredge fisheries management.

In addition to sampling on the water, the FDI samples fish markets to inform stock assessments. Observers sample commercial catches that include species such as striped bass, dogfish, squid, black sea bass, menhaden, and tautog. One of their largest portside sampling programs is the Atlantic herring portside sampling and bycatch avoidance program, which was started in 2008 by the Massachusetts Department of Marine Fisheries (DMF). The goal of the program is to reduce

[33] Massachusetts Division of Marine Fisheries. Fisheries Dependent Investigations. Available: www.mass.gov/service-details/fisheries-dependent-investigations. Accessed June 2023.

river herring and American shad bycatch by 50%. Rather than placing biologists on the vessels as observers, the program has biologists sample landings when vessels offload their catch. The DMF samples an average of 133 trips and 17,000 metric tons of landings each year.[34] Coverage rates for Atlantic herring typically exceed 75%. Observers also record fish length and collect biological samples portside. If bycatch is found in a landing, they report the fishing location as a hotspot and encourage fishermen to avoid fishing those areas.

Although the Massachusetts sampling program is state-run, they coordinate their protocols and sampling priorities with NMFS Northeast Fisheries Observer Program.

Section V. Electronic Monitoring of Bycatch

Electronic Monitoring Background

Electronic monitoring, or EM, is a broad category of systems used to monitor fisheries. There are different EM systems, such as video monitoring, logbooks, count catch data, vessel monitoring systems to track vessel locations, electronic logbooks allowing fishermen to digitally enter data, and electronic fish tickets to replace paper tickets when fish are sold. The choice of systems depends on the management needs. Important factors to determine which EM system to use include the location of the fishing trip, gear-type, the duration of the fishing trip, and the amount of bycatch.

Video EM is a tool used to collect fishing data including the number of fish that are caught, fishing effort, and bycatch. Cameras are generally placed on vessels pointed at the deck and can watch fishing activity up to 24-hours a day. Some systems may monitor fishing 24-hours a day but are only triggered to record when gear-hauling hydraulics activate. This saves space on EM-related hard drives. EM companies work with the fishing vessels to place cameras to ensure the fishermen are comfortable with the camera angle, the necessary data that are collected, and blind spots are being prevented as much as possible. These systems may one day have the potential of replacing or complementing a human observer, however, a human is still required to review the footage as artificial intelligence recognition technologies are not fully developed.[35]

[34] Massachusetts Division of Marine Fisheries. Herring Portside Sampling and Bycatch Avoidance. Available: www.mass.gov/service-details/herring-portside-sampling-and-bycatch-avoidance. Accessed June 2023.
[35] D.C. Bartholomew et al. 2018. Remote Electronic Monitoring as a Potential Alternative to On-Board Observers in Small-Scale Fisheries. Biological Conservation 219 (2018): 43 p. http://www.sciencedirect.com/science/article/pii/S0006320717307899.

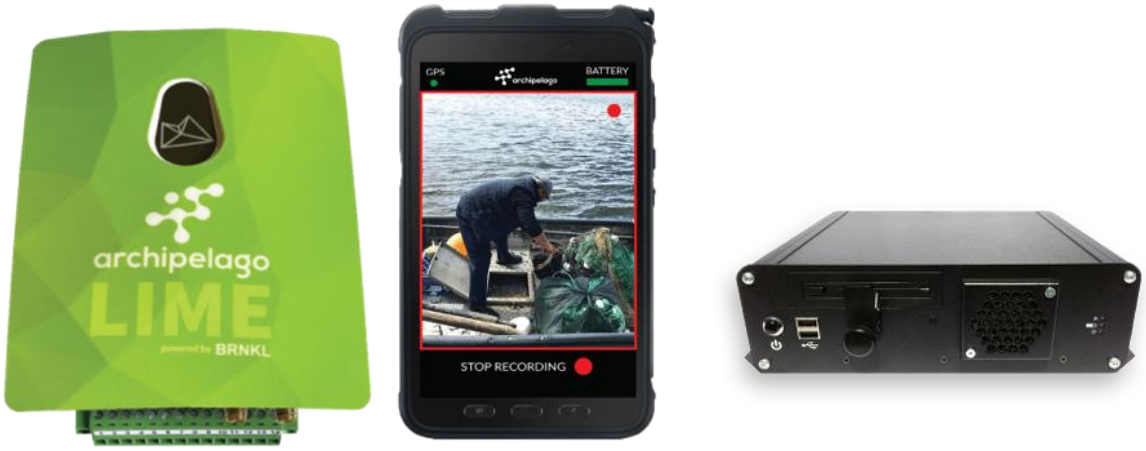
Images courtesy of NOAA Fisheries. Electronic monitoring systems installed on fishing vessels.

Leading Electronic Monitoring Systems

EM is an expensive technology for what is currently a small collection of clients. The technology is competitive because there is no standardized method for EM, and EM companies compete for a small number of fishermen or observer programs to choose their systems over another system.

Existing EM providers include Archipelago Marine Research Ltd., Saltwater, Inc., TeamFish, Transparensea, New England Marine Monitoring, and Integrated Monitoring. The programs tend to remain within their region of origin, and all have different business models.

Some of the service providers offer hardware and software but not video review, while some offer all three. Archipelago Marine Research Ltd. is one of the leading systems in EM in California. They provide comprehensive data collection platforms, high-quality video cameras and gear sensors, full design and management of EM systems, log systems, comprehensive training, and EM options for small inshore fishing to large pelagic vessels.



Images courtesy of Archipelago Marine Research Ltd. Different EM observation systems including (from left to right) a vessel tracking system, a system using video to track discarded vs. retained catch, and a system that records data from cameras for commercial fishing vessels.

Federal Encouragement for Electronic Monitoring Utilization

NMFS and the National Fish and Wildlife Foundation (NFWF) have programs in development to help encourage fishermen to participate in EM programs. NMFS's program, the Fisheries Information System Program, is a state-regional-federal partnership that offers an annual, competitive funding proposal process that helps improve EM monitoring.[36] Additionally, the NFWF has a fund entitled the Fisheries Innovation Fund, which offers financial incentive for fishermen to put EM systems onto their vessels.[37] One potential project could be to install EM video systems and observers at the same time then investigate the efficacy of these video systems for set gillnets.

Current Electronic Monitoring Usage

In the United States there are several EM programs that have been fully implemented, including the Alaska small-boat fixed gear program, the Atlantic pelagic longline fishery, and the Northeast groundfish fishery.[38] Each EM program is designed to meet the different management needs of the fisheries. The Alaska EM program is used to monitor and collect data on all catch, while the Atlantic longline fishery EM program monitors incidental catch of bluefin tuna.[39] The Northeast groundfish fishery employs two EM programs – a logbook audit model on smaller vessels and on larger vessels a system that monitors compliance with maximized retention.[40]

There are also many EM projects and programs in development in the United States.[39] On the West Coast, EM in the groundfish fishery is anticipated to be fully implemented in 2025. In Alaska, full implementation of EM in the midwater trawl pollock fishery is scheduled for 2024. EM projects are also underway in the Pacific Islands pelagic longline fishery, in addition to several pilot EM projects in Alaska and the Gulf of Mexico. EM for bycatch monitoring has not yet been explored for California set gillnets.

Advantages and Disadvantages

One major disadvantage with EM systems is that so far there has been no coordinated effort to standardize the hardware and software of EM technology. Even if the technology can be standardized and artificial intelligence incorporated, it will likely augment rather than replace human observers. While EM has proven to be an effective tool to meet fisheries monitoring

[36] NMFS. 2023. Fisheries Information System Program. Available: www.fisheries.noaa.gov/national/commercial-fishing/fisheries-information-system-program. Accessed June 2023.
[37] National Fish and Wildlife Foundation. 2023. Fisheries Innovation Fund. Available: www.nfwf.org/programs/fisheries-innovation-fund?activeTab=tab-3. Accessed June 2023.
[38] NMFS. 2020. National Electronic Monitoring Workshop Report 2019/2021. https://s3.amazonaws.com/media.fisheries.noaa.gov/2020-09/2020-EM-National-Workshop-Report-FINAL-4-webready.pdf?ci7Mq1XPdpkHw2yzVtxGTtWXXObKWlPr
[39] NMFS. 2020. National Electronic Monitoring Workshop Report 2019/2021. 46 p. https://s3.amazonaws.com/media.fisheries.noaa.gov/2020-09/2020-EM-National-Workshop-Report-FINAL-4-webready.pdf?ci7Mq1XPdpkHw2yzVtxGTtWXXObKWlPr
[40] NMFS. 2022. Electronic Monitoring for Sectors [Fact Sheet]. Greater Atlantic Regional Office, 2 p. https://media.fisheries.noaa.gov/2022-05/EM-spring2022-508nefsc.pdf

objectives, data collected require manual review and analysis to extract meaningful catch accounting information. This can be an expensive and time-consuming effort. Developing an accurate machine learning or algorithm-based model for marine species recognition requires a large and diverse dataset of labeled and verified images. Collecting such data can be challenging, especially for rare or lesser-known species. However, efforts are underway to advance these systems and develop durable models. The EM Innovation (EMI) project is one that aims to address these issues by researching and piloting cost-effective and durable machine learning and computer vision (CV) advancements for EM camera system deployments, with the goal of providing near real time, automated, catch accounting and reporting. [41]

Another complexity with video EM is confidentiality. Fishermen have raised concerns with cameras running 24 hours a day on their vessels and have expressed concern about how the footage will be used or shared. To address this concern, NMFS has created a confidentiality policy entitled Policy on Electronic Technologies and Fishery-Dependent Data Collection that details how they apply information law to the data they are collecting. [42]

Another challenge posed by EM is blind spots and system maintenance. There are certain fishery operations that are more prone to data gaps or data tampering, and all captains and crews with EM systems must maintain these systems, including cleaning the camera lens so that clear images can be captured. In most cases, a trial is needed to figure out where cameras should be placed to evaluate the appropriate operations of the vessel, and every EM program to date in the U.S. has completed trials to work out the best placement for cameras on a vessel. Even with the presence of cameras, it is important to review the video footage to understand vessel crew behavior and catch handing operations, such as recognizing if a bycatch event occurred outside the view of the cameras (e.g., in the water next to the vessel). A longline fishery operating at night may be difficult to monitor solely through a camera lens, even with floodlights, so human observation may be necessary in these situations. Since EM for set gillnets has not yet been explored on the West Coast, systems will require testing to determine how to make EM viable for this gear type.

Despite these disadvantages, in the long-term, EM has potential to be more efficient than humans on certain tasks, such as counting catch. Therefore, any new efforts to use EM to quantify bycatch should use both human observers and EM video on the same trip, so that the data collected by each method can be compared.

[41] Lee Son, G. S. et al. 2023. Development of electronic monitoring (EM) computer vision systems and machine learning algorithms for automated catch accounting in Alaska Fisheries. AFSC Processed Rep. 2023-01, 113 p. Alaska Fish. Sci. Cent., NOAA, Natl. Mar. Fish. Serv., 7600 Sand Point Way NE, Seattle WA 98115. https://repository.library.noaa.gov/view/noaa/49143

[42] Alger, Brett. 2019. Policy on Electronic Technologies and Fishery-Dependent Data Collection. Office of Science and Technology, 5 p. https://media.fisheries.noaa.gov/dam-migration/04-115.pdf

Electronic Logbooks

Logbooks rely on fishermen self-reporting catch and other information about their fishing trips. Historically, fishermen filled out paper logbooks and submitted them to fishery managers. Electronic logbooks offer the potential for submitting this information digitally through a tablet with internet connection or cellular service. However, in the context of bycatch data collection, the use of electronic logbooks may mimic existing under-reporting and biased data problems with self-reporting, especially if there is an incentive not to report bycatch. For fisheries with high rates of bycatch, electronic logbooks may not be practical for obtaining catch and bycatch composition. That said, they may be useful for collecting other data from fishermen, such as the type of nets used, the start and end points of fishing activities, and bycatch hotspots. Electronic logbooks could also be a means to report data collected by oceanographic and environmental sensors on fishing vessels or gear.

How Electronic Monitoring Could Be Implemented

If EM was to be implemented as part of a California State Observer Program, it should initially be considered as a complement to human observers, rather than a replacement. Once EM has been demonstrated to have comparable accuracy to human observers, a data optimization system could inform a percentage of observation covered entirely by humans and portion covered entirely by EM. However, it is imperative that observer programs treat human observers and EM systems as two completely different observation methods. Humans can collect data in a detailed and accurate manner, whereas a camera can offer efficient data collection without the same accuracy. There are costs and benefits to each method; therefore, observers and cameras cannot be expected to collect the same data. Comparing data collected by observers and EM on the same fishing trips would be informative in future applications of EM.

Other types of EM than video monitoring could be used to complement observers. EM systems with vessel tracking and net sensors can track when and where nets are in the water, while human observers could collect fine scale data such as species identification, catch composition, and biological samples. In this example, EM and human observers complement one another.

EM is still in its early stages, and fully developing the technology to meet the needs of the fishery managers may take longer than originally anticipated. Communication with the industry and programs already using EM is invaluable to ensure EM continues to develop optimally and previous mistakes are not repeated.

The Costs of Electronic Monitoring

EM has the potential to collect certain data efficiently and reduce costs. A 2018 study conducted in Peru estimated that an EM system would cost half of the cost of human observers.[43] Additionally, for cod vessels in Alaska, EM costs were estimated at 27 to 41% less than the costs of observers.[44]

However, in many fisheries EM costs remain high and the technology has not yet reached the point of replacing human observers. Existing EM companies compete for a tiny marketplace with a small number of customers; therefore, the companies are not making a lot of money to further develop their hardware and software. Even though it may be relatively inexpensive to build a simple program that counts catch in a gillnet, it may not be feasible to expect automatic species identification, so it will likely be necessary to include human review of the video footage.

Cost estimations for EM are complex due to the variability of situations and the many different types of EM. EM costs are dependent on the number of vessels participating in the EM program, the number of systems that need to be purchased and/or replaced on an annual or recurrent basis, deployment rates, field support services, video review, and other factors. Vessel length can be used as a general proxy for the cost of purchasing and installing EM. A 2017 report projecting cost estimates for EM in the New England Groundfish Fishery concluded: 1) the video monitoring systems cost approximately $8,000 to purchase and install per vessel; 2) the average costs (based on the gear type) for 100% video review ranged from $270 to $335 per day; and 3) the average annual cost per vessel for equipment, purchase, installation, program management, and review of 100% of video collected was estimated at $15,000.[45] Once established, the highest annual cost is accrued from EM submission, review and reporting. For gillnet vessels in this fishery, 100% EM video review is estimated to cost $284 per fishing day (4 sets/day, at $71/set). In this projected EM costs report, a cost breakdown is presented of a sample gillnet vessel based on the scenario of 100% EM coverage and 50% video review (Figure 1).

[43] D.C. Bartholomew et al. 2018. Remote Electronic Monitoring as a Potential Alternative to On-Board Observers in Small-Scale Fisheries, Biological Conservation 219: 43 p., http://www.sciencedirect.com/science/article/pii/S0006320717307899.
[44] S. Buckelew et al. 2015. Electronic Video Monitoring for Small Vessels in the Pacific Cod Fishery, Gulf of Alaska. North Pacific Fisheries Association and Saltwater Inc., 2015, 19 p. https://www.npfmc.org/wp-content/PDFdocuments/conservation_issues/Observer/EM/Pcod%20Tech%20report_FINAL.pdf
[45] CapLog Group LLC. 2019. Projected Cost of Providing Electronic Monitoring to 100 Vessels in New England's Groundfish Fishery. Commissioned by the Nature Conservancy. Available: https://em4.fish/wp-content/uploads/2019/04/TNC-EM-Cost-Assessment-Report-Submission-to-NEFMC-4_10_19.clean_.pdf

Sample Vessel Two:
Gear: Gillnet
Length: 40 feet
Trips per Year: 50 trips
Trip Length: 18-24 hours
Sets per Trip: 3 sets per trip
EM Catch Handling Efficiency: Average
Vessel EM Service Requirements: Average

Estimated Annual (Year 3) Cost for User-Specified Vessel	
Policy, Regulatory and Program Dev Costs	**$ -**
Program Planning and Development	$ -
On-Vessel Costs	**$ 1,620**
EM Equipment and Software	$ -
Repair and Support of EM Systems	$ 1,620
Program Admin and Operations Costs	**$ 9,527**
Program Management	$ 2,520
Management Software and Systems	$ 300
EM Submission, Review and Reporting	$ 6,000
EM Video / Data Storage	$ 707
Total for EM Program	**$ 11,147**

100% ASM Coverage v 100% EM Coverage	
# of Fishing Days	50 days
Sample FY2018 ASM Rate for full day (18-24 hr)	$ 570
Vessel Cost for 100% ASM Coverage	**$ 28,500**
Vessel Cost for 100% EM Coverage	**$ 11,147**

Figure 1. Example estimation of annual EM cost of a gillnet vessel in the New England Groundfish fishery, based upon 100% EM coverage and 50% video review. EM estimates are compared to at-sea monitoring (ASM) estimates for the same vessel.[45]

The costs presented in the 2017 report represent those of an experimental program that tested new processes and technologies. As any EM program evolves from experimental to an established stage, it is reasonable to expect cost per vessel to decrease.

Section VI. Recommendations for a California Observer and Bycatch Monitoring Program

Objectives for the State Observer Program

Within the California set gillnet fishery, the main needs of an observer program are to collect accurate catch and bycatch compositions both by weight and number of individuals, of species such as fishes, invertebrates, marine mammals, sea turtles and seabirds, and other rare species. If coverage is less than 100%, accurate and consistent information on fishing effort is essential to ensure that expanded estimates of total catch and bycatch are achievable. Bycatch data collected by the observer program would be most useful when collected in the same unit as landed catch data, which is currently recorded by weight. Total effort of the fleet can be tracked in several ways, however, and the observer program should track number of sets, sets per trip, the length of the net panels, and soak duration to quantify accurate total effort of the fleet.

Currently, NMFS combines data from all California set gillnets as a single fishery. However, there are two distinct mesh sizes (6.5 inches and 8.5 inches) which are intended to target different species assemblages. We recommend future observer coverage clearly identify the mesh

size used in each set to enable analysis of the bycatch and catch data by mesh size in addition to in aggregate.

Specific to the California set gillnet fishery, NMFS has previously recommended a minimum of 20% observer coverage year-round.[46] Higher coverage levels up to 100% may be necessary to detect rare species interactions and/or enforce potential hard caps on bycatch.

Authority and Funding

When setting up a state-run observer program, the state must establish regulations to require vessels to carry observers upon request, along with notification requirements. NMFS currently requires the California set gillnet fishery to carry observers upon request under the authority of the MMPA.

Since California does not currently have a state-run observer program, new funding will be needed. One option would be to establish a new budget allocation to CDFW to establish and run an observer program. Another option would be to seek funding from the California Ocean Protection Council to develop a pilot observer program. There may be federal funding opportunities through the NMFS Bycatch Reduction and Engineering Program, and Saltonstall-Kennedy grant programs. Additionally, non-state funding from non-governmental or philanthropic organizations (such as the National Fish and Wildlife Fund) could be used to fund the program through a public-private partnership.

The fishing industry could be required to pay at least partially for the costs of observers either directly or through increased landings fees, like the funding model described above in the North Carolina State Observer Program. As another example, the North Pacific Groundfish and Halibut Fishery Observer Program is funded based on the amount of target organisms landed by vessels in the partial coverage category. The vessels are given a 1.65% fee multiplied by the price of landed catch weight.[47] This fee percentage is set in regulation and reviewed periodically by the North Pacific Fishery Management Council. Additionally, this fee is split between the buyer of the fish and the vessel owner or operator. This program also started funding certain EM fleets in 2019. However, it is important to note that the California set gillnet fleet is significantly smaller with a fraction of the participants compared to the fleets in the examples above.

Recommendations for Observing the California Set Gillnet Fishery

We recommend a 3-phase approach where initially the state would work with NMFS to reinstate the federal observer coverage while the state concurrently develops its own pilot state observer program that would inform a long-term program and expand to other state managed fisheries. The benefit of this approach is that observer coverage of the gillnet fleet could resume near-term.

[46] NMFS. 2011. U.S. National Bycatch Report [W. A. Karp, L. L. Desfosse, S. G. Brooke, Editors]. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-F/SPO-117E, 508 p. https://spo.nmfs.noaa.gov/sites/default/files/tm117E.pdf
[47] NMFS. 2022. Observer Fee Collection and Payment - North Pacific Groundfish and Halibut Fisheries Observer Program. Available : www.fisheries.noaa.gov/alaska/commercial-fishing/observer-fee-collection-and-payment-north-pacific-groundfish-and-halibut. Accessed June 2023.

However, the eventual implementation of a state-run program would be a long-term solution for state fishery monitoring and management needs. For any of these potential observer programs, data collected at sea must be consistent and comparable with landings and total effort data.

i. Reinstating Observer Coverage by the National Marine Fisheries Service

In the immediate term, reinstating the currently dormant federal observer coverage could ensure timely data for the California set gillnet fishery. The state of California would need to work with NMFS to allocate funds for additional, regular observer coverage, and possibly an increase in the number of observers, under the existing West Coast Region Observer Program.

Under this approach, it is important to consider whether NMFS can amend its current data collection protocols to meet the state's management needs, such as adding new requirements for observers to take length or weight measurements of observed marine species. Additionally, it is important to ensure there are enough observers in the region to provide coverage to an additional fishery. In its review of available bycatch data in the set gillnet fishery, CDFW raised concerns that "the Federal Observer Program only documented a sub-sample of the fleet, and observation assignments were not randomly sampled across the various fishing ports or active permittees".[48] To address this issue and to ensure that observer data are accurate and usable in the future, additional funds may be needed to hire the appropriate number of observers and ensure random assignment.

To avoid past data discrepancies between the observer program and the state's records, the state would need to refine logbook reporting requirements to align its estimates of total fishing effort with the way NMFS tracks effort. If the NMFS observer program continues to record catch per set, the state should consider also tracking total effort by number of sets, to allow for accurate extrapolation of the observer data.

ii. A Pilot California State-Managed Observer Program

We recommend the best long-term approach for California to obtain accurate bycatch data for its data-limited fisheries is to implement a California state-run observer program. This state-managed observer program could begin as a three-year pilot program for the California set gillnet fishery, for which a discrete funding package would fund with the goal of informing long-term costs. This could be considered a one-time funding allocation over a limited duration, which would likely be a higher initial cost as the program is being developed.

Under this approach, the state would have the ability to determine observer coverage needs, the selection process for vessels, and what data the observers are collecting. The state would also need to develop its own training protocols and requirements to ensure all observers are properly trained, as well as provide the necessary equipment. Previous state observer programs have largely used existing federal training and data collection methods to ensure data is comparable

[48] CDFW. 2023. Evaluating Bycatch in the California Halibut Set Gill Net Fishery. Available: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=213567&inline.

and the agencies remain collaborative. One suggestion would be for the state to partner with public state universities to train observers.

Notably, the state would not be starting from scratch. The state could draw upon the training and data collection protocols from existing federal programs and could consider contracting observers from the same observer providers that already have experience observing the California set gillnet fishery and other fisheries, which in this case is the contractor Frank Orth and Associates.

The challenges with creating a state program are first and foremost the costs. Building a new program will require time, training, negotiation, funding, and the creation of new roles in CDFW. These roles would include contract management with the observer provider, training manager and overseer, debriefing observers, communication with the captain of the vessels, data management and data queries, and coordination with other programs around the country.
As discussed above, we recommend including an EM program alongside the development of a human observer program to better evaluate and develop EM as an efficient long-term solution. In addition to catch accounting, vessel tracking and net sensors would enable fishery managers to validate soak times, net length, and fishing locations. The next step would be to create trials for video cameras while observers are also on vessels to compare data and assess the accuracy and limitations of EM. California can look to other fisheries using more advanced EM systems, such as Alaska, to evaluate those tools and compare the costs of observers to the installation of EM systems and the of hiring technicians to review video footage.

iii. Long-term Permanent California Fisheries Observer Program

Under this approach, funding for the initial development of the pilot project to get the program up and running would then be followed by ongoing funding to continue the program into the long term. Upon completion of the pilot state observer program, funding, infrastructure, workload, staff capacity, equipment and technology needs could be assessed to inform long-term budget and funding pathways for regular observer coverage. This program, once established, could be expanded to other state-managed fisheries.

VII. Conclusion

Accurate and consistent catch and bycatch data are critical to sustainably manage the target species and ensure the overall health of the ocean ecosystem. This report compiles several examples of federal observer programs across the country, and it must be noted that all NMFS observer programs receive millions of dollars in appropriations. This highlights the need for dedicated, long-term funding, which is the greatest barrier to implementing and continuing an observer program for state-managed species. While there are many factors to consider in addition to funding, California can draw on experience from the federal government, other states, and its own historic program to develop a fishery observer program for state-managed fisheries such as the California set gillnet fishery. In this report, we have outlined a potential pathway for the state to implement more regular and extensive monitoring of its fisheries, utilizing human observers

and new EM technologies. Ultimately, an investment in increased observer coverage will benefit fishing communities, sustainable fisheries populations, and marine ecosystems.

Acknowledgments

We would like to express our sincere gratitude to the experts who generously provided valuable information and advice during the preparation of this report. Their expertise and insights significantly enriched our understanding of the subject matter.

The information and recommendations presented in this report are solely at the discretion of the authors, and it does not necessarily reflect the viewpoints or endorsement of the experts who offered their guidance or peer review. Moreover, the experts are not officially affiliated with this report.

These individuals include:

- Lee Benaka: NOAA Bycatch Lead, lee.benaka@noaa.gov
- Kenneth Keene: NOAA National Observer Program Coordinator, kenneth.keene@noaa.gov
- Brett Alger: NOAA Electronic Technologies Coordinator, brett.alger@noaa.gov
- Charles Villafana: NOAA Fish Biologist, charles.villafana@noaa.gov
- Scott Casey: Frank Orth & Associates, seagoat98@hotmail.com

We additionally wish to thank CDFW staff and one anonymous reviewer for their peer review of earlier drafts of this report.

From: Scott Webb <swebb@rri.org>
Sent: Friday, November 3, 2023 4:36 PM
To: Ashcraft, Susan@FGC [redacted] FGC <FGC@fgc.ca.gov>
Cc: Ramey, Kirsten@Wildlife [redacted] Matthews, Kinsey-Contractor@fgc [redacted] Shester, Geoff <GShester@oceana.org>; Cbirch <cbirch@oceana.org>
Subject: Public Comment for MRC Agenda Item 2: NGO Sign-On Letter

Hi Susan,

Happy Friday! I want to submit the attached NGO Sign-on letter under MRC Agenda Item 2: "Evaluation of bycatch in the California halibut set gill net fishery in support of the fishery management review," to be available for the briefing booklet.

I will also submit individual comments for the Resource Renewal Institute before the 5 p.m. deadline.

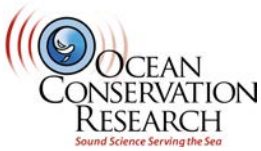
Thank you so much!

All the best,

Scott

--
Scott Webb (he/him)
Director of Advocacy & Engagement
Resource Renewal Institute

OCEANDEFENDERS.ORG



November 3, 2023

Mr Eric Sklar, President
California Fish and Game Commission
P.O. Box 944209,
Sacramento, CA 94244-2090

Dr. Charles Bonham, Director
California Department of Fish & Wildlife
P.O. Box 944209,
Sacramento, CA 94244-2090

MRC Agenda Item 2: Evaluation of bycatch in the California halibut set gill net fishery in support of the fishery management review

Dear Director Bonham, President Sklar, and Members of the Commission,

We, the undersigned organizations, commend the California Fish and Game Commission and the California Department of Fish and Wildlife (CDFW) for developing a suite of management measures to reduce bycatch and bycatch mortality associated with set gillnet fishing. Addressing the unintended catch and discarding of dead or injured marine life is a top priority for California, and we applaud the extensive work the Commission and CDFW put into fulfilling the state's commitment to protecting marine biodiversity from this threat.

We support the suite of management changes and data collection improvements the Commission directed CDFW to bring forward. Of those, we believe the following list of measures can be readily adopted and help reduce the bycatch in this fishery to acceptable levels. They should be applied to all set gillnets, not just those targeting California halibut. We ask the Commission to initiate a regulatory package at the December 2023 meeting to adopt the following measures.

1. A maximum soak time of no greater than 24 hours for all set gillnets to significantly reduce bycatch mortality of sharks, rays, and other vulnerable species due to substantial evidence that demonstrates soak times longer than 24 hours drastically decrease the survivorship of all species, decrease the quality of the target catch, and increase entanglement and depredation impacts;
2. Temporal closures to protect vulnerable species like tope (soupfin) sharks during their spawning season, as well as new area closures to set gillnets to protect areas of high biodiversity;
3. Limitations on the maximum net height for trips targeting halibut as suggested by the gillnet fleet;
4. A system to track set gillnet gear loss that does not depend on self-reporting;
5. Unique gear-marking that allows set gillnets to be identified throughout all elements of the gear. Unique gear-marking would increase the likelihood that gear involved in wildlife entanglements can be positively or negatively attributed to the fishery and minimize the potential for unattributed entanglements;
6. New logbook requirements to precisely quantify set gillnet fishing effort.

These policies will only be rendered effective if the state adopts independent methods of collecting bycatch data and enforcing regulations. We strongly support implementing a CDFW-led pilot observer program utilizing human observers and simultaneously testing electronic monitoring. This will be an asset to the Commission and CDFW by providing unbiased data for stakeholders to measure the success of the proposed regulations and could serve as a model for obtaining catch and bycatch data in other Commission-managed fisheries. The National Marine Fisheries Service (NMFS) has an existing observer program for the set gillnet fishery, yet they have not observed the fishery since 2017. In the interim, we ask the Commission to request that NMFS immediately resume observer coverage of set gillnets in 2024. We also support a move toward electronic logbooks and electronic vessel monitoring to verify fishing locations to increase the accuracy of data on catch and bycatch in the set gillnet fishery.

CDFW has confirmed that certain measures discussed by the Commission require statutory change. For proposed statutory changes outside of the scope of the Commission's authority, we look forward to engaging further with CDFW and the Commission as the legislature addresses exemptions that currently allow the sale of protected species, makes changes to gillnet permits, and finds creative solutions to reduce bycatch.

We are grateful to the Commission and CDFW for developing a suite of regulatory measures to reduce bycatch and improve data collection for set gillnets off the California coast. The successful adoption of these measures will meaningfully reduce bycatch in set gillnets, benefiting a wide suite of vulnerable fish, sharks, rays, and marine mammals. This comprehensive package will ensure effective implementation of the MLMA's requirements to ensure bycatch is limited to acceptable types and amounts.

Sincerely,

Scott Webb
Director of Advocacy
Resource Renewal Institute

Geoff Shester
California Campaign Director
Oceana

Caitlynn Birch
Pacific Marine Scientist
Oceana

Jason Schratwieser
President
International Game Fish Association

Francine Kershaw
Senior Scientist
Natural Resources Defense Council

Dan Silver
Executive Director
Endangered Habitats League

Kurt Lieber
President
Ocean Defenders Alliance

Michael Bear
Community Science Director
Shark Stewards

Joy Primrose
ACS Oregon Chapter President
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Mark J Palmer
Associate Director
International Marine Mammal Project of Earth Island Institute

Emily Parker
Coastal and Marine Scientist
Heal the Bay

Ashley Eagle-Gibbs
Interim Executive Director
Environmental Action Committee of West Marin

Tomas Valadez
Senior Conservation Manager
Azul

Ben Grundy
Oceans Campaigner
Center for Biological Diversity

Rachel Bustamante
Interim Ocean Program Director
Earth Law Center

Stefanie Brendl
Executive Director
Shark Allies

Todd Steiner & Teri Shore
Executive Director & Board Member
Turtle Island Restoration Network

Andrew Johnson
California Representative
Defenders of Wildlife

Lesley Handa
Lead Ornithologist
San Diego Audubon Society

Natalie Para
Campaign Director
Ocean Preservation Society

Lincoln O'Barry
Campaigns Coordinator
Dolphin Project

William Rossiter
Vice President
NY4WHALES

Erica Donnelly-Greenan
Executive Director
Save Our Shores

Andy Rogan
Science Manager
Ocean Alliance

Erin Politz
Vice President
The SeaChange Agency

Georgia Hancock
Director and Senior Attorney, Marine Life Program
Animal Welfare Institute

Michael Quill
Marine Programs Director
Los Angeles Waterkeeper

Michael Stocker
Director
Ocean Conservation Research

From: Birch, Caitlynn <cbirch@oceana.org>
Sent: Friday, November 3, 2023 3:34 PM
To: FGC <FGC@fgc.ca.gov>
Cc: Ashcraft, Susan@FGC < Ramey, Kirsten@Wildlife <[redacted] Shuman, Craig@Wildlife <[redacted]>; Matthews, Kinsey-Contractor@fgc <[redacted] Shester, Geoff <GShester@oceana.org>
Subject: Oceana Comment Letter for Nov MRC, Agenda Item 2

Good Afternoon,

Please include the attached comment letter and attachment in the binder materials for the November MRC under Agenda Item 2. We'd also like to resubmit for inclusion in the binder (also under Agenda Item 2) our last comment letter and attachment previously submitted to the October FGC meeting.

Thank you Kirsten and Craig for the ongoing discussions over the past months and for the advanced copy of the Department's presentation.

Susan and Kinsey – we look forward to touching base on Monday :)

Looking forward to seeing you all in San Diego at the MRC.

Have a great weekend,

Caitlynn

Caitlynn Birch | Pacific Marine Scientist
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September 29, 2023

Mr. Eric Sklar, President
California Fish and Game Commission
P.O. Box 944209
Sacramento, CA 94244-2090
Agenda Item 18: General Public Comment: Marine Mammal Bycatch Underreporting in the Set Gillnet Fishery

Dear President Sklar and Members of the Commission:

We are writing to express our strong support for the Commission's efforts to increase observer coverage in the set gillnet fishery targeting California halibut and white seabass. The availability of accurate data on marine mammal interactions and protected species is vital for informed decision-making and responsible fisheries management.

The analysis provided in our attachment compares self-reported data to observer-based estimates of marine mammal take in the set gillnet fishery, finding that only 6% of marine mammal interactions were reported. The substantial gaps in bycatch self-reporting underscore the critical importance of reliable data in evaluating the impacts on populations and ensuring compliance with state and federal wildlife protection laws. The wide disparities between self-reported and estimated marine mammal takes in the fishery highlight a pressing issue of underreporting, which can have significant consequences for both marine life conservation and sustainable management practices if relied upon without independent observer data.

In light of these findings, we commend the Commission for its proactive steps towards improving data on bycatch and the work the California Department of Fish and Wildlife continues to do to explore options for increased observer coverage, electronic monitoring, and logbook requirements in the set gillnet fishery. Increasing observer coverage is a pivotal move towards transparency and accuracy in data collection. We urge the California Fish and Game Commission to continue its efforts to expand observer coverage in the California set gillnet fishery to ensure that decision-makers have access to credible, objective, and verifiable information. By doing so, the Commission will not only enhance its ability to safeguard marine life but also promote responsible and sustainable fishing practices that are crucial for the long-term health of our ocean ecosystems. We look forward to the Commission's Marine Resource Committee meeting in November where the Committee will be considering recommendations for management and monitoring improvements in the fishery.

Thank you for your dedication to preserving California's marine resources, and we look forward to our continued work with you on these critical initiatives.

Sincerely,

Geoffrey Shester, Ph.D.
California Campaign Director & Senior Scientist

Caitlynn Birch
Marine Scientist

Attachment: Underreporting of Marine Mammal Takes in the California Set Gillnet Fishery Underscores Need for Observers

OCEANA Protecting the World's Oceans

Underreporting of Marine Mammal Takes in the California Set Gillnet Fishery Underscores the Need for Observers

September 2023

C. Birch, Pacific Marine Scientist
G. Shester, Ph.D., Senior Scientist

Collecting accurate data on the catch of sensitive or protected species is critical for fishery managers to evaluate impacts to populations and ensure fisheries comply with state and federal wildlife protection laws. Fishery managers are often limited by available data such as landings data that does not include discards; and must rely upon observer data and self-reported data from fishermen to quantify impacts and adjust management accordingly. Independent and accurate fisheries observer data is considered the gold standard for quantifying catch, bycatch, and protected species interactions because it comes from objective sources that are trained to document and identify species. However, limited resources often limit or preclude desired levels of observer coverage. In the California set gillnet fishery targeting white seabass and California halibut, fishery observers have been present on a small portion of total fishing effort in 6 of the last 15 years, and observed zero fishing trips in 8 of those years, with no observer coverage since 2017.

In the absence of independent observer data, managers rely upon logbook and self- reporting data to fill key information gaps. Federal regulations under the Marine Mammal Protection Act (MMPA) require each commercial permittee to report all marine mammal interactions to the National Marine Fisheries Service (NMFS) within a 48-hour period, and fishermen must maintain an accurate and complete record of catch in logbooks. However, the value of this information is reliant on accurate reporting. In this analysis we find a significant difference between the number of self-reported and estimated marine mammal takes based on observer data in the California set gillnet fishery, suggesting underreporting of marine mammals is taking place in the fishery. A lack of verifiable independent observer data poses a major challenge to the conservation and management of this fishery and the wildlife it catches.

After conducting a bycatch inquiry under the California Marine Life Management Act in 2023 for the California halibut set gillnet fishery, the California Fish and Game Commission recommended improving data on bycatch and tasked the California Department of Fish and Wildlife with scoping potential options for increased observer coverage, electronic monitoring, and logbook requirements to fill information gaps.

To quantify self-reported marine mammal interactions and total estimated marine mammal take in the fishery, Oceana compared self-reported marine mammal takes in the California set gillnet fishery obtained through a Freedom of Information Act (FOIA) request to federal estimates of marine mammal take based on observer data. Each self-report includes the species, date, and location.

Species	Number Self-Reported
Sea lion	161
Harbor seal	27
Pacific white-sided dolphin	3
Common dolphin	2
Harbor porpoise	1
Northern elephant seal	1
Gray whale	1
Total	**196**

Table 1. Total self-reported marine mammal interactions by the set gillnet fleet 2002 – 2022. Source: NMFS FOIA Response 2023.

From NMFS-released FOIA records, self-reports in the California set gillnet fishery from 2002 – 2022 accounted for a total of 196 protected species interactions comprising 7 different marine mammal species. Eighty-two percent of self-reports involve the California sea lion, followed by the harbor seal at 14 percent. Rarer event species represent 4 percent of total reported interactions, and involve the common dolphin, the Pacific white sided dolphin, harbor porpoise, northern elephant seal, and gray whale (Table 1). Annual self-reports from 2002 to 2022 for the fishery average 8 marine mammal interactions per year. The full dataset, with species, date, and number of animals involved in each interaction is shown in Table 4.

