

California Fish and Game Commission

Marine Resources Committee

Meeting Binder

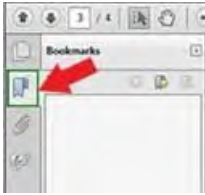


November 6-7, 2024

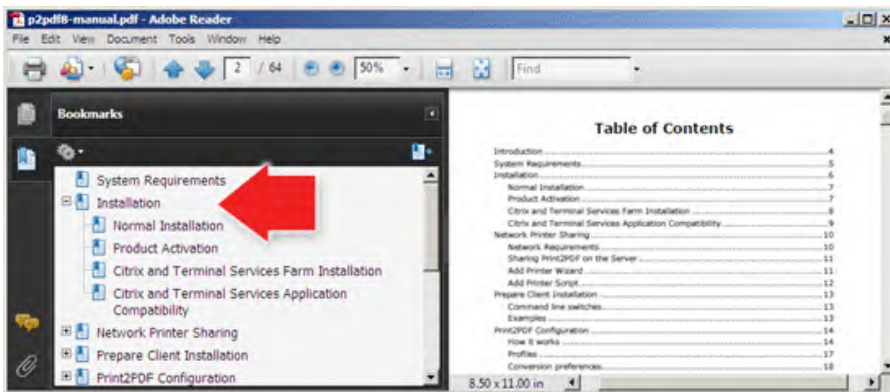
Sacramento


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 California 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 the Bagley-Keene Open Meeting Act. However, it is important to note that the committee cannot take action independent of the full Commission; instead, the committee makes recommendations to the Commission at regularly scheduled meetings.
- These proceedings are being recorded and will be posted to the Commission website or YouTube page for reference and archival purposes.
- Items may be heard in any order pursuant to the determination of the committee chair or co-chairs.
- Committee meetings operate informally and provide an opportunity for everyone to contribute to the discussion about agenda items. If you wish to contribute to an agenda item, please follow these guidelines:
 1. Raise your hand and wait to be recognized by the chair or a co-chair.
 2. Please share your name and affiliation (if any).
 3. Time is limited; please be concise to give others time to speak.
 4. If several speakers have the same concerns or ideas to express, please appoint a group spokesperson.
 5. Generally, participants in person are called on first, followed by participants joining by zoom or phone.
 6. As a topic discussion evolves, we encourage participants to continue contributing to the dialogue.
 7. If speaking during the general public comment agenda item, 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 discusses that item).
- Please note the nearest emergency exit for use in the unlikely event of an emergency.
- For those joining us in the meeting room, restrooms are located _____.

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
Kelsey Leaird Staff Services Analyst
Kimi Rogers Environmental Scientist
Devon Rossi Sea Grant State Fellow
David Haug (zoom) Regulatory Analyst

California Department of Fish and Wildlife

Chuck Bonham Director
Eric Kord Assistant Chief, Marine Enforcement Division
Craig Shuman Regional Manager, Marine Region
Joanna Grebel (zoom) Environmental Program Manager, Invertebrate Program,
Marine Region
Kirsten Ramey (zoom) Environmental Program Manager, State Managed Finfish
and Nearshore Ecosystem, Marine Region
Claire Wagonner Environmental Program Manager, Marine Habitat Program
Manager
Danny Lengning Captain, Marine Enforcement Division
Armand Barilotti (zoom) Environmental Scientist, Marine Region
Rebecca Flores-Miller (zoom) Environmental Scientist, Marine Region
Katie Grady (zoom) Environmental Scientist, Marine Region
Christy Juhasz (zoom) Environmental Scientist, Marine Region
Trung Nguyen (zoom) Environmental Scientist, Marine Region

Invited Guests

Staci Lewis MPA Program Manager, California 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)

Commissioners
Samantha Murray, President
La Jolla
Erika Zavaleta, Vice President
Santa Cruz
Jacque Hostler-Carmesin, Member
McKinleyville
Eric Sklar, Member
Saint Helena
Darius W. Anderson, Member
Kenwood

STATE OF CALIFORNIA
Gavin Newsom, Governor

Melissa A. Miller-Henson
Executive Director
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fgc@fgc.ca.gov
www.fgc.ca.gov

Fish and Game Commission



*Wildlife Heritage and Conservation
Since 1870*

Marine Resources Committee

Committee Co-chairs: Commissioner Sklar and Commissioner Murray

***Revised Meeting Agenda November 6-7, 2024**

Participate in Person

**California Natural Resources Headquarters Building
715 P Street, 2nd Floor
Sacramento, CA 95814**

or

Participate via Webinar/Phone

To participate in the meeting remotely, you may join the webinar directly at <https://wildlife-ca.gov.zoom.us/j/85953003100>. For complete instructions on how to join via Zoom or telephone, [click here](#) or visit fgc.ca.gov/meetings/2024.

*** The agenda has been revised to:**

- **change the start time on Wednesday, November 6 to 9:30 a.m.,**
- **update the description for item 2(B) to clarify the scope of discussion,**
- **correct the company name identified in item 3, and**
- **identify that MRC is expected to move item 12 (general public comment) to be the first item on Thursday, November 7.**

- Notes:**
- (1) See important meeting deadlines and procedures, including written public comment deadlines, starting on page 6.
 - (2) Except as indicated, the California Department of Fish Wildlife is identified as Department.
 - (3) 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.

November 6, 2024; 9:30 a.m.

Call to Order

1. Approve agenda and order of items

MRC is expected to move item 12, general public comment for items not on the agenda, to be the first item of the day on November 7.

Discussion and Action Items

2. Marine protected area (MPA) regulation change petitions – evaluation process

- (A) Receive and discuss Department evaluation and recommendations for MPA petitions in Bin 1 (petitions ready to be evaluated in the near-term) and develop potential committee recommendation.
- (B) Discuss sorting MPA petitions in Bin 2 (petitions that require additional policy guidance, information and/or resources before evaluation), and next steps. Receive update on tools for petition visualization and evaluation from the Department and the California Ocean Protection Council.
- (C) Receive general input on MPA petitions (*as time allows following completion of 2A and 2B*).