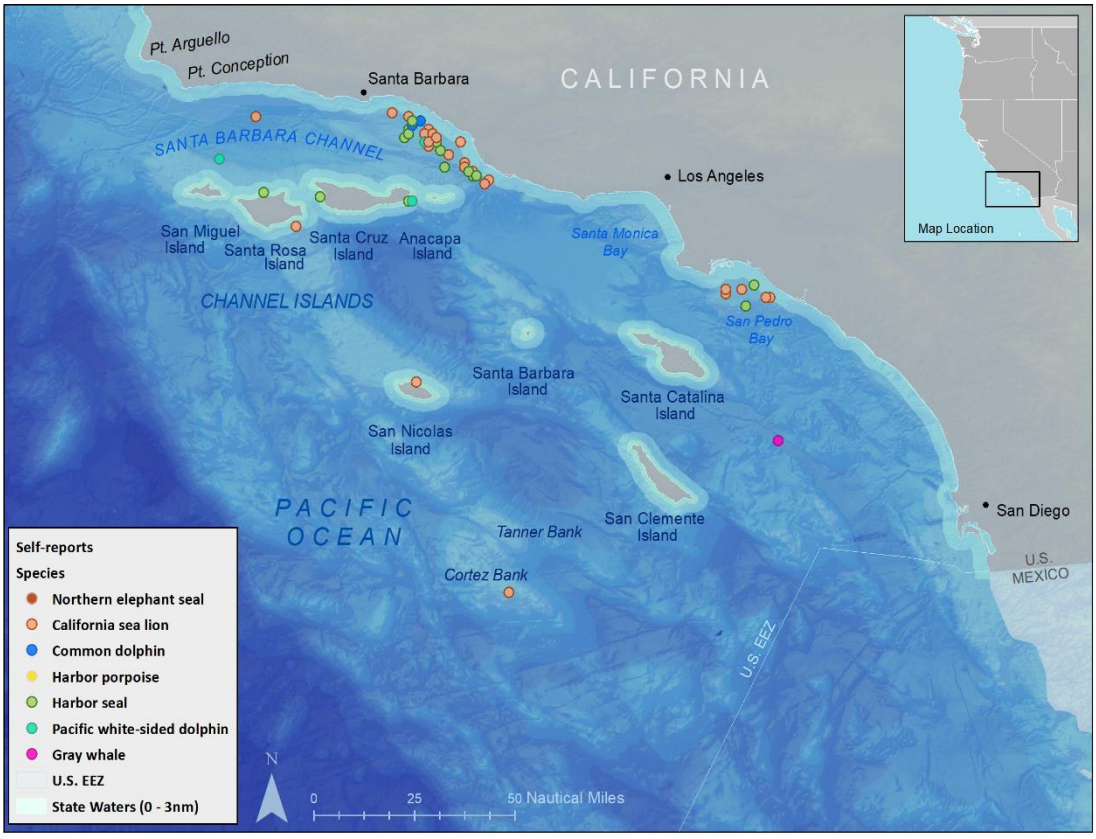

Figure 1. Locations of all (n = 170) non-erroneous marine mammal interactions self-reported to NMFS in the set gillnet fishery from 2002 – 2022. Twenty-six reports contained erroneous coordinates not within the fishing area that were removed. Each data point may represent more than 1 interaction.

The majority (45%) of reported marine mammal interactions occurred in the Santa Barbara Channel (Figure 1). This is an area of high relative fishing effort,[1] with a shallow shelf feature allowing for set net fishing just outside the state waters 3 nautical mile (nm) boundary, and close to Santa Barbara and Ventura ports. Nine percent of reported interactions occurred in San Pedro Bay, another shallow shelf area close to shore and coastal ports. Reported interactions around the main Channel Islands represented 10% of total reports, while 23% occurred around Cortez Bank, San Nicolas Island and East of San Clemente Island. While protected species takes at Cortez Bank occurred at a singular location, there were two reported interactions that involved 24 and 18 California sea lions at this location. The single self-reported gray whale interaction occurred East of San Clemente Island offshore from Huntington Beach. Thirteen percent of location coordinates associated with reports were erroneous [e.g., on land or outside the area where set gillnets are authorized] and are not displayed on the map in Figure 1. All reports and locations were self-reported by set gillnet fishermen.

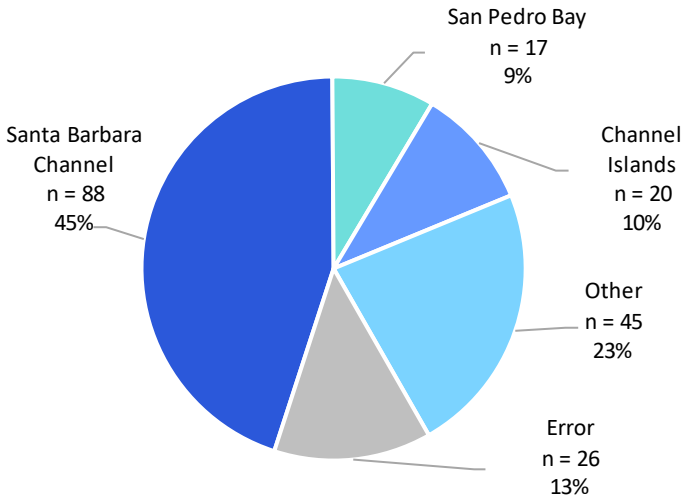

Figure 2. Proportion of self-reported marine mammal interactions by location in the Southern California Bight, 2002 – 2022. Source: NMFS FOIA Response 2023.

NMFS estimates annual marine mammal takes in Marine Mammal Stock Assessment Reports (SARs) by extrapolating the number of marine mammal interactions observed during the proportion of fishing effort observed to the total annual fleetwide fishing effort. These total estimates are based upon unbiased subsamples of fishing data collected by trained observers and do not typically include self-reported data. These estimates are intended to be the best estimate of total marine mammal take, although they are likely underestimates and do not include extrapolated estimates of post-release or entanglement mortality associated with fishing gear. The Pacific Marine Mammal Center and other marine mammal rescue centers frequently rescue and euthanize mammals entangled in fishing gear, many of which are caused by monofilament netting consistent with set gillnets. These mortalities represent additional mortalities not included in the NMFS estimates based purely on observer data. However, if fishermen are self-reporting all interactions with protected species as required by federal law, the self-reports should be consistent in number to the total estimated number of marine mammal takes based on federal observer data.

California set gillnets are fished in Southern California federal waters (3 – 200 nm) with exceptions (1-3 nm in state waters around the Channel Islands). Two gillnet mesh sizes are used including 6.5-inch mesh intended to target white seabass and 8.5-inch mesh to target California halibut. Many other species are retained and landed, and there are high relative rates of discards including bycatch of protected species. The NMFS observer program summary data combines both mesh sizes and presents the data as a single California set gillnet fishery targeting California halibut and white seabass.

Oceana compared self-reported annual marine mammal takes obtained through our FOIA request to total NMFS estimated annual marine mammal takes for the set gillnet fishery from 2005 to 2022 as published in the

[1] California Department of Fish and Wildlife, pers. comms. (2022). Fishing effort by California halibut landed (mt) for the California halibut set gillnet fishery.

federal Marine Mammal SARs.[2,3,4,5,6] The NMFS estimates based on observer data and specific to the set gillnet fishery are only available for California sea lion and harbor seal stocks beginning in 2005, and not for the other marine mammal species reported in the self-reports. SARs estimated take in the fishery are unavailable for the harbor seal stock past 2012, limiting the data available for comparison to 2005 – 2012. Estimates for the California sea lion are available from 2005 – 2016 (Table 2).

From 2005 – 2012, looking at only California sea lion and harbor seal reports for which we have comparable take estimates from the stock assessment reports, a total of 100 sea lion and seal takes were self-reported by fishery participants, averaging 12 mammals per year. Over this same period (2005 – 2012), NMFS estimates total marine mammal serious injury/mortality for California sea lions and harbor seals in the fishery to be 1,698, with an average of 212 marine mammal takes per year. This indicates that 6% of the estimated annual marine mammal interactions were self-reported by fishery participants during this period (Figure 3 & 4).

While the NMFS estimates for annual California sea lion and harbor seal take are not available in more recent years due in part to the absence of observer data, the number of self-reports per year remain extremely low, and indicate underreporting is likely still occurring. From 2002 to 2012 the number of self-reports averaged 13.6, whereas for years 2013 to 2022, an average of 4.6 mammals were reported each year. Underreporting of bycatch and protected species takes is a global issue occurring in many fisheries despite regulations requiring fishermen to report all marine mammal interactions.[7,8] For instance, Oceana conducted a similar analysis with comparable results in the California swordfish drift gillnet fishery.[9] In theory, bycatch reporting in mandatory fishing logbooks could be a cost-effective, scientifically valuable way to monitor protected species bycatch. However, results from this analysis and others show significant under-reporting and use of such data typically results in negatively biased estimates of bycatch rates, supporting that logbooks in their current form are not reliable for use in management.[10,11,12] This chronic underreporting of protected species underscores the importance of independent federal or state fisheries observers and electronic monitoring to ensure unbiased data is available for fishery managers, and that human impacts on marine mammals and other species are accurately quantified.

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[2] NMFS. California Sea Lion (U.S stock) Stock Assessment Report 2018. Table 1, pg. 3. https://media.fisheries.noaa.gov/dam-migration/po2014slca_508.pdf

[3] NMFS. California Sea Lion (U.S stock) Stock Assessment Report 2014. Table 1, pg. 3. https://media.fisheries.noaa.gov/dam-migration/po2014slca_508.pdf

[4] NMFS. California Sea Lion (U.S stock) Stock Assessment Report 2008. Table 1, pg. 4. https://media.fisheries.noaa.gov/dam-migration/po2011slca_508.pdf

[5] NMFS. Harbor Seal (California stock) Stock Assessment Report 2014. Table 1, pg. 10. https://media.fisheries.noaa.gov/dam-migration/po2014sehr-ca_508.pdf

[6] NMFS. Harbor Seal (California stock) Stock Assessment Report 2011. Table 1, pg. 12 . https://media.fisheries.noaa.gov/dam-migration/po2011sehr-ca_508.pdf

[7] Basran, Charla Jean, and Guðjón Már Sigurðsson. (2021) "Using Case Studies to Investigate Cetacean Bycatch/Interaction Under-Reporting in Countries With Reporting Legislation." *Frontiers in Marine Science* 8.. https://doi.org/10.3389/fmars.2021.779066.

[8] Mucientes, Gonzalo, Marisa Vedor, David W. Sims, and Nuno Queiroz. (2022) "Unreported Discards of Internationally Protected Pelagic Sharks in a Global Fishing Hotspot Are Potentially Large." *Biological Conservation* 269: 109534. https://doi.org/10.1016/j.biocon.2022.109534.

[9] Oceana,(2021). Underreporting of Marine Mammal and Sea Turtle Bycatch in the California Swordfish Drift Gillnet Fishery. https://usa.oceana.org/wp-content/uploads/sites/4/593/marine_mammal_bycatch_is_grossly_underreported.pdf

[10] Wade, Paul R., Kristy J. Long, Tessa B. Francis, André E. Punt, Philip S. Hammond, Dennis Heinemann, Jeffrey E. Moore, et al. (2021) "Best Practices for Assessing and Managing Bycatch of Marine Mammals." *Frontiers in Marine Science* 8.. https://www.frontiersin.org/articles/10.3389/fmars.2021.757330.

[11] Walsh, W. A., Kleiber, P., and McCracken, M. (2002). Comparison of logbook reports of incidental blue shark catch rates by Hawaii-based longline vessels to fishery observer data by application of a generalized additive model. Fish. Res. 58, 79–94. doi: 10.1016/S0165-7836(01)00361-7

[12] Emery, T. J., Noriega, R., Williams, A. J., and Larcombe, J. (2019). Changes in logbook reporting by commercial fishers following the implementation of electronic monitoring in Australian Commonwealth fisheries. Mar. Policy 104, 135–145. doi: 10.1016/j.marpol.2019.01.018

California fishery managers recently recommended increased observer coverage for the set gillnet fishery, given the fishery has not been observed since 2017. The California Department of Fish and Wildlife is currently in the process of scoping observer coverage, electronic monitoring, and new logbook requirements to fill such data gaps. For accurate estimates of species commonly taken in set nets, like California sea lions, 20 to 30% observer coverage may be adequate provided this coverage occurs every year and is free of sampling bias.[13] However, detecting and accurately estimating bycatch of rare interactions (such as sea turtles) likely requires nearly 100% observer coverage.[14] Accuracy of electronic monitoring technologies to correctly estimate bycatch has not been examined for California set gillnets, and this should be an area of future inquiry to determine its potential. In summary, this analysis suggests that self-reporting of protected species interactions and other bycatch species greatly underestimates actual bycatch, is not reliable, and highlights the need for increased observer coverage.

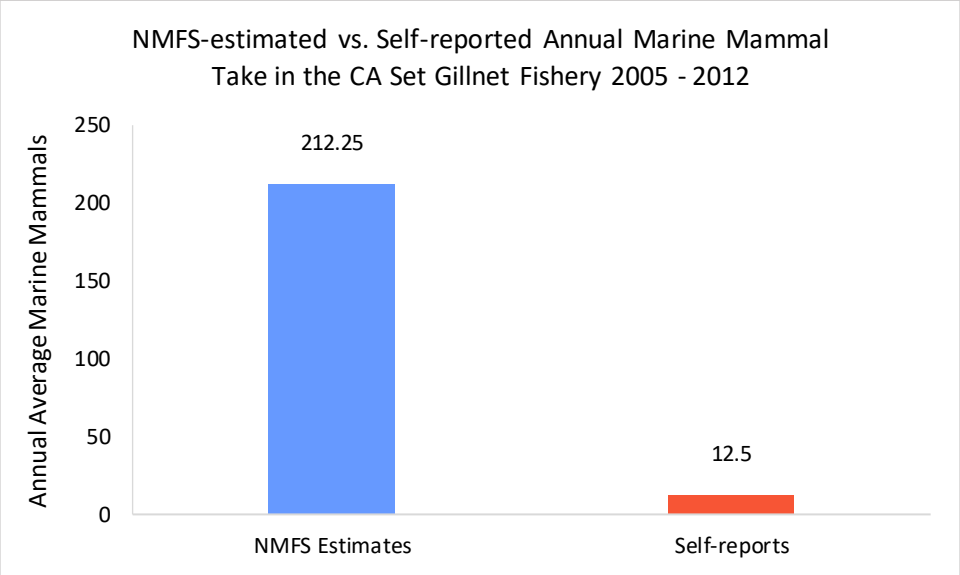


Figure 3. California set gillnet marine mammal take, 2005-2012, comparing the average annual self-reported bycatch to NMFS's estimated average annual take of California sea lions and harbor seals. NMFS estimates an average of 212 animals per year experience serious injury/mortality in this fishery. Over this same period, self-reported interactions averaged 12.5 per year. Source: Marine Mammal Stock Assessment Reports, (SARs) California Sea Lion and Harbor Seal Stock; NMFS FOIA Response 2023.

[13] National Marine Fisheries Service,(2011). U.S. National Bycatch Report [W. A. Karp, L. L. Desfosse, S. G. Brooke, Editors]. U.S. Dep. Commer., NOAA Tech. Memo. pg. 359. Available: https://repository.library.noaa.gov/view/noaa/31335

[14] Curtis, K. & Carretta, James. (2020). ObsCovgTools: Assessing observer coverage needed to document and estimate rare event bycatch. Fisheries Research. 225. 105493. 10.1016/j.fishres.2020.105493.

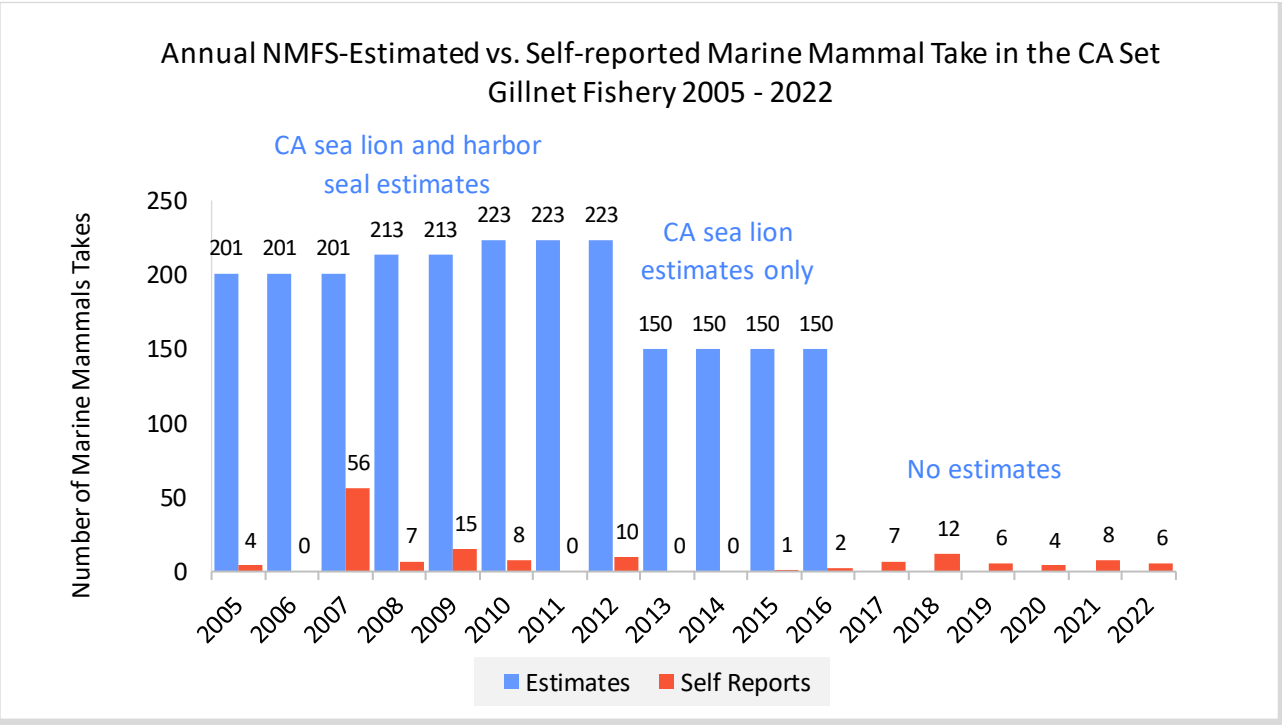


Figure 4. California set gillnet annual marine mammal take, 2005 – 2022, comparing self-reported annual marine mammal take to NMFS's annual estimated take for the California sea lion and harbor seal in the fishery. NMFS-estimated take for the harbor seal stock is available 2004 – 2012 for the set gillnet fishery. NMFS's California sea lion estimated take is available 2005 to 2016. From years 2017 to 2022 there are no NMFS' estimates of marine mammal take based on observer data. While recent NMFS estimates of marine mammal take in the fishery are unavailable, the trends in self-reported marine mammal interactions have remained low. Notably, 2007 is the first year of operation for the current observer program in the fishery (with the exception of 12 sets observed in 2006), and is the year that had the highest observer coverage (17.5%) during which a clear increase in self-reports is evident. Source: Marine Mammal Stock Assessment Reports, (SARs) California Sea Lion and Harbor Seal Stock; NMFS FOIA Response 2023.

	California sea lion		Harbor seal		Other Mammals
Year	SARs Estimates	Self-Reports	SARs Estimates	Self-Reports	Self- Reports
2005	190	3	11	1	
2006	190		11		
2007	190	52	11	4	
2008	190	6	23		1
2009	190	15	23		
2010	200	7	23	1	
2011	200		23		
2012	200	10	23		
2013	150		NA		
2014	150		NA		
2015	150		NA		1
2016	150	2	NA		
2017	NA	3	NA	3	1
2018	NA	6	NA	4	2
2019	NA	5	NA		1
2020	NA	3	NA		1
2021	NA	7	NA		1
2022	NA	6	NA		

Table 2. California set gillnet annual marine mammal take, 2005 – 2022, comparing self-reported annual marine mammal take to annual estimated take for the California sea lion and harbor seal. Estimated take for the harbor seal stock is available 2004 – 2012 for the set gillnet fishery. California sea lion estimated take is available 2005 to 2016. From 2017 to 2022 there are no estimates of marine mammal take based on observer data. Source: Marine Mammal Stock Assessment Reports, (SARs) California Sea Lion and Harbor Seal Stock; NMFS FOIA Response 2023.

Year	California sea lion	Harbor seal	Common dolphin	Pacific white-sided dolphin	Harbor porpoise	Northern Elephant seal	Gray whale	Total Annual Self-Reports
2002	9	5						14
2003	5							5
2004	22	9						31
2005	3	1						4
2006								0
2007	52	4						56
2008	6				1			7
2009	15							15
2010	7	1						8
2011								0
2012	10							10
2013								0
2014								0
2015							1	1
2016	2							2
2017	3	3	1					7
2018	6	4	1			1		12
2019	5			1				6
2020	3			1				4
2021	7			1				8
2022	6							6
Total	**161**	**27**	**2**	**3**	**1**	**1**	**1**	**196**

Table 3. Self-reported annual marine mammal take in the California set gillnet fishery by species, 2002- 2022. Source: NMFS FOIA Response 2023.

Year	Date	Species	Number of Interactions
2002	4/4/2002	California sea lion	1
2002	4/4/2002	Harbor seal	1
2002	4/29/2002	California sea lion	2
2002	4/29/2002	Harbor seal	1
2002	8/22/2002	California sea lion	1
2002	8/22/2002	Harbor seal	1
2002	8/23/2002	California sea lion	3
2002	8/23/2002	Harbor seal	2
2002	12/19/2002	California sea lion	2
2003	2/13/2003	California sea lion	3
2003	5/29/2003	California sea lion	2
2004	4/26/2004	California sea lion	2
2004	5/7/2004	Harbor seal	1
2004	5/7/2004	California sea lion	1
2004	5/8/2004	California sea lion	1
2004	5/8/2004	Harbor seal	1
2004	5/12/2004	Harbor seal	1
2004	5/12/2004	California sea lion	3
2004	5/13/2004	California sea lion	1
2004	5/13/2004	Harbor seal	1
2004	5/20/2004	California sea lion	3
2004	5/20/2004	Harbor seal	1
2004	5/22/2004	California sea lion	3
2004	5/22/2004	Harbor seal	1
2004	5/27/2004	Harbor seal	2
2004	5/27/2004	California sea lion	3
2004	6/22/2004	California sea lion	3
2004	6/22/2004	Harbor seal	1
2004	6/27/2004	California sea lion	1
2004	6/27/2004	California sea lion	1
2005	9/27/2005	California sea lion	2
2005	9/30/2005	California sea lion	1
2005	9/30/2005	Harbor seal	1
2007	1/24/2007	California sea lion	3
2007	1/24/2007	Harbor seal	1
2007	2/25/2007	California sea lion	3
2007	3/10/2007	California sea lion	24
2007	3/10/2007	California sea lion	18
2007	3/10/2007	California sea lion	1
2007	3/12/2007	California sea lion	1
2007	3/14/2007	Harbor seal	1
2007	3/16/2007	California sea lion	1
2007	4/11/2007	Harbor seal	1

2007	5/16/2007	California sea lion	1
2007	8/8/2007	Harbor seal	1
2008	3/30/2008	Harbor porpoise	1
2008	3/30/2008	California sea lion	1
2008	1/7/2008	California sea lion	5
2009	5/15/2009	California sea lion	1
2009	6/2/2009	California sea lion	2
2009	6/2/2009	California sea lion	1
2009	6/3/2009	California sea lion	2
2009	6/10/2009	California sea lion	1
2009	6/13/2009	California sea lion	3
2009	6/13/2009	California sea lion	1
2009	6/15/2009	California sea lion	1
2009	8/18/2009	California sea lion	3
2010	3/26/2010	California sea lion	1
2010	3/30/2010	California sea lion	2
2010	3/30/2010	Harbor seal	1
2010	4/7/2010	California sea lion	1
2010	4/8/2010	California sea lion	3
2012	2/2/2012	California sea lion	7
2012	2/10/2012	California sea lion	2
2012	10/4/2012	California sea lion	1
2015	7/30/2015	Gray whale	1
2016	4/27/2016	California sea lion	2
2017	4/21/2017	California sea lion	1
2017	4/21/2017	Harbor seal	1
2017	4/22/2017	Harbor seal	1
2017	5/4/2017	California sea lion	1
2017	5/4/2017	Common dolphin	1
2017	6/7/2017	California sea lion	1
2017	6/7/2017	Harbor seal	1
2018	3/8/2018	Common dolphin	1
2018	3/20/2018	Harbor seal	1
2018	4/8/2018	California sea lion	1
2018	5/1/2018	California sea lion	2
2018	5/1/2018	Harbor seal	1
2018	5/2/2018	California sea lion	1
2018	5/2/2018	Northern elephant seal	1
2018	5/2/2018	Harbor seal	1
2018	5/3/2018	Harbor seal	1
2018	5/3/2018	California sea lion	1
2018	12/8/2018	California sea lion	1
2019	5/23/2019	California sea lion	5
2019	6/16/2019	Pacific white-sided dolphin	1
2020	4/14/2020	California sea lion	2

2020	4/14/2020	Pacific white-sided dolphin	1
2020	5/21/2020	California sea lion	1
2021	2/19/2021	California sea lion	2
2021	6/1/2021	California sea lion	2
2021	6/1/2021	Pacific white-sided dolphin	1
2021	6/30/2021	California sea lion	3
2022	5/24/2022	California sea lion	6
Total	**2002 – 2022**	**7 species**	**196**

Table 4. Self-reported marine mammal take in the California set gillnet fishery by date, species, and number of animals involved in each interaction. Source: NMFS FOIA Response 2023.

COMMITTEE STAFF SUMMARY FOR NOVEMBER 17, 2022 MRC
For background purposes only

4. RED ABALONE FISHERY MANAGEMENT PLAN

Today's Item **Information ☐** **Action ☒**

Receive Department update on 2022 abalone survey results, harvest control rule development, and *de minimis* fishery concepts, and develop potential committee recommendation.

Summary of Previous/Future Actions

- FGC supported development of recreational red abalone fishery management plan (FMP) — Oct 8, 2014; Mt. Shasta
- FGC received peer review results for draft FMP and re-referred to MRC — Oct 17, 2018; Fresno
- FGC supported revised process per MRC recommendation — Dec 12-13, 2018; Oceanside
- MRC received administrative team report recommendations — Mar 17 and Apr 29, 2020; MRC, Webinar/Teleconference
- MRC recommended FGC support DFW to develop a draft FMP with administrative team report options — Jul 29, 2020; MRC, Webinar/Teleconference
- FGC approved MRC recommendation — Aug 19-20, 2020; Webinar/Teleconference
- MRC received DFW updates on FMP progress — Jul 16, Nov 21, and Nov 17, 2020; MRC, Webinar/Teleconference
- MRC received draft management chapter for FMP — Mar 24, 2022; MRC, Webinar/Teleconference
- MRC discussed draft management strategy and provided input to DFW — Jul 14, 2022; MRC, Santa Rosa
- **Today receive DFW update and potential MRC recommendation** — **Nov 17, 2022; MRC, San Diego**

Background

An FMP for the north coast recreational red abalone fishery has been under development by DFW since 2014; DFW has provided regular progress updates to MRC.

Key milestones relevant to today's discussion are detailed in background materials from the Jul 2022 MRC meeting (Exhibit 1). In brief, recent milestones have culminated in:

- FGC endorsement of MRC recommendation for DFW to develop a draft FMP, using both spawning potential ratio (SPR) and density metrics in a harvest control rule (Aug 2020)
- DFW developing a draft FMP and giving general updates to MRC (late 2020-early 2022)
- DFW presenting a draft FMP management chapter to MRC and the public (Mar 2022). The chapter introduced:

  - New “climate-ready” environmental and abalone indicators for fishery opening;
  - a new harvest control rule approach called an “egg production-based indicator model” that merges the SPR and density data streams into a single model rather than separate metrics; and
  - rationale for developing a hybrid model rather than separate data streams.
- MRC requests and DFW commitments (Mar 2022, Jul 2022):
  - Increase transparency and communication with key partners and the Recreational Abalone Advisory Committee (RAAC);
  - prepare a more in-depth and clear explanation of how DFW staff arrived at the current proposed management strategy;
  - discuss the proposed new management strategy and partner concerns in more depth;
  - seek to find common ground with partners among competing management strategies and find a workable management strategy solution;
  - provide more information about scale of a *de minimis*, or limited, fishery relative to a rebuilding stock size; and
  - perform summer field surveys to assess abalone stock status and provide updated data.

Update

Consistent with its commitments made in Jul 2022, DFW completed the summer abalone field surveys; conducted stakeholder outreach for more thorough discussion of management strategies; and prepared an in-depth report of rationale for its management strategy recommendation. In the report (Exhibit 2), DFW further expounds on its recommendation to use the density and egg production model by detailing:

- Background on the management approaches analyzed (i.e., density, SPR , and egg production);
- the management strategy evaluation it conducted; and
- the assessment of indicators (i.e., SPR and density performance for simulated red abalone data, and egg production performance).

For today’s meeting, DFW will present 2022 survey results, management strategy details, an analysis of abalone stock indicators (i.e., trade-offs of using density, SPR, density and SPR, or egg production), and future fishing opportunity considerations (Exhibit 4). The presentation will support discussion and a potential MRC recommendation related to a potential path forward with harvest control rule development, *de minimis* fishery concepts, surveys, or other next steps.

Significant Public Comments

An abalone historian makes a case for redirecting focus from harvest control rule development to helping abalone recover given the “perilous current condition of red abalone” and provides historic and current context to support the request. The commenter urges FGC and DFW to

shift focus to red abalone recovery efforts, such as developing new strategies to address the key threats that have emerged since the time of the Abalone Recovery and Management Plan (Exhibit 4).

Recommendation

FGC staff: Provide guidance regarding project focus on abalone surveys, harvest control rule selection or further development, and *de minimis* fishery development as recommended by DFW. (2) Discuss whether DFW should place emphasis on developing a recovering plan (currently in preparation for FMP).

DFW*:* Provide guidance regarding additional abalone surveys, harvest control rule selection or further development, and *de minimis* fishery development.

Exhibits

1. Background document: Staff summary and exhibits from Jul 14, 2022 MRC meeting
2. DFW report: *Analysis of red abalone stock indicators*, Marine Region, dated Oct 2022
3. DFW presentation
4. Email from Ann Vileisis, dated Nov 4, 2022

Committee Direction/Recommendation

The Marine Resources Committee recommends that the Commission support DFW focusing on the following areas of red abalone fishery management plan development and/or recovery planning: _____ .

Overview of Proposed Process to Develop a Statewide Red Abalone Recovery Plan

California Department of Fish and Wildlife

Marine Resources Committee Meeting
of the California Fish and Game Commission
July 20, 2023

Overview: The California Department of Fish and Wildlife (CDFW) has developed a proposed process to create a statewide recovery plan for red abalone (*Haliotis rufescens).* The Red Abalone Recovery Plan (RARP) will use a science-based approach to support recovery of the population to sustainable harvestable levels. The RARP will facilitate a robust, adaptive, climate-ready approach to improve the red abalone population in the face of changing ocean conditions.

Process: To develop the RARP, CDFW staff proposes a process which includes engaging with tribal interests, establishing technical and stakeholder teams, and collaborating with agency partners (e.g., Fish and Game Commission, National Marine Fisheries Service, Ocean Protection Council, etc.) to solicit input on technical and policy guidance throughout recovery plan development.. CDFW will lead the engagement process by:

A) Work with California Native American Tribes to develop pathways and opportunities to **promote Tribal engagement** throughout the RARP development process. Pathways and opportunities will be explored and identified initially through solicitation for feedback by reaching out to California Tribes and Tribal Communities. Tribal engagement may include early consultation, listening sessions, opportunities to provide input on draft documents. Regular updates on the development process will be provided at the Fish and Game Commission's Tribal Committee meetings.

B) Assembling a **Technical Team** consisting of abalone restoration experts from a broad array of disciplines and geographic areas, tasked with providing scientific and technical guidance on all aspects of the RARP.

C) Assembling a **Stakeholder Team** to solicit stakeholder perspectives on the development of the RARP. The Stakeholder Team will include recreational and commercial fishing representatives, conservation interests, and other interested individuals with expertise in abalone recovery. Members of the Stakeholder Team will be selected through a solicitation process.

Timeline: CDFW proposes the following RARP development timeline:

- 2023: Solicit nominations for tribal, technical and stakeholder groups
- 2024-26: Conduct tribal, scientific and stakeholder engagement
- 2024: Begin drafting RARP
- 2026: Finalize RARP, public review, submission to Fish and Game Commission
- 2027: Recovery plan implementation

Agenda Item 3: Red Abalone Recovery Plan Update

16 November 2023

Presented to:

Marine Resources Committee

CA Fish and Game Commission

Presented by:

Joanna Grebel

Invertebrate Program Manager
Marine Region

Overview

- 2023 Field Work
- Red Abalone Recovery Plan
- Red Abalone Monitoring Strategy
- Next Steps

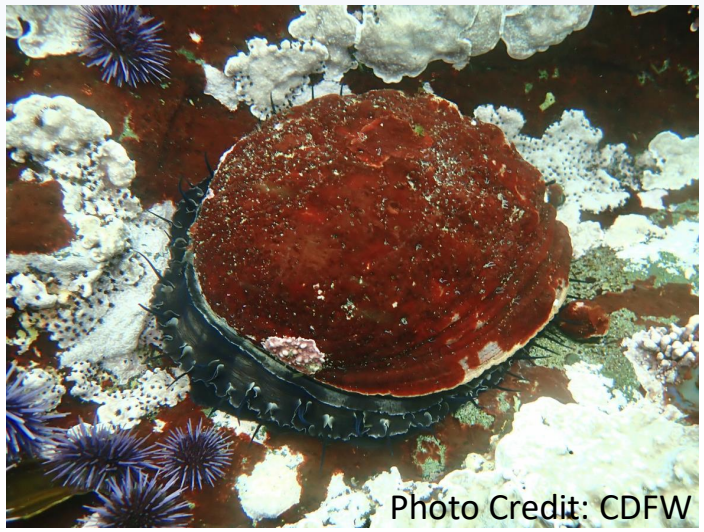
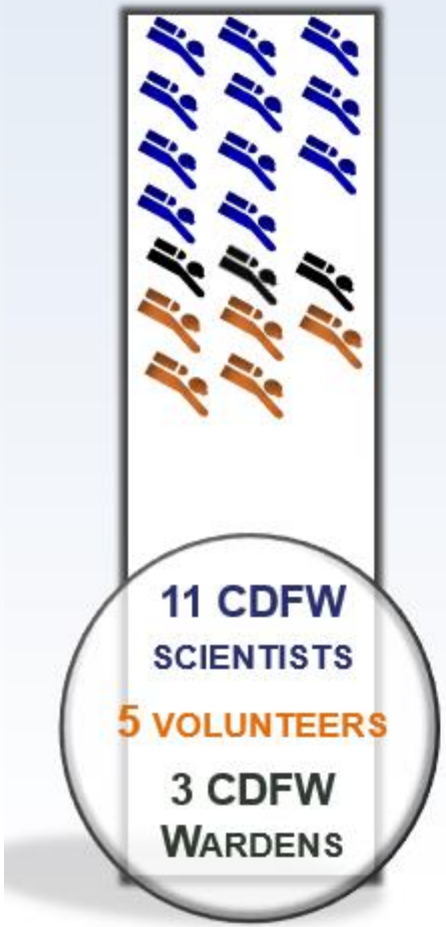


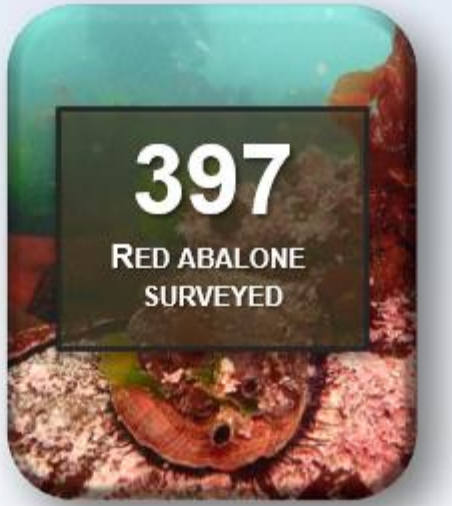
Photo Credit: CDFW


Photo Credit: CDFW

2023 Field Work

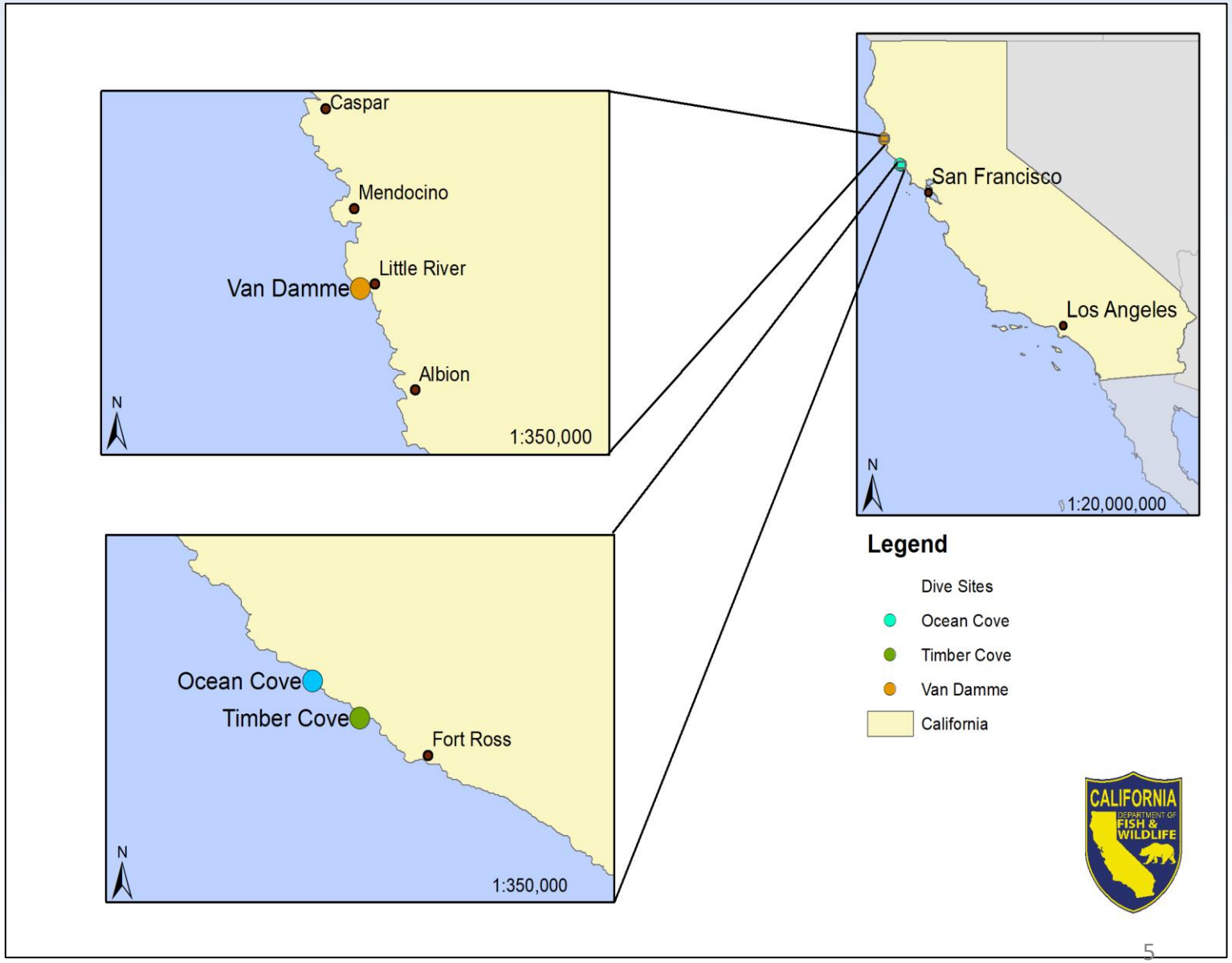
2023 Survey Statistics





Survey Sites

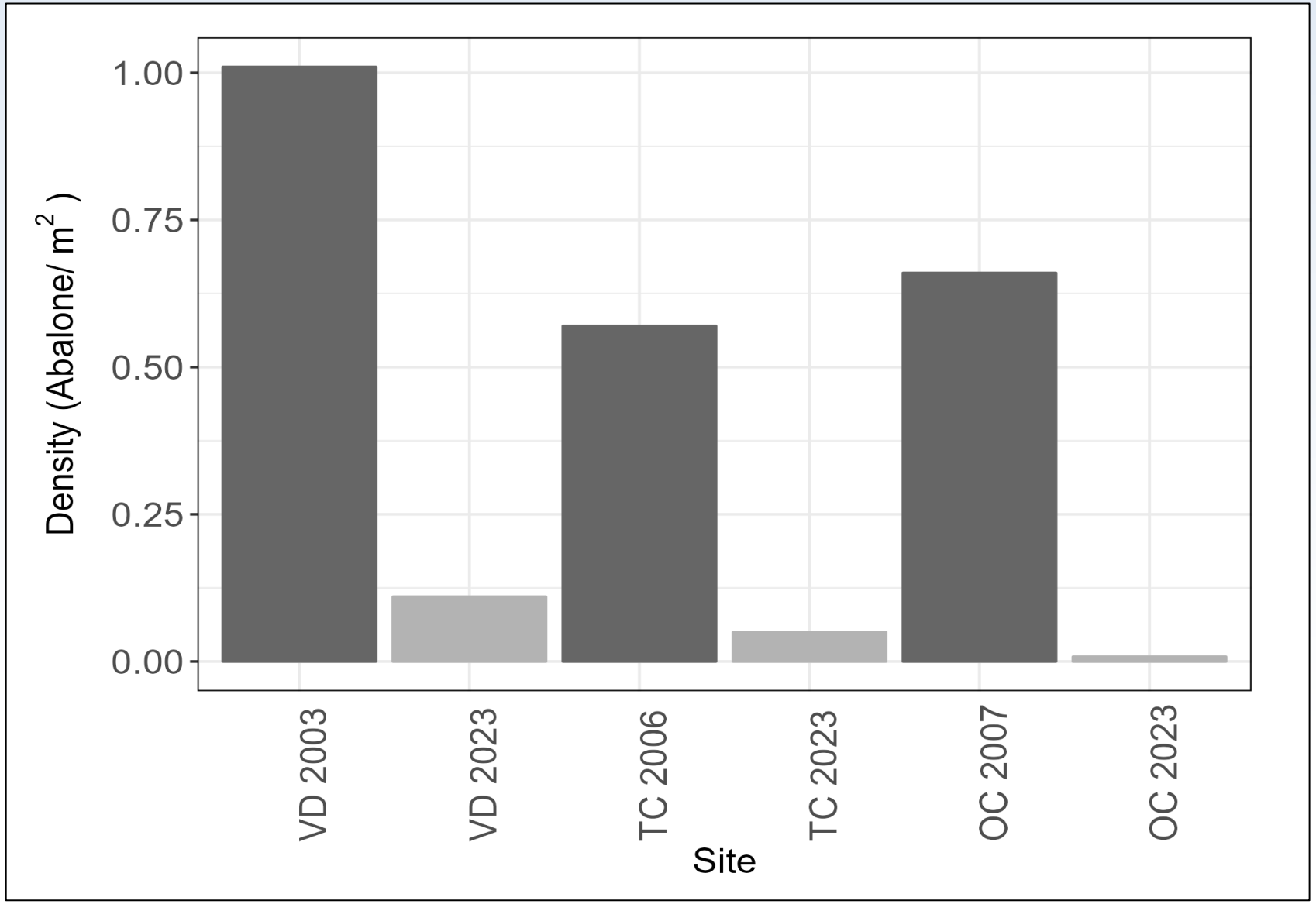
- Mendocino County
  - Van Damme
- Sonoma County
  - Ocean Cove
  - Timber Cove



2023 Survey Data

Site	Transects	Area Surveyed (m^2)	Red Abalone Observed	Density (ab/m^2)	2018 Density
Ocean Cove (Sonoma)	16	360	12	0.01	0.08
Timber Cove (Sonoma)	12	720	29	0.05	0.09
Van Damme (Mendocino)	48	2,880	356	0.11	0.16

2023 Density Compared to Historical

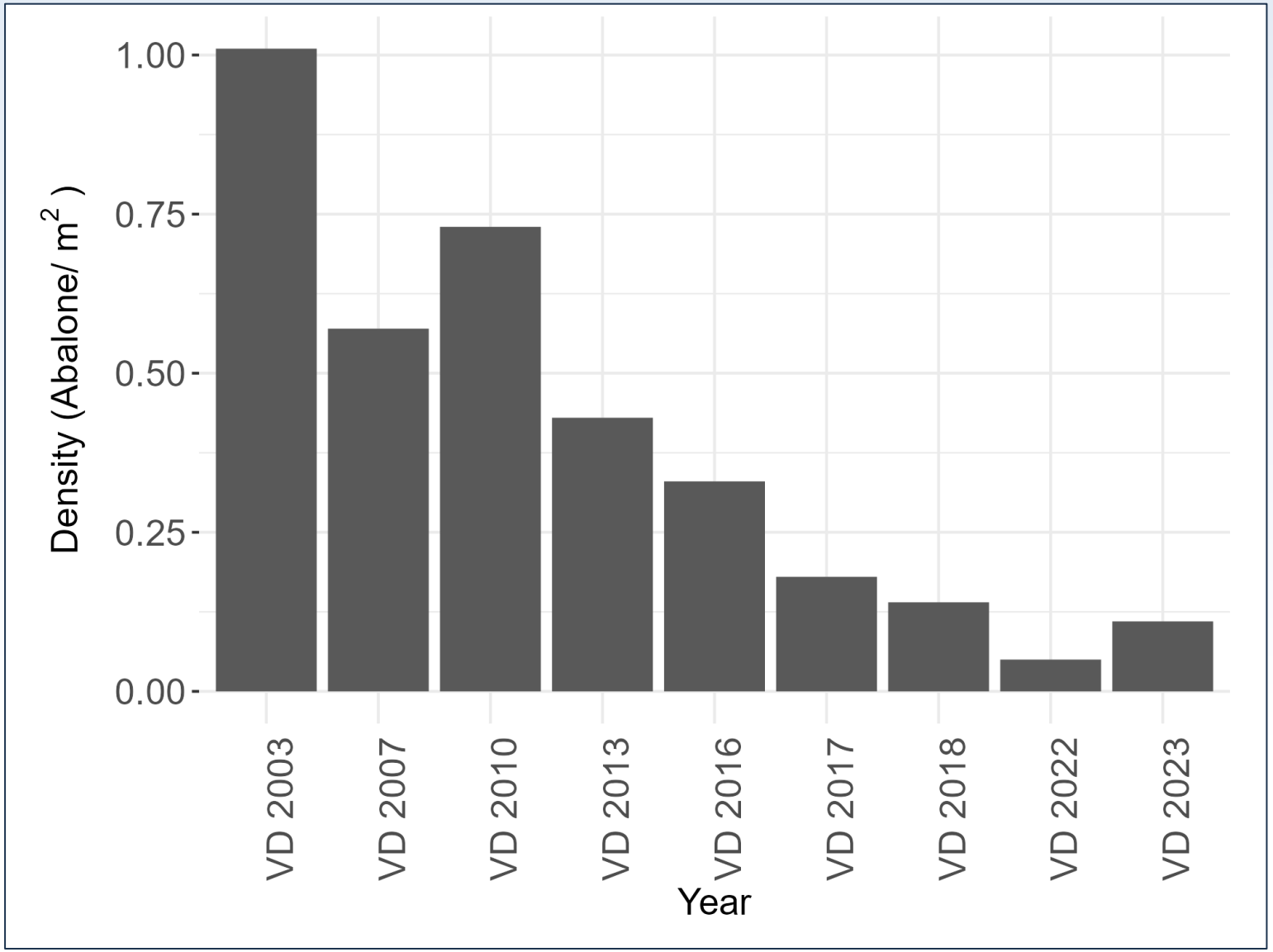


VD= Van Damme

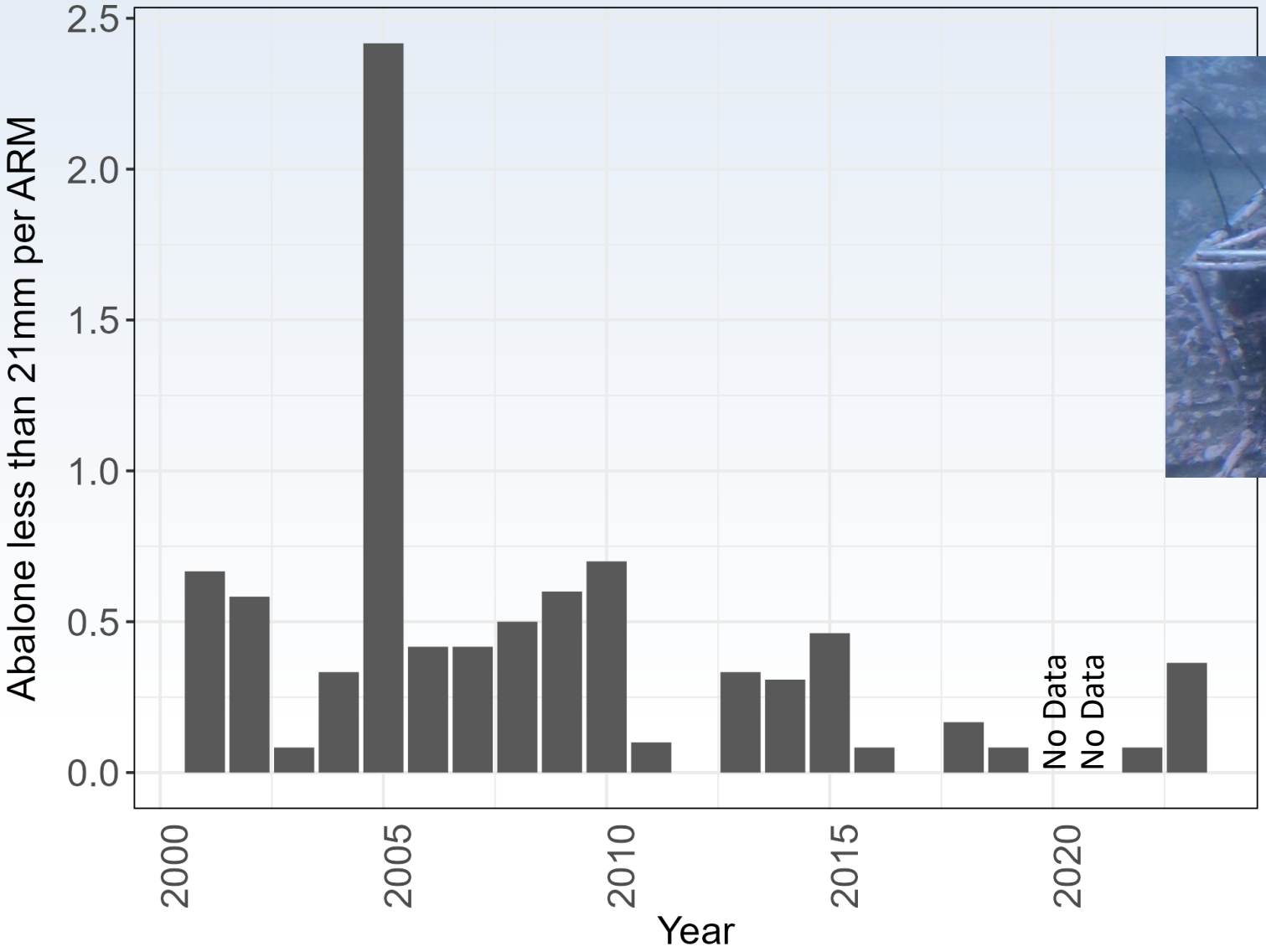
TC= Timber Cove

OC= Ocean Cove

Van Damme Density



Van Damme Recruitment



Pycnopodia Sighting


Photo Credit: CDFW


Photo Credit: CDFW

Future Surveys

- Current surveys are time intensive and expensive
  - Duration: 2 years
  - Approximate cost: $40-50K/yr
- Intensive monitoring not needed until stock status improves
- Need to explore different monitoring methods

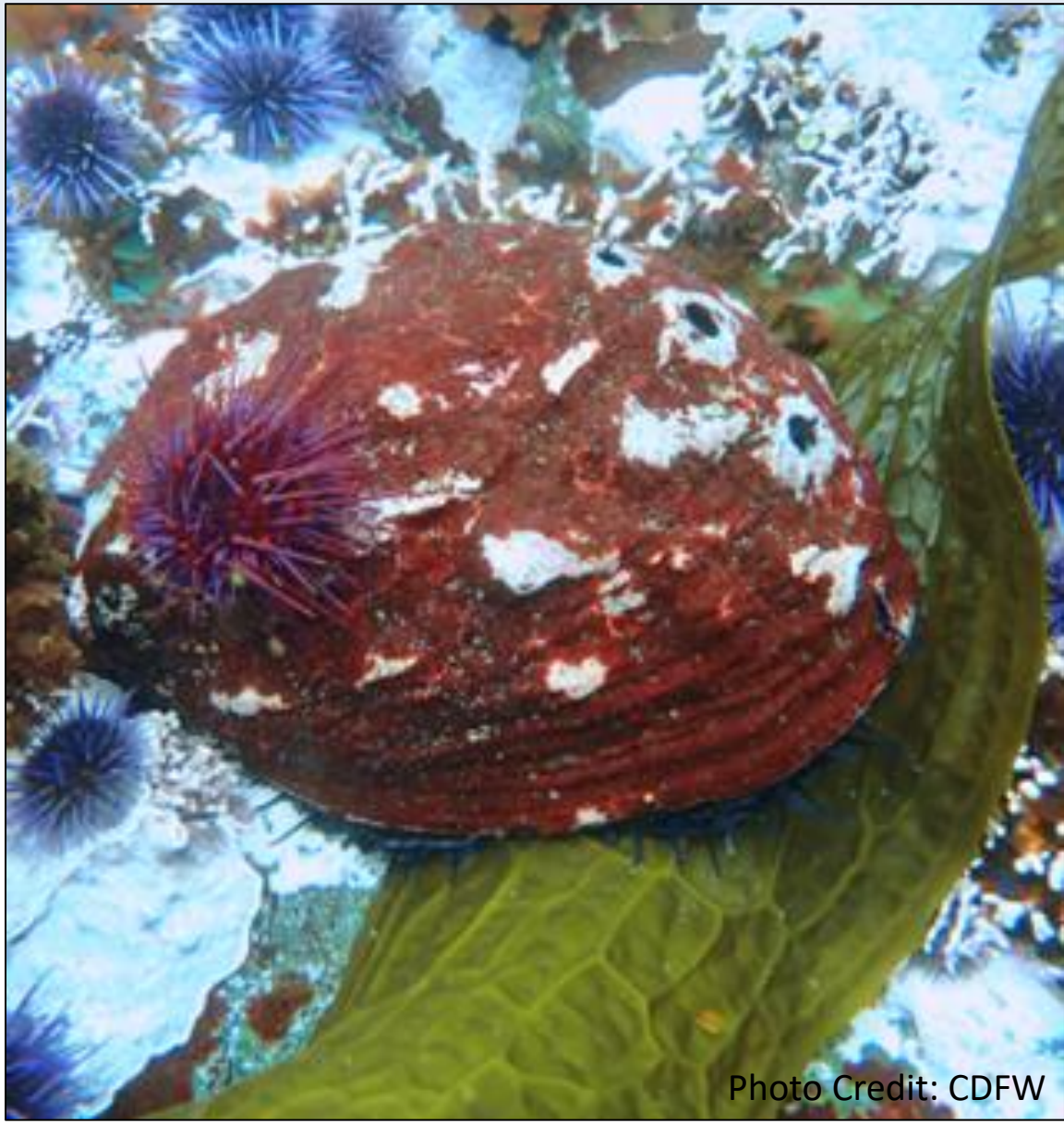


Photo Credit: CDFW

Red Abalone Recovery Plan

Need for a Red Abalone Recovery Plan

- Abalone Recovery and Monitoring Plan (2005) includes a recovery plan framework
- However, the ARMP is:
  - Limited in geographic scope
  - Focused on fishing related impacts
  - Does not address current threats to stock

Plan Development

- Develop a robust, adaptive, climate ready approach to improve the red abalone population in the face of changing ocean conditions
- Opportunity to incorporate new information and ideas
- Develop in partnership with Tribes, community stakeholders, and technical experts

Monitoring Strategy

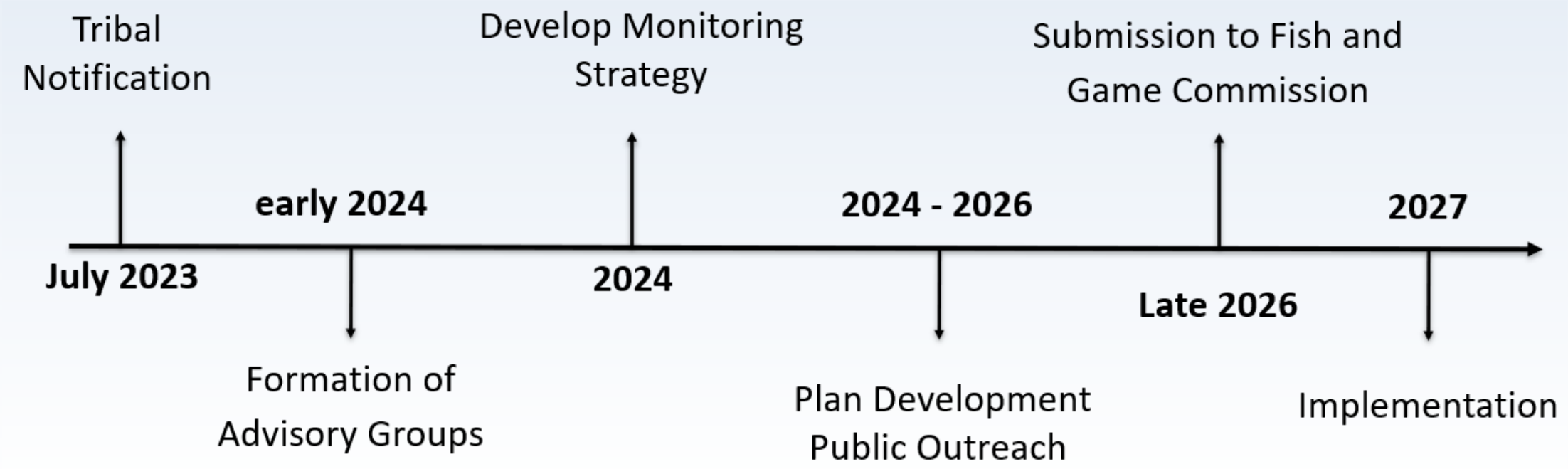
- Develop efficient, collaborative approach:
  - Citizen science
  - Explore new methodologies
- Adaptable to different stock conditions

Photo Credit: CDFW

Phases for Monitoring

Phase 1	Collapsed population	
Phase 2	Recovering Population	
Phase 3	Approaching Recovery	

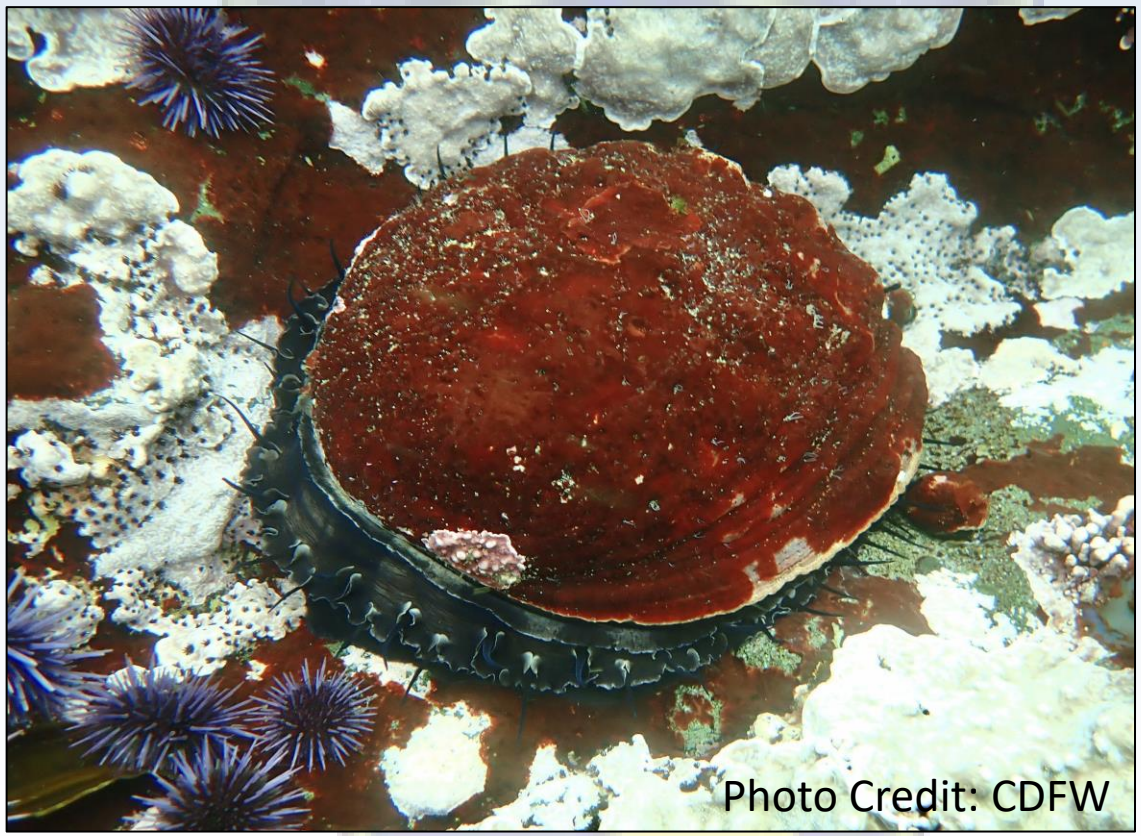
Proposed Process Timeline



Summary & Next Steps

- Develop nomination process to establish technical and stakeholder teams
- Solicit nominations in early 2024
- Prioritize development of a monitoring plan and monitoring approach
  - Incorporate new survey methodologies and data sources
  - Utilize citizen science and other partnerships

Thank You



Questions: Abalone@wildlife.ca.gov

Status of Research and Monitoring, Restoration Efforts, and Developing Management Strategies for Kelp Canopy Forming Species in California

(Photo Credit: CDFW)

California Department of Fish and Wildlife, Marine Region and

California Ocean Protection Council

November 2023

Citation: California Department of Fish and Wildlife (CDFW) and California Ocean Protection Council (OPC). 2023. Status of Research and Monitoring, Restoration Efforts, and Developing Management Strategies for Kelp Canopy Forming Species in California.

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LIST OF ACRONYMS

CCR	California Code of Regulations
CSUMB	California State University Monterey Bay
CWG	Community Working Group
EBM	Ecosystem Based Management
ESR	Enhanced Status Report
FGC	Fish and Game Commission
FMP	Fishery Management Plan
F/V	Fishing Vessel
GFA	Greater Farallones Association
GFNMS	Greater Farallones National Marine Sanctuary
KRMP	Kelp Restoration and Management Plan
LTER	Long Term Ecological Research
MHW	Marine Heat Wave
MLML	Moss Landing Marine Laboratories
MPA	Marine Protected Area
NGO	Non-Government Organization
QAQC	Quality Assurance Quality Control
OPC	Ocean Protection Council
NOAA	National Oceanic and Atmospheric Administration
PISCO	Partnership for Interdisciplinary Studies of Coastal Oceans
SAC	Scientific Advisory Committee
SSU	Sonoma State University

SSWD	Sea Star Wasting Disease
TNC	The Nature Conservancy
UC	University of California

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1. BACKGROUND

Two canopy forming kelp species, bull kelp (*Nereocystis luetkeana*) and giant kelp (*Macrocystis pyrifera),* occur in California and are regionally divided across the state. Bull kelp dominates the cooler waters of northern California, while giant kelp dominates southern California's nearshore waters. Central California provides a unique transitional environment where both species comprise a kelp forest ecosystem. In recent years, California has experienced climate-driven kelp declines along its coastline, with some regions and localized areas exhibiting severe and persistent loss that has led to significant negative impacts to biodiversity, coastal communities, and culturally and economically important fisheries.

Bull kelp forests in northern California, specifically in Sonoma and Mendocino counties, have been severely impacted by the North Pacific Marine Heat Wave (MHW) that emerged in 2014 and compounded with a strong El Niño in 2015, and an unprecedented increase in sea surface temperatures through 2016. Subsequent synergistic environmental stressors, including the loss of the predatory sunflower sea stars (*Pycnopodia helianthoides*) due to Sea Star Wasting Disease (SSWD) (Harvell et al. 2019) and increased densities of purple urchin (*Strongylocentrotus purpuratus*) of up to 60 times historical abundances (Rogers-Bennett and Catton, 2019), have led to a regime shift from kelp forest-dominated to urchin barrens over approximately 100 miles of the northern California coastline. For example, over 90% loss of observed bull kelp canopy has been documented in Sonoma and Mendocino counties, with little signs of recovery since 2014, which has had significant negative impacts to northern California's nearshore ecosystems resulting in the collapse of the commercial red urchin *(Mesocentrotus franciscanus*) fishery due to urchin starvation and lack of quality roe product forcing declaration for federal disaster regarding the fishery in 2015 and the closure of the iconic recreational red abalone (*Haliotis rufescens*) fishery in 2018 following extensive population declines.

In contrast to the region-wide devastation observed on the north coast, patterns in kelp canopy on California's central coast (San Francisco Bay to Point Conception) and south coast (Point Conception to U.S./Mexico border) are more complex. At the local scale in both of these regions, there are kelp beds exhibiting both long-term increases and decreases in kelp canopy. Kelp cover along the central coast region of the state has remained relatively stable, though localized areas along the Monterey Bay Peninsula have experienced significant declines since the 2014-16 MHW. While giant kelp and bull kelp co-occur in the central coast region, the Monterey Bay Peninsula has been predominantly composed of giant kelp. The giant kelp-dominated south coast region has also experienced declines since 2014, though not to the degree of loss observed on the north coast. The specific areas of concern

include Orange County, San Diego County, and San Miguel Island in the northern Channel Islands.

In an effort to address the catastrophic loss of kelp in key regions across the state, and to adaptively manage these vital marine ecosystems, the California Department of Fish and Wildlife (Department) and the California Ocean Protection Council (OPC) have prioritized the development of a Kelp Restoration and Management Plan (KRMP). The goal of the KRMP is to develop a robust, adaptive, climate-ready approach to managing, protecting, and restoring giant and bull kelp forest ecosystems statewide for consideration and adoption by the California Fish and Game Commission (FGC).

The state has also invested in the protection and restoration of kelp forest ecosystems, and the communities they support through grant funding opportunities aimed to fill critical knowledge gaps to advance the understanding of kelp restoration and research. As anthropogenic climate change is predicted to increase disturbances such as MHWs, and exacerbate stochastic events like El Niño Southern Oscillation, these research efforts provide a frontline defense for the protection and proliferation of these vital marine ecosystems and the associated fisheries they support.

This update consists of KRMP development, an overview of bull kelp and giant kelp status and monitoring data, and research projects across the state exploring kelp restoration techniques.

2. KELP RESTORATION AND MANAGEMENT PLAN DEVELOPMENT

2.1. Kelp Recovery and Management Plan Development Process

The Department, in partnership with OPC, is developing a statewide, ecosystem-based, adaptive KRMP for giant kelp and bull kelp. The Department and OPC are using a multi-pronged approach, consisting of a Community Working Group, Science Advisory Committee, and Tribal Engagement to ensure the development of the KRMP is informed by the best available science and community perspectives across the state of California. The KRMP will include a cohesive kelp management strategy which consists of three core components: 1) a harvest management framework and other Fishery Management Plan (FMP) elements required by the Marine Life Management Act (MLMA); 2) an innovative framework for ecosystem-based management (EBM) of kelp forests; and 3) a Restoration Toolkit. The integration of EBM approaches and a Restoration Toolkit into the traditional FMP framework will facilitate a robust, adaptive, climate-ready approach to managing the State's kelp forest ecosystems in the face of changing ocean conditions. The KRMP development process is anticipated to occur over the course of three to five years. The KRMP will also reference and build off several guidance documents that have been developed for kelp recovery throughout the state including the Sonoma-Mendocino Bull Kelp Recovery Plan (2019), OPC Interim Kelp Action Plan (2021), and the Department's Giant Kelp and Bull Kelp Enhanced Status Report (2021).

The **Community Working Group (CWG)** is an informal advisory body composed of California Native American tribes, stakeholders, and interested members of the public established to help inform the design and development of the KRMP. The goals of the CWG are to advise on and inform the development of the core components of the KRMP. CWG members are tasked with sharing information about the KRMP development with their broader community networks, as well as gathering and sharing their communities' perspectives, interests, and feedback.

The **Science Advisory Committee (SAC)** is an independent body tasked with providing scientific expertise on all aspects of the KRMP to ensure the best available and most current science is directly integrated into the KRMP. The SAC is composed of experts in natural and social sciences, economics, and local and traditional knowledge, spanning a broad scope of disciplines and geographic areas.

Pathways for **Tribal Engagement** throughout the development of the KRMP include Tribal Roundtable Listening Sessions, government-to-government consultation, representation on the CWG and SAC. Additional pathways for engagement may be identified as the KRMP development process unfolds. A top priority for the State of

California is to provide California Native American tribes the opportunity to inform the design and development of the KRMP's process and outcomes, including co-management pathways, if this is identified as a priority by California Native American tribes.

2.2. Kelp Recovery and Management Plan Timeline

The KRMP development process is anticipated to occur over the course of three to five years. The early stages of KRMP planning began in 2022 and in 2023, the Department and OPC staff assembled the SAC and the CWG.

2022

- Fish and Game Commission Marine Resources Committee update (March)
- Notification of interested parties and stakeholders (ongoing)
- Funding secured to support development of KRMP (October)
- FGC Tribal Committee update (August)
- Project Management Team contracted to support development of the KRMP (December)

2023

- Fish and Game Commission Marine Resources Committee update (March)
- Solicitation and establishment of CWG (ongoing)
- Tribal notification (May) and consultation (ongoing)
- Tribal Roundtable Listening Sessions (June)
- CWG meeting (July)
- Establishment of SAC (ongoing)
- SAC meeting (September)

2.2.1. Community Working Group

To facilitate and bolster community and stakeholder engagement throughout the development of the KMRP, OPC has contracted Strategic Earth LLC. to work with OPC and the Department to coordinate and administer the CWG. The CWG, was

established in 2023 and is composed of 24 individual members spanning California's coast and representing non-governmental organizations (NGOs), local businesses, commercial harvesters, and tribal governments. The CWG is expected to hold eight virtual meetings and two 1.5 day hybrid meetings throughout the initial development of the KMRP (2023-2025).

2.2.2. Science Advisory Committee

In collaboration with the Department and OPC, California Sea Grant (CASG) is tasked with convening, administering, and facilitating the KRMP SAC. Composed of 11 professional scientists with representation from academia, agency, non-profit, and tribal governments, the SAC will provide expertise and perspectives for the KRMP's science needs assessment. The SAC is expected to meet quarterly for the initial development of the KRMP (2023-2025) virtually (three meetings per year) and in-person (two half day meetings per year). The SAC convened for the first time in Fall 2023 for a virtual orientation session and will meet again in December 2023 for a two-day in-person workshop.

2.2.3. Tribal Engagement

In June 2023, the Department and OPC, in collaboration with Strategic Earth LLC., held two virtual Tribal Roundtable Listening Sessions that were open to elected officials and representatives of California's native tribes. The purpose of these sessions was to solicit early feedback from tribal governments regarding their priorities for protecting, conserving, restoring, and managing kelp forest ecosystems, as well as pathways for effective and meaningful engagement with tribal governments. Representatives from several California tribal nations also sit on the CWG and SAC.

3. OVERVIEW OF GIANT AND BULL KELP STATUS

3.1. Monitoring of the Resource

Kelp is very dynamic and variable by nature therefore the availability of long-term data is fundamental for monitoring the resource and identifying trends and patterns of concern. The Department uses several monitoring sources to assess and inform kelp status throughout the state, these include data from remote sensing imagery, subtidal surveys, and the commercial kelp fishery.

3.1.1. Kelp Canopy Fishery-Independent Monitoring Data

Emerging technologies have provided additional sources of kelp canopy data at greater temporal and finer spatial scales, that the Department, OPC, and others use to understand and assess kelp canopy dynamics.

Landsat is a remote sensing satellite imagery tool that provides kelp canopy data at 30-meter resolution, dating back to 1984. These data provide the longest continuous time series of kelp canopy information statewide, are publicly available, sourced from the Santa Barbara Coastal Long-Term Ecological Research (SBCLTER) data portal, and can also be viewed on KelpWatch through an interactive mapping tool. The Department currently uses Landsat canopy data to assess broad region (Figure 1) and county (Appendix 1) spatial scales throughout the state.

OPC recently invested in a partnership among the Department and researchers at University of California Los Angeles to advance kelp canopy mapping techniques with PlanetScope imagery, including automation of image processing and production of high-resolution statewide kelp canopy maps (3-meter resolution). This will provide the State with the ability to analyze trends and variability in kelp canopy dynamics, with elevated focus on areas of special concern (e.g., the Mendocino and Sonoma Coasts). Project partners will use PlanetScope classification to document spatial patterns of recovery and identify potential drivers of resilience, including factors such as habitat quality, marine protected area (MPA) protection status, sea temperature, and nutrients, urchin dynamics, and kelp dispersal. This will allow for the characterization of the connectivity between refugia (i.e., areas where kelp canopy persisted from 2014-2020) and unoccupied habitat, with close examination of the relationship between connectivity and probability of recovery.

Kelp canopy data sourcing to date				
Survey Type		Primary Data Source	Spatial Resolution	Timeframe
	Piloted Aerial Survey	CDFW	2-meter	1989; 1999-2016
	Satellite Remote Sensing	PlanetScope	3-meter	2016-present
		*Landsat	30-meter	1984-present
	Unoccupied Aerial Systems (drones)	Variable	centimeters	Sporadic; Project-specific

Table 1: Spatial and temporal resolution of different remote sensing tools used to assess kelp canopy data. Highlighted row indicates the primary data source the Department is using to assess kelp canopy on relatively broad spatial scales. *Santa Barbara Coastal Long-term Ecological Research.

3.1.1.1. Regional Trends (North to South)

This report provides updates for canopy data through the end of 2022. The current timeline for quality assurance and quality control (QAQC) and processing remote sensing and satellite imagery data offsets the ability to report and update figures by approximately one to three quarters each year.

The north coast (Oregon-California border to San Francisco Bay) regional data (Figure 1; top panel) shows severe and persistent declines in kelp canopy following the 2014 MHW and associated cascading events. Sonoma and Mendocino County show the most severe declines (Appendix 1), with more than 95% and 90% loss in average kelp canopy cover in Sonoma and Mendocino counties respectively, since the 2014 MHW (Figure 2).

The central coast (San Francisco Bay to Point Conception) regional data (Figure 1; middle panel) shows trends within the normal variability of historical canopy cover. Looking at the county spatial scale, Monterey County also shows some indication of decline post-MHW, though trends look to be within normal range of historical coverage (Figure 2; Appendix 1). This pattern is largely driven by declines along the Monterey Peninsula. It is important to note that much of the coastline that makes up Monterey County is encompassed by Big Sur, which has maintained strong canopy cover through the post-MHW time period. Other areas in the central coast region,

such as San Mateo and Santa Cruz counties have increased kelp canopy cover since the 2014 MHW (Figure 2; Appendix 1).

The south coast (Point Conception to USA-Mexico border including the Channel Islands) shows some regional declines since the 2014 MHW. San Diego and Orange counties have both shown kelp canopy declines post-MHW (Appendix 1). However, kelp canopy cover in Santa Barbara County (Appendix 1) has exhibited some increases since the 2014 MHW (Figure 2). The Channel Islands have also experienced losses in kelp canopy since 2014 (Figure 2) with the most significant declines at San Miguel Island and Santa Rosa Islands (Appendix 1).

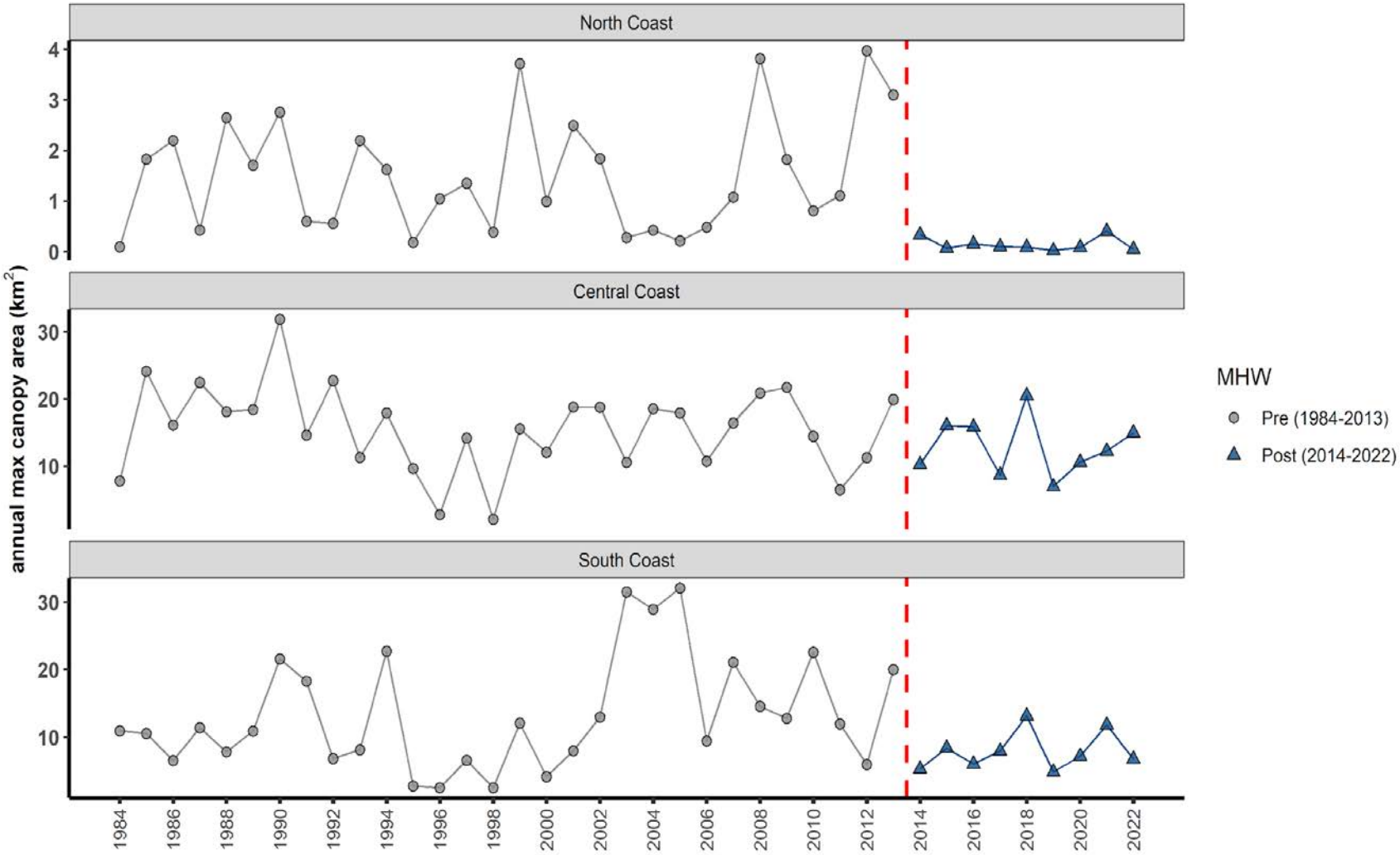

Figure 1. Landsat derived regional canopy data from 1984 through the end of 2022 (Q4). The red dashed line indicates the onset of the MHW in 2014. Data Source: SBCLTER et al. 2022.

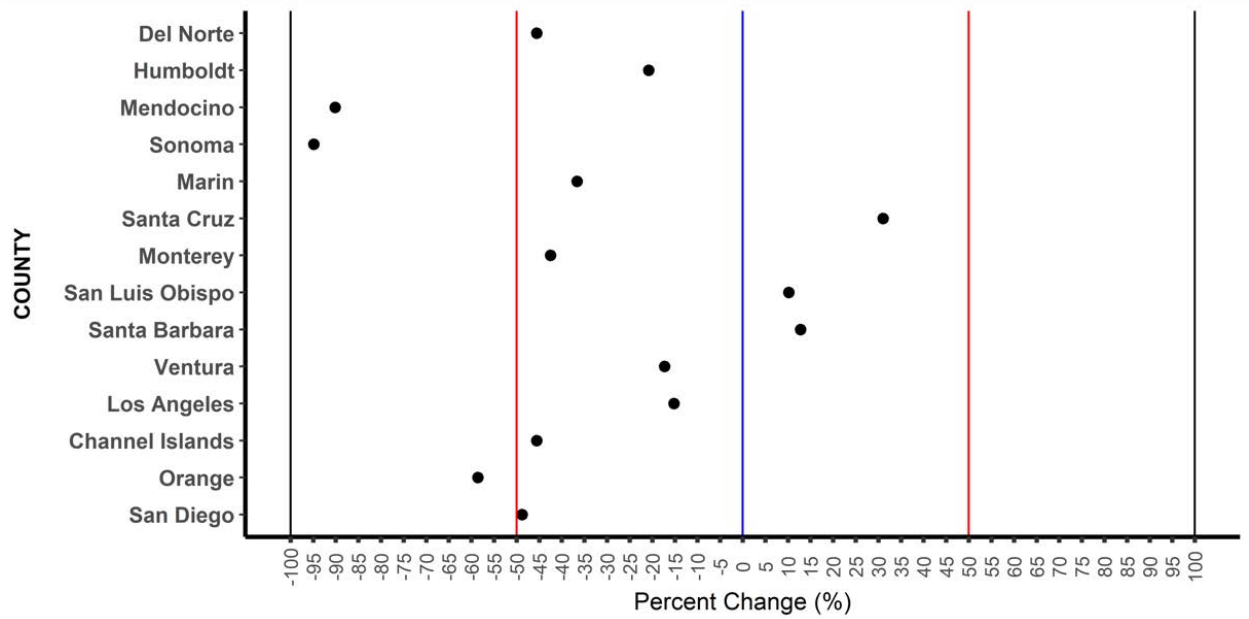

Figure 2. Percent change in mean canopy cover by county (listed north to south) from 1984-2013 (pre-MHW) and 2014-2022 (post-MHW). Note that this figure excludes San Mateo County due to greater than 400% increase in kelp canopy cover and San Francisco County due to zero kelp canopy cover over time. Central blue line indicates 0% or no change; Red lines indicate 50% change (left: negative indicating a decrease; and right: positive indicating increase in mean canopy cover). Data Source: SBCLTER et al. 2022.