November 7, 2024; 8:30 a.m.

Call to Order

Discussion and Action Items

3. Application for New Aquaculture Lease

Presentation and public vetting of San Andreas Shellfish Company's application for a state water bottom lease for aquaculture purposes in Tomales Bay, consistent with the Commission's enhanced leasing process.

4. Market squid fishery management and fishery management plan review

Discuss Department report on the Department Squid Fishery Advisory Committee review of California market squid fishery management and proposed recommendations; develop potential committee recommendation.

5. Recreational barred sand bass fishery

Receive and discuss Department's update on the recreational barred sand bass fishery, barred sand bass working group outcomes, and recommendations for potential regulation changes; develop potential committee recommendation.

6. Recreational crab trap gear options and trap validation for commercial passenger fishing vessels

Discuss Department proposed regulation changes related to gear and marine life entanglement concerns, and trap validation for commercial passenger fishing vessels; develop potential committee recommendation.

7. **Commercial harvest of marine algae sea palm (*Postelsia*)**
Receive and discuss Department-recommended regulations governing commercial harvest of sea palm; develop potential committee recommendation.
8. **Experimental Fishing Permit (EFP) Program**
Receive and discuss Department updates:
 - (A) ***Box crab exploratory fishing EFP research project***
 - (B) ***EFP program overview, including pop-up gear testing***
9. **Red Abalone Recovery Plan: Risk tolerance for harvest**
Discuss risk tolerance for reopening red abalone fishery harvest in the context of statewide recovery plan development.
Staff will recommend this item be continued to a future meeting.

Updates and Administrative Items

10. **Staff and agency updates**
These items provide updates from staff and/or other agencies on topics requested by the Committee. *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
 - II. Marine Region
 - a. Kelp recovery and management plan development
 - (C) ***Commission staff***
 - I. Coastal Fishing Communities Policy – initial implementation steps
11. **Future agenda items**
Review work plan agenda topics and timeline, and identify any potential new agenda topics for Commission consideration.

General Public Comment

12. **General public comment for items not on the agenda**
Receive public comment regarding topics within the Commission's authority that are not included on the agenda.
Note: 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].
MRC is expected to move this item to be the first of the day on November 7.

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. All Commission meetings will include a webinar/teleconference option for attendance and every effort will be made to ensure that committee meetings include the same.

Meeting Date	Commission Meeting	Committee Meeting
December 10, 2024		Tribal California Natural Resources Headquarters Building 715 P Street, 2nd Floor Sacramento, CA 95814
December 11-12, 2024	California Natural Resources Headquarters Building Auditorium 715 P Street, 1st Floor Sacramento, CA 95814	
January 15, 2025		Wildlife Resources California Natural Resources Headquarters Building 715 P Street, 2nd Floor Sacramento, CA 95814
February 12-13, 2025	California Natural Resources Headquarters Building 715 P Street, 2nd Floor Sacramento, CA 95814	
March 13, 2025		Marine Resources California Department of Fish and Wildlife 1010 Riverside Parkway, Poppy Room West Sacramento, CA 95605
April 15, 2025		Tribal California Natural Resources Headquarters Building 715 P Street, 2nd Floor Sacramento, CA 95814
April 16-17, 2025	Sacramento area	
May 14, 2025	Teleconference Trinidad, Sonoma, Sacramento, Santa Cruz, and San Diego	
May 15, 2025		Wildlife Resources California Natural Resources Headquarters Building 715 P Street, 2nd Floor Sacramento, CA 95814

Meeting Date	Commission Meeting	Committee Meeting
June 18-19, 2025	California Natural Resources Headquarters Building 715 P Street, 2nd Floor Sacramento, CA 95814	
July 17, 2025		Marine Resources San Diego area
August 12, 2025		Tribal Fortuna
August 13-14, 2025	Fortuna	
September 11, 2025		Wildlife Resources California Natural Resources Headquarters Building 715 P Street, 2nd Floor Sacramento, CA 95814
October 8-9, 2025	San Jose area	
November 6, 2025		Marine Resources Sacramento
December 9, 2025		Tribal San Diego area
December 10-11, 2025	San Diego area	

Other Meetings of Interest

Association of Fish and Wildlife Agencies

- September 22-25, 2024 – Madison, WI

Pacific Fishery Management Council

- September 18-24, 2024 – Spokane, WA
- November 13-19, 2024 – Costa Mesa, CA
- March 5-11, 2025 – Vancouver, WA
- April 9-15, 2025 – San Jose, CA

Pacific Flyway Council

- August 30, 2024 – Jackson, WY

Wildlife Conservation Board

- August 22, 2024 – Sacramento, CA
- November 21, 2024 – Sacramento, CA

Important Commission 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 topics before the Commission than would otherwise be possible. Committee meetings are less formal in nature and provide additional access to commissioners. The Committee does not take action independent of the Commission; instead, the Committee makes recommendations to the full Commission at regularly scheduled Commission 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 as possible.

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 Civil Rights Office at (916) 653-9089 or civilrights@wildlife.ca.gov. Accommodation requests for facility and/or meeting accessibility and requests for American Sign Language 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. For those joining by Zoom, you may be able to enable closed-captioning via the Zoom platform. If a request for an accommodation has been submitted but is no longer needed, please contact the Civil Rights Office immediately.

Stay Informed

To receive meeting agendas about those subjects of interest to you, visit the Commission's website, www.fgc.ca.gov, to sign up on our electronic mailing lists.

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; **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 October 24, 2024**. 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 1, 2024**. Comments received by this deadline will be made available to commissioners at the meeting.

After these deadlines, written information may be delivered in person to the meeting; please bring **six** copies and provide them to staff during the relevant agenda item.

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

Regulation Changes

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 regulation change, please provide your comments during Commission business meetings, via email, or by delivering to the Commission office.

As a general rule, requests for regulatory change must be submitted on the required petition form, [FGC 1, Petition to the California Fish and Game Commission for Regulation Change](#). 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 contribute to the dialogue. 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.
- If you have written information to share, please provide **six** copies to staff before you begin speaking.
- 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 general public comment for items not on the agenda, 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 discusses 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 **Supplemental Comment Deadline** and approved by the Commission executive director before the meeting.