3.1.2. Subtidal Fishery-Independent Data

Subtidal monitoring of kelp forests using SCUBA divers has occurred for several decades and provides critical information on kelp density, community diversity, and ecosystem health. There are several subtidal monitoring programs collecting long-term data in kelp forest ecosystems throughout the state, including the Department's north coast (Mendocino and Sonoma counties) nearshore ecosystem dive surveys (est.1971). Other important subtidal monitoring programs include Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO; est.1999), Channel Islands National Park Kelp Forest Monitoring Program (est. 1982), and Reef Check (2005-present). The data collected by these monitoring groups are used directly by managers to make informed, science-based decisions regarding California's marine communities. While remote sensing and aerial surveys are useful tools to assess changes in kelp canopy abundance, diver surveys can provide critical *in situ* kelp and marine algae abundance and biodiversity data as well as important indicator species data that are used to quantify, model, and track ecosystem health (Figure 3). Further, these data help marine managers assess the efficacy of marine managed areas and provide updates for marine resource managers. An interactive map

showing the monitoring sites of many Sanctuary Integrated Monitoring Network (SIMoN) can be found on the Kelp Ecosystem Monitoring Map webpage. Additionally, MPA monitoring provides baseline and long-term monitoring of kelp forest ecosystems.

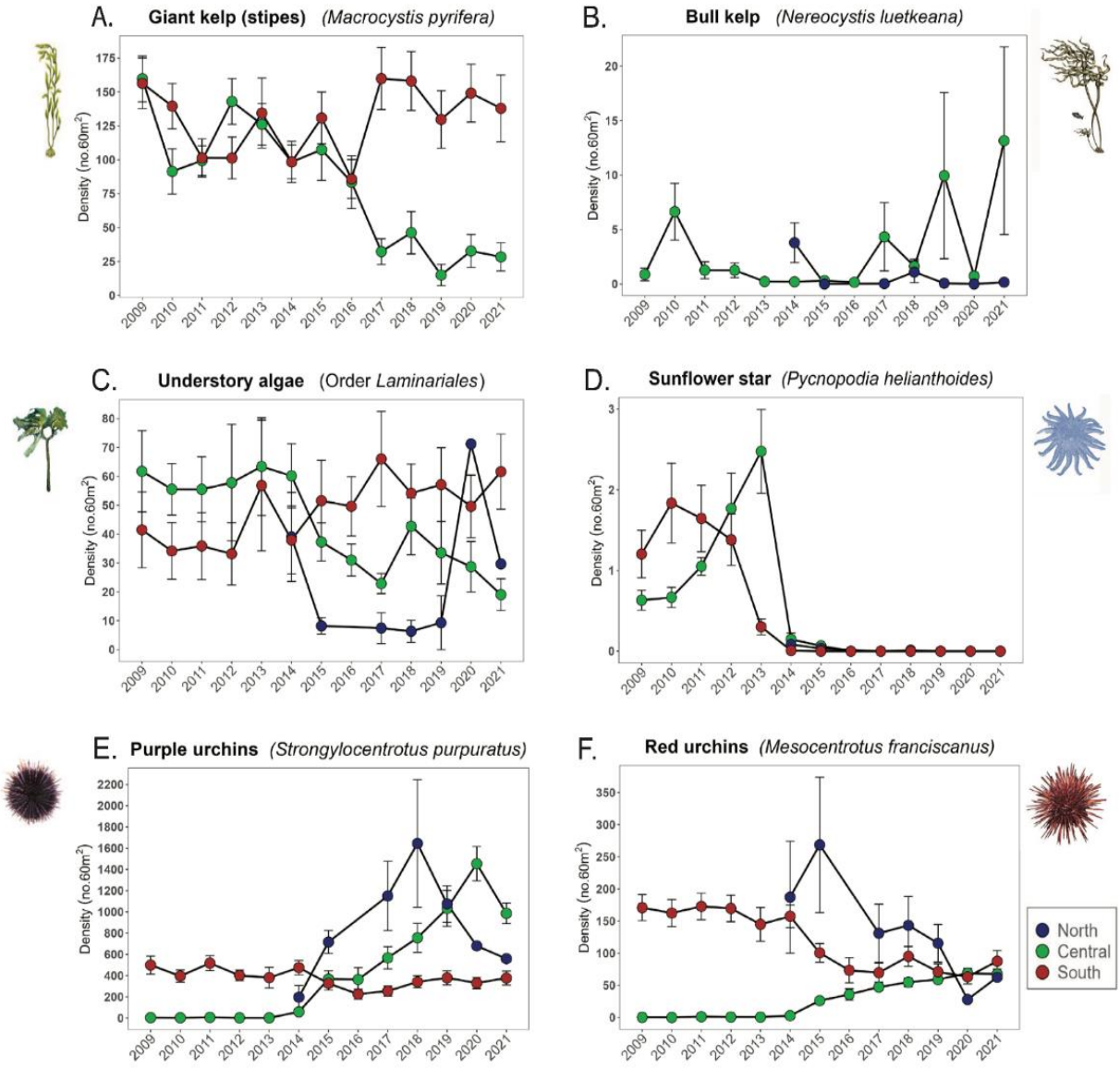

Figure 3: Giant kelp stipe counts (A), bull kelp counts (B), understory stipitate kelp counts (C), sunflower sea star counts (D), purple urchin density counts (E), and red urchin density counts (F). Data are provided by PISCO; figure provide by Dr. Jenn Caselle, UCSB. Due to sampling and data availability limitations, data for the north coast date back to 2014; only one site was surveyed in 2021 and 2022.

3.1.3. Commercial Kelp Harvest Fishery-Dependent Data

The Department manages commercial kelp and other marine algae harvest statewide. The commercial harvest of giant and bull kelp is managed and reported differently depending on use (for general use, i.e., including as feed for farmed abalone aquaculture or for human consumption as edible seaweed). The Department's commercial kelp harvest data for general use dates back to 1916 with the majority of kelp harvest likely being giant kelp. Edible seaweed harvest reporting for giant and bull kelp began in 2002. The FGC recently adopted amendments to the commercial harvest regulations that include more precise harvest location reporting for bull kelp, separating reporting weights for bull and giant kelp in the Commercial Kelp Harvester's Monthly Report (harvest for general use), and information on catch by unit effort. There are currently no reporting requirements for recreational kelp harvest.

3.2. Monitoring Next Steps

Historically, aerial surveys have been the primary method of monitoring kelp canopy off the California coast. However, aerial surveys are expensive and have considerable logistical constraints. Remote sensing, via satellite imagery, provides a more cost-effective and reliable strategy for long-term kelp canopy monitoring. Pilot work supported by OPC shows that maps of kelp canopy derived from high-resolution PlanetScope satellite imagery match well with maps derived from aerial surveys. A recent investment by the State will support the next steps in the development of a novel approach for kelp canopy monitoring. This project will result in the creation of seasonal, statewide, high-resolution maps of kelp canopy from 2016-2023, the development of a fully automated approach for processing large amounts of satellite imagery, the use of satellite imagery to analyze kelp canopy dynamics, and the development of a method for monitoring kelp at very small spatial scales (0.5m - 3m) using very high-resolution imagery.

To further advance the implementation of emerging technologies to inform kelp forest management, the State has invested in the use of SkySat/Pelican, a high-resolution satellite dataset from PlanetScope, which will provide satellite imagery on a scale of 0.5m. These data are not suited for large-scale statewide maps but will be more cost effective and useful for site-based monitoring and evaluation at current kelp restoration sites, and for planning and monitoring future kelp restoration efforts.

In advance of their December 2023 meeting, OPC plans to recommend a $9 million dollar investment for three years of MPA monitoring from 2024 to 2026 including rocky intertidal, kelp forest, estuary, sandy beach, and surf zone habitats. OPC staff are currently scoping further monitoring investments for their February 2024 meeting.

4. REGULATORY ACTION

4.1. Commercial Bull Kelp

Given the dramatic and persistent loss of bull kelp in Sonoma and Mendocino counties since 2014, and due to the lack of scientific data to explain whether commercial harvest does or does not have an impact on the current bull kelp population, the FGC adopted precautionary measures to protect and maintain the remaining bull kelp in the region. These regulatory actions included temporary closure of commercial bull kelp harvest in Sonoma and Mendocino counties, implementation of an annual bull kelp harvest limit of four tons wet weight in Humboldt and Del Norte counties combined (harvest is allowed for human consumption only), and closure of three lease-only administrative kelp beds in Mendocino, Humboldt, and Del Norte counties (see California Code of Regulations [CCR], Title 14, Section 165(c)(9) and Section 165.5(c)). These temporary commercial bull kelp regulations became effective on January 1, 2023, and are intended to sunset in three years (January 1, 2026) with the intent to allow time for the Department, Tribes, industry, and other stakeholders to develop the KRMP.

4.2. Recreational Purple Urchin

Amendments to the recreational purple urchin regulations were implemented in response to increased densities of purple urchin and over-grazing pressure on northern California kelp forests since the onset of the MHW and associated loss of the predatory sunflower sea star and impacts to local fisheries such as the closure of the red abalone fishery. In 2018, an emergency regulatory action was approved by the FGC, increasing the daily bag limit for (hand harvest) from 35 individuals to 20 gallons of purple urchin in Sonoma and Mendocino counties. In 2019, the daily bag limit of purple urchin was further increased from 20-gallons to 40-gallons in Sonoma, Mendocino, and Humboldt counties (CCR, Title 14, Section 29.06(b)), with no sunset date. The intent of the higher 40-gallon limit was to promote continued involvement of recreational divers in efforts to restore severely-impacted kelp forest ecosystems and contribute more greatly to urchin suppression efforts without adversely affecting the long-term health of the native purple urchin population. Separately, in 2020 a temporary regulation to remove the recreational bag limit for purple urchin was implemented at two specific locations in California, including unlimited take of purple urchin via hand harvest or culling at Caspar Cove, Mendocino County, and unlimited take of purple and red urchin via hand harvest or culling at Tanker Reef, Monterey County. The intended sunset date for both of these temporary site-specific regulations is April 1, 2024, however, a current regulatory process is underway that may allow one or both of the sites to extend regulations for an additional five years

(April 1, 2029) or modify the existing site boundaries for Tanker Reef (Department, 2023). The FGC adoption hearing for these proposed regulations is anticipated at their February 2024 meeting.

5. ADVANCING KELP RESEARCH

5.1. Kelp Research and Recovery Program

The Kelp Research and Recovery Program (KRRP) was created by OPC, CASG, and the Department to fill critical knowledge gaps and advance understanding of kelp research and restoration. In 2020, a combined total of $1,800,000 was released to fund six KRRP projects as the first round of competitive kelp research and restoration projects. These projects filled critical knowledge gaps in applied restoration techniques for temperate rocky reefs in California and have helped establish protocols for future kelp forest restoration.

A team of researchers from UC Santa Barbara and UC Santa Cruz created the first of its kind decision tree to inform agency managers, funders, and other restoration practitioners about where and when to focus kelp restoration efforts. Concomitant with the generation of this model, a multi-faceted team from UC Davis, UC San Diego and Sonoma State University investigated the synergistic factors that influence bull kelp loss. Specifically, this team sought to understand bull kelp's vulnerability to heat, the decline in sunflower sea stars, which has contributed to an overabundance of purple urchins on the north coast, and the efficacy of different protocols for removing urchins. While canopy-forming kelps persist exclusively on subtidal rocky reefs (in California), purple urchins spawn in both subtidal and intertidal ecotones. Researchers from CSU Monterey Bay (CSUMB) and Reef Check surveyed the urchin populations at nine intertidal sites across the Monterey Peninsula and discovered that intertidal areas are a far more important source for urchin populations than previously thought. The results from these projects directly inform critical spatiotemporal knowledge gaps surrounding restoration success and help ensure the direction and efficacy of future projects.

The urgency to restore the staggering loss of kelp forests in key areas across the state has suggested human intervention may be necessary to ensure success on manageable timelines. Scientists from Moss Landing Marine Laboratories (MLML) and San Jose State University developed a novel, low-cost technique for culturing bull kelp year-round. When scaled, these methods will greatly inform the feasibility and success of future bull kelp outplanting. Separately, a team from UC Irvine adapted a giant kelp outplanting technique for use in California. The use of an inoculated gravel substrate, in conjunction with laboratory-rearing experiments to breed heat-tolerant kelps, will influence how projects can "future-proof" restoration efforts to ensure efficacy under climate change-induced ocean warming. Finally, a consortium of researchers from the University of Wisconsin-Milwaukee, UC Santa Cruz, and University of Southern California developed a "seed bank" of more than

1,700 bull kelp genotypes from 14 sites across the state. This collection, the first of its kind, will help preserve the genetic diversity of bull kelp, and may be used in captive rearing and outplanting restoration projects.

5.2. 2024 Kelp Research and Restoration Program Request for Proposals

To advance the KRRP and fill critical knowledge gaps, OPC, CASG, and the Department announced a second round of competitive funding with a combined total of $5,000,000 in Summer 2023. Building on the success of the KRRP, this second round of funding is intended to specifically support solutions-oriented projects that directly contribute to the recovery of California's kelp ecosystems and coastal communities, and to inform management approaches for protecting and restoring kelp ecosystems. Over 40 Letters of Intent were submitted to CASG in Summer 2023; OPC, CASG, and the Department will be participating in the full proposal review and selection process with an external panel of scientific experts in Fall 2023. The final suite of recommended projects will be brought to the OPC at their December 2023 meeting for consideration of funding. Upon approval, the three-year research awards are expected to begin in February 2024.

5.3. Non-State Funded Research

Due to its ecologic and economic importance, many academic institutions, NGOs, and other interested entities are engaged in cutting edge kelp research. One such project is the Kelp Restoration as an Integrated Socio-Ecological System (Kelp RISES) consortium hosted by UC Davis, which aims to understand how different management approaches account for ongoing climate change in relation to California's kelp forest communities. Other notable consortia include the Pycnopodia Working Group facilitated by The Nature Conservancy (TNC), which is leading efforts to explore the recovery of a key kelp forest predator (the sunflower sea star; see below).

6. EFFORTS INFORMING THE DEVELOPMENT OF THE KELP RESTORATION AND MANAGEMENT PLAN

6.1. Building a Science-based Kelp Restoration Toolkit

Kelp forest restoration has been practiced in California since the late 1950s, with most historical efforts occurring in southern California (Eger et al. 2022b). Projects have included removing urchins, removing competitive and invasive algae, outplanting kelp, transplanting reproductive material, and providing substrate. More recent kelp restoration and recovery projects have been focused on the northern California region due to the dramatic loss of the resource particularly in Sonoma and Mendocino counties. Much of the restoration work occurring in California is aimed to identify restoration tools or a combination of methods that can be used strategically to defend restoration sites from overgrazing and facilitate kelp growth and persistence. Kelp restoration work is extremely labor intensive and logistically challenging (e.g., variable weather, remoteness of sites, etc.), therefore many of the restoration projects are being implemented through partnerships and coordination with several other state and federal agencies, researchers, non-profits, tribal, and coastal communities.

Restoration tools that are currently being implemented include urchin suppression such as commercial hand harvest, recreational hand harvest (increased bag limit in Humboldt, Mendocino, and Sonoma; CCR, Title 14, Section 29.06(b)), recreational culling (Caspar Cove; CCR, Title 14, Section 29.06(d)(1) and Tanker Reef; CCR, Title 14, Section 29.06(d)(2)), commercial culling (via Scientific Collecting Permit), and boat-based urchin trapping. Several restoration projects have also explored using commercial urchin divers to remove purple urchin via hand harvest and landing purple urchins where they are sold or donated for use as soil amendment in compost. These projects have been mutually beneficial to restoration practitioners and the commercial urchin fishery due to the collapse of the red urchin fishery and need for experienced urchin divers to clear restoration areas.

Some restoration projects are also exploring methods of kelp enhancement to facilitate kelp growth and persistence in areas that have been recently cleared of urchin including, outplanting of cultured substrates such as green gravel and inoculated biodegradable substrates (including seeded twine). Other more passive methods of kelp enhancement being tested are transplanting reproductive material via introduction of spore bags and pumping concentrated spore solution onto the benthos.

6.2. Current and Ongoing Restoration Projects

Below is a summary of current restoration projects, from north to south, including a brief background, project goals, approximate timeframe, initial take-aways and next steps, and key partners and contributors.

6.2.1. Noyo Bay, Mendocino County: *Coordinated Grazer Suppression via Commercial Hand Harvest of Purple Urchin to Support Kelp Recovery*

Background: In 2020, the first State-supported bull kelp restoration effort was initiated in Mendocino County. Noyo Bay and Albion Cove (see "Albion Cove" section below) were selected as restoration sites based on several criteria, including logistics, proximity to extant bull kelp patches, and encroachment of purple urchin into these kelp refugia locations (Eger et al. 2022a, Ward et al. 2022). Restoration began at Noyo Bay; commercial divers systematically harvested purple urchin from August through November in 2020, during which time they completed the initial clearing of the site to the target threshold density of ≤2 purple urchins per m^2 (Ward et al 2022). Harvest resumed in March 2021, and the purple urchin target density was maintained until project completion in December 2021 (Ward et al 2022). Increases in bull kelp density were observed at the restoration site in Noyo Bay in comparison to the control site and reached approximately 20% of historical densities (Eger et al 2022a, Ward et.al 2022).

Goals: Evaluate the feasibility and efficacy of coordinated grazer suppression via commercial urchin diver hand harvest to a maintained threshold density (2 urchin/m^2) as a bull kelp restoration tool in the north coast region.

Timeframe: 2020 - 2021

Take-aways: Commercial urchin divers demonstrated a coordinated approach in reducing urchin densities to the target density in the restoration area of Noyo Bay. This project was co-managed by state agencies and nonprofit entities and established successful engagement with local commercial divers impacted by the loss of the kelp forest. This project provided mutual benefits for the fishing community by providing supplement income and fiscal support for the recovery of the red urchin fishery. Restoration practitioners gained vital local knowledge, experience, and equipment to effectively reduce urchin densities (Ward et al. 2022, Eger et al. 2022a). The work at Noyo initiated strong partnerships and collaboration that continues to evolve in the region.

Next Steps: Though grazer densities were reduced, and initial bull kelp growth was detected at Noyo Bay (Figure 4), the project timeframe (two-years) did not allow

consecutive seasons to facilitate expansion or self-sustaining kelp recovery (Ward et al. 2022). The outcomes of this work necessitate the need for continued research and exploration of grazer suppression paired with novel bull kelp enhancement techniques over longer periods of time for ecosystem recovery. Outcomes from this state-supported project have led to ongoing research and exploration of grazer suppression and kelp enhancement techniques, supported by TNC, at Noyo Bay and Albion Cove.

Partners and Contributors: OPC, the Department, Reef Check, TNC, Waterman's Alliance, Noyo Center for Marine Science, and commercial urchin divers and processors.

Figure 4. [Left-Photo] Commercial urchin diver hand harvesting purple urchins at the Noyo Bay restoration site. [Right-Photo] Bull kelp stipes observed at the Noyo Bay restoration site following purple urchin removals. Photo Credit: Tristin McHugh (TNC).

6.2.2. Caspar Cove, Mendocino County: *Evaluating Efficacy of Recreational Diver Participation in Kelp Recovery*

Background: Leading to the closure of the recreational red abalone fishery at the end of 2017, there was high public interest and momentum to reduce detrimental purple urchin grazing pressure on bull kelp recruitment and growth in Sonoma and Mendocino counties. As such, emergency regulations were initiated in 2018 to increase the daily bag limit of purple urchin for the recreational diving community. For divers with valid fishing licenses, bag limits increased from 35 individuals per day to 20 gallons, and most recently to 40 gallons in Mendocino, Sonoma, Humboldt, and Del Norte counties. However, due to logistical challenges, and safety and efficiency considerations, public interest remained to reduce urchin densities *in situ*. In 2020, the FGC adopted a temporary emergency regulation to remove the recreational bag limit for purple urchins and allow unlimited take by hand and

handheld tools inside the boundary area of Caspar Cove, Mendocino County (Figure 5).

Goals: Provide a science-based assessment of in-water purple urchin culling at a focused location by recreational divers as a potential bull kelp restoration tool in the north coast region.

Timeframe: 2018 to present

Take-aways: Though regulations allowing for *in situ* recreational culling efforts at Caspar Cove began in February 2020, engagement was minimal due to the COVID-19 pandemic, which imposed significant challenges such as site accessibility, limited local resources, and other logistical constraints. Despite the unique setbacks that impacted the rural coastal community of Mendocino County, the recreational dive community, led by The Waterman's Alliance, remained engaged and motivated to conduct urchin removals. The Watermen's Alliance and partners have since identified solutions to many of these local challenges, such as working with Sonoma County Sheriff and Mendocino Fire Department to secure SCUBA cylinder fills for monthly recreational diver events, which has resulted in increased diver effort. As of July 2023, 241 self-reported dives have been logged by 110 unique divers, resulting in an estimated removal of 130,758 purple urchins. Recreational divers have been able to successfully coordinate within a one-acre restoration focal area established in 2022 inside Caspar Cove (Figure 5) that was developed between The Waterman's Alliance, TNC, and the Department. Within this area divers have been able to effectively reduce purple urchin densities detectable via subtidal monitoring by Reef Check and patchy kelp canopy has been detected through Unoccupied Aerial Vehicle (UAV, e.g., drones) surveys (Figure 5).

Next Steps: The temporary regulation allowing culling *in situ* at Caspar Cove is under consideration by the FGC to extend past the original sunset date of April 1, 2024, for an additional five years (April 1, 2029). Due to the early disruptions that caused delays in recreational diver effort, extension of this regulation would allow continued engagement and monitoring needed to inform whether urchin culling by recreational divers represents a viable tool for bull kelp restoration in northern California.

Partners and Contributors: The Department, Waterman's Alliance, TNC, Reef Check, Cal Poly Humboldt State University, Sonoma County Sheriff, Mendocino Fire Department, California State Parks, Caspar Campground and Store, and the recreational dive community

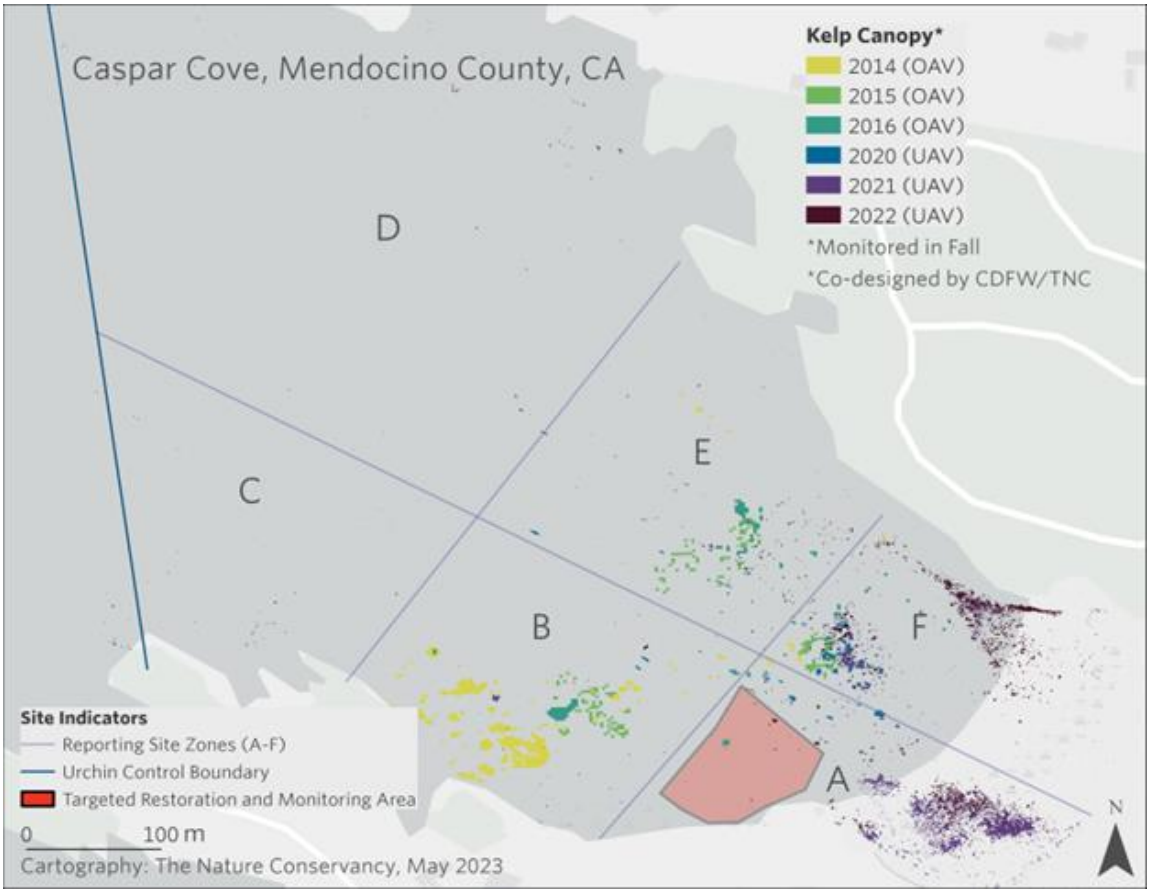

Figure 5. Map of Caspar Cove restoration site including the regulation boundary, site zones, and one-acre Targeted Restoration and Monitoring Area (inside site zone A). Layered OAV kelp canopy data from 2014-2016 was sourced from the Department and Sandoval & Associates, LLC (30cm resolution) and UAV kelp canopy data from 2020-2023 was sourced from TNC (3cm resolution). Map cartography by TNC.

6.2.3. Albion Cove, Mendocino County: *Identifying Scalable Kelp Enhancement Techniques Alongside Urchin Suppression via Commercial Hand Harvest*

Background: Suppression of purple urchins by commercial urchin divers began at Albion Cove in 2021 in the year following the initiation of restoration at Noyo Bay (see “Noyo Bay” above). The first in-water testing of bull kelp enhancement techniques in California were initiated alongside the effort to reduce urchin densities below the 2 urchins per m^2 threshold. This limited spatial-scale kelp enhancement study was part of the state’s first Kelp Recovery and Research Program and sought to identify optimal methods for outplanting juvenile bull kelp for the north coast region (2020-2021). Considerations for scaling (2022-2023) were continued and managed by TNC.

Goals: Leverage best practices and lessons learned in kelp enhancement at Albion Cove to identify scalable and regionally appropriate bull kelp enhancement techniques. Multiple kelp enhancement techniques are being tested alongside grazer suppression via commercial urchin diver hand harvest.

Timeframe: 2020 to present

Take-aways: Results from 2020-2022 suggest that grazer densities can be reduced to the desirable threshold by commercial urchin divers. In addition, spore bags and seeded lines are likely to be the two most viable bull kelp enhancement strategies to test at larger spatial scales (Graham et al. 2023). In 2023, leading kelp enhancement techniques (spore bags, seeded lines and *in-situ* inoculation) were implemented by researchers at MLML and Sonoma State University (SSU) in Albion Cove to further develop kelp enhancement methods and approaches that can be used to boost productivity in a limited kelp recovery environment. Commercial urchin divers were able to effectively maintain threshold urchin densities with coordination support by Reef Check. Initial findings in 2023 demonstrated that spore bags support kelp recruitment on the reef and subsequent recruitment, growth, and increased survivorship of outplanted kelp on suspended lines (Figure 6). For the first time in California, researchers have observed bull kelp growth from “seed” to reproductive adult on outplanted lines on an open coast environment.

Next Steps: Continuation of urchin suppression to support assessment of kelp enhancement techniques at Albion Cove is planned through 2023, and monitoring for kelp enhancement successes will continue through 2024. Future restoration studies have proposed techniques that deviate from horizontal lines in the water and instead use smaller-profile vertical infrastructure.

Partners and Contributors: TNC, the Department, MLML, SSU, Reef Check, Albion River Campground, and commercial urchin divers and processors.

Figure 6. [Left-Photo] Researcher surveying bull kelp recruits on lines at the Albion Cove restoration site. [Right-Photo] Close-up of bull kelp growing on suspended seeded lines in Albion Cove. Photo Credit: Abbey Dias (SSU).

6.2.4. Fort Ross and Timber Cove, Sonoma County: *Implementing Urchin Suppression via Commercial Hand Harvest of Purple Urchin Supplemented with Kelp Outplanting Techniques*

Background: The Greater Farallones National Marine Sanctuary (GFNMS) is a federally marine-managed area that encompasses nearshore ecosystems from its northern boundary just north of Point Arena in Mendocino County, to its southern boundary, near Rocky Point in Marin County. To address the severe loss of kelp forests in GFNMS, The Greater Farallones Association (GFA) launched the Kelp Recovery Program in 2017 in partnership with GFNMS. GFA-GFNMS have conducted research to investigate strategies for kelp forest restoration, with a focus on strategically restoring bull kelp forest refugia, or 'oases', along GFNMS's northern coastline to serve as source populations to supply spores for surrounding areas that may be suitable as kelp forest habitat. Sonoma County, located within the GFNMS has suffered the greatest kelp loss (over 95%) in the state of California since 2014. In response, the first large-scale effort to restore bull kelp forest habitat at key sites within GFNMS was initiated by the Greater Farallones Kelp Restoration Project, led by GFA and GFNMS.

Goals: Restore resilient kelp habitat by establishing a network of kelp forest oases in GFNMS and facilitate broad-scale sustainable kelp recovery. The primary restoration tools being implemented in Sonoma County are urchin suppression via large scale hand harvest of purple urchin by experienced local commercial urchin divers. In sites with reduced grazing pressure, natural bull kelp recovery will be supplemented with seasonal outplanting techniques.

Timeframe: 2023-present

Take-aways: Commercial divers began conducting purple urchin hand harvest in early September at Fort Ross and Timber Cove. As of October 2023, five local divers have removed approximately 16,000 pounds of urchins from both sites over a total of 30 dive days. Concurrently, researchers from SSU and MLML conducted kelp enhancement via spore bags and seeded substrates at Fort Ross. NOAA divers from GFA-GFNMS conducted restoration assessment surveys of both sites, and ten sites along Sonoma County were mapped by staff from CSUMB to capture data on kelp canopy extent.

Next Steps: Restoration work in the form of commercial hand harvest and supplemental kelp enhancement is anticipated at Fort Ross and Timber Cove through November 2023 and is planned to restart and expand to Ocean Cove in Spring of 2024. Stillwater Cove (Sonoma County) is proposed as a future restoration site as restoration work expands in GFNMS.

Partners and Contributors: GFNMS, GFA, CSUMB, MLML, SSU, the Department, and commercial urchin divers.

6.2.5. Drakes Bay, Marin County: *Investigating (Non-diver) Bull Kelp Enhancement Techniques to Support Natural Recovery of Kelp Forest Habitat*

Background: In 2022, GFA-GFNMS launched a pilot restoration study in Marin County, also located within the GFNMS to help preserve the nearshore bull kelp spore bank and facilitate natural recovery of kelp forest communities.

Goals: Investigate kelp enhancement techniques for establishing bull kelp refugia along the Point Reyes National Seashore (Marin County) and characterize interconnectivity between coastal habitats.

Timeframe: June 2022-present

Take-aways: This project piloted kelp enhancement techniques at Drakes Bay and Double Point in Marin County. The two vessel-based (non-diver) kelp outplanting techniques conducted at this site include: (1) the use of twine seeded with bull kelp sporophytes wrapped around biodegradable substrate (Figure 7); and (2) pumping concentrated bull kelp zoospore solution to the benthos via the “reef duster” method (Figure 7). Drones are being used to monitor and map kelp canopy at fine scales and a Remotely Operated Vehicle (ROV) is being used to check substrate type and survey previous outplanting locations. Moorings have also been deployed at these sites to track oceanographic conditions at depth.

Next Steps: Kelp canopy in Drake's Bay and Double Point will be surveyed again in the spring of 2024 and findings will be coalesced into a report in the summer of 2024. The project may be extended another two years pending funding.

Partners and Contributors: GFNMS, GFA, SSU, FishBio, Monterey Bay Seaweeds (MBS), CSUMB, and the Department.

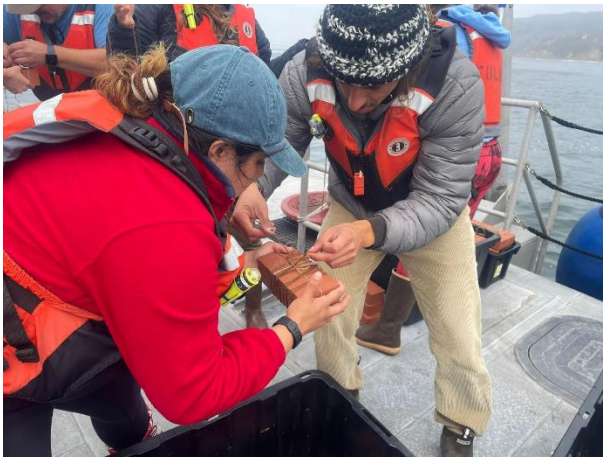

Figure 7: [Left-Photo] Researchers prepare reproductive bull kelp samples for "reef duster" kelp enhancement method. [Right-Photo] Researchers carefully wrap inoculated twine around clay bricks to be deployed at the Drakes Bay restoration site. Photo Credit: Rietta Hohman (GFA-GFNMS; NOAA Affiliate).

6.2.6. Tanker Reef, Monterey County: *Evaluating Recreationally-led Urchin Suppression to Aid in Kelp Recovery*

Background: In 2020, the FGC adopted an emergency regulation to remove the recreational bag limit for Caspar Cove (Mendocino County). In August 2020, the FGC authorized notice to initiate a regular rulemaking to continue the take provisions for a period of three years. Additionally, in response to a petition regarding concerns of giant kelp declines along the Monterey Bay Peninsula, the FGC authorized notice to remove the bag limit for purple and red urchins and allow unlimited take by hand and handheld tools at Tanker Reef (Monterey County) for the same three-year period.

Goals: The exemption for unlimited recreational take of purple and red urchin at Tanker Reef was designed to provide an assessment of the efficacy of the recreational diver community to self-organize and implement *in situ* urchin culling, which would later be evaluated as a potential tool in support of kelp restoration by facilitating natural recovery. Data gathered from the three-year Tanker Reef effort would be analyzed and evaluated in terms of feasibility and efficacy, to inform the state's response to kelp loss via future management and restoration strategies.

Timeframe: 2021 to present

Take-aways: Culling efforts at Tanker Reef were initiated in April 2021 and led through the efforts of the petitioner. As of July 27, 2023, the petitioner reported 1,369 dives conducted by 187 unique divers, resulting in an estimated removal of 633,211 purple and red urchins. Actual counts of urchins culled were not made but estimated based on average rates of culling per minute of diver effort multiplied by diver bottom time. Of the estimated 633,211 urchins removed, approximately 219,733 (34%) were removed from the 100-meter squared focal restoration area ("grid"). Between Spring and Fall 2021 monitoring surveys revealed that urchin densities were reduced below a target threshold of ≤2 urchins per m^2 within the grid and remained around the threshold density through Summer of 2023 (Figure 8). Beginning in Spring of 2022, densities of giant kelp individuals increased in the grid and reached a maximum in Summer of 2022 (Figure 9). Through Summer 2023 giant kelp individual and stipe densities have remained higher in the grid as compared to the control site, an adjacent area of similar size where culling is not supposed to occur.

Next Steps: The temporary regulation allowing culling *in situ* at Tanker Reef is under consideration by the FGC to extend past the original sunset date of April 1, 2024, for an additional five years (April 1, 2029). To date, data have been collected by the Department and Monterey Bay National Marine Sanctuary (MBNMS) scientists ("targeted monitoring" of urchins and kelp only), Reef Check volunteer citizen science divers ("ecosystem monitoring", including kelp and marine algae, invertebrates (including urchins), and fishes), and the petitioner (e.g., culled urchin estimates, diver effort). These data sets have not yet been combined into a synthesized report that can serve as the basis for understanding the dynamics at Tanker Reef, whether it can be scaled up, and feasibility and application to other parts of the state. Depending on the outcome of the ongoing regulatory process, the Tanker Reef site may enter a post-restoration phase. This phase of post-restoration monitoring would be conducted at the grid and control sites to characterize the resistance and resilience of the newly established kelp patch in the absence of ongoing diver intervention.

Partners and Contributors: Giant Giant Kelp Restoration Project (G2KR), Reef Check, MBNMS, the Department, and the recreational dive community.

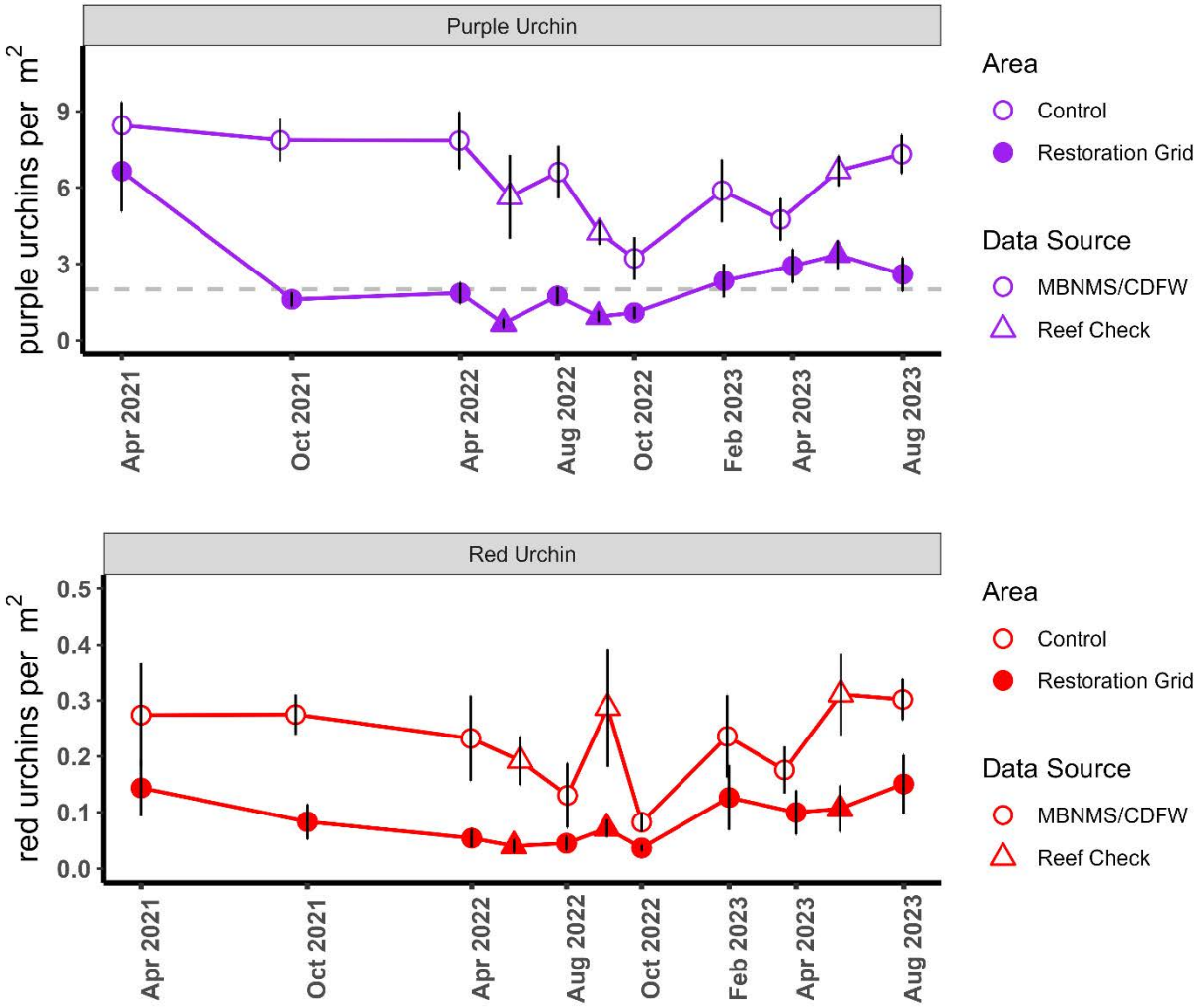

Figure 8. Purple urchin (top) and red urchin (bottom) density (urchin/m^2) during each subtidal survey timepoint (2021-2023). Filled points indicate densities at the restoration focal area (100x100m) and open points indicate urchin densities at the control area (comparable 100x100m area). Data source: the Department and MBNMS (circles) and Reef Check (triangles).

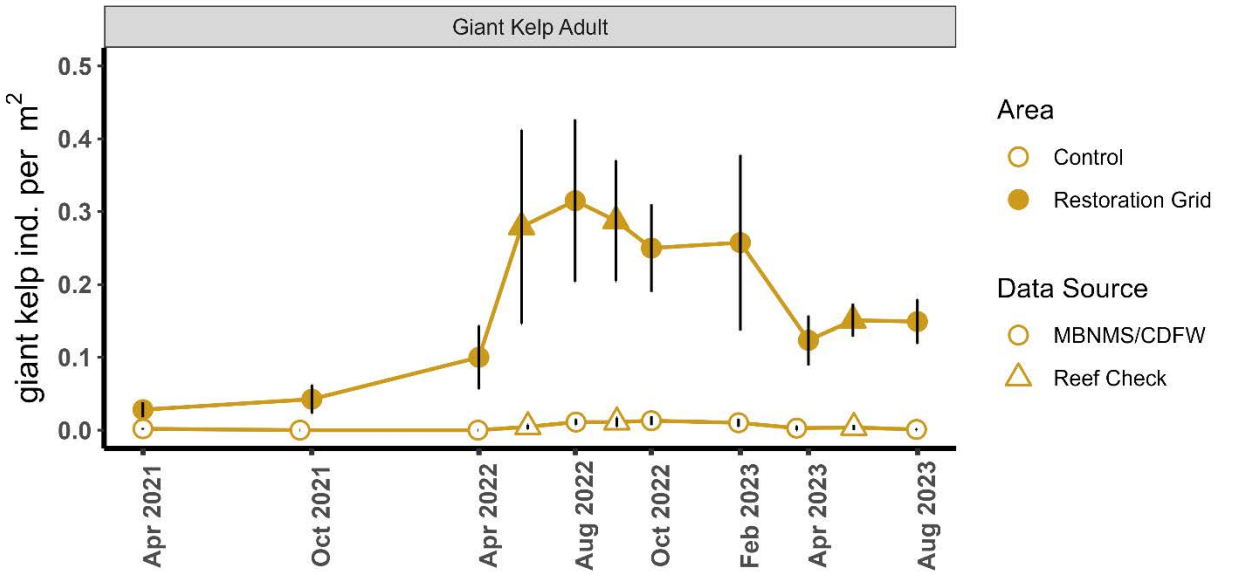

Figure 9. Giant kelp individual density (per/m^2) during each subtidal survey timepoint (2021-2023). Giant kelp individuals are defined as individuals >1m off the bottom. Filled points indicate kelp densities at the restoration focal area (100x100m) and open points indicate densities at the control area (comparable 100x100m area). Data source: the Department and MBNMS (circles) and Reef Check (triangles).

6.2.7. Palos Verdes, Los Angeles County: *Systematic Urchin Suppression via Commercial Diver Culling Results in Minimal Maintenance of Restoration Sites*

Background: The Palos Verdes Peninsula, located between Los Angeles and Long Beach, has one of the longest documented declines in kelp forests along the California Coast. Subtidal surveys in 2010 revealed an estimated 62 hectares of the peninsula's rocky reefs were described as persistent urchin barrens. Building on previously successful kelp restoration in the Santa Monica Bay via the removal of urchins, The Bay Foundation (TBF) partnered with NOAA, Vantuna Research Group (VRG, Occidental College), Montrose Settlements Trustees, and commercial urchin fishermen in one of the longest running subtidal restoration projects in California.

Goals: TBF seeks to restore the Palos Verdes Peninsula to a kelp-dominated state through culling purple urchins *in situ* with the use of hand tools by commercial divers. At select sites along the coast of the Peninsula, adjacent to the Point Vicente and Abalone Cove State Marine Conservation Areas, TBF conducts pre- and post-urchin removal surveys to comprehensively determine the initial and post removal densities of purple urchins. These efforts ensure a restoration target of approximately 2 purple urchins per m^2 is achieved throughout a restoration site. In conjunction with project

partners, TBF also conducts surveys in adjacent reference sites. TBF's methods of systematically delineating and clearing urchins along band transects has resulted in minimal maintenance of restoration sites. VRG has and continues to conduct annual Cooperative Research and Assessment of Nearshore Ecosystems surveys across selected restoration sites and in neighboring rocky reef/kelp forest habitats to contextualize and describe trends resulting from these efforts.

Time Frame: 2013-present

Take-Aways: TBF has implemented large-scale restoration via a core team of commercial urchin divers systematically culling purple urchins, reducing densities from an average of ~30/m^2 to ~2/m^2. A total of 58 acres of kelp forest has been restored since 2013, with minimal maintenance needed. Increases to giant kelp, invertebrates, fish diversity and biomass, and increased red urchin gonad weight have been documented in restoration sites along the Palos Verdes Peninsula (Figure 10).

Next Steps: As this is an ongoing project, TBF and VRG continue to monitor pre- and post-culling, and reference sites as it expands its efforts across the southeast coast of the Peninsula.

Partners and Contributors: TBF, VRG, NOAA, Montrose Settlement Trustees, and commercial urchin harvesters.

Figure 10: [Left-Photo] Before and after [Right-Photo] systematic commercial urchin culling at TBF restoration site in Palos Verdes. Photo Credit: TBF.

6.2.8. Urchin Trapping: *A Non-diving Opportunity for Urchin Suppression*

Background: Urchin trapping is a novel urchin grazer suppression technique that may provide an alternative and cost-effective approach for reducing purple urchin

populations that does not require divers to get in the water. This is a key consideration for the north coast where the ocean conditions often constrain the hand harvest of urchins. A novel approach to testing urchin traps in Mendocino County was initiated in 2021 by TNC alongside the Department and a commercial urchin diver. During Phase 1 (2021), the project team refined trap design, tested bait types (drift kelp, fish carcass, produce), and explored viable soak times to maximize catch and streamline logistics for deployment on the north coast. In Phase 2 (2022) the project team sought to understand trap performance in urchin barrens on reefs with differing urchin densities to evaluate performance under differing restoration scenarios. Currently, in Phase 3 (2023), the project team is testing trapping to protect kelp refugia and, at an exploratory scale, developing techniques to maximize catch per unit effort (CPUE) and reduce cost to help guide potential expansion of this work to additional participants and geographies.

Goals: Identify best methods and approaches for urchin trap deployment to maximize CPUE, reduce costs of restoration, provide equitable solutions for grazer suppression (non-diving options), and thereby serve as an effective kelp restoration tool

Timeframe: 2021 to present

Take-aways: During Phases 1 and 2 over 23,000 purple urchins were caught using traps. Although questions of efficiency compared to other methods remain, there is strong interest to explore grazer suppression methods that do not require humans to get in the water. Urchin trapping study results identified the following for maximum trap performance: kelp beach wrack as bait distributed evenly across the trap, soak time of less than 48 hours, and trap catch is greater in higher density urchin barrens (McHugh et al. in prep). However, in lowered urchin density scenarios, traps have been observed to “attract” wandering urchin and aggregate them to a focal area. Urchin traps can be an effective urchin suppression tool and may provide increased catch capacity if coupled with commercial diving, allowing divers to soak traps while hand-harvesting urchins.

Next Steps: Expand opportunity to more commercial urchin harvesters to test urchin traps in other geographies within California to maximize CPUE, reduce restoration costs, and provide equitable opportunities for non-diving participants. Further, questions remain regarding their efficiency in defending recovering restoration areas with low urchin density, especially in scenarios where urchins are inhibiting kelp recovery and persistence of kelp refugia.

Partners and Contributors: TNC, UC Santa Barbara, F/V *Crazyhorse* (Commercial Sea Urchin Diver), Reef Check, the Department, and Urchin Processors at Noyo Harbor.

6.2.9. Sunflower Star: *Restoring Ecosystem Balance Following the Loss of an Apex Predator*

Background: The sunflower sea star (*Pycnopodia helianthoides*) is a significant predator in Northeastern Pacific nearshore ecosystems and can impose top-down pressure on urchins, thus promoting kelp proliferation (Heady et al., 2022). Beginning in 2013, sunflower sea star populations along the West Coast were significantly affected by SSWD, ultimately reducing populations by over 99% in California waters, resulting in the functional extinction of this species (Gravem et al. 2021). Numerous entities through the range of sunflower sea stars have been investigating the ecology and epidemiology of SSWD and are developing a pathway for the recovery of this species.

Goals: Identifying key steps necessary for recovery, securing funding, and developing strong partnerships and coordination for action.

Take-aways: The 2022 *Roadmap to Recovery for the Sunflower Sea Star*, was developed through TNC convening a working group of West Coast experts and managers and provides an overview of the species, status, and threats as well as identifies knowledge gaps and priority objectives and actions for informing recovery of the species. Unfortunately, since the onset of SSWD, the sunflower sea star has exhibited little natural recovery in California, necessitating the need for continued research and redundant captive breeding programs. The first subtidal sighting on the north coast since 2014 was in December of 2022 in Mendocino County by F/V *Crazyhorse*, and since, there have been a total of at least four recent (2022-2023) individual sightings of sunflower sea stars in Mendocino County.

Next Steps: Current studies are investigating the ecology and behavior of sunflower sea stars, SSWD and disease mitigation, expansion of captive breeding and rearing of the sunflower sea star and identifying best methodology for potential translocation.

Partners and Contributors: TNC, University of Washington, University of Oregon, the Department, Aquarium of the Pacific, California Academy of Sciences, Sunflower Sea Star Lab, and many others.

7. LOOKING AHEAD

The Department and OPC continue to explore novel tools and techniques to restore, enhance, protect, and manage California's kelp forest ecosystems. These efforts include the ongoing support in monitoring the kelp resource as well as urchin suppression and kelp enhancement practices, and the strategic release of competitive funds to catalyze research that will fill vital knowledge gaps and inform current and future regulatory actions and adaptive management. In addition, OPC and the Department anticipate releasing an update to the Kelp Action Plan in early 2024, which directly supports the development and implementation of the KRMP. Throughout KRMP planning and development, OPC and Department staff will continue to engage with California Native American tribes, KRMP SAC and CWG, FGC, stakeholders, and the ocean community to ensure that expert knowledge, and community perspectives support and inform the KRMP.

ACKNOWLEDGEMENTS

We would like to thank the following partners for their specific contributions to this document including Tristin McHugh (TNC), Nora Eddy (TNC), Rietta Hohman (GFA-GFNMS), Tom Ford (TBF), Annie Bauer-Civiello (RC), and Steve Lonhart (MBNMS). Additionally, we would like to thank the many partners and stakeholders (Figure 11) the Department and OPC work with to support kelp monitoring, research, and recovery efforts moving forward.

Figure 11. Non-exhaustive list of entities engaged in current kelp monitoring, research and recovery efforts in California.

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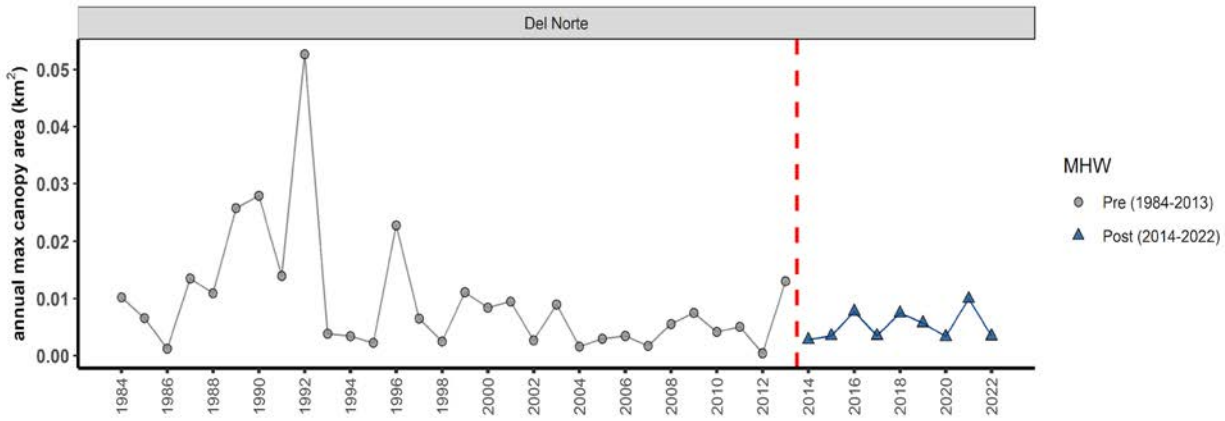
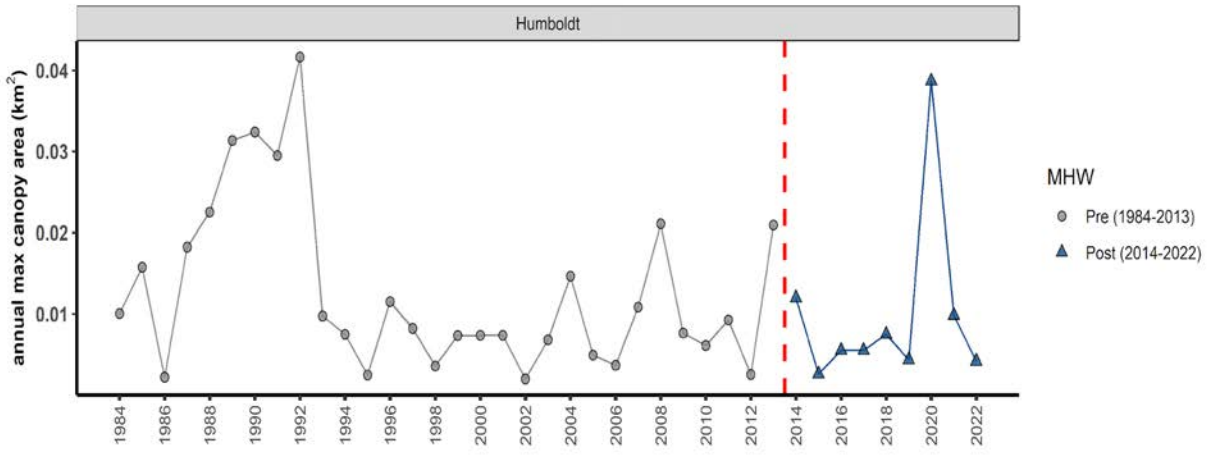
APPENDIX 1: Kelp Canopy Data by County

Landsat derived canopy data by California County from 1984 through the end of 2022 (Q4). The red dashed line indicates the onset of the MHW in 2014. Data Source: SBCLTER et al. 2022. Please note that San Fransico County is not included due to zero kelp canopy data over time.

Del Norte



Humboldt



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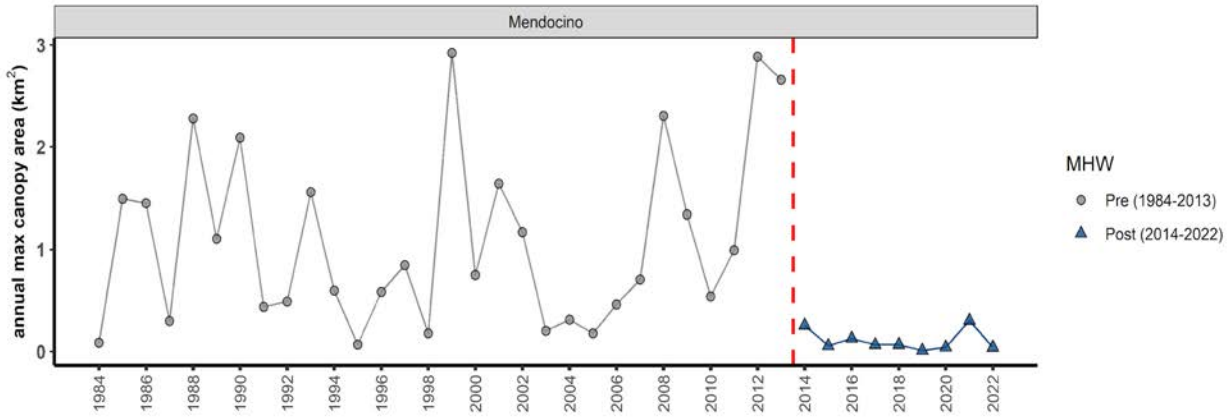
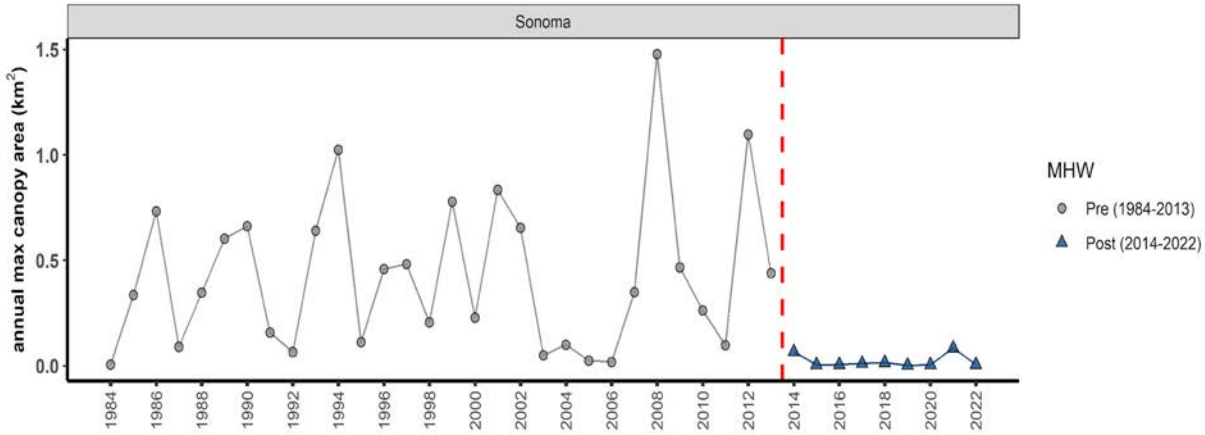
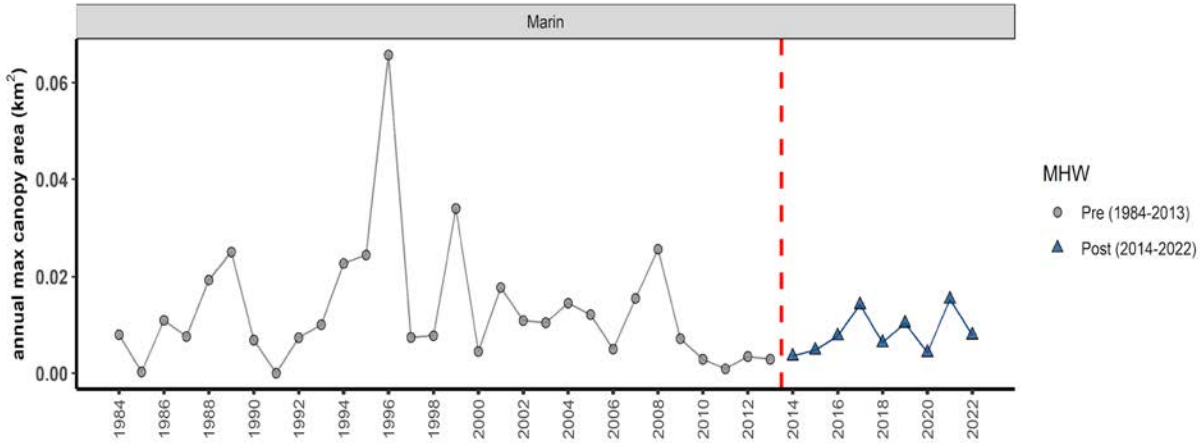


Sonoma

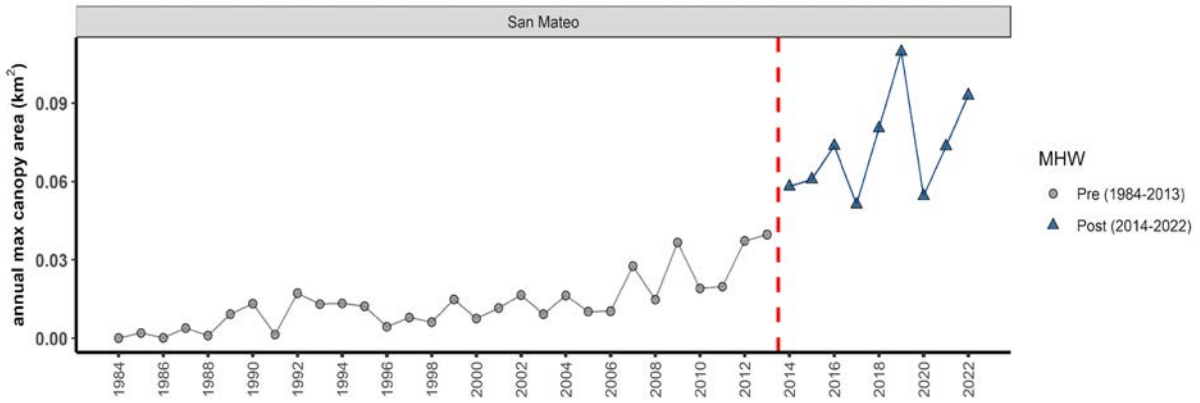


Marin



San Francisco: no kelp canopy data for San Fransico county

San Mateo



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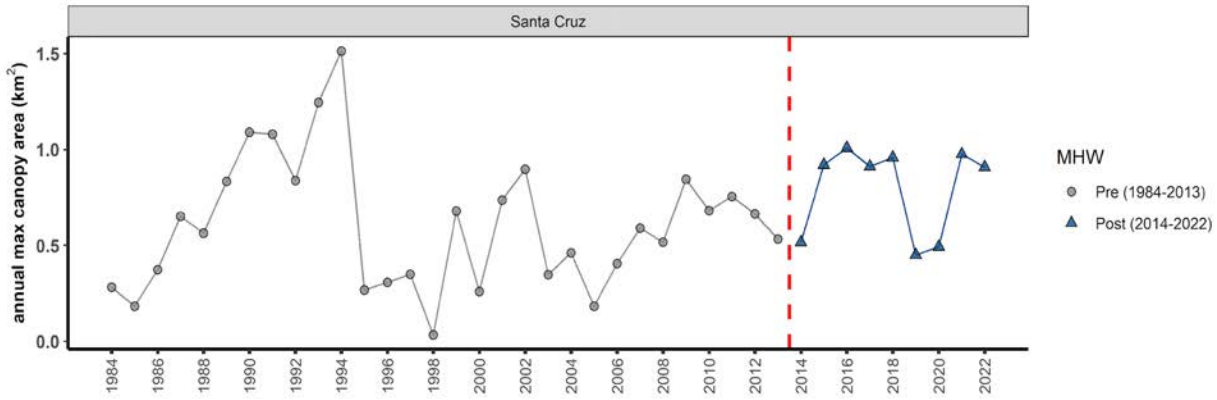

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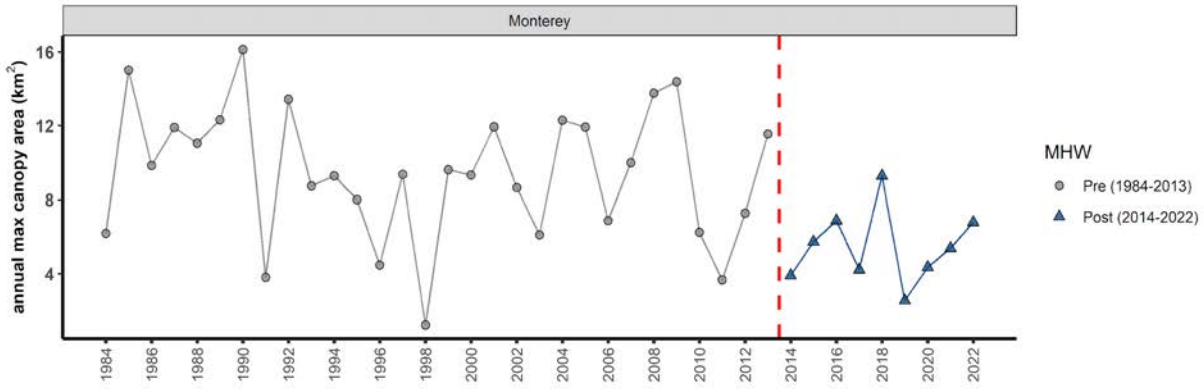

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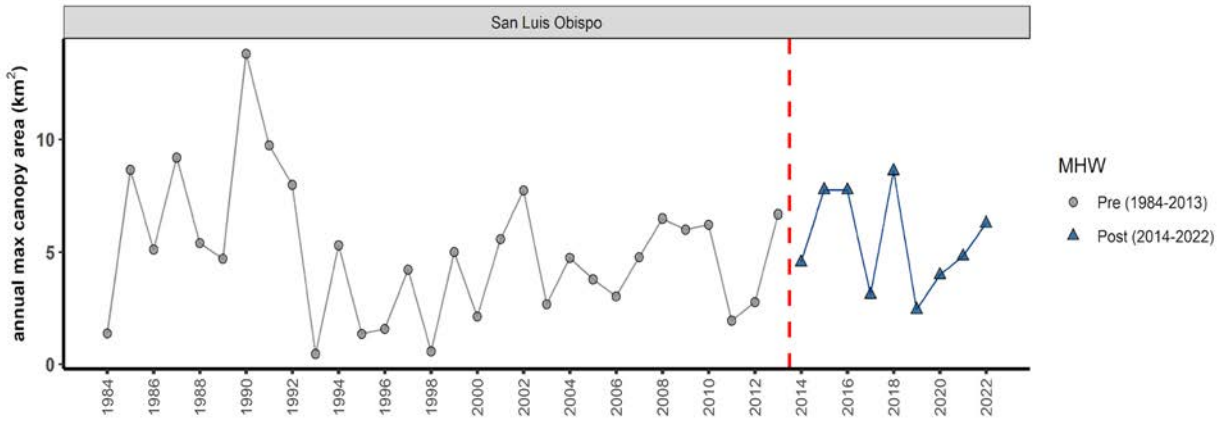
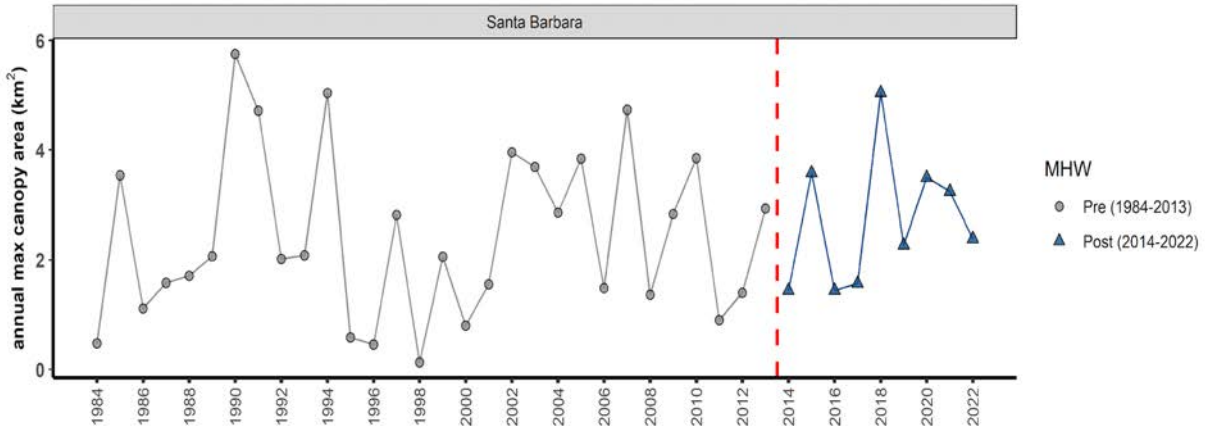


Santa Barbara (mainland)



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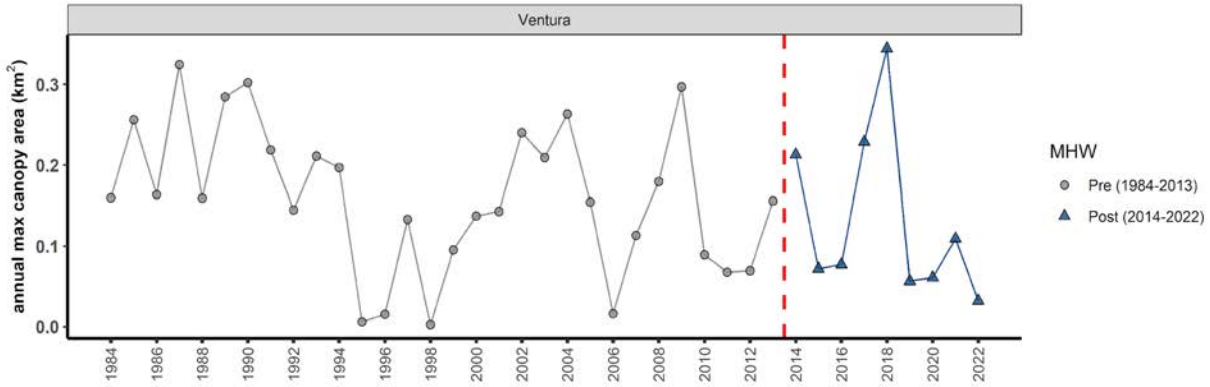

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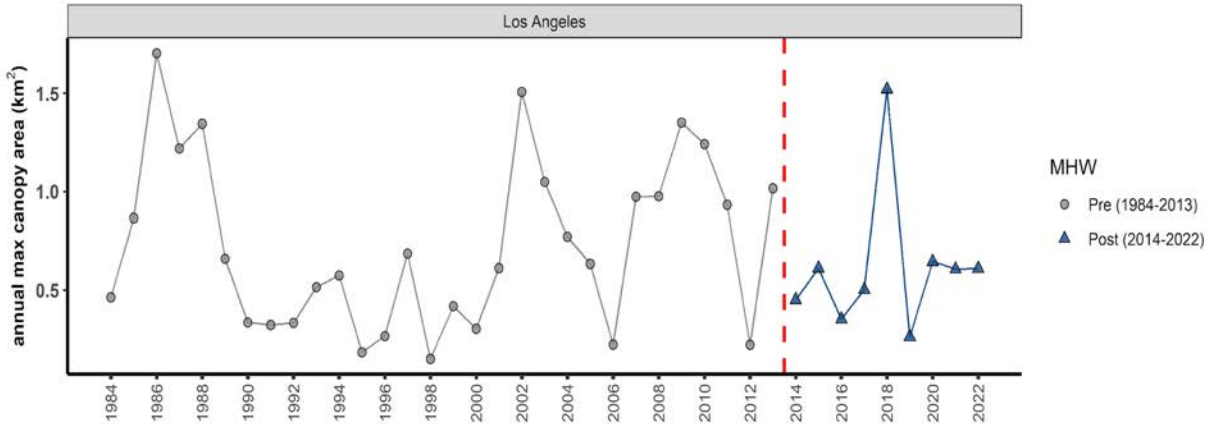
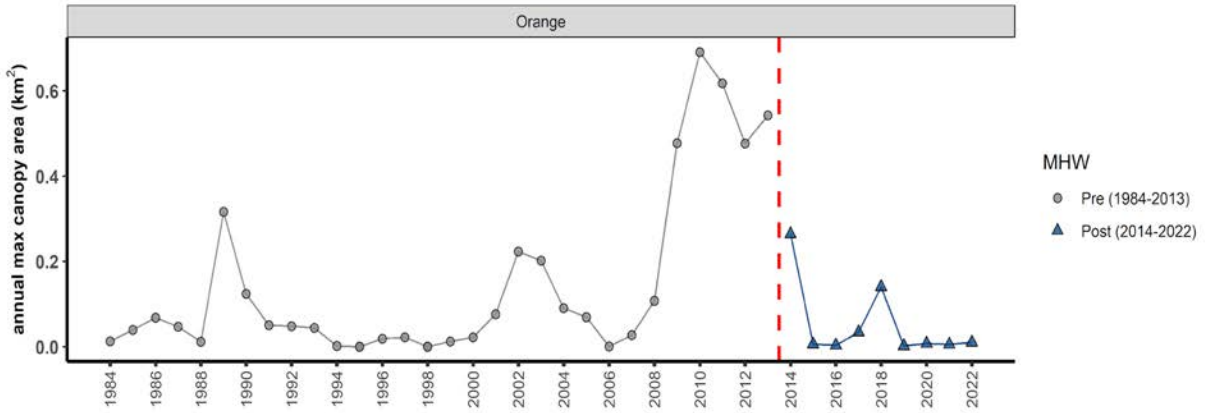
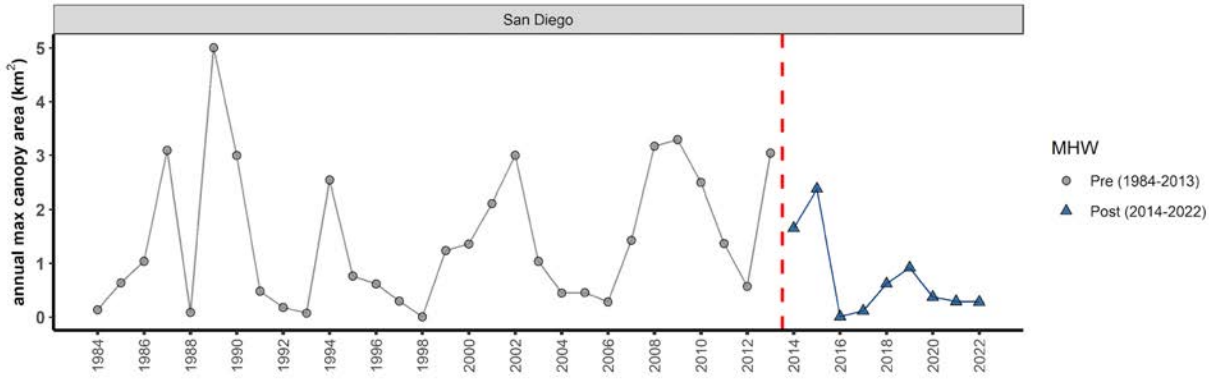


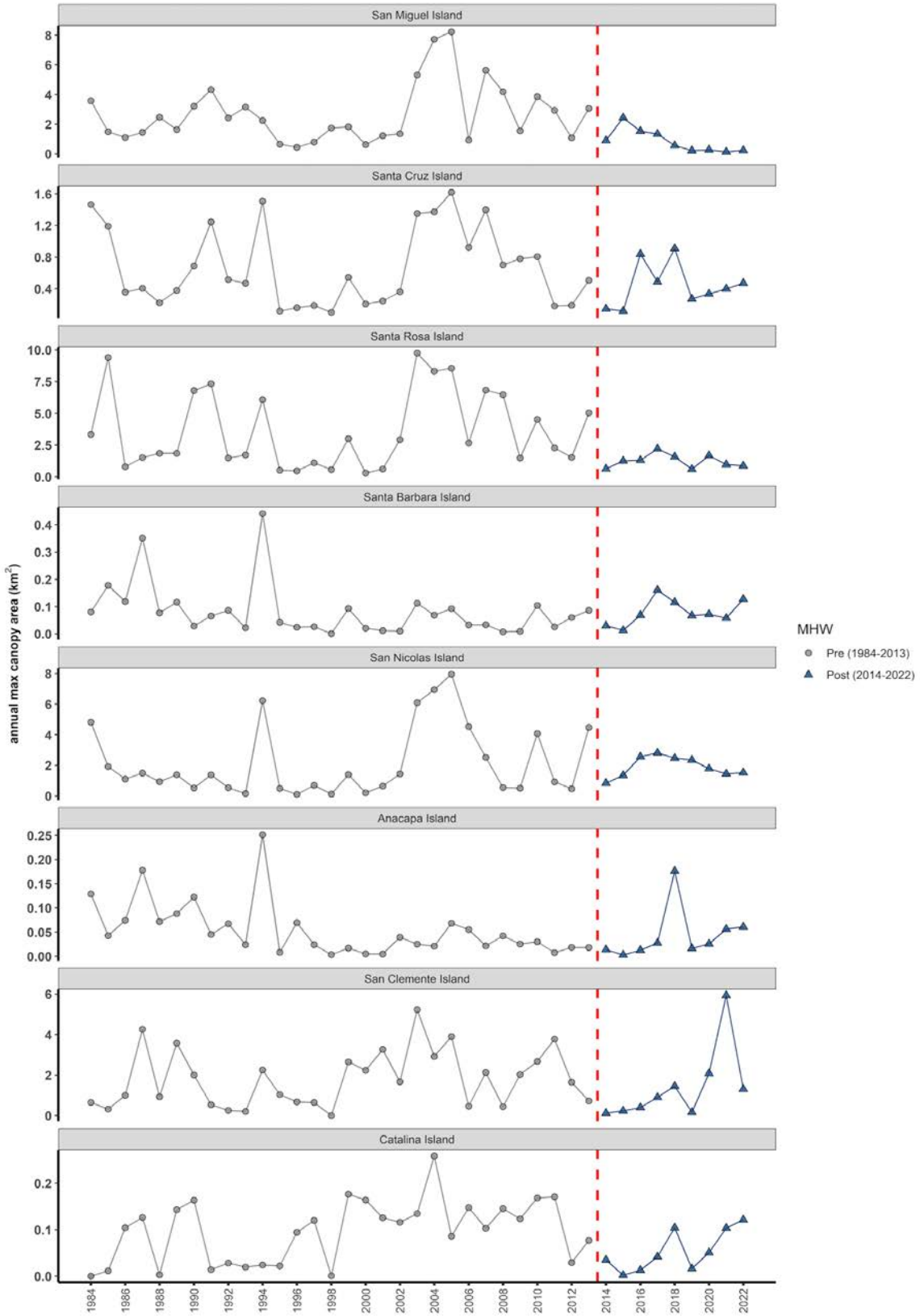
Orange



San Diego



Channel Islands (all)



Agenda Item 4: Kelp Restoration Update

16 November 2023

Presented to:

Marine Resources Committee

Fish and Game Commission

Presented by:

Dr. Kristen Elsmore

Senior Environmental Scientist Specialist

Marine Region

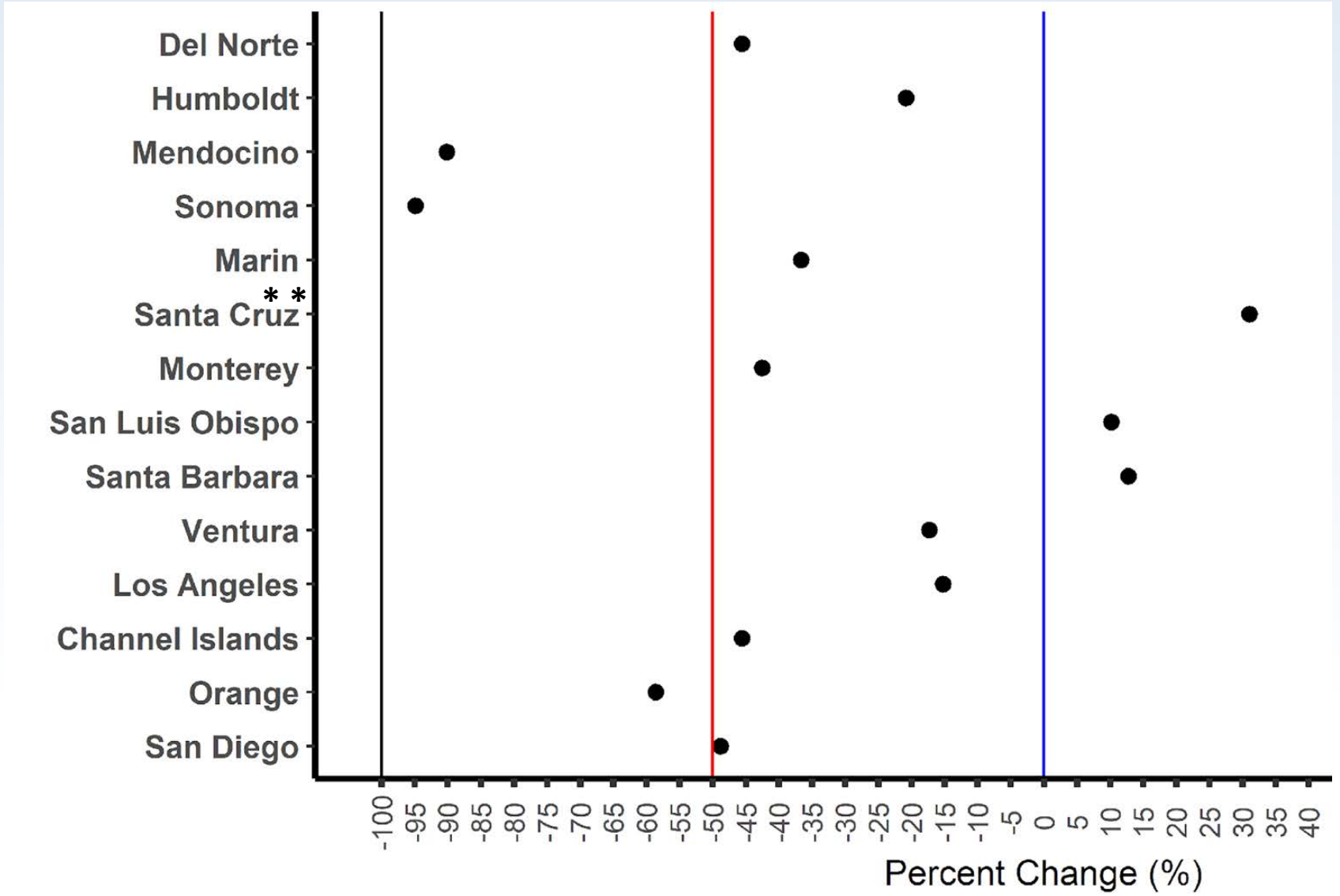
Overview

- Kelp Canopy Status and Trends
- Overview of Select Research and Restoration Efforts
- Upcoming Opportunities for Kelp
- Development of Kelp Restoration and Management Plan (KRMP)


PC: K. Elsmore


PC: K. Elsmore

Changes in Kelp Canopy Across the State



Exploring Tools for the Restoration Toolkit

- Urchin suppression techniques
  - Urchin culling by commercial divers
  - Urchin culling by recreational divers
  - Experimental traps
- Kelp enhancement techniques
  - Spore bags
  - Seeded substrates and lines
  - Concentrated spore solution

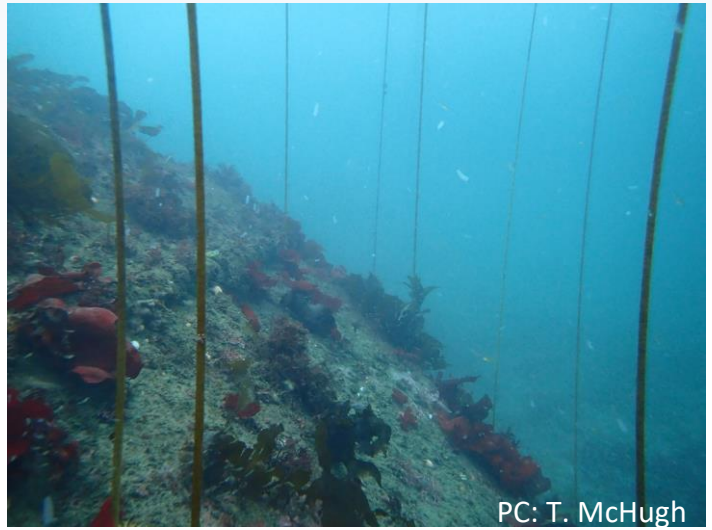
Building a Toolkit: Restoration Underway

Restoration Site	Urchin Suppression				Kelp Enhancement
	Commercial Hand-Harvest	Recreational Culling	Commercial Culling (SCP)	Exp. Trapping	
Noyo Bay	X			X	
Caspar Cove		X		X	
Albion Cove	X				X
Fort Ross	X				X
Timber Cove	X				
Drakes Bay					X
Tanker Reef		X			
Palos Verdes			X		

Urchin Suppression: Commercial Hand-Harvest

- **Sites:** Noyo Bay
- **Goal:** Efficacy of commercial harvest to maintain less than 2 urchin/meter^2 density
- **Takeaways:**
  - Strong partnerships and collaboration
  - Urchin densities reduced
  - Initial bull kelp regrowth
  - Timeframe (< 2 yrs) was short-lived
- **Next Steps:**
  - Continued research

PC: K. Elsmore


PC: T. McHugh

Urchin Suppression: Recreational Culling

- **Sites:** Caspar Cove and Tanker Reef
- **Goal:** Efficacy of urchin culling via recreational divers
- **Takeaways:**
  - Successful coordination of recreational divers
  - Caspar: Delayed effort due to COVID-19
    - Increased diver effort in 2022
  - Tanker: Urchin densities reduced; initial kelp regrowth
- **Next Steps:**
  - Pending regulatory decision process


PC: K. Elsmore


PC: K. Elsmore

Urchin Suppression & Kelp Enhancement

- **Sites:** Albion Cove (Mendocino); Fort Ross (Sonoma)
- **Goal:** Test kelp enhancement techniques alongside urchin suppression efforts
- **Take Aways:**
  - Albion: Bull kelp recruitment through spore bags and seeded lines
  - Fort Ross: Outplanting of spore bags and seeded substrates
- **Next Steps:**
  - Continue urchin suppression and monitoring of kelp recruitment

Kelp Enhancement

- **Site:** Drakes Bay (Marin County)
- **Goals:** Establish bull kelp refugia and characterize interconnectivity between coastal habitats
- **Takeaways:**
  - Outplanting of seeded twine on substrate and “reef dusting”
  - Drone + ROV monitoring
- **Next Steps:**
  - Monitoring of kelp recruitment


PC: R. Hohman


PC: R. Hohman

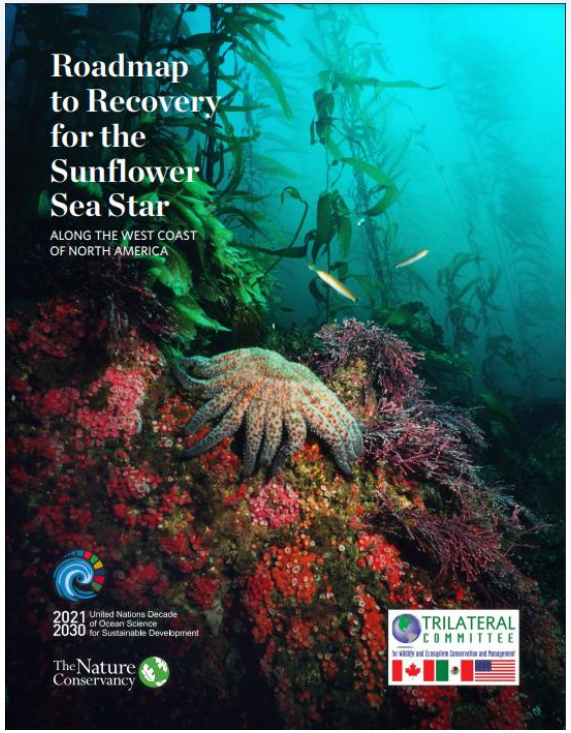
Commercial Urchin Culling (SCP)

- **Site:** Palos Verdes (Los Angeles County)
- **Goals:** Restoration via urchin culling by commercial divers
- **Takeaways:**
  - 58 acres of kelp forest restored since 2013
  - Minimal maintenance of restoration sites
  - Increases in giant kelp, inverts, fish diversity and biomass, and red urchin gonad weight
- **Next Steps:**
  - Continued monitoring pre/post-culling and reference sites

Sunflower Sea Stars (*Pycnopodia helianthoides*)

- Status of Sunflower Star in CA
  - Little-to-no recovery
  - First subtidal sightings since initial loss (Mendocino County, Dec. 2022)
- Roadmap to Recovery (2022)
  - Overview of the species, status, and threats
  - Identifies knowledge gaps
  - Priority objectives and actions for informing recovery


PC: G. Downie



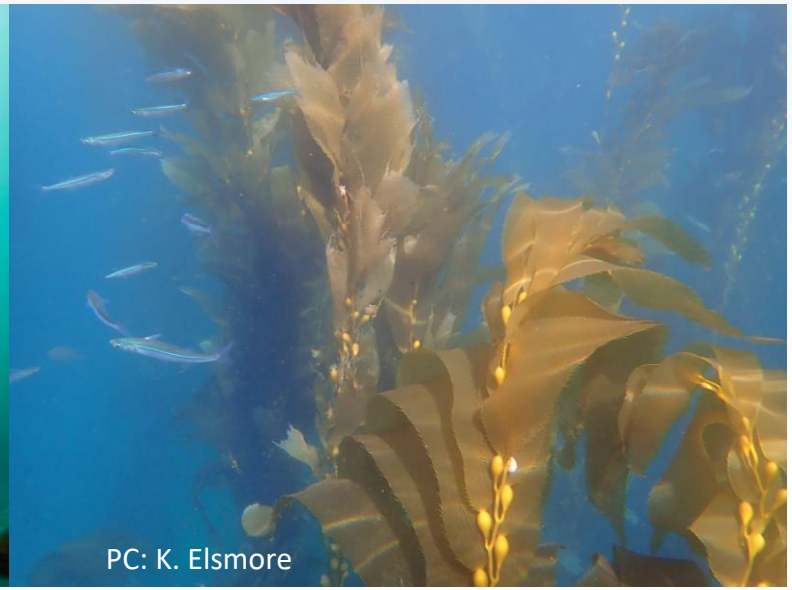
Broad, Collaborative Efforts Across the State

Accelerating Kelp Research and Restoration

- $5 million for state-funded Accelerating Kelp Research and Restoration in California


PC: S. Kawana


PC: A. Dias


PC: K. Elsmore

Kelp Restoration and Management Plan

Goal:

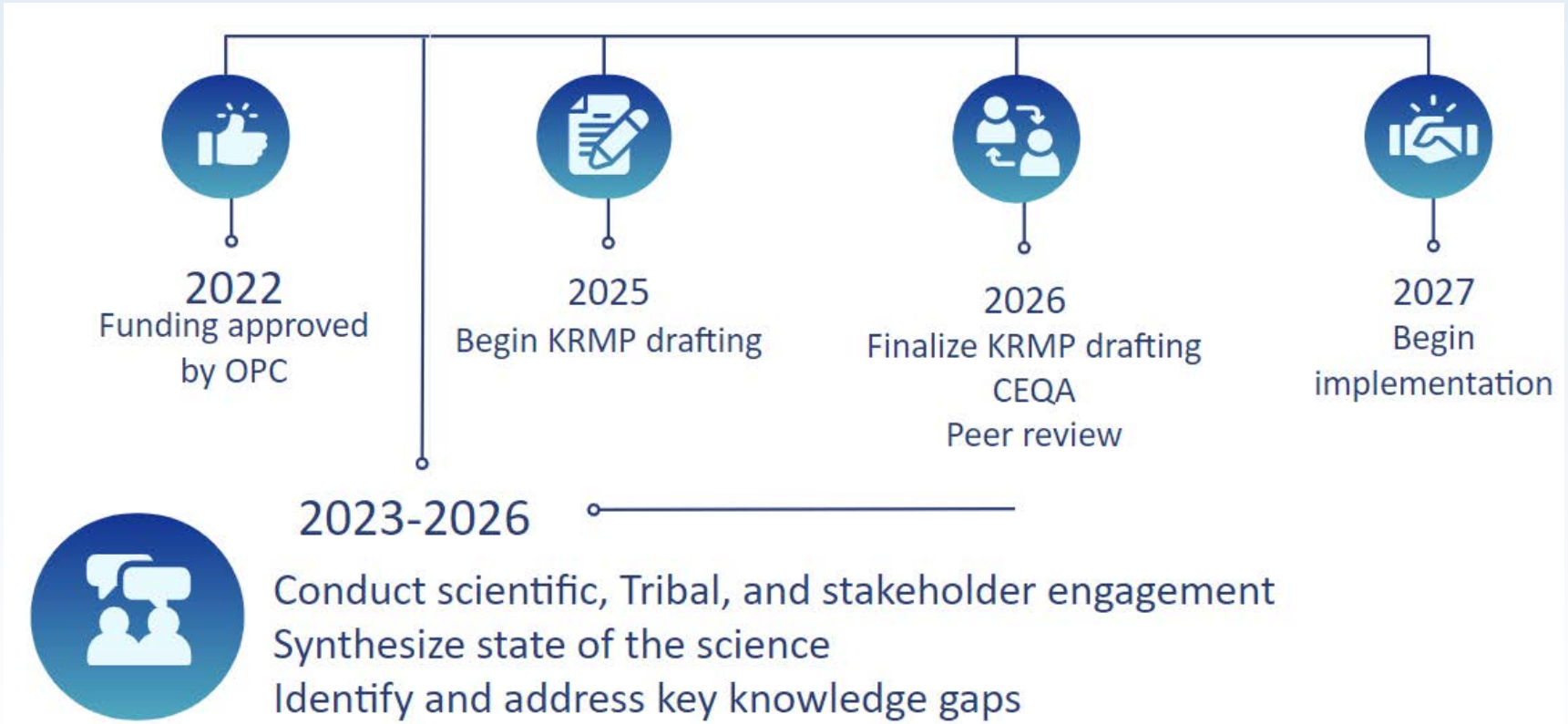
To develop a robust, adaptive, climate-ready approach to managing, protecting, and restoring giant and bull kelp forest ecosystems statewide for consideration and adoption by the Fish and Game Commission

Core components:

- Ecosystem-based management approach
- Adaptive kelp harvest framework
- Restoration Toolkit

Kelp Restoration and Management Plan Timeline

- Tribal Engagement
- Community Working Group
- Scientific Advisory Committee



Kelp Restoration and Management Plan Milestones

2023 KRMP Milestones

- Community Working Group (CWG): Solicitation and establishment
  - First Community Working Group meeting (July)
- Establishment of Science Advisory Committee (SAC)
  - First SAC meeting (September)
  - Second in-person SAC meeting (December)
- Tribal Roundtable Listening Sessions (June)
  - Representatives from several California tribal nations to sit on the CWG and SAC

Summary

- Kelp Canopy Data
  - Persistent kelp loss in the north coast
  - Different patterns of loss and recovery across the state
- Research and Recovery Efforts
  - Broad suite of collaborative efforts across the state
  - Will inform KRMP development
- Kelp Restoration and Management Plan
  - Plan development funded by OPC
  - Initiating science, tribal, and stakeholder engagement

Thank You!

- kelp@wildlife.ca.gov

- https://wildlife.ca.gov/Conservation/Marine/Kelp
- https://marinespecies.wildlife.ca.gov/kelp/true/
- https://www.opc.ca.gov/webmaster/ftp/pdf/agenda_items/20210216/Item7_KelpActionPlan_ExhibitA_FINAL.pdf

MPA Enforcement Report

July 2023

Assistant Chief Eric Kord
Marine Enforcement District

MPA Enforcement Stats 2022 Totals

2022

- Patrol Hours – 15,143 Hrs.
- Contacts – 25,845
- Warnings Given – 889
- Citations issued- 612
- MPA Citations Issued – 602
- Total MPA violations – 825
- Title 14 section 632 violations – 422

- ***Change to RMS in tracking all MPA citations and violation***

MPA Enforcement Stats 2022 and 2021 Totals in Comparison

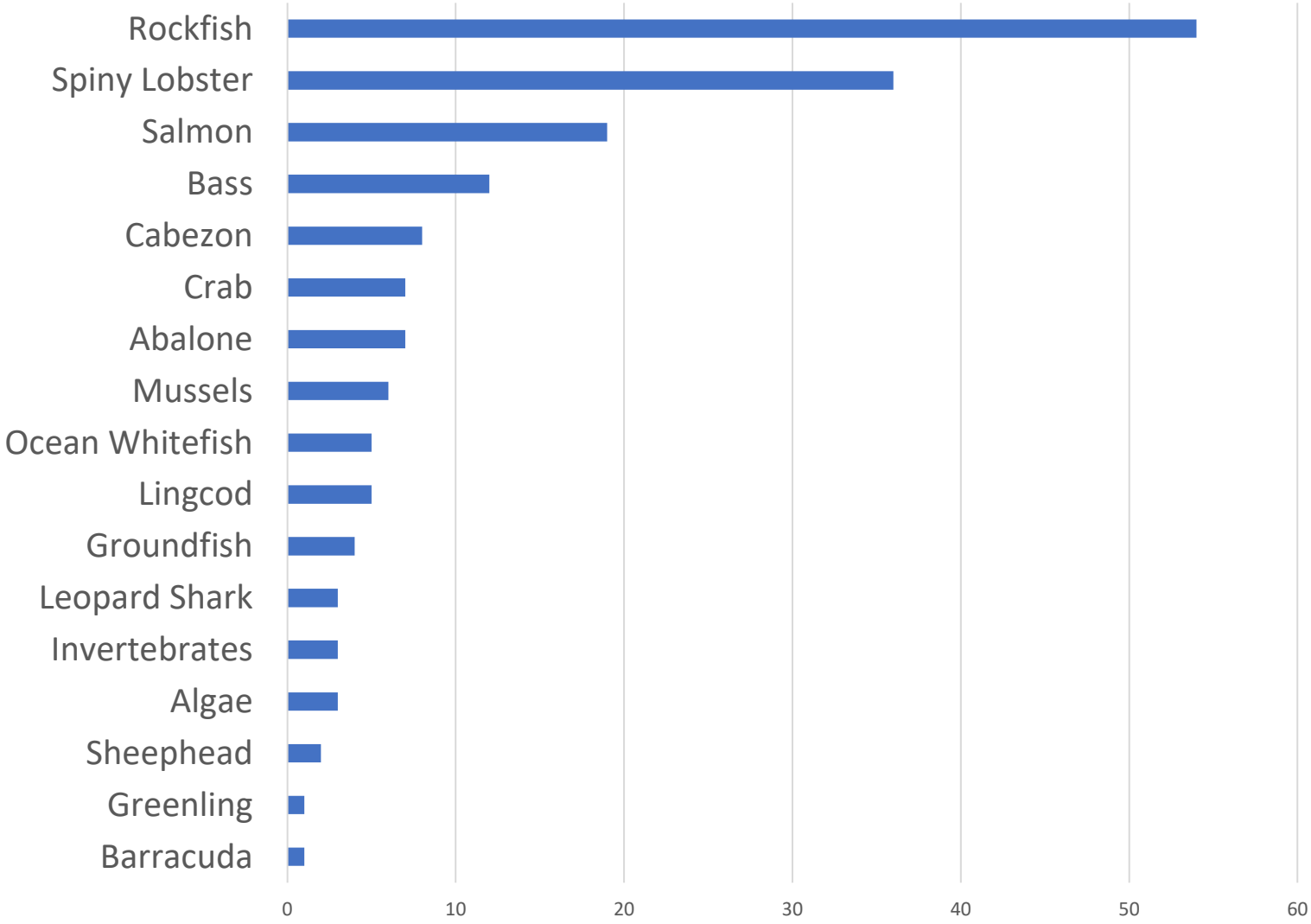
2022 (post RMS change)

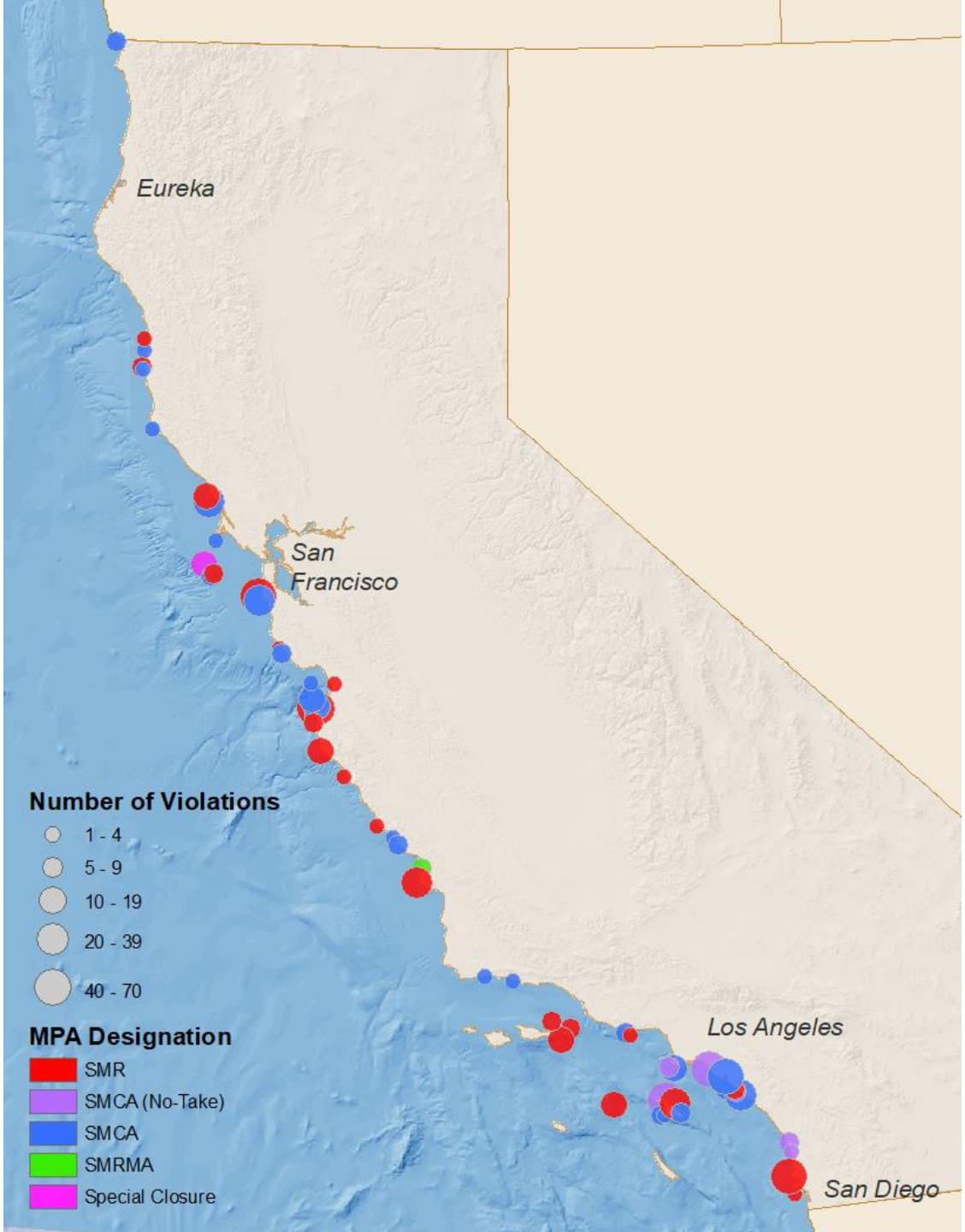
- Patrol Hours – 15,143 Hrs.
- Contacts – 25,845
- Warnings Given – 889
- Citations issued- **612**
- MPA Citations Issued – **602**
- Total MPA violations – **825**
- Title 14 section 632 violations – **422**

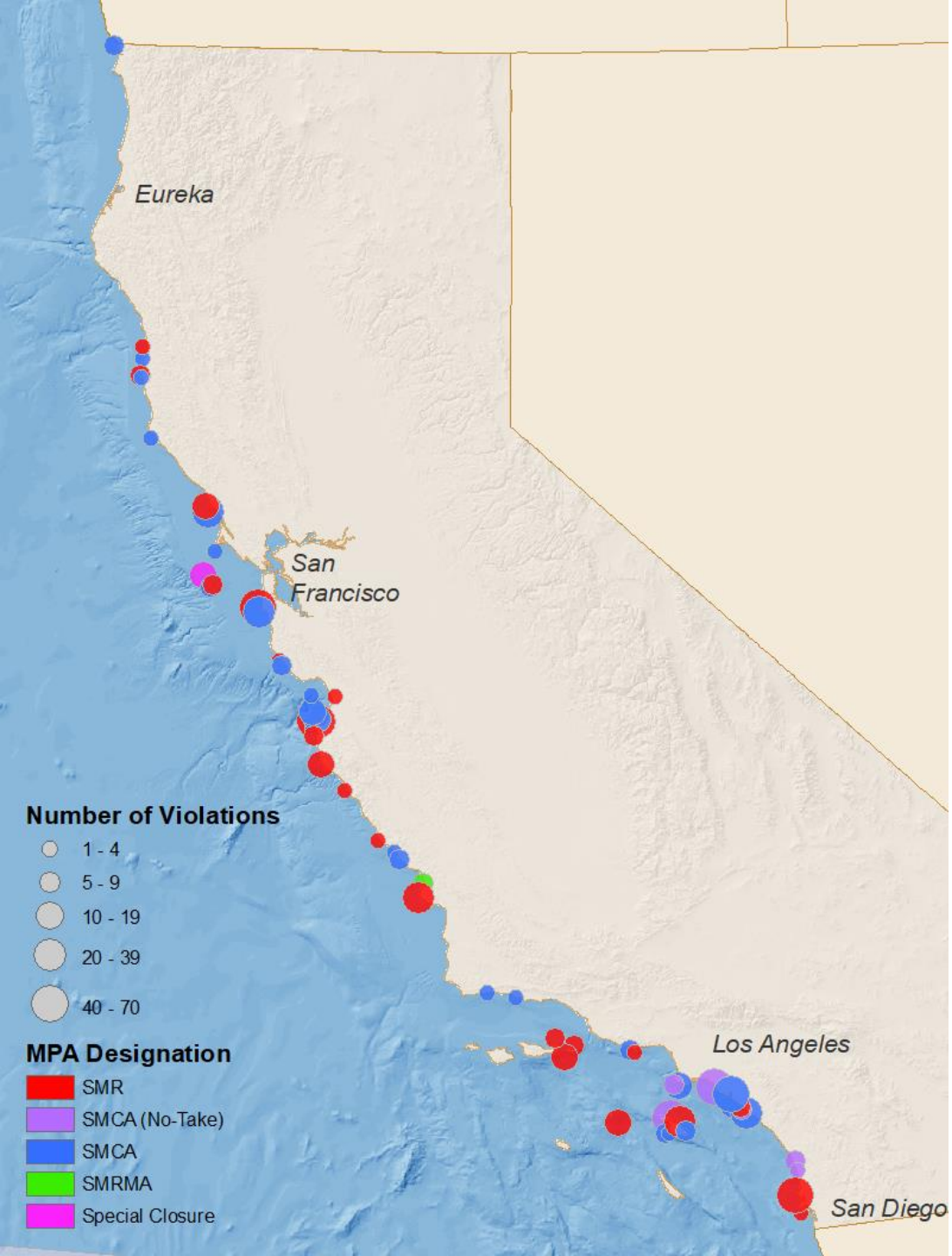
2021 (pre RMS change)

- Patrol Hours – 16,363 Hrs.
- Contacts – 32,441
- Warnings Given – 1,366
- Citations Issued – **665**
- MPA Title 14 632 violations- **271**

Violations by Species and Species Groupings in MPAs




Eureka
San Francisco
Los Angeles
San Diego
Number of Violations
1 - 4
5 - 9
10 - 19
20 - 39
40 - 70
MPA Designation
SMR
SMCA (No-Take)
SMCA
SMRMA
Special Closure


Eureka
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Number of Violations
1 - 4
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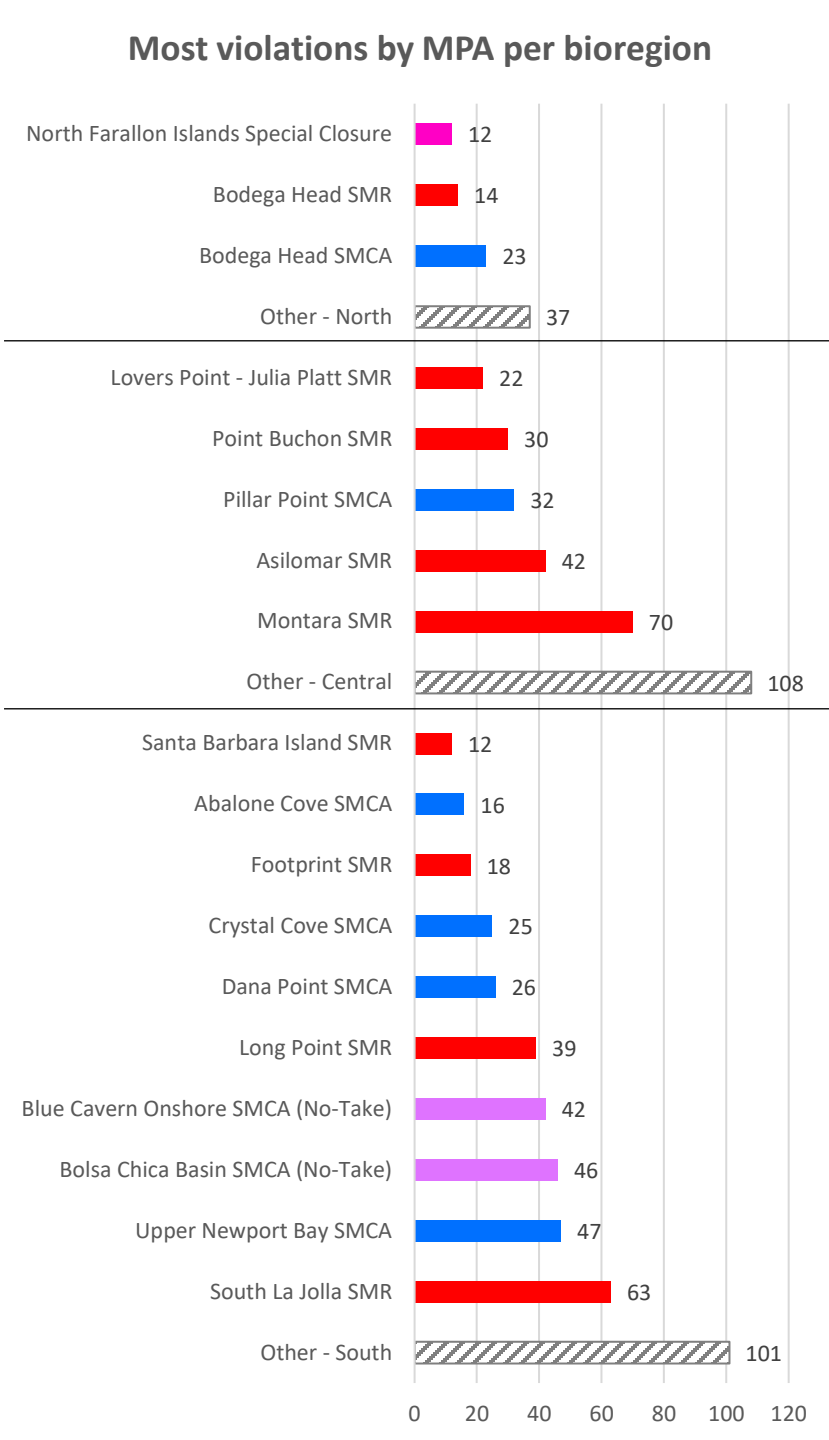
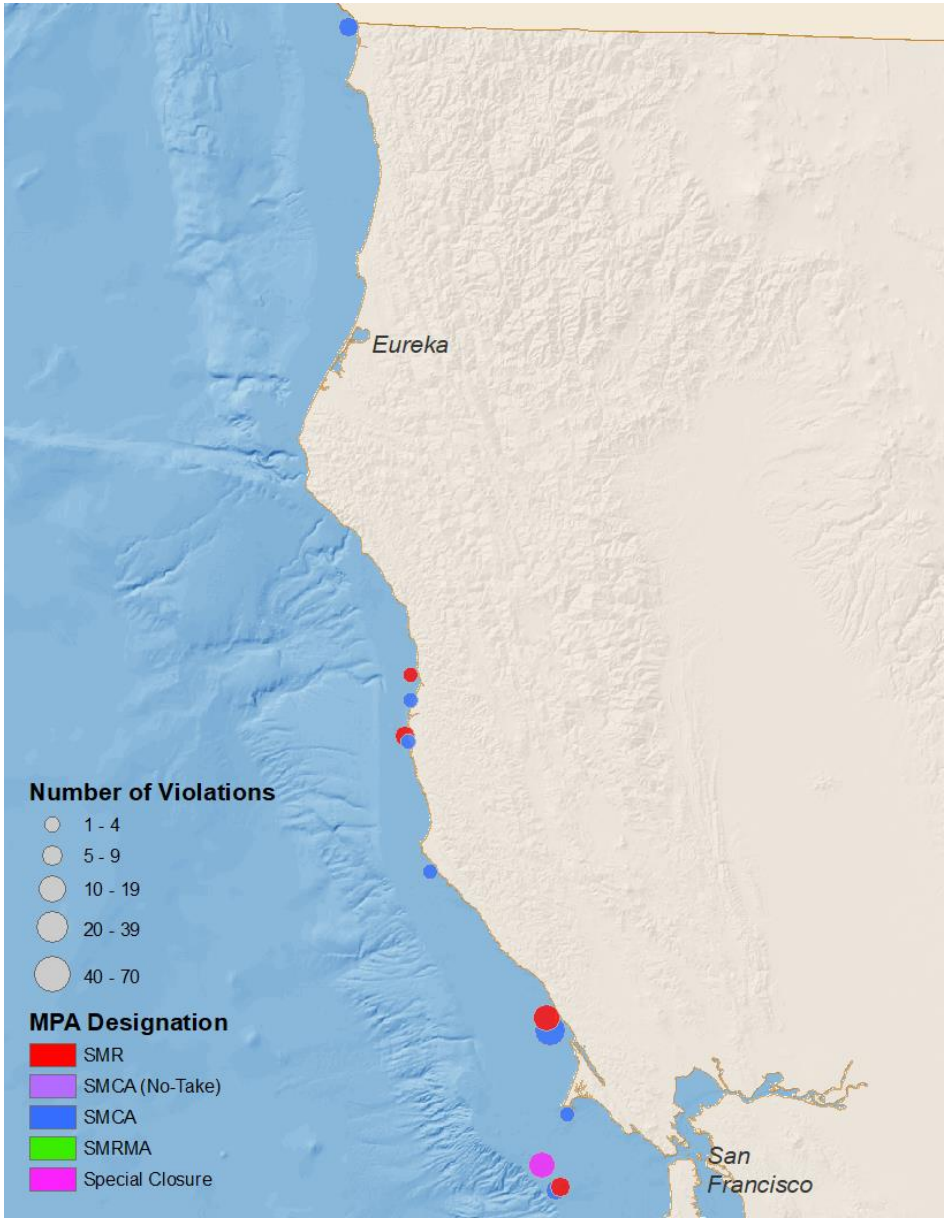
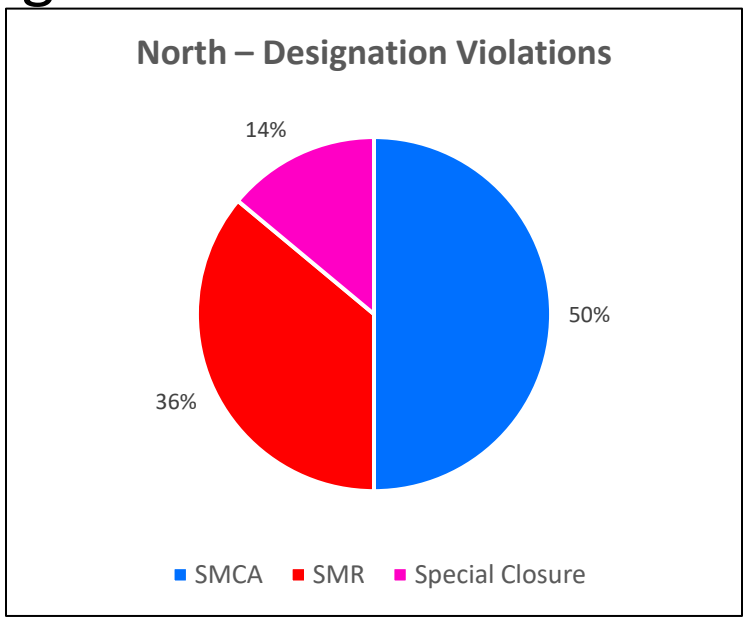
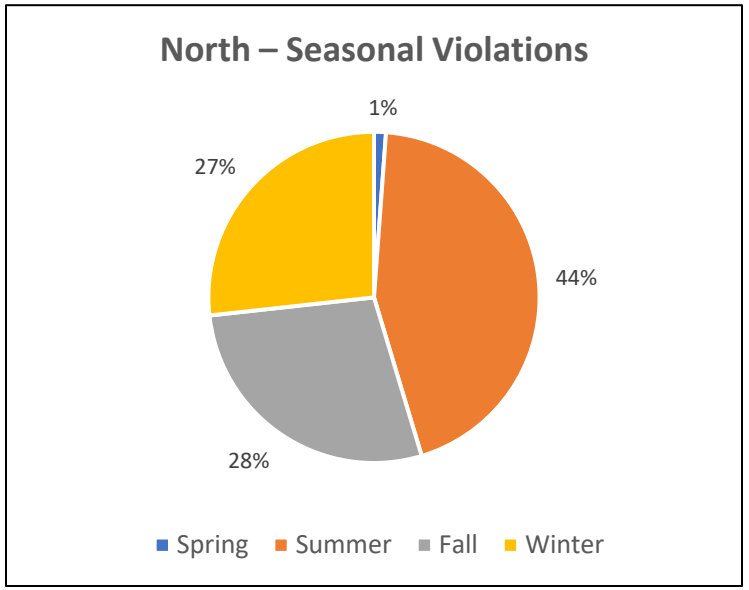
MPA Designation
SMR
SMCA (No-Take)
SMCA
SMRMA
Special Closure


Most violations by MPA per bioregion
North Farallon Islands Special Closure 12
Bodega Head SMR 14
Bodega Head SMCA 23
Other - North 37
Lovers Point - Julia Platt SMR 22
Point Buchon SMR 30
Pillar Point SMCA 32
Asilomar SMR 42
Montara SMR 70
Other - Central 108
Santa Barbara Island SMR 12
Abalone Cove SMCA 16
Footprint SMR 18
Crystal Cove SMCA 25
Dana Point SMCA 26
Long Point SMR 39
Blue Cavern Onshore SMCA (No-Take) 42
Bolsa Chica Basin SMCA (No-Take) 46
Upper Newport Bay SMCA 47
South La Jolla SMR 63
Other - South 101
0 20 40 60 80 100 120