- 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.
- All electronic formats must be Windows PC compatible.
- If participating in person, it is recommended that you bring a print copy of any electronic presentation in case of technical difficulties.

Committee Staff Summary for November 6-7, 2024 MRC

2. Marine Protected Area (MPA) Regulation Change Petitions – Evaluation Process

Today's Item	Information <input type="checkbox"/>	Action <input checked="" type="checkbox"/>
(A) Receive and discuss Department evaluation and recommendations for MPA petitions in Bin 1 (petitions ready to be evaluated in the near-term) and develop potential committee recommendation		
(B) Discuss sorting of MPA petitions in Bin 2 (petitions that require additional policy guidance, information and/or resources before evaluation), and next evaluation steps		
(C) Receive general input on MPA petitions (<i>as time allows</i>)		

Summary of Previous/Future Actions

- Received decadal management review (DMR) report and Department presentation February 8-9, 2023
- Marine Resources Committee (MRC) and Commission discussed and prioritized adaptive management recommendations from DMR 2023; various
- Received 20 MPA regulation change petitions December 13-14, 2023
- Referred 20 MPA petitions to Department for review and to MRC for discussion February 14-15, 2024
- MRC received and discussed Department-proposed approach for reviewing and evaluating petitions for MPA regulation changes March 19, 2024; MRC
- Department presented proposed Phase 1 “binning” of MPA petitions into bins 1 and 2, and MRC developed recommendation July 17, 2024; MRC
- Approved MRC recommendation for Bin 1 and Bin 2 petitions; requested updates on process for Bin 2 petitions and proposed timeline August 14-15, 2024
- Department provided update on developing Bin 1 recommendations and proposed next steps for evaluating Bin 2 petitions. October 9-10, 2024
- **Today receive and discuss Department Bin 1 petitions evaluation and draft recommendations; discuss sorting of Bin 2 MPA petition actions and next evaluation steps** **November 6, 2024; MRC**
- Commission considers MRC recommendations; receives Department annual MPA Management Program update December 11-12, 2024; MRC

Background

Twenty public MPA regulation change petitions, containing over 80 individual petition actions, are currently under review by the Department for evaluation and recommendations following

Committee Staff Summary for November 6-7, 2024 MRC

Commission referral in February 2024. The Department is following the three-phase framework for evaluating MPA petition requests, which the Commission approved in April 2024 based on MRC recommendation, including four core petition evaluation considerations (see Exhibit 1, pages 3-4). The petition evaluation framework organizes further evaluation considerations into three MPA cornerstones: Governance, Management Program Activities, and Network Performance (See Exhibit 1, page 5).

Phase 1 Binning of Individual Petitions – July 2024 MRC

The Department presented draft binning of individual petitions into Bin 1 (near-term evaluation) and Bin 2 (longer-term evaluation) at the July MRC meeting. In August, the Commission supported the draft placement of petitions into the bins as proposed, initiating Department evaluation of the petitions in Bin 1. The Commission requested a process update in October.

Department Progress Update in October 2024

In October, the Department presented: (1) the status of Bin 1 petition evaluations under the approved MPA petition evaluation framework; (2) proposed next steps for the petition evaluation framework (for discussion at MRC in November 2024); (3) near-term milestones for MRC and Commission meetings (through early 2025); and (4) the Department's newly-launched [MPA Petitions StoryMap](#). The agenda topic materials are in Exhibit 1. The Commission expressed strong interest in tracking the MPA petitions discussions as the evaluation process unfolds.

Following the October meeting, the Department submitted a report to the Pacific Fishery Management Council for the November Council meeting, to provide a high level overview of the process underway with the Commission (Exhibit 5).

Today's Meeting – November 6, 2024

The Department will give a presentation to serve as a roadmap for today's discussion about the Bin 1 evaluation and draft recommendations, and the next phases of the evaluation framework (Exhibit 2).

(A) Bin 1 Petitions Evaluation and Draft Recommendations

The Department has released its draft recommendations and rationale for all petitioned actions in the five petitions sorted into Bin 1 (exhibits 3 and 4). To clarify terminology used in the draft recommendations, "Support" is exclusively for non-regulatory actions, while "Grant" or "Deny" are formal terms used for regulatory actions, aligning with the Commission's authority under the State's Administrative Procedure Act.

Following its introductory presentation, the Department will then walk through the individual draft recommendations for each Bin 1 MPA petition action, categorized into four groups based on the type of action:

- *Non-regulatory*
- *Allowable uses*
- *Classification/take*
- *Boundaries*

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Today, MRC will discuss the Department's draft recommendations and potentially develop an MRC recommendation for Commission consideration.

(B) *Next Steps for Bin 2 Petitions Sorting and Action Evaluation*

This item is to discuss next steps for sorting and evaluating individual actions within Bin 2 petitions (those requiring additional policy guidance, information, or resources) as well as other process considerations.

The Department has begun separating Bin 2 petitions into the individual actions for review. In October 2024, the Department proposed to further sort Bin 2 actions using the Phase 1 considerations to identify those actions ready for near-term evaluation versus those on a longer-term evaluation time scale (Exhibit 1). Based on the Bin 1 review and discussion, today is an opportunity to consider the potential effectiveness of the evaluation method for more involved or complex actions.

There are several sources of information and context to support discussion and potential MRC guidance on the Bin 2 sorting and evaluations:

- *Evaluation framework*: In addition to evaluation guidelines related to compatibility with MLPA and master plan, advancing MLPA goal(s), garnering community support, and advancing DMR adaptive management recommendations, the MPA petition evaluation framework organizes evaluation considerations into the three cornerstones: governance, management program activities, and network performance (found in Exhibit 1). There are multiple ways the sorted actions could be grouped for evaluation purposes, one of which is to use the framework categories to separate actions aimed at adaptive management of existing MPAs through management program changes versus those focused on expanding or adding MPAs to improve network performance. Such an approach is in contrast to, say, focusing discussions in specific regions, or grouping by action type. Each of the approaches may be reasonable, depending on the proposed actions.
- *Staff-proposed petition revision process*: In October, the Commission confirmed its willingness to receive requests from MPA petitioners to amend their original MPA petition. Staff has developed a proposed petition amendment process for MRC consideration (Exhibit 6).
- *Tools for evaluation* (design and scientific analysis): At the October Commission meeting, the California Ocean Protection Council shared its intent to invest in updating two existing tools with recent data: SeaSketch and the Connectivity Model. During today's meeting, Ocean Protection Council staff will provide an update on the tools, anticipated timing for when data updates will be complete, and clarify what the potential applications of each tool are for petition review and evaluation (Exhibit 7).
- *Design feasibility and science guidelines*: Staff and the Department have noted the potential application of existing design feasibility and science guidelines (found in the master plan for MPAs) in reviewing petitioned actions.

Committee Staff Summary for November 6-7, 2024 MRC

(C) General Input on MPA Petitions (as time allows)

Upon completion of 2(A) and 2(B), this section provides a place for comments related to specific MPA petitions or MPAs more broadly. A number of general comments were received by the public comment deadline.

Next Steps – December 11-12, 2024 Commission Meeting

At its December meeting, the Commission will receive any MRC recommendations related to: (1) actions on MPA petitions in Bin 1; (2) a potential petition revision process for Bin 2 petitions; and (3) potential sorting or evaluation guidance for individual actions in Bin 2 petitions, including the use of design and evaluation tools. Additionally, the Department will present its annual MPA Management Program update under the Department's Marine Region update.

Significant Public Comments**(A) Bin 1 Petitions – Department Evaluation and Recommendations**

- *Petition 2023-26MPA (Swami's State Marine Conservation Area, SMCA)*

Amend: The petitioner requests to withdraw the boundary change proposals, but retain proposed color changes for no-take SMCAs in outreach materials (Exhibit 8).

Oppose: A recreational fishing and hunting organization and two recreational fishermen oppose the proposed boundary changes, citing concerns about scientific basis, fishing access, and enforcement challenges (exhibits 9 through 11).

- *Petition 2023-31MPA (Drakes Estero SMCA) or Petition 2023-30 (Big River SMCA)*

Support 2023-31MPA: The petitioner provides additional support for the petition from various individuals and organizations (National Park Service, Marin County Supervisor Rodoni, scientists, non-governmental and community-based organizations, local individuals, and tribes) (Exhibit 12).

Oppose 2023-31MPA and 2023-30MPA: A recreational fishing and hunting organization opposes both petitions due to potential impacts on recreational harvest and lack of clear scientific rationale (Exhibit 9).

- *Petition 2023-22MPA (several Orange County MPAs)*

Support 2023-22MPA_7: Twenty-two individuals support adding language to Orange County MPAs stating that "Scientific research, monitoring, restoration, and education is allowed pursuant to any required federal, state, or local permits, or as otherwise authorized by the Department."

(B) Bin 2 Petitions – Sorting and Next Steps in Evaluation Process

- *MPA Petition Evaluation Process:* Four fishing organizations and three individual fishermen have raised concerns about the MPA petition evaluation process, especially for advancing large-scale MPA change petitions. They cite issues such as insufficient scientific support, inadequate stakeholder engagement, potential conflicts with the Commission's new Coastal Fishing Communities Policy, and coastal fishing communities facing multiple marine spatial developments (offshore wind, 30x30, quillback-driven area closures). Some commenters recommend prioritizing adaptive management adjustments actions, separating evaluations for network expansion, and

Committee Staff Summary for November 6-7, 2024 MRC

pausing the process for new MPA proposals to allow for a more thorough and inclusive approach (see examples in exhibits 13-18).

(C) General Comments

- *Disputing MPA Effectiveness*: Two recreational fishing organizations submitted documents as evidence from scientific sources challenging the effectiveness of MPAs in increasing fish abundance (Exhibit 19).
- *Amend: Petition 2023-15MPA (Channel Islands MPAs)*: The petitioner requests to amend the petition with several options offered for take allowance, including full access and restrictions on gear types, and addresses potential impacts on nearshore areas. Also provides rationale to allow fishing for highly migratory species (HMS) in three Channel Islands MPAs (states HMS have minimal impact on MPA ecosystems; current regulations are overly restrictive due to unintentional gear movement and military closures; and the proposal aligns with adaptive management principles). (Exhibit 20)
- *Support, Oppose or Additional Information*: Over a dozen letters and emails in support of or opposition to specific Bin 2 petitions (Exhibit 21).
- *Petition 2023-23MPA*: Petitioner provides additional information about outreach and compromises made, responds to objections to petition, identifies where additional policy guidance is needed, and attaches a table with all MPA petitions with proposed actions and justifications, and other non-MPA related information (Exhibit 22).

Recommendation

Commission staff: (A) Review the Department's draft recommendations for Bin 1 petition actions and provide feedback. Develop an MRC recommendation for each Bin 1 action, considering public input and potential modifications to the Department's proposals, if any. (B) Discuss the categorization of Bin 2 petitions into individual actions. Provide guidance on the evaluation process, including any specific information or criteria that should be displayed.

Department: (A) Support the Department's draft Bin 1 actions recommendations as proposed. (B) Discuss potential next steps for Bin 2 petition evaluations and amendments.