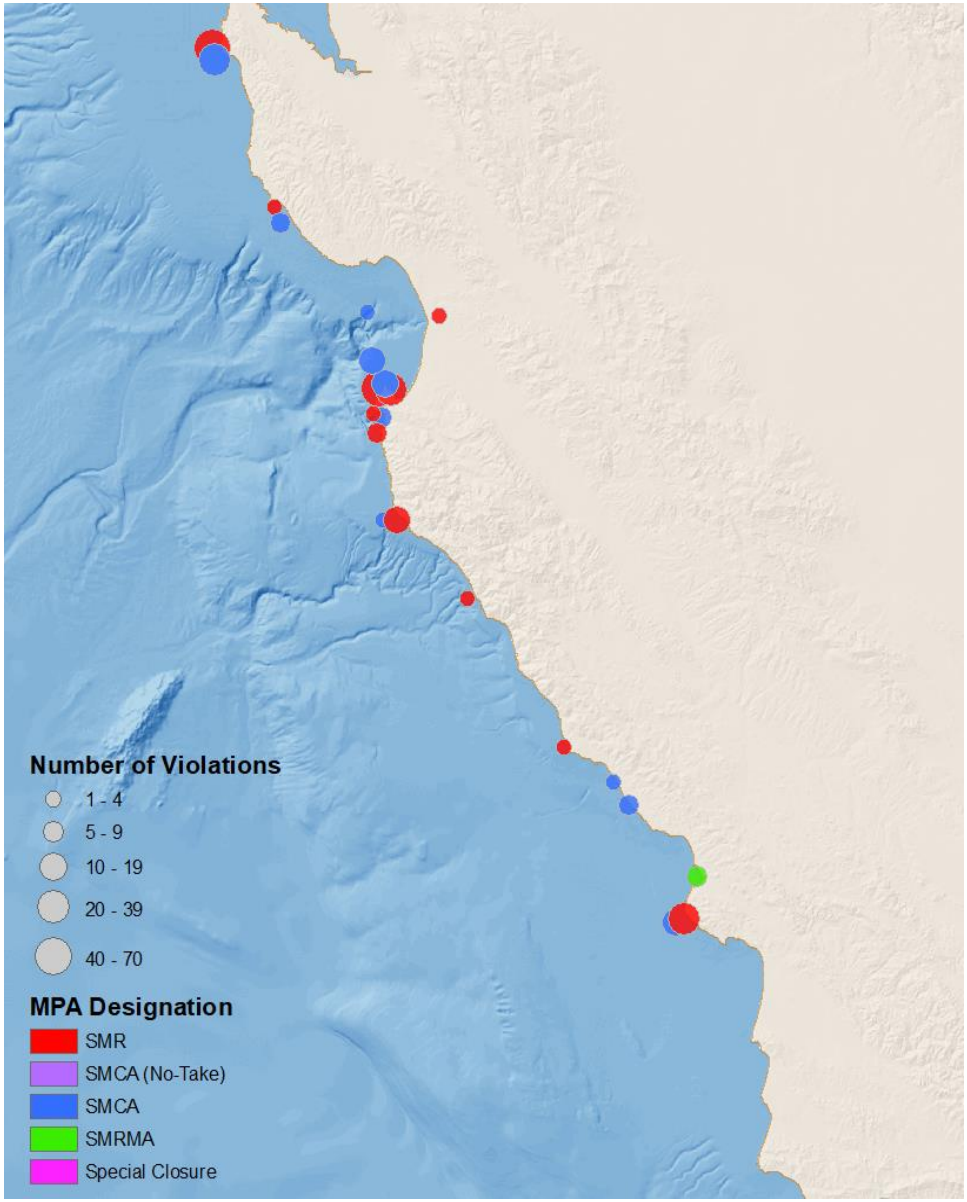
North Coast Bioregion

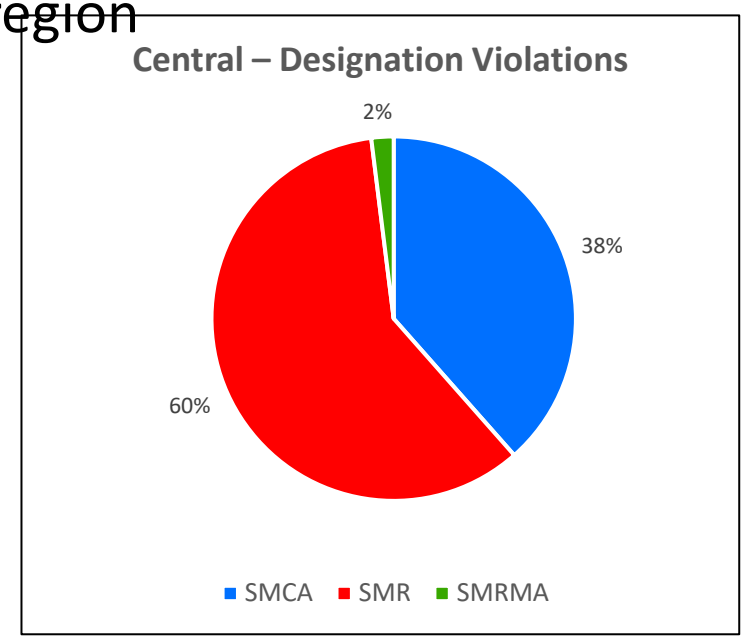


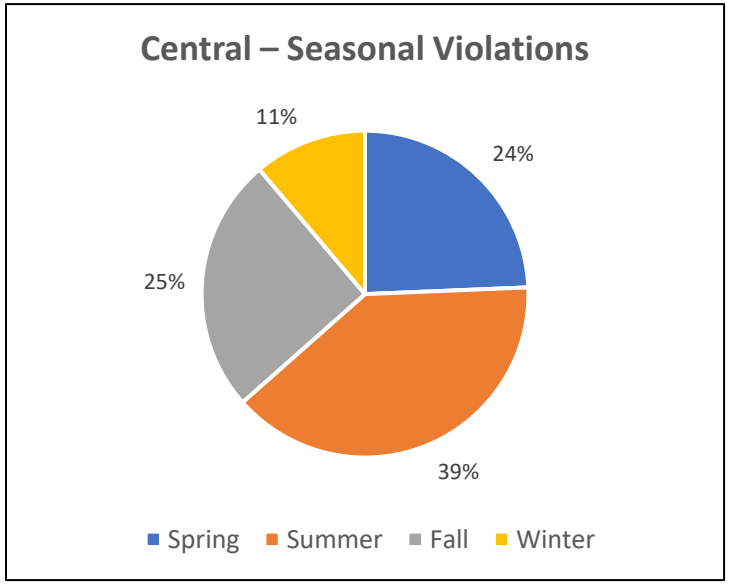




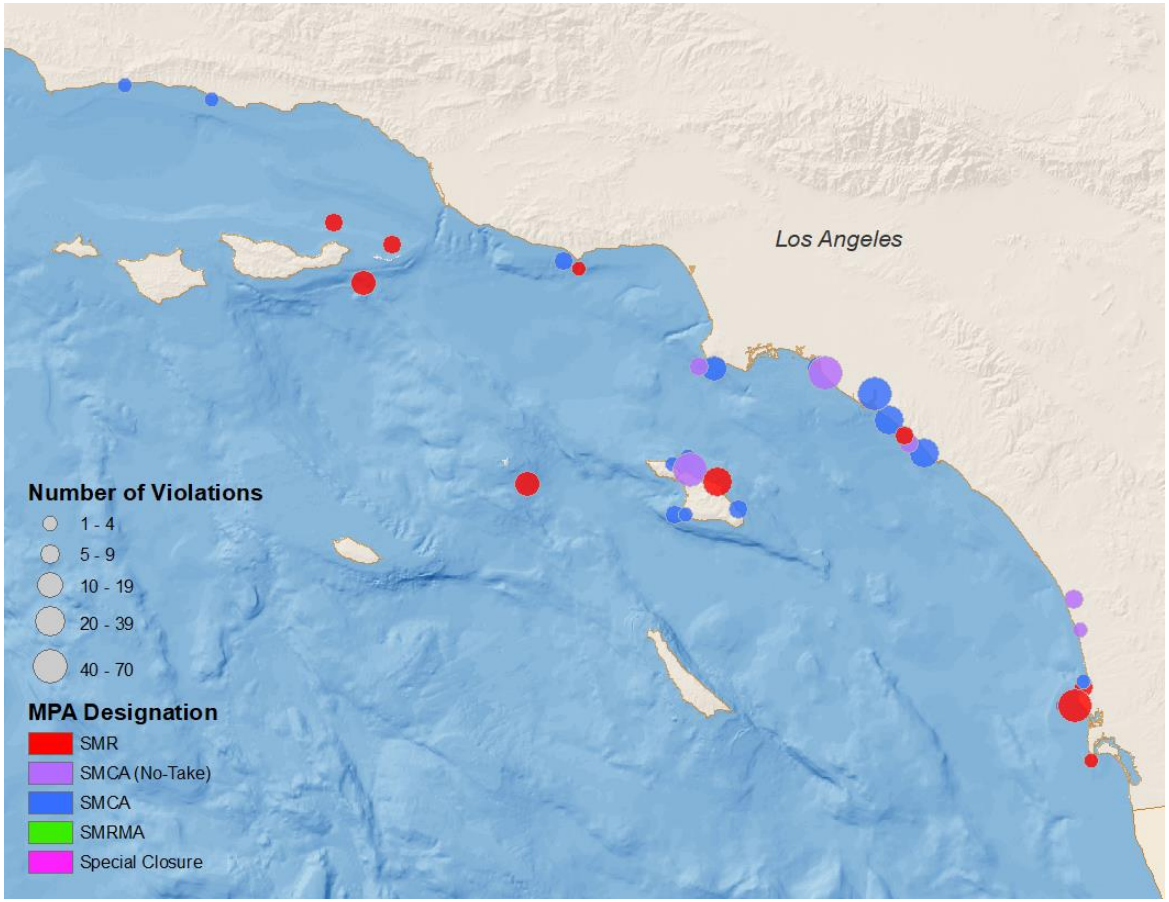
Central Coast Bioregion

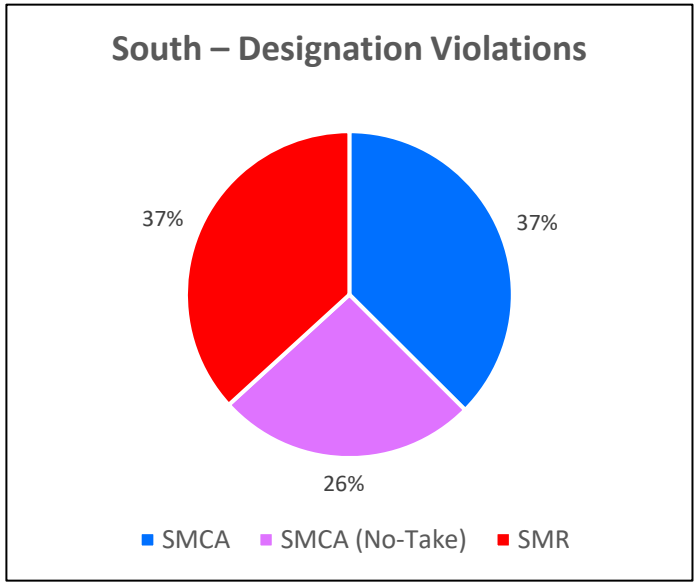


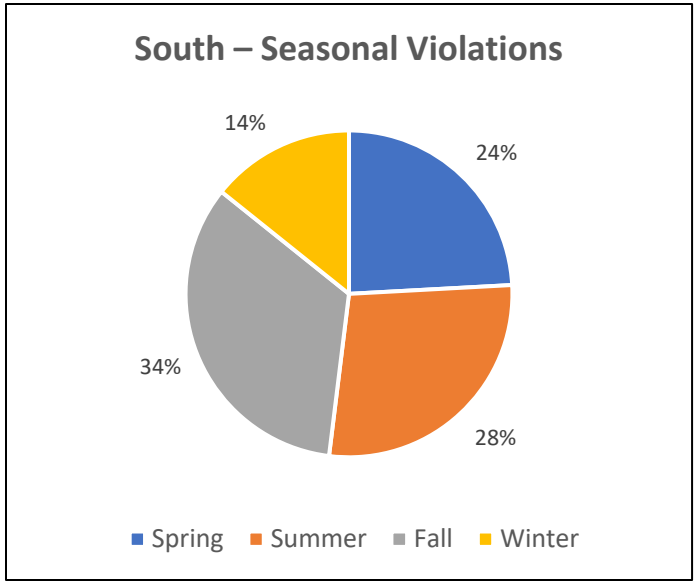




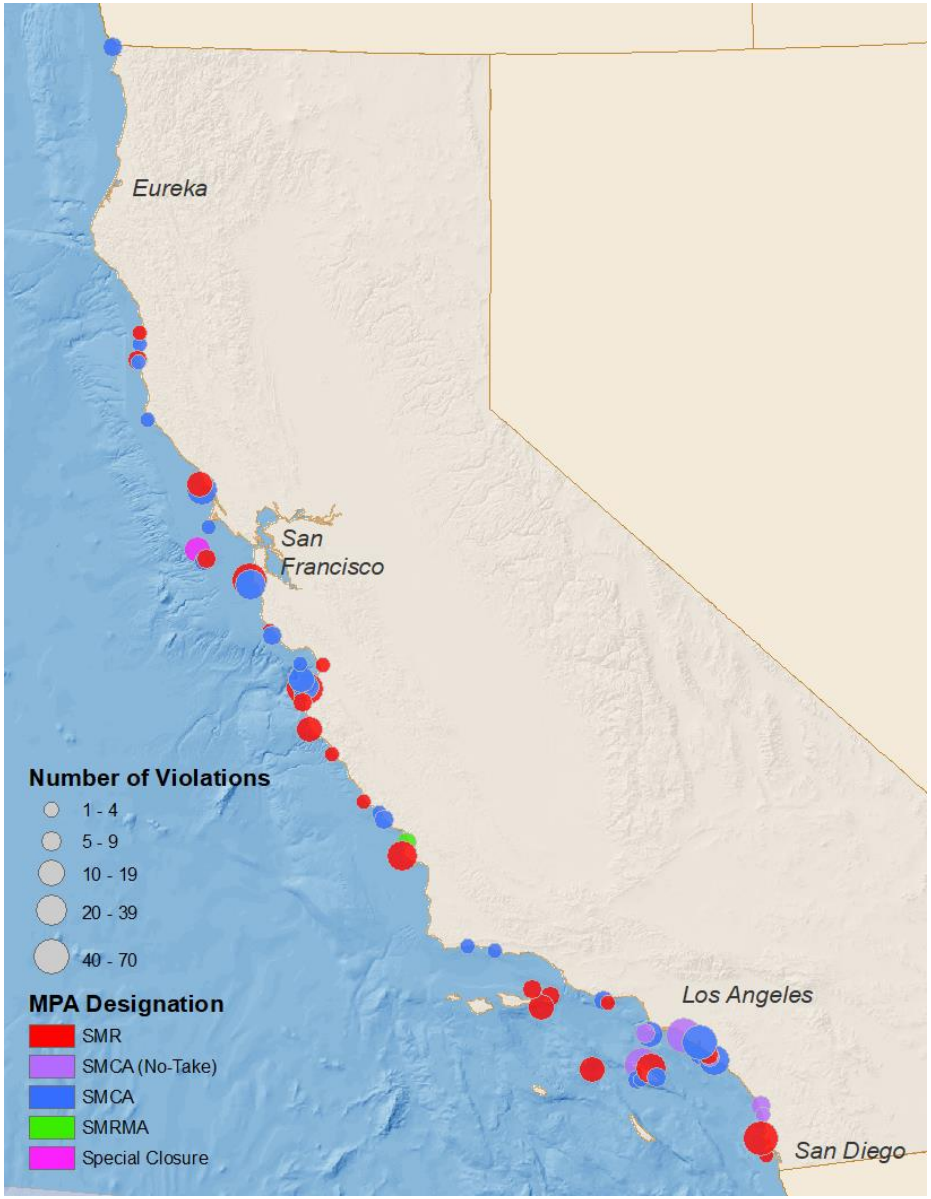
South Coast Bioregion

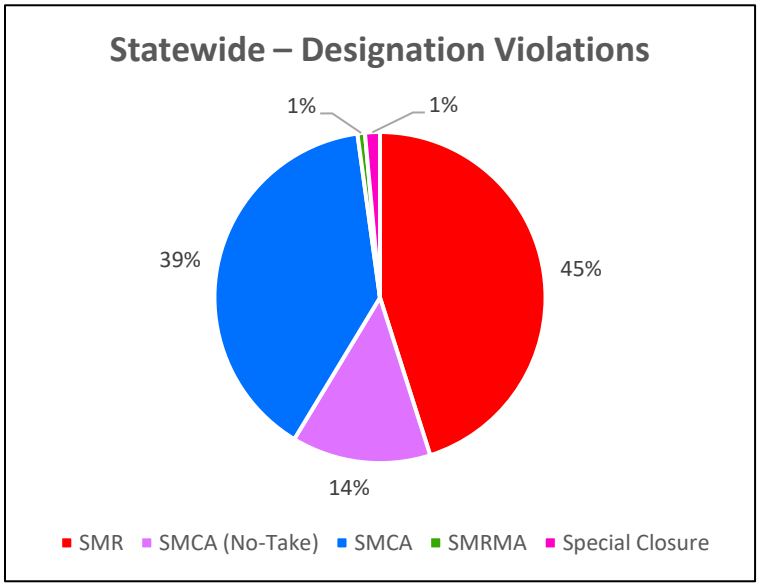


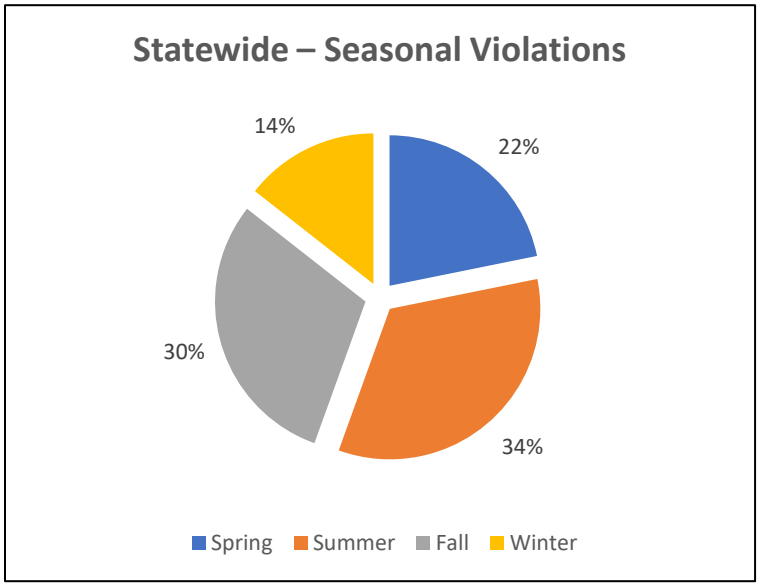




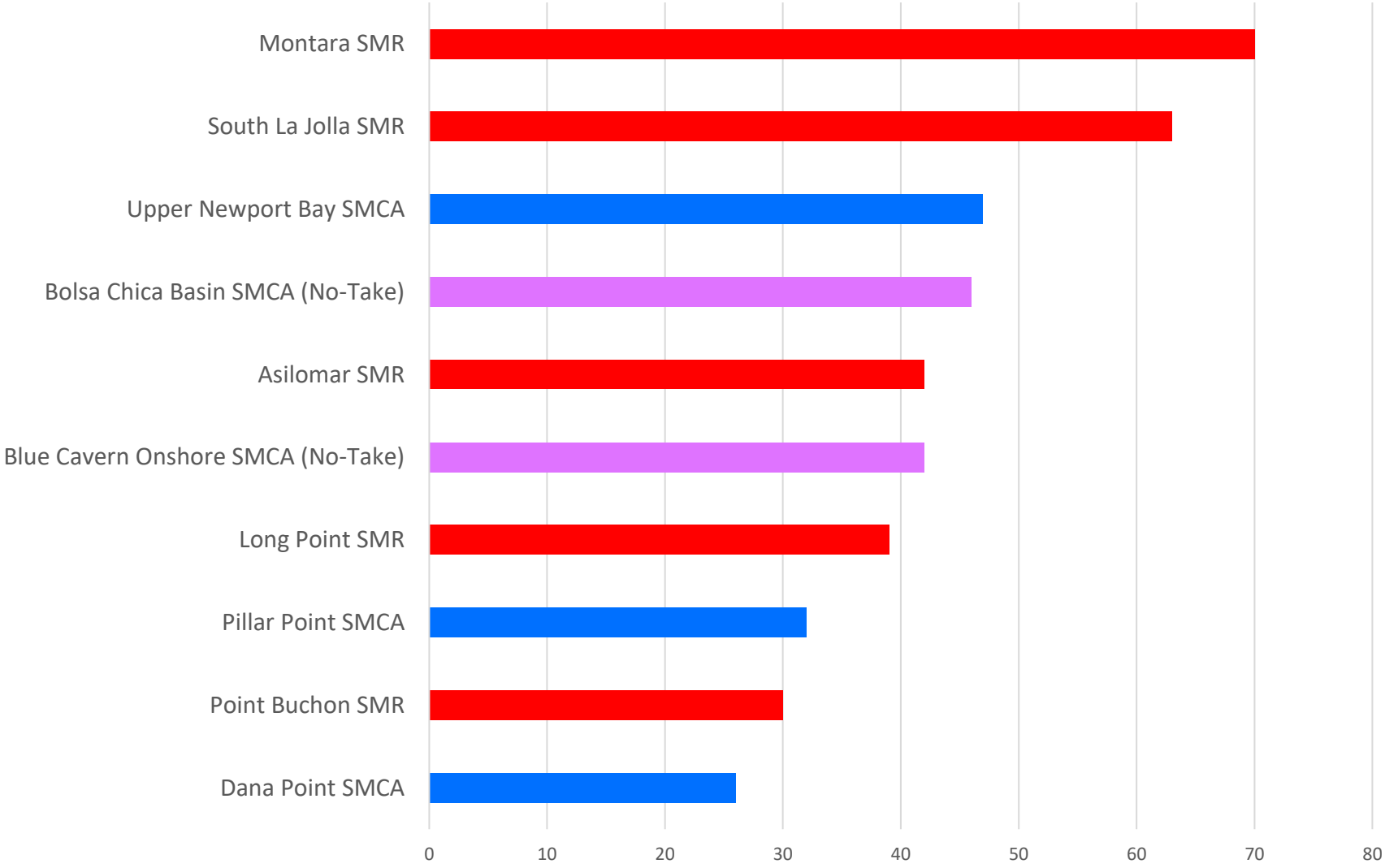
Statewide Summary, 2022







Top 10 MPAs for Violations in 2022



Improvements to RMS for 2023

- For 2023, RMS has been modified to track all ocean related violations in addition to MPA violations and violations.
- Will be able to look at percentage of MPA violations in relation to all ocean violations
- LED is committed to using technology for predictive policing. This may include increased use or expansion of other technologies.

Questions?

Squid Fishery Advisory Committee
California Department of Fish and Wildlife

Report to the Marine Resources Committee
of the California Fish and Game Commission
July 20, 2023 Meeting

The CDFW Squid Fishery Advisory Committee (SFAC) consists of a cross section of stakeholders tasked with reviewing market squid fishery management and advising CDFW on potential management changes. The market squid fishery is routinely the largest in the State, both in revenue and landings, and includes one of California's earliest Fishery Management Plans. The SFAC completed its third meeting on May 16th to discuss changes in fishing effort dynamics and collaborate with researchers to build a forecast model to test the performance of fishery management controls under climate change. The SFAC's next meeting is scheduled for July 12th where discussions will shift to review of the market squid fishery logbook program and strategies to modernize data collection methods. The SFAC is expected to have its final meeting in spring of 2024. The Department currently anticipates bringing final recommendations to the Commission during the summer of 2024 in order to determine next steps. The roster and meeting schedule is included in supporting documents.

CDFW Squid Fishery Advisory Committee Roster	
Name	Affiliation
Mark Fina	Trade Association
Ken Towsley	Dealer/Processor
Joe Cappuccio	Dealer/Processor
Anthony Vuoso	Dealer/Processor
Ryan Augello	Dealer/Processor
Corbin Hanson	Commercial Squid Fishing - Seine
John Barry	Commercial Squid Fishing - Seine
Porter McHenry	Commercial Squid Fishing - Seine
Tom Noto	Commercial Squid Fishing - Seine
David Crabbe	Commercial Squid Fishing - Light/Brail
Joe Villareal	Commercial Squid Fishing - Light/Brail
Brian Susi-Blair	Commercial Squid Fishing - Light/Brail
Richie Ashley	Commercial/Recreational - Bait
Ken Bates	Commercial Fishing - Access
Dan Yoakum	Commercial Fishing - Access
Caitlin Allen Akselrud	Government Agency
Russell Galipeau	Non-Consumptive
Greg Helms	Non-Governmental Organization
Anna Weinstein	Non-Governmental Organization

Squid Fishery Advisory Committee (SFAC) Meeting Schedule 2023-2024

- 4/18/23 — Monterey Bay – Effort/EDM
- 5/16/23 — Virtual – Effort/EDM
- 7/12/23 — Virtual – Monitoring
- 8/15/23 — Los Angeles – Monitoring
- 10/6/23 — Virtual – Gear
- 11/15/23 — Virtual – Gear
- 1/25/24 — San Francisco Bay Area – Access

The SFAC will conclude with a one-to-two-day meeting in Southern California in early 2024.

This schedule is preliminary, and content is subject to shift

Updated 3/13/2023

Squid Fishery Advisory Committee Update
California Fish and Game Commission
Marine Resources Committee
November 16, 2023

The Squid Fishery Advisory Committee (SFAC) consists of a cross section of stakeholders tasked with reviewing market squid fishery management and advising the California Department of Fish and Wildlife (CDFW) on potential management changes. The market squid fishery is routinely the largest in the State, both in revenue and landings, and includes one of California's earliest adopted Fishery Management Plans.

During its first six meetings, the SFAC explored and discussed the following topics:

- Fishing effort, dynamics, and climate readiness
    - These discussions are being supported by empirical dynamic modeling (EDM). EDM provides a novel method to look at past performance and gauge potential outcomes of future climate and fishery management scenarios. It is being developed as a potential tool to assist with analyzing management options and, if successful, help to predict future fishery success.
- Modernizing monitoring efforts including updates to the market squid logbook
    - General SFAC consensus is that the logbook could benefit from being converted to an electronic platform. Some SFAC members have volunteered to assist with development and testing, in advance of a future transition from paper logs.
- Fishing gear, bycatch, habitat, and wildlife interactions
    - SFAC discussions on these topics are just beginning. The group will provide input on potential changes, if necessary, to existing management to address any issues that are identified.

The SFAC completed its seventh meeting on November 15th, where they continued discussions on habitat and introduced the topic of small-scale fishery access. The SFAC's next meeting is scheduled for January 25th where discussions on these topics will continue.

The SFAC is currently scheduled to have a final meeting in spring of 2024, to conclude the advisory process and finalize recommendations to the Department. With each SFAC meeting, discussions have become more detailed and in-depth, particularly with in-person engagement. The Department is considering options to increase the number of in-person meetings to provide the most comprehensive and complete recommendation to the commission. The Department will seek additional funding in order to allow the upcoming meetings to all be in-person.

The Department anticipates bringing final recommendations and proposed next steps to the Commission during the summer or fall of 2024.

View as a webpage / share

California Fish and Game Commission
Wildlife Heritage and Conservation Since 1870

Commission-approved aquaculture public interest criteria

In short: Following a recommendation from its Marine Resources Committee (MRC), the California Fish and Game Commission has approved public interest criteria and a framework for evaluating if a new state water bottom lease for aquaculture purposes is in the public interest. The Commission also approved an enhanced application review process for new state water bottom lease applications for aquaculture purposes.

More details: After discussions at multiple MRC meetings and various iterations of public documents, MRC developed its recommendations in July 2023 for the Commission to support advancing the proposed public interest criteria evaluation framework and an enhanced lease application review and approval process.

At its August meeting, the Commission approved MRC's recommendation and directed staff to work with the California

Department of Fish and Wildlife and other agency partners to implement the proposed enhanced lease application process.

Commission staff offers its most sincere thanks to everyone who contributed to the process to develop the public interest criteria and enhanced lease process. We are grateful for your contributions and support as we navigated the complexities and challenges associated with the project.

Additional details are available in the approved public interest criteria evaluation framework document and the figures depicting the enhanced leasing process. Please reach out to staff at fgc@fgc.ca.gov if you have any questions.

Sincerely,

Susan Ashcraft
Marine Advisor
California Fish and Game Commission

California Fish and Game Commission
State Water Bottom Leases for Aquaculture Purposes – Next Steps in Considering Applications for New Leases

November 16, 2023 Staff Report to the Marine Resources Committee

Commission staff has prepared this written update on efforts to implement the enhanced aquaculture leasing process (pages 3-6 below) and public interest criteria and evaluation framework, both of which were approved by the Commission in August 2023. Following the Commission's approval, staff released a public notice to communicate the outcomes of the Commission action. Staff has also worked closely with the California Department of Fish and Wildlife's (Department) state aquaculture coordinator and Marine Region staff to begin implementing the enhanced aquaculture lease application process and ensure coordination on internal efforts.

Two main components for the initial phase of implementation include engaging agencies of jurisdiction and developing next steps for integrating existing new lease applications into the enhanced process.

Engaging Agencies of Jurisdiction

Phase 0 of the approved leasing process envisions enhanced pre-application agency coordination and input on project designs. Within this phase, Commission and Department staff will notify and convene interested agencies of jurisdiction to facilitate an opportunity for agencies to (1) highlight and discuss areas of concern and (2) help applicants refine their project design for the lease application and subsequent agency permitting. Many design considerations are reflected in the approved public interest criteria, which will be shared with prospective applicants. Staff is working in close coordination with Department staff to operationalize phase 0 in two steps, through outreach to other agencies and an initial interagency meeting.

- *Outreach to agencies*: In close coordination with the Department, the Commission's new environmental scientist is reaching out to agencies of jurisdiction to share with them the new leasing process and public interest criteria the Commission approved, and to invite their participation, beginning with an initial coordination meeting.

- *Initial interagency meeting*: Commission and Department staff are preparing to schedule and facilitate an initial interagency coordination meeting that will help lay the groundwork for future interagency and lease applicant meetings. The prospective meeting with sister agencies of jurisdiction will serve to orient them to the Commission's enhanced leasing pre-application process, identify shared agency goals, and explore both interest and coordination strategies for their participation as new lease applications are received. At a recent informal interagency workgroup meeting, staff communicated with the California Ocean Protection Council about integrating this concept into the workgroup and for potential integration into the anticipated state aquaculture action plan.

Developing Next Steps for Existing New Lease Applications

The Commission has three lease applications that were received prior to approving the enhanced leasing process and public interest criteria. While each lease has passed the pre-application stage

and the Commission has made a public interest determination for two of the three, the applications will be integrated into the new leasing process, beginning with interagency review and input and with vetting at committee meetings.

- *Opportunity for interagency review and input*: Consistent with the intent of the pre-application stage, staff will engage agencies of jurisdiction to support an interagency dialogue about each proposed lease project, and to identify any issues of concern that may help refine the proposed projects and/or be addressed through the California Environmental Quality Act review process. Staff will invite agencies to a meeting with each applicant.

- *Vetting at Marine Resources Committee and Tribal Committee meetings:* Consistent with phase 1 of the enhanced process, staff recommends referring the lease applications to the committees for public vetting. Staff is in the process of contacting applicants to confirm timing and process, and suggests that vetting could be scheduled for the March 2024 Marine Resources Committee meeting and the April 2024 Tribal Committee meeting.

California Fish and Game Commission

Figures Displaying Steps in the Aquaculture Leasing Process for New State Water Bottom Lease Applications, including Public Interest Determination

November 9, 2023

Figure 1. ***Phases 0 through 3.*** Overview of Commission-approved consideration of new state water bottom aquaculture lease applications, including public interest determination. Includes an enhanced and formalized pre-application phase (Phase 0) facilitated by CDFW and including interagency consultation, followed by a three-phase Commission process (phases 1-3) (see figures 5 and 6 for close-up images of each phase with written descriptions below steps in the corresponding phase).

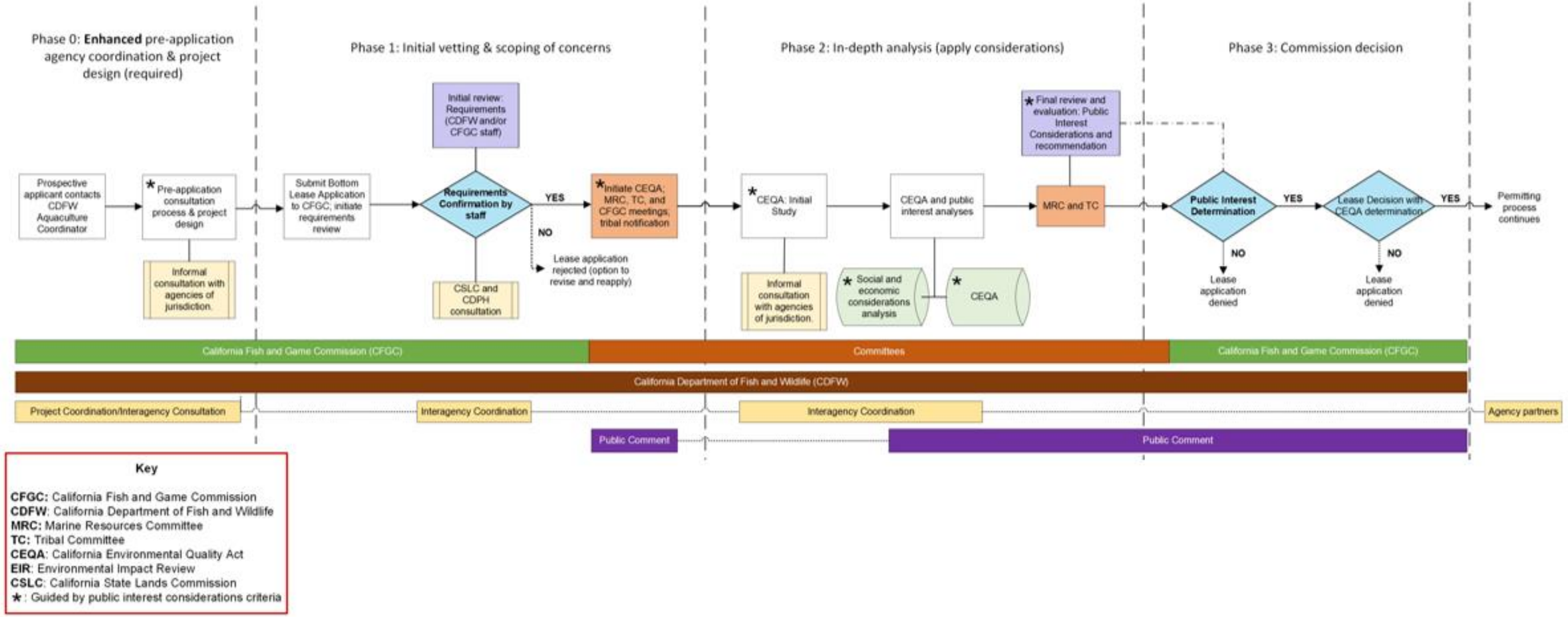


Figure 2. Phases 0 and 1, Detailed. Enlarged image of phases 0 and 1 with written descriptions below steps in the corresponding phase.

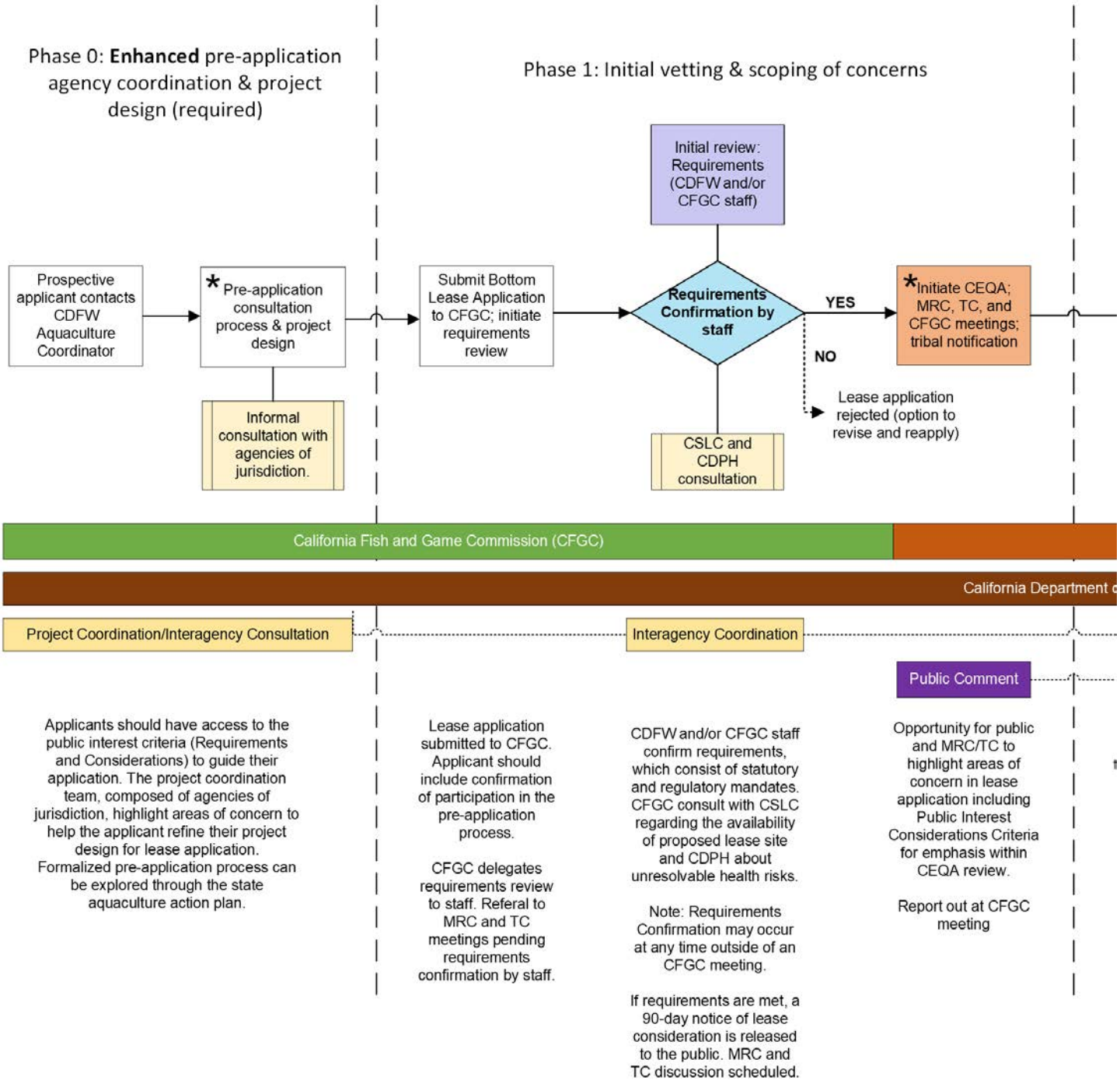
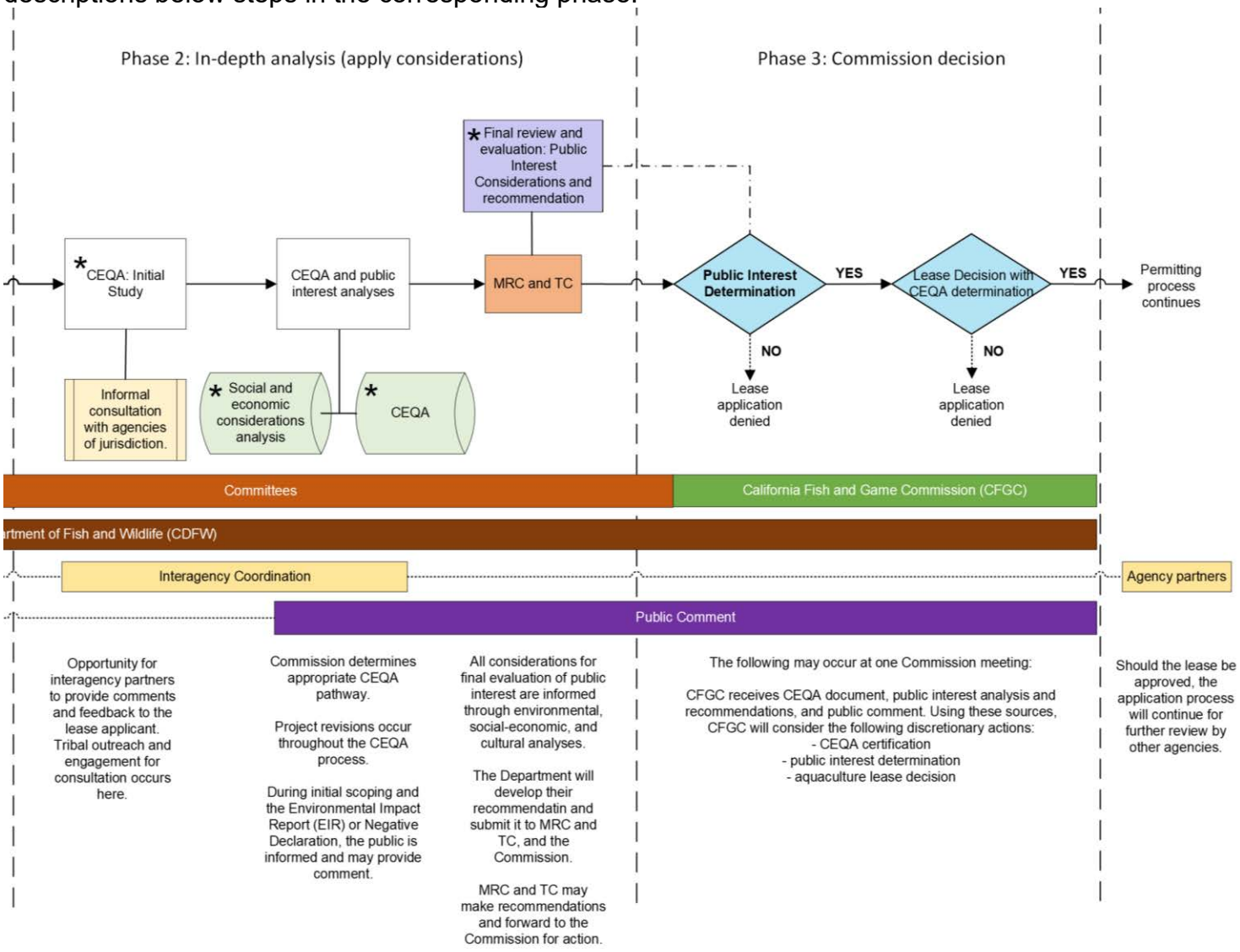


Figure 3. Phases 2 and 3, Detailed. Enlarged image of phases 2 and 3 with written descriptions below steps in the corresponding phase.