Exhibits

1. [Staff summary and exhibits from October 9-10, 2024 Commission meeting, Agenda Item 10\(C\), Marine Region Report](#), regarding MPA regulation change petitions (*for background purposes only*)
2. [Department presentation](#)
3. [Department memo: MPA Regulations Change Petitions-Evaluation Process](#), received October 25, 2024
4. [Department recommendations for Bin 1 petition actions](#), received October 25, 2024
5. [Department report on the California MPA Petition Process](#), Agenda Item D.2.b Marine Planning, Pacific Fishery Management Council, November 2024
6. [Staff-proposed process for revising MPA petitions](#), dated October 25, 2024
7. [California Ocean Protection Council presentation](#) – evaluation tools

Committee Staff Summary for November 6-7, 2024 MRC

(A) Comments on Bin 1 Petitions

8. [Letter from Katie O'Donnell, U.S. Ocean Conservation Manager, WILDCOAST](#), received October 10, 2024
9. [Letter from Joel Weltzien, California Chapter Coordinator, Backcountry Hunters & Anglers](#), received October 23, 2024
10. [Email from Volker Hoehne](#), received October 16, 2024
11. [Letter from David Clutts](#), member, San Diego Freedivers, Norcal skindivers, and Richmond Pelican Skindivers, received October 21, 2024
12. [Letter from Ashley Eagle-Gibbs, Executive Director, Environmental Action Committee of West Marin](#), received October 24, 2024

(B) Comments on Bin 2 Petition Evaluation Process

13. [Letter from Kim Selkoe, Executive Director, Chris Voss, President, and Ava Schulenberg, Assistant Director, Commercial Fishermen of Santa Barbara](#), received October 24, 2024
14. [Letter from Kim Selkoe, Founder and CEO, and Victoria Voss, COO, Get Hooked Seafood](#), received October 24, 2024
15. [Letter from Miles Wallace, Owner, Open Ocean Seafood, and Board Member, California Lobster and Trap Fishermen's Association](#), received October 24, 2024
16. [Email from Matthew Bond, AllWaters PAC](#), received October 24, 2024
17. [Letter from Ava Schulenberg, Executive Director, California Lobster and Trap Fishermen's Association](#), received October 24, 2024
18. [Letter from Ava Schulenberg](#), commercial fisherman, received October 24, 2024

(C) Comments on Individual Petitions or MPAs Generally

19. [Emails and attachments from Chris Killen, AllWaters PAC, and Bill Shedd, Coastal Conservation Association California](#), received October 9 to October 23, 2024
20. [Letter from Blake Hermann](#), petitioner for Petition 2023-15MPA, received October 15, 2024
21. [Compilation of eleven letters and emails](#), received October 9 to October 24, 2024
22. [Letter and attachments from Keith Rootsart, Founder, Giant Kelp Restoration](#), and petitioner for 2023-23MPA, received October 24, 2024

Committee Direction/Recommendation

The Marine Resources Committee recommends that the Commission support the Department draft recommendations for petitioned actions in Bin 1 MPA regulation change petitions; and schedule those petitions for action at the February 2024 Commission meeting.

OR

The Marine Resources Committee recommends that the Commission support the Department draft recommendations for petitioned actions in Bin 1 MPA regulation change petitions, except for: _____ for which the MRC recommends: _____, and schedule those petitions for action at the February 2024 Commission meeting.

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3. Application for New Aquaculture Lease**Today's Item****Information** **Action**

Presentation and public vetting of San Andreas Shellfish Company's state water bottom lease application in Tomales Bay, consistent with the Commission's enhanced leasing process.

Summary of Previous/Future Actions

- Commission received San Andreas Shellfish Company's application for a state water bottom lease for aquaculture purposes February 2017
- San Andreas Shellfish Company submitted revised project descriptions for the aquaculture lease September 2019 and October 2021
- Commission approved MRC to develop proposed public interest determination standards and placed the lease application on pause April 2022
- Commission approved MRC-recommended public interest determination criteria and evaluation framework and an enhanced leasing process August 2023
- Commission referred San Andreas Shellfish Company application to MRC and the Tribal Committee for vetting, consistent with new, enhanced leasing process June 19-20, 2024
- San Andreas Shellfish Company submitted final revised project description October 7, 2024
- **Presentation to MRC and public vetting of San Andreas Shellfish Company's proposed aquaculture project** **November 6-7, 2024; MRC**
- Presentation to the Tribal Committee and public vetting of San Andreas Shellfish Company's proposed aquaculture project December 10, 2024; TC
- Commission expected to receive staff update and completed review of requirements and considerations for lease application December 11-12, 2024

Background

The California Fish and Game Commission (Commission) has the authority to lease state water bottoms to any person for the purpose of conducting aquaculture in marine waters of the State, under terms agreed upon between the Commission and the lessee (California Fish and Game Code sections 15400 and 15405). Prior to approving any lease, the Commission must determine that the lease is in the public interest (Fish and Game Code subdivision 15400(a)).

San Andreas Shellfish Company's Application Timeline Overview

At its February 2017 meeting, the Commission received from San Andreas Shellfish Company an application for a state water bottom lease, proposing a new shellfish aquaculture operation in

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Tomales Bay. In the following months, the Department conferred with the California State Lands Commission to ensure that the proposed lease area was unencumbered; it also confirmed with the California Department of Public Health that there are no known red flags for water quality at the project site. Based on input from various entities and agencies of jurisdiction, the applicant pursued a multi-year effort to revise the project. In September 2019 and again in October 2021 the applicant submitted revised project proposals to the Commission, based on the conversations and feedback. In October 2021, the Commission referred the revised application to the Department to complete a public interest evaluation and recommendation.

Public Interest Evaluation Criteria and Enhanced Leasing Process Development

In March 2022, MRC discussed what standards were being evaluated to support a recommendation for the public interest determination by the Commission. MRC recommended that the Commission direct staff to first develop, in collaboration with the Department, more standardized criteria for evaluating if a new lease application is in the public interest, which the Commission approved in April 2022. A public interest criteria effort concluded in August 2023 when the Commission approved “Criteria and Framework for Evaluating if a New State Water Bottom Lease is in the Public Interest” (Exhibit 2). In addition, the Commission approved an [enhanced leasing process for new state water bottom lease applications](#), which changed the timing of the public interest determination from being the first step to being later in the process.

Integrating San Andreas Shellfish Company’s Project into Enhanced Leasing Process

With Commission approval of the enhanced leasing process and public interest criteria, staff resumed consideration of the lease application from San Andreas Shellfish Company in a manner that is integrated into the refined process. The process includes: (1) interagency notification and coordination, including meeting(s) between the applicant and agencies of jurisdiction to support initial review of the proposed lease area, provide opportunities for discussion, and confirm other agencies’ permitting processes; (2) tribal notification; (3) project refinement based on agency and tribal feedback; (4) evaluation of lease requirements in the public interest evaluation framework; and (5) public vetting of the proposed project at MRC and Tribal Committee meetings.

Interagency Coordination: Commission and Department staffs engaged with individual agencies about the new enhanced leasing process and an opportunity to engage on the new lease application; the discussions helped strengthen interagency communication efforts as envisioned in the Commission’s enhanced leasing process. In June 2024, staff facilitated an interagency coordination meeting with various state and federal agency representatives, where San Andreas Shellfish Company presented its proposed project and received feedback. While the company had engaged in several discussions with individual agency representatives since its original application in 2017, this meeting presented the first opportunity for multiple agencies to engage with the applicant and each other collectively.

Revised Project Description: In October 2024, based upon the discussions held during and subsequent to the interagency coordination meeting, San Andreas Shellfish Company submitted a further revised project description and project map to the Commission (Exhibit 1) to advance through the next vetting and evaluation phases.

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Tribal Notification: Commission staff sent a letter and the October 2024 project description to potentially affected tribes in the Tomales Bay region, as identified by the Native American Heritage Commission. The letter invites the tribes to early vetting of the proposed project – either by attending one of the Commission’s committee meetings, or in separate discussions with the applicant and staff. The tribal notification letter is in addition to future notification under the California Environmental Quality Act (CEQA).

Evaluation of Requirements from the Public Interest Evaluation Framework: Department and Commission staffs have completed an evaluation of the “requirements” criterion, confirming that all requirements are met (Exhibit 3); staff will submit the report to the Commission for its December 2024 meeting. The requirements evaluation completes the initial stage of evaluating public interest consistent with the criteria and framework approved by the Commission in August 2023, a step necessary to proceed with public vetting of the proposed project at MRC (today) and the Tribal Committee (scheduled for December 10, 2024).

Today’s Public Vetting and Next Steps

Today, staff will recap the enhanced leasing process, summarize staff’s efforts to integrate the San Andreas Shellfish Company project into the process, and introduce representatives for the company. San Andreas Shellfish Company’s founder/owner and the company’s environmental consultant will present an overview of the proposed project, including how they have addressed input from multiple agencies and their planned next steps (Exhibit 4).

Discussions during today’s and the December Tribal Committee meetings will assist San Andreas Shellfish Company as it prepares a draft initial study to embark on the CEQA process. The CEQA process will also provide analyses for the “considerations” portion of the public interest determination. For reference and to support public discussion, Exhibit 2 contains the public interest criteria and evaluation framework with the considerations and associated inquiries.

Significant Public Comments (N/A)

Recommendation (N/A)

Exhibits

1. [San Andreas Shellfish Company revised project description, received October 9, 2024](#)
2. [“Criteria and Framework for Evaluating if a New State Water Bottom Lease is in the Public Interest,” as approved by the Commission on August 23, 2023](#)
3. [“Evaluation of Aquaculture Lease Requirements in Support of Public Interest Determination for San Andreas Shellfish Company Lease Application,” dated October 28, 2024](#)
4. [San Andreas Shellfish Company presentation](#)

Committee Direction/Recommendation (N/A)

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4. Market Squid Fishery Management and Fishery Management Plan Review**Today's Item**Information Action

Discuss Department report on Department Squid Fishery Advisory Committee (SFAC) review of California market squid fishery management and proposed recommendations, and develop potential committee recommendation.

Summary of Previous/Future Actions

- Commission adopted *Market Squid Fishery Management Plan* (FMP) and implementing regulations August 2004
- Commission referred market squid fishery management review to its Marine Resources Committee (MRC) April 2021
- Department presented proposed approach to squid fishery management review, including forming an SFAC July 2021; MRC
- Department written update on squid management review planning July 2022; MRC
- Department written updates on SFAC process July and November 2023; MRC
- Received update and discussed SFAC meetings to date and next steps March 19, 2024; MRC
- Received and discussed SFAC report and proposed recommendations July 17-18, 2024; MRC
- **Today discuss Department's SFAC report and proposed recommendations, and potential MRC recommendation** **November 7, 2024; MRC**

Background

The California market squid fishery is significant in California's fishery economy and has been undergoing a comprehensive review of management since 2021, the first of its kind since the Market Squid Fishery Management Plan (FMP) was adopted in 2004. A Department director's SFAC was established to assist in the management review process.

SFAC's deliberations across ten meetings culminated in a report, *Squid Fishery Advisory Committee Review of California Market Squid Fishery Management and Proposed Recommendations* (Exhibit 1). The report reviews SFAC discussions, options explored, and Department recommendations in six categories:

- Monitoring
- Fishing dynamics and empirical dynamic modeling (EDM)
- Fishing effort and temporal closures
- Small-scale fishery access
- Nets and squid spawning habitat
- Lighting and seabird habitat

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At the July 2024 MRC meeting, the Department presented a summary of the report, including SFAC deliberations and emerging themes, options considered, and Department recommendations. The recommendations encompass: (1) potential FMP amendments and regulation changes; (2) non-regulatory outreach goals focused on advancing fishery “best practices” amongst the fleet; and (3) areas of continued research for potential future action related to small-scale opportunities, forecasting with EDM, and evaluating potential wildlife-fishery interactions with nocturnal seabirds. See Exhibit 2 for additional details concerning the SFAC process and July discussion.

Following discussion at the July 2024 meeting, MRC requested follow-up on several topics raised during public discussion: (1) the use of seal bombs (also known as marine mammal deterrent devices) in the market squid fishery; (2) lighting and seabird impacts, particularly for Scripp’s murrelet at the northern Channel Islands; and (3) small-scale fishery access considerations.

Update

Today the Department will give a presentation to recap the SFAC process and resulting Department recommendations and highlight a proposed timeline for Commission FMP amendment and rulemaking processes (Exhibit 3). The Department will also address questions and discussion topics from the July 2024 MRC meeting as requested. The Department recognizes the continued interest in small-scale access to squid in port areas outside the traditional squid fishing grounds, and concerns from the seabird conservation community regarding potential interaction of lights from nighttime fishing with nocturnal sea birds, but continues to recommend non-regulatory approaches at this time to further explore the topics, which could lead to future management changes. Staff concurs.