California Fish and Game Commission
Naming Installations Policy

It is the policy of the Fish and Game Commission that:

I. No fish hatchery, game refuge, wildlife area or any installation, other than Marine Protected Areas (MPAs), shall be named for any person, living or dead. Installations shall be named in a manner which will indicate their geographical location, avoiding as far as possible the names of local political units. Vessels shall be named for fish.

II. The Commission may commemorate an individual by including that individual's name after the geographic name of a MPA if all of the following criteria are met:

1. The individual has been deceased for a minimum of 5 years;
2. It has been determined the individual has made an extraordinary, unique, and long-lasting contribution to the conservation, use and/or enjoyment of California's living marine resources;
3. It has been determined with reasonable care and consideration that the individual's merit and/or contribution can stand the test of time;
4. The individual and/or their efforts have a direct connection with the geographic location of the MPA or immediate vicinity.

III. The Commission shall be represented at and may participate in all ceremonies dedicating the launching or inauguration of any of the facilities mentioned above. The Department and the Commission staff shall coordinate their work and efforts in setting up or arranging such programs.

(Amended: 04/07/94; 05/23/12)

California Fish and Game Commission
Overview of Process to Consider Potential Changes to California's Marine Protected Area Network: Regulation Change Petition Process, Timeline and Historical Documents

October 11, 2023

The California Fish and Game Commission (Commission) is engaged in an adaptive management process for California's marine protected area (MPA) network and management program based on adaptive management recommendations from the first comprehensive decadal management review (DMR) of the network and management program. This document provides updates related to prioritizing adaptive management recommendations and recent Commission action to **initiate a process to receive and consider public petitions for changes to the MPA network** for this adaptive management cycle.

At its August 22-23, 2023 meeting, the Commission acted on recommendations from its Marine Resources Committee (MRC) and provided guidance relative to prioritizing the adaptive management recommendations from the DMR. The Commission approved a MRC recommendation to support the California Department of Fish and Wildlife's (Department's) prioritized recommendations from the MPA DMR report for near-, mid-, and long-term focus.

In addition, the Commission approved an MRC recommendation to move forward with the near-term priority recommendation to *apply what is learned from the first decadal management review to support proposed changes to the MPA network.* The Commission initiated a process and timeline – beginning with the December 2023 meeting – for considering proposals for MPA changes as part of this adaptive management cycle. Information in this document is intended to guide you through the process.

The process for submitting proposed changes to the MPA network includes three elements**:** Timeline, format, and supplemental information to consider in developing a petition.

Timeline

All petitions received by the *December 2023 Commission meeting deadlines will* be considered during this adaptive management review cycle. This will allow review and evaluation of petitions not only individually, but also holistically in the context of the MPA network.

Receipt of Petitions

The standard public comment deadlines specified for the December 2023 Commission meeting apply.

a. *November 30 at 5:00 p.m. (strongly preferred)* – Written Comment Deadline. Submitting MPA petitions before this deadline is strongly encouraged; petitions will be made available to the Commission before the meeting, and posted online with meeting materials.

b. Petitions submitted by the Supplemental Comment Deadline (*December 8 at noon*) or in person at the Commission meeting in San Diego (*December 12-13*) will be received by the Commission at the meeting, but will be processed after those received by the November 30 comment deadline and not initially posted online.

c. *Submittals after December Commission meeting*: Petitions received after the December meeting deadlines will be received by the Commission at a subsequent meeting and will be considered, consistent with the Commission's petitions regulations (Section 662, Title 14, California Code of Regulations). However, the Commission will determine at that time whether to include later submittals in this management review cycle or to hold them for a subsequent MPA review cycle.

Action on Petitions (Grant, Deny or Refer for Evaluation)

Petitions received for the December meeting will be scheduled for initial consideration at the next regularly-scheduled business meeting (February 14-15, 2024), unless the petition is rejected under staff review, pursuant to Section 662.

The Commission will take action to grant or deny each petition, or may refer petitions to the Department to consider, evaluate and make a recommendation (individually and collectively) before the Commission takes final action. The Commission plans to schedule MRC discussion and potential recommendations when Department evaluations are ready (timing to be determined) to support final action by the Commission to grant or deny referred petitions.

Format: Required Petition Submittal Form

Every person, agency or organization recommending that a regulation be added, amended, or repealed must submit a petition to the Commission using the authorized petition form:

Form FGC 1 – Petition to Commission for Regulation Change

Commission regulations require using Form FGC-1, which is available on the Commission website at https://fgc.ca.gov/Regulations/Petition-for-Regulation-Change; see the webpage for more information, including options for how to submit your petition.

There are four "required information" fields specified in Section 1 of the form; be sure to complete all required fields. The second required field is called "Rulemaking Authority*,"* which is the statutory or constitutional authority of the Commission to take the action requested. The information to add in the field is: "Sections 200, 205(c), 265, 399, 1590, 1591, 2860, 2861 and 6750, Fish and Game Code; and Sections 36725(a) and 36725(e), Public Resources Code." The authorities listed are for the MPA regulations found at California Code of Regulations, Section 632.

Supplemental Information to Consider in Developing a Petition (voluntary)

Additional MPA information is available for prospective petitioners as a reference while developing petitions. The two types of information are Department-summarized "considerations" for evaluating referred MPA petitions and historical background documents from the regional MPA network planning processes.

Department-Summarized "Considerations" for Evaluating Referred MPA Petitions

Regulation change petitions submitted to the Commission are evaluated on a case-by-case basis to help inform Commission action and are commonly referred to the Department. In July 2023, MRC received input and discussed a potential framework of "considerations" *that may assist in evaluating petitions the Commission receives related to changes to the MPA network*. The Department summarized the considerations and provided them to the Commission in

August 2023. The Department and individual commissioners generally supported the considerations to help guide development of MPA-specific petitions prior to submitting them to the Commission for review and may guide subsequent evaluation by the Department. A summary document, Potential framework to assist in evaluation of petitions the Commission may receive related to changes to the MPA network and management program, is available at https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=216395&inline.

- ***Petitioners are encouraged (but not required**) to review the summarized considerations to assist them in preparing their petition and communicating the intent, and to highlight in the submitted materials any considerations that are relevant to the petition.*

Historical Background Documents from the Regional MPA Network Planning Processes

Historical documents from the regional MPA planning, design, and adoption processes are available as resources to assist in developing MPA petitions. Historical documents include the 2016 master plan for MPAs, regional planning process intent documents, and regional planning process evaluation documents.

Some historical documents are no longer posted online; however, they are available upon request. To request copies of a document, or if you need an accessible version, please submit a request to fgc@fgc.ca.gov or call (916) 653-4899.

- ***Petitioners are encouraged (but not required)** to familiarize themselves with the history and intent of the relevant MPA planning, design, and adoption processes, and to highlight how any proposed changes might align with or strengthen the original intent or objectives of the MPA.*

*2016 Master Plan for MPAs Appendices (available online)**

Six appendices provide documentation from the regional MPA planning and redesign processes conducted under the Marine Life Protection Act (MLPA) goals and guidelines.

a. Appendix A: MPA planning through the MLPA Initiative.
   Includes scientific foundation for MPA and network design and planning, design guidelines, and management considerations. Key documents include:
   - MLPA goals and guidelines
   - Science guidance for MPA and network design
   - Department MPA design and feasibility guidance with criteria

b. Appendix B: Records communication and consultation with California tribes and tribal governments during planning.

c. Appendices C-F: One appendix for each of the four planning regions, provides regional goals and objectives, background and priorities for MPAs, and regional design considerations.

***** Appendices include footnotes with links to other historic documents; many links are "broken." Contact Commission staff to obtain any specific document not available online.

Regional Planning Process Intent Documents (available on request)

Separate documents for each planning region with table(s) of regional MPAs developed through the planning process. Lists each MPA and its specific goals, objectives, and design

considerations for MPAs adopted in each region. Most regions also include multiple regional MPA proposals brought forth by regional stakeholder group teams, and an integrated preferred alternative recommended to the Commission. *Contact Commission staff for a link to access documents.*

Regional Planning Process Evaluation Documents (available on request)

Other historic documents include original evaluations conducted for regional MPAs and regional network components (MPA size, habitat spacing, habitat coverage, feasibility, socioeconomic impact, goal 3 opportunities, and more). *Contact Commission staff for more information.*

View as a webpage / share

California Fish and Game Commission
Wildlife Heritage and Conservation Since 1870

Petitions for changes to marine protected areas (MPAs) and priorities for adaptive management

Following recommendations from its Marine Resources Committee (MRC), the California Fish and Game Commission (Commission) has provided guidance relative to adaptive management recommendations from the first comprehensive decadal management review of the MPA network and management program, and initiated a process to consider potential changes to the MPA network.

At its August 22-23, 2023 meeting, the Commission supported the California Department of Fish and Wildlife's prioritized recommendations from the MPA decadal management review report for near-, mid-, and long-term focus.

The Commission also approved moving forward with the near-term priority recommendation to *apply what is learned from the first decadal management review to support proposed changes to the MPA*

network. The Commission initiated a process and timeline – to begin with its December 2023 meeting – for considering potential MPA changes proposed by the public, agencies and organizations as part of this adaptive management cycle.

Information and resources intended to provide guidance for preparing and submitting an MPA regulation change petition to the Commission are available at https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=216577.

Please reach out to staff at fgc@fgc.ca.gov with any questions.

Sincerely,

Susan Ashcraft
Marine Advisor
California Fish and Game Commission

MPA Petition Process

Following the Decadal Management Review (DMR)

Presented to the MPA Statewide Leadership Team

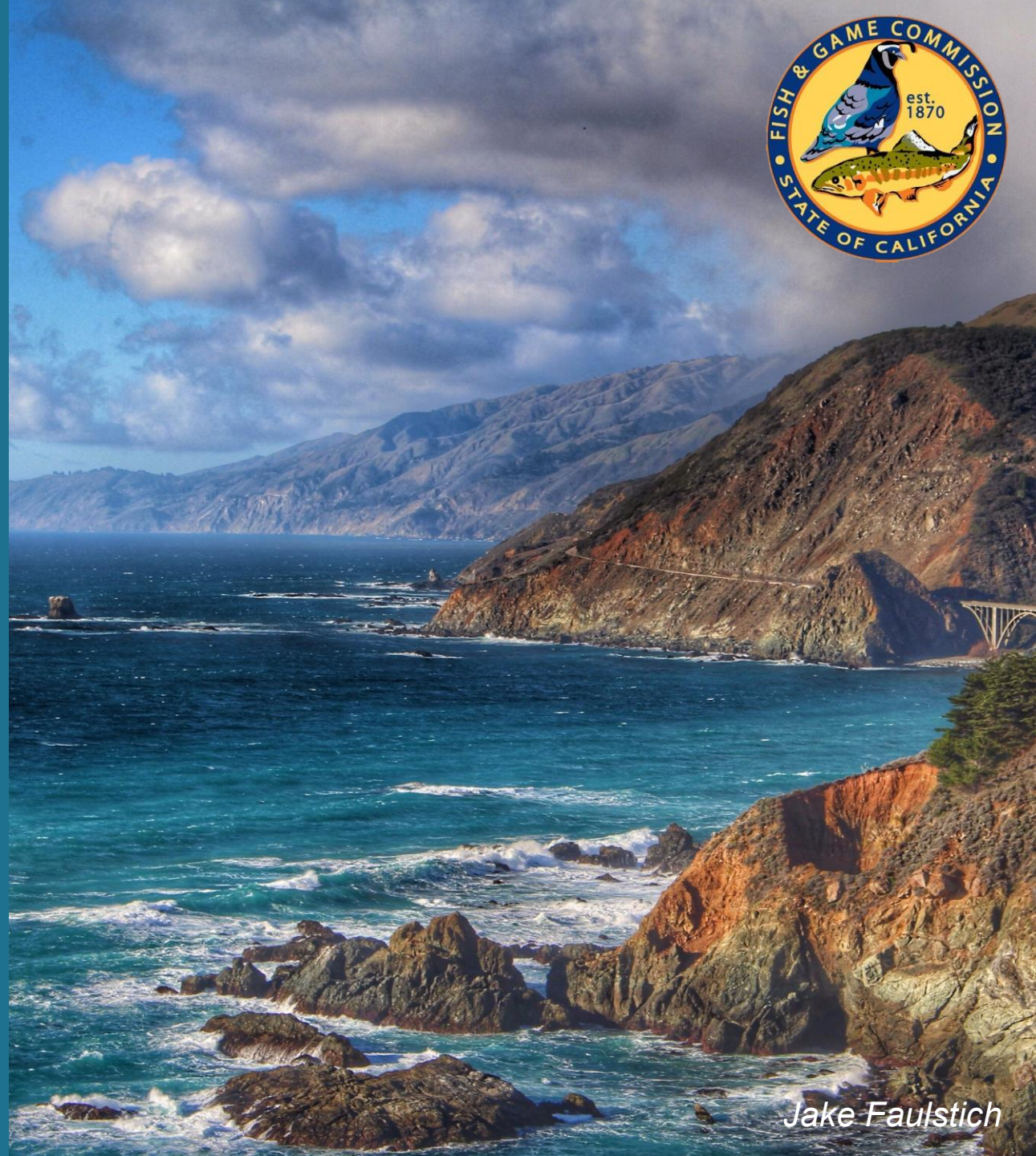
Susan Ashcraft, Marine Advisor

October 25, 2023

Katharine Moore | Shutterstock

Outline

- Commission Action
- Commission Guidance
  - MPA Petition Process
- Timeline

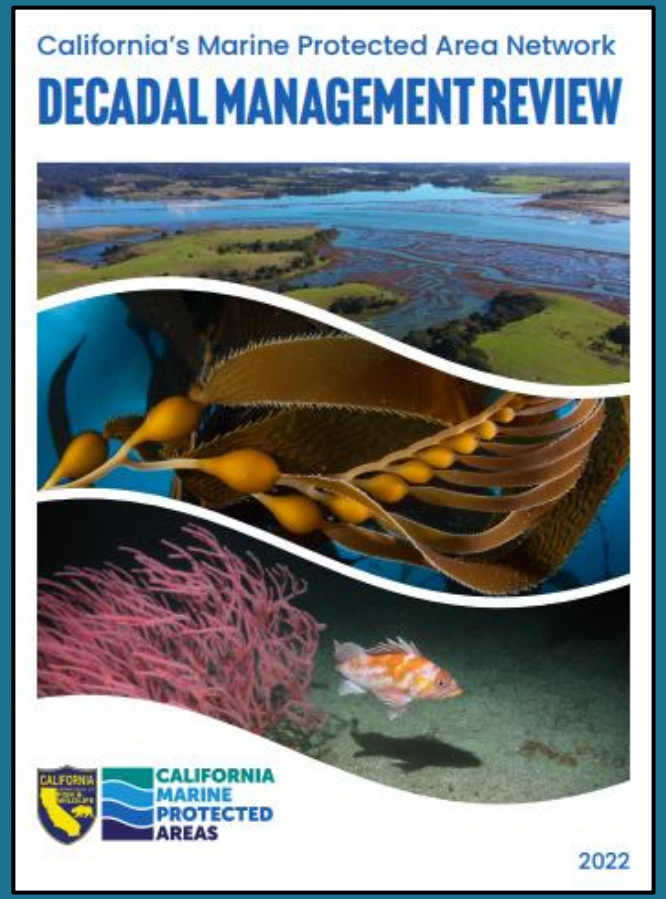


Commission Action: August Meeting

- Supported CDFW-prioritized recommendations from DMR into near-, mid-, and long-term priorities

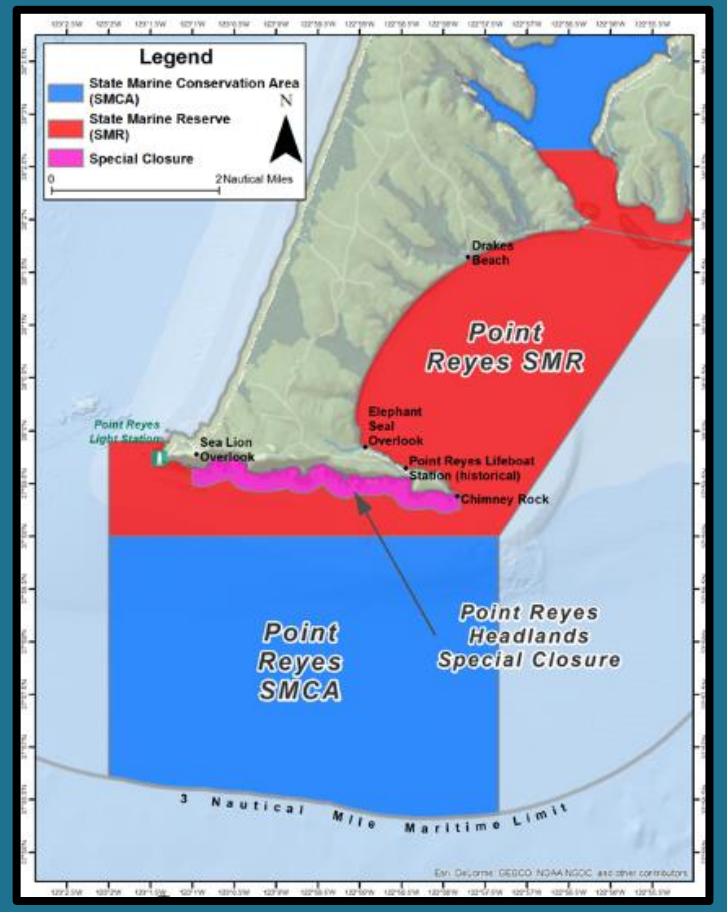
- Initiated near term recommendation 4:

  “Apply what is learned from the first DMR to support proposed changes to the MPA network…”



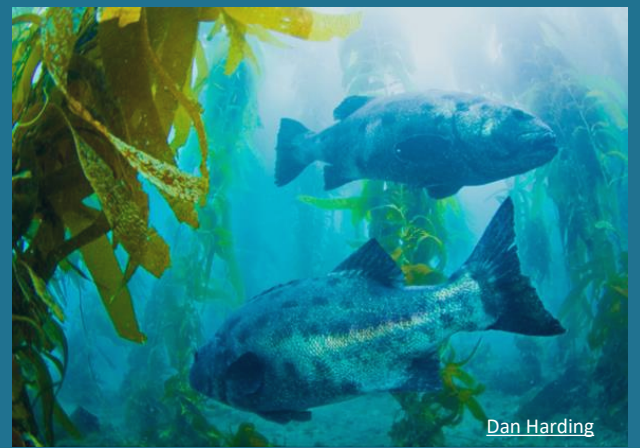
Commission Guidance – MPA Proposals

1. Use **existing petition process** for regulation changes
2. Include **consideration** of DMR results, MLPA goals, MPA design history
3. Provide **historical documents**
4. **Evaluate petitions** collectively re: MPA network



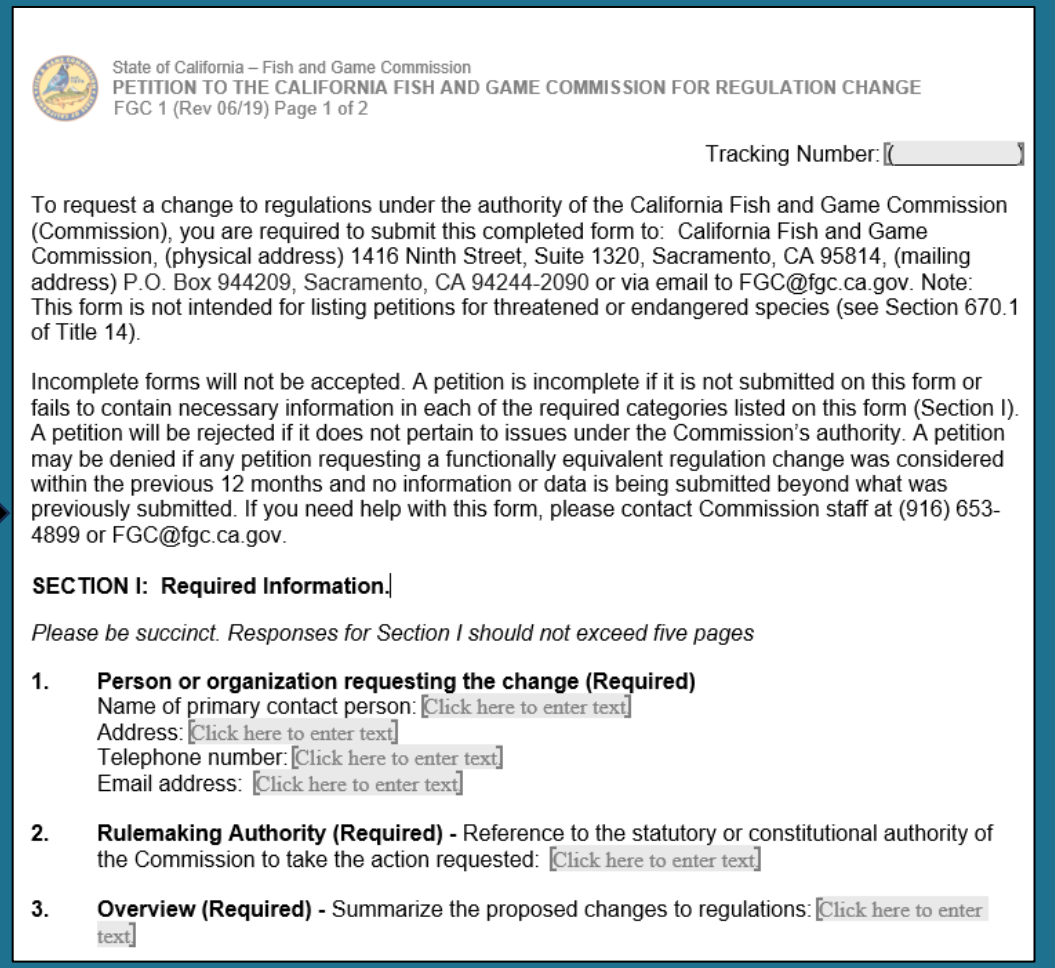
1. Use Existing Petition Process

- Process for regulation change petitions (Section 662, T14)
  - Two-meeting process
    - Receipt
    - Action (*approve, deny, or refer*)
- Required Petition Submittal Form FGC-1



Form FGC-1

- Found on Commission website



State of California – Fish and Game Commission
PETITION TO THE CALIFORNIA FISH AND GAME COMMISSION FOR REGULATION CHANGE
FGC 1 (Rev 06/19) Page 1 of 2

Tracking Number: [ ]

To request a change to regulations under the authority of the California Fish and Game Commission (Commission), you are required to submit this completed form to: California Fish and Game Commission, (physical address) 1416 Ninth Street, Suite 1320, Sacramento, CA 95814, (mailing address) P.O. Box 944209, Sacramento, CA 94244-2090 or via email to FGC@fgc.ca.gov. Note: This form is not intended for listing petitions for threatened or endangered species (see Section 670.1 of Title 14).

Incomplete forms will not be accepted. A petition is incomplete if it is not submitted on this form or fails to contain necessary information in each of the required categories listed on this form (Section I). A petition will be rejected if it does not pertain to issues under the Commission's authority. A petition may be denied if any petition requesting a functionally equivalent regulation change was considered within the previous 12 months and no information or data is being submitted beyond what was previously submitted. If you need help with this form, please contact Commission staff at (916) 653-4899 or FGC@fgc.ca.gov.

SECTION I: Required Information.

Please be succinct. Responses for Section I should not exceed five pages

1. **Person or organization requesting the change (Required)**
   Name of primary contact person: [Click here to enter text]
   Address: [Click here to enter text]
   Telephone number: [Click here to enter text]
   Email address: [Click here to enter text]

2. **Rulemaking Authority (Required) -** Reference to the statutory or constitutional authority of the Commission to take the action requested: [Click here to enter text]

3. **Overview (Required) -** Summarize the proposed changes to regulations: [Click here to enter text]

2. Include Considerations …

Department of Fish and Wildlife: Summary of Marine Protected Area (MPA) Regulation Change Petition Framework Discussion

(07/27/23) Revised 08/10/23; Revised 8/17/23

At the California Fish and Game Commission's (CFGC) July 20, 2023 Marine Resources Committee (MRC) meeting, MRC, CFGC staff, California Department of Fish and Wildlife (CDFW) staff, and stakeholders discussed potential next steps in pursuing the MPA Decadal Management Review (DMR) report recommendations and goals. The discussion included a potential framework to assist in evaluation of petitions the CFGC may receive related to changes to the MPA network and management program. At the request of MRC, staff from CDFW summarized the input received at the July 20, 2023 MRC meeting regarding these MPA petition framework considerations.

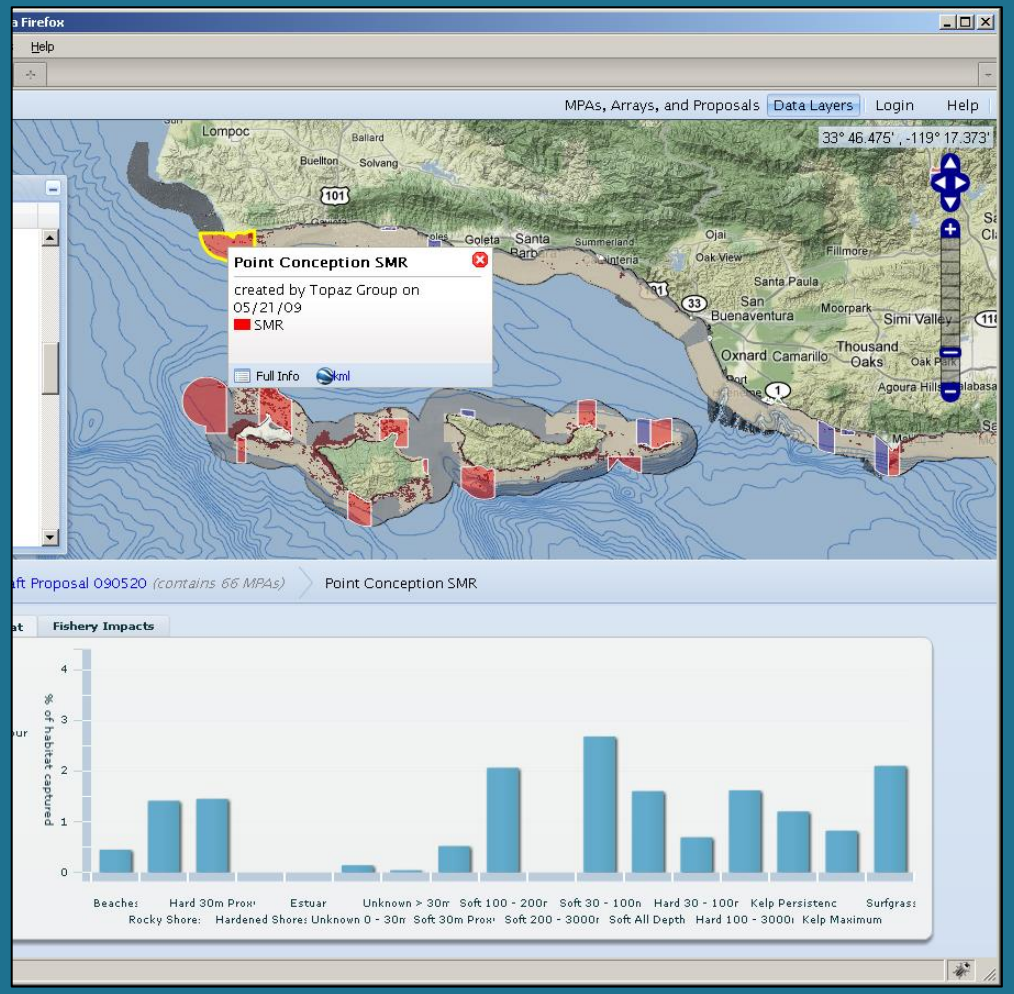
Broadly, petitions submitted to the CFGC are evaluated on a case by case by basis. To help guide petition development and subsequent review by CDFW, the MRC received the following input for evaluating petitions related to MPAs:

- Compatible with the goals and guidelines of the Marine Life Protection Act (MLPA);
- Help advance one or more of the six goals of the MLPA;
- Garner strong community support; and/or
- Advance adaptive management recommendations under the cornerstones of MPA governance, MPA Management Program activities, and MPA Network Performance outlined in DMR Table 6.1 to ensure that petitions meet MPA management priorities.

- Considerations to help guide: (1) petition development and (2) CDFW review
- e.g.
  - Support MLPA goal(s)
  - Advance DMR recommendations
  - Account for original design considerations

3. Provide Historical Documents

- Regional MPA planning process records
- Available upon request
  - NGO re-uploaded to Google Drive
- Petitioners: Highlight how proposed changes relate to MPA's original intent/objectives



4. Evaluate Petitions - Approach

- CDFW will evaluate referred petitions
  - Assisted by Considerations
  - Evaluate collectively
- CDFW recommendations discussed at Marine Resources Committee (MRC)

Wonderlane

Timeline for MPA Petitions

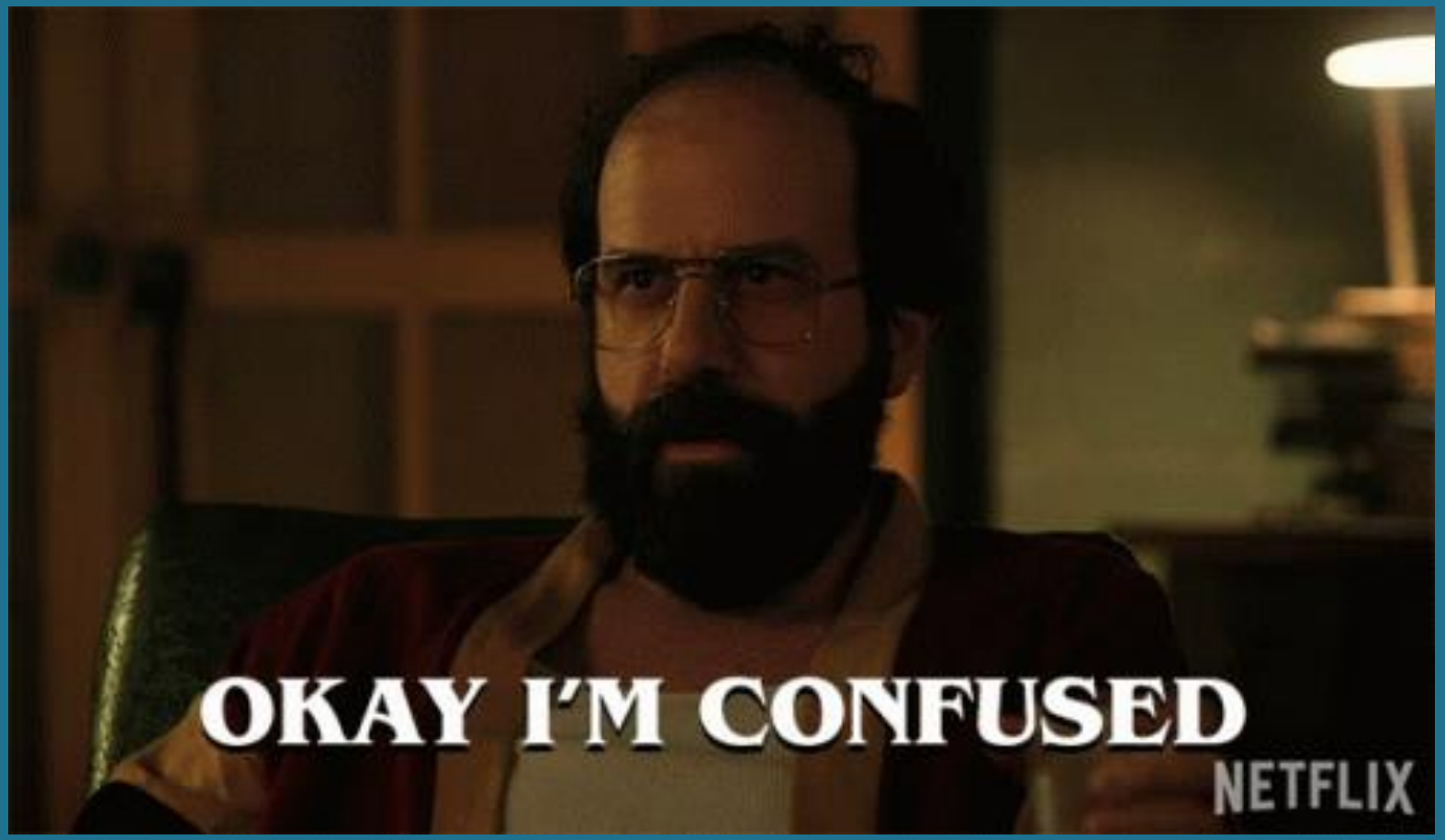
November 30, 2023	SUBMIT PETITIONS: Written comments deadline is *preferred* due date
December 12-13, 2023	RECEIPT at Commission meeting
February 14-15, 2024	ACTION at Commission meeting – Commission may *grant*, *deny*, or *refer* for CDFW review
March, July, and/or November 2024 (TBD)	MRC discussion when CDFW evaluations are ready
TBD	Commission receipt/action of MRC and CDFW recommendations

Final Notes…

Jen Savage

- Commission will consider all petitions received after December 2023 meeting, but timing is TBD
- Staff is exploring options for tribal outreach beyond Commission's Tribal Committee

Questions??



From: Phoebe Lenhart [redacted]
Sent: Thursday, November 2, 2023 2:11 PM
To: FGC <FGC@fgc.ca.gov>
Subject: FGC, November 16, 2023 meeting, Public Comment, #6 : SOUTHERN RESIDENT KILLER WHALES-CRISIS! And, "Off Shore Wind Turbines " ,in Morrow Bay, Threaten the Survival of Sea Otters!

Dear FGC Commissioners,

This email is sent to your attention regarding two grave matters, the survival of the Southern Resident Killer Whale pods and the survival of sea otters in Morrow Bay. I am appalled and dismayed by the dire status of both in CA.

First, the following information can be confirmed at NOAA. The Southern Resident Killer Whales (SRKW) population has been in decline for years with the most recent population being only 74 killer whales. When broken down by pods, the counts being as follows: "J" pod 24; "K" pod 17; and "L" pod 33. Per the information provided, genome sequencing reveals that there's significant "inbreeding". Currently, it's estimated that there are only 30 "breeders" among the 74 killer whales.

There are numerous threats to this species mostly due to interference by human beings. Toxicology reports reveal numerous poisons in the killer whales (details available at NOAA). Further, the killer whale population is starving and dying due to a reduction in their prey. In the summer months, about 75% of their diet consists of chinook salmon. Salmon populations are far below any sustenance level in the ocean off the coast of CA.

Thus, my proposal to address the depletion of salmon populations available for the SRKW. When the FGC/DFW considers fishing quotas for salmon, I suggest that the FIRST "quota " to be determined, by the FGC/DFW, will be for the SRKW. Only after the quota for the SRKW is decided; then, I suggest that the quotas for commercial and recreational fishing can be determined.

Let's calculate (on an average) a killer whale can eat 20-25 salmon daily (minimum). With the SRKW currently having a population of 74; this sum will be 1,480-1,850 salmon (minimum). If we were to calculate the amount of salmon required daily by the SRKW by weight (with a salmon at 35 pounds) that would amount to 51,800-64,750 pounds of salmon per day (25.9-32.4 tons of salmon per day minimum). Then, I suggest that the FGC/DFW "reserves" a quota to provide for the survival (eventually hoping for "thriving" conditions)of the SRKW for 100 days annually. Thus, 2,590 -3,200 tons of chinook salmon are yearly reserved for the SRKW (to start). Please consider my proposal for reserving salmon for the SRKW in the approaching "salmon season" fishing quotas.

Second, in regard to the " romp" or "raft" of sea otters in the area of Morrow Bay and the "approved" 376 square miles of off shore wind turbines. I believe that the decision to build 376 square miles of "WEA" is absolutely, pathetically ludicrous and unduly incompetent. I think it's absolutely impossible for any federal or state agency to promise the public that they are able to "mitigate " any damages to the sea otter population during the installment and maintenance of off shore wind turbines. I send this email to the FGC's Marine Resources Committee with my request to review and respond to the above. Thank you.

Sincerely,

Phoebe Lenhart

[redacted]

Sent from my iPad

California Fish and Game Commission
Marine Resources Committee (MRC) Work Plan

Updated October 31, 2023

Note: Proposed changes to topics/timing are shown in blue underscore or strike-out font.

Topics	Category	Jul 2023	Nov 2023	Mar 2024
Planning Documents and Fishery Management Plans (FMPs)				
MLMA Master Plan for fisheries – implementation updates	Plan Implementation			
Red abalone recovery plan (north coast)	Management Plan	*	X	
California halibut fishery management review	Management Review			X
California halibut bycatch evaluation for fishery management review – set gill net	Management Review	X/R	X/R	
Market squid fishery management and FMP review	Management/ FMP Review	*	*	X
Kelp recovery and management plan (KRMP) development	Management Plan		X	
Marine protected area network 2022 decadal management review	Management Review	X/R	*	*
Regulations				
California halibut trawl grounds review	Commercial Take			X
Kelp and algae commercial harvest – sea palm (*Postelsia*)	Commercial Take			
Petition 2023-04: Commercial sea urchin fishing north of San Luis Obispo/Monterey county line	Commercial Take			X
Recreational crab trap gear options and trap validation for commercial passenger fishing vessels	Recreational Take			* –
Marine Aquaculture				
Statewide aquaculture action plan	Planning Document	*		
Aquaculture state water bottom leases: Status of existing leaseholder requests	Current Leases			*
Aquaculture state water bottom leases: Applications for new leases	Lease Applications		*	X
Aquaculture lease best management practices plans (Hold, TBD)	Regulatory			
Informational Topics / Emerging Management Issues				
Kelp restoration and recovery tracking	Kelp		X	
~~Invasive non-native kelp and algae species~~	~~Kelp / Invasive Species~~			
Special Projects				
Coastal Fishing Communities Project	MRC Special Project			
Box crab experimental fishing permit (EFP) research project	EFP			

Key: **X** = Discussion scheduled **X/R** = Recommendation may be developed and may move to Commission
* = Written or verbal agency update