The timeline proposed for the FMP amendment and rulemaking process is to receive the draft amended FMP and consider notice of proposed regulation changes in April 2025, hold a discussion in June 2025, and adopt the final amended FMP and regulations in August 2025.

Significant Public Comments

1. An environmental non-governmental organization submitted two reports analyzing the use of seal bombs in California’s fisheries, specifically focusing on the market squid fishery, in response to MRC’s inquiry in July 2024 (Exhibit 4).
2. An environmental non-governmental organization, which had an appointed conservation representative on the SFAC, expresses support to: (1) extend weekend closures to enhance precautionary management; (2) implement ribeline and rope purse line requirements to protect seabed habitat and squid egg beds; (3) adopt nighttime, area restrictions on squid fishing to aid the recovery of sensitive bird nesting sites; and (4) consider exploring small-scale fishery access (Exhibit 5).
3. Two seabird conservation groups urge MRC to support enacting closure of nighttime fishing and the use of artificial lights near Santa Barbara, Anacapa, and San Miguel islands to protect Scripps’s murrelet, a threatened bird species. They state that artificial light used for squid fishing is a distinct threat to the nocturnal bird, which is listed as threatened under the California Endangered Species Act (exhibits 6 and 7).

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Recommendation

Commission staff: (1) Advance the proposed FMP amendments and regulation changes as recommended by the Department, and schedule a three-meeting concurrent process to commence in April 2024; (2) support the Department’s proposal to conduct outreach and continue research related to lighting best practices, forecasting with EDM, evaluating nocturnal seabird interactions with particular emphasis on Scripp’s murrelet, and exploring small-scale access through experimental fishing permits, recognizing that future adaptive management may be warranted; and (3) track progress on the non-regulatory actions through updates at MRC meetings.

Department: (1) Advance for the Commission’s consideration the proposed FMP amendments and regulation changes, as outlined in Exhibit 3, and schedule a three-meeting concurrent process to commence in April 2024; and (2) support continued non-regulatory actions, including outreach through a fishery “best practices” guide, continuing research on forecasting with EDM, evaluating potential wildlife interactions (primarily nocturnal seabirds) with squid fishery log data, and exploring small-scale fishing access through the Experimental Fishing Permit Program.

Exhibits

1. [Department report, *Squid Fishery Advisory Committee Review of California Market Squid Fishery Management and Proposed Recommendations*, dated July 18, 2024](#)
2. [Staff summary from July 17-18, 2024 MRC meeting](#), Agenda Item 5 (*for background purposes only*)
3. [Department presentation](#)
4. [Letter from Geoff Shester](#), California Campaign Director and Senior Scientist, Oceana, received October 23, 2024
5. [Letter from Greg Helms](#), Manager, Fish Conservation Program, Ocean Conservancy, received October 24, 2024
6. [Letter from Dennis Arguelles](#), Southern California Director, National Parks Conservation Association, received September 30, 2024
7. [Letter from Lindsay Ardean](#), 2024 Vice-Chair for Conservation, Pacific Seabird Group, received September 30, 2024

Committee Direction/Recommendation

The Marine Resources Committee recommends that the Commission: (1) schedule for consideration proposed amendments to the Market Squid Fishery Management Plan and proposed regulation changes, as recommended by the Department, through a three-meeting concurrent process commencing in April 2024; and (2) support the Department’s plans for outreach to provide a fishery “best practices” guide and for continued research on forecasting with empirical dynamic modeling, evaluating potential wildlife interactions with squid fishery log data, and exploring small-scale opportunities through the State’s Experimental Fishing Permit Program.

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5. Recreational Barred Sand Bass Fishery**Today's Item**Information Action

Receive and discuss Department's update on the recreational barred sand bass fishery, barred sand bass working group outcomes, and recommendations for potential regulation changes; develop potential committee recommendation.

Summary of Previous/Future Actions

- Department update and discussion on the recreational barred sand bass fishery and considerations for potential regulation changes July 17-18, 2024; MRC
- **Today receive an update and recommendations for potential regulation changes** November 6-7, 2024; MRC

Background

The barred sand bass fishery is an historic recreational fishery in southern California that is open year-round and managed collectively with kelp bass and spotted sand bass. Current regulations include a five-fish bag limit (in any combination of the three species) and a minimum size limit of 14 inches (35.6 centimeters); these were established in 2013 due to concerns about the status of kelp bass and barred sand bass stocks.

Population Trends, Management Response, and Stakeholder Engagement

While no formal stock assessment exists for barred sand bass, abundance estimates suggest a severely depressed population in southern California. The presumed decline is likely due to a combination of environmental conditions, poor recruitment, and fishing pressure on easily targeted spawning aggregations.

The Department has analyzed available data for the species. Fishery-dependent data indicate continued declines in barred sand bass, except for the past year, with spawning aggregations becoming much smaller or difficult to find. Fishery-independent data over the past several years have shown a pulse of fish entering the fishery, corroborated by the fishery-dependent data showing a slight increase in catch. However, there has been no sizeable recruitment pulse seen behind the entry fish, suggesting that current regulations established in 2013 (lower bag limit and increased size limit) are insufficient to protect the stock, especially if the observed year class of juveniles enters the fishery and fishing effort increases.

Due to population concerns, the Department began discussions with the recreational fishing community and academic community about potential changes to barred sand bass fishery regulations. The Department also requested the Commission refer the topic to MRC and committed to bring a range of recommendations for MRC discussion.

July 2024 MRC Meeting

At the July MRC meeting, the Department presented an overview of the available data for barred sand bass, highlighted outreach to date regarding the types of potential management changes under consideration, and described additional collaboration with sport fishing

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associations and researchers to help recover barred sand bass populations while minimizing impacts to recreational fishing. The Department committed to forming a working group of researchers, recreational fishery representatives, and stakeholders to jointly develop a recommendation for recreational fishery regulations to bring to the November 2024 MRC meeting for discussion, and to support developing a potential recommendation for Commission consideration.

Update

Following the July MRC meeting, the Department convened and has worked closely with a group of sport fishing associations and researchers, including facilitating two meetings. The goals of the working group are to improve shared understanding of the current status of the barred sand bass population and fishery; develop a shared understanding of the current need for a conservation measure; identify information gaps and strategies to collaborate on future data collection; and support an open, collaborative process to share information on the species and fishery.

Today, the Department will present additional details regarding barred sand bass life history and fishery analyses reviewed with the working group, present the outcomes of the working group and its collaboratively-developed options for regulation changes, and provide recommendations for discussion and potential committee recommendation (Exhibit 1). The Department supports a management measure for a period of three years, during which time Department staff would continue to work with stakeholders to fill priority research gaps and develop a long-term conservation strategy to protect barred sand bass spawning aggregations.

Significant Public Comments

1. A sport fishing association representative, who is also a member of the Department's barred sand bass working group, supports the recommended barred sand bass sub-bag limit of four as a three-year, interim, conservation measure (Exhibit 2). They also support utilizing sport fishing organizations to fill knowledge and data gaps. In addition, they share observations about the fishery, including barred sand bass migration and spawning behavior, the relationship between catch rate and regulations, and shifts in fishing effort.
2. A representative of a recreational fishing advocacy organization shares the Department's concern about the health of the barred sand bass population and urges the Commission to take steps to allow it to recover (Exhibit 3). Rather than changing bag or size limits, they propose closing some of the known spawning aggregation sites in southern California to barred sand bass fishing for a specific period or closing barred sand bass fishing during spawning months, as there are other sport fishing opportunities available in the summer. Alternatively, they suggest the regulation changes could be a combination of some fraction of the spawning season combined with size and bag limit adjustments.

Recommendation

Commission staff: Support the Department's recommendation to advance a regulation for the barred sand bass fishery, with a regulation sunset date, and public notice in December as

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discussed today. Support continuation of the Department's work with stakeholders to fill data gaps and develop a long-term conservation strategy for barred sand bass.

Department: Support developing an interim regulation of a year-round bag limit of four barred sand bass, with no more than five bass in combination, with a sunset date after three years, while the Department continues to work with stakeholders to fill priority research gaps and develop a long-term conservation strategy based on best available science to protect barred sand bass spawning aggregations.

Exhibits

1. [Department presentation](#)
2. [Email from Merit McCrea, Sportfishing Association of California, received October 24, 2024](#)
3. [Email from Matt Band, Allwaters Protection & Access Coalition, received October 24, 2024](#)

Committee Direction/Recommendation

The Marine Resources Committee recommends that the Commission: (1) schedule a rulemaking with notice in December 2024 to set a year-round bag limit of four barred sand bass, with no more than five bass in combination, and a regulation sunset of three years, as recommended by the Department; and (2) support the Department's efforts to continue to work with stakeholders to fill priority research gaps and develop a long-term conservation strategy based on best available science to protect barred sand bass spawning aggregations.

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6. Recreational Crab Trap Gear Options and Trap Validation for Commercial Passenger Fishing Vessels

Today's Item

Information Action

Discuss Department-proposed regulation changes related to gear and marine life entanglement concerns, and trap validation for commercial passenger fishing vessels (CPFVs); develop potential committee recommendation.

Summary of Previous/Future Actions

- Commission granted, in part, a regulatory petition concerning crab validation stamps for CPFVs June 14-15, 2023
- MRC received Department update on scope of potential recommendations for changes to recreational crab regulations March 19, 2024; MRC
- MRC received and discussed Department overview of proposed recommendations for changes to recreational crab regulations July 17-18, 2024; MRC
- **Today, receive Department update on proposed regulation changes and develop potential MRC recommendation November 7, 2024; MRC**

Background

In June 2023, the Commission took action on a regulation change petition from the CPFV industry related to CPFV-specific crab trap validation stamps and modifying surface buoy gear requirements. The Commission granted the CPFV validation stamps part of the petition and requested that the Department work with recreational crab fishery participants to develop other regulation options related to gear and entanglement concerns.

Following the June meeting, Department staff worked with CPFV and sport fishing representatives to develop proposed changes to recreational crab regulations, followed by a survey of 2023 crab validation stamp purchasers in spring of 2024. The survey was intended to inform the efficacy of a validation stamp for management, and the potential utility of a CPFV-specific validation stamp.

At the July MRC meeting, the Department reported survey results and provided an overview of its proposed changes to recreational crab regulations and the rationale for those changes (Exhibit 2). The Department presented five potential regulation changes to address gear and marine life entanglement concerns and to create a new trap validation for commercial passenger fishing vessels. The Department committed to conducting additional outreach, continue analyzing the crab validation survey results, and present a final recommendation to MRC at this meeting.

Update

Following the July MRC meeting, the Department conducted additional outreach regarding the proposed regulation changes via a public webinar, the Dungeness Crab Fishing Gear Working

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Group, the Dungeness Crab Task Force, and tribal notifications. Today, the Department will present an update and will highlight any changes from the July recommendation, as informed by recent outreach (Exhibit 1).

Significant Public Comments (N/A)**Recommendation**

Commission staff: Advance to rulemaking the proposed changes to recreational crab trap regulations related to gear and marine life entanglement concerns and trap validation for commercial passenger fishing vessels, as recommended by the Department and discussed today.

Department: Advance to rulemaking the proposed changes to recreational crab trap regulations related to gear and marine life entanglement concerns and trap validation for commercial passenger fishing vessels, including to: (1) create a specific CPFV validation stamp; (2) prohibit tampering with hoop nets without permission of operator; (3) clarify northern hoop net surface gear; (4) update recreational entanglement evaluation, including triggers, and management actions [do not include northern hoop nets]; and (5) prohibit use of line required in other fisheries, as described today. Schedule for notice hearing in April 2025.

Exhibits

1. [Department presentation](#)
2. [Department July 2024 presentation to MRC \(for background purposes only\)](#)

Committee Direction/Recommendation

The Marine Resources Committee recommends that the Commission advance to rulemaking the proposed changes to the recreational crab trap fishery related to gear and marine life entanglement concerns and trap validation for commercial passenger fishing vessels as recommended by the Department, and schedule public notice for April 2025.

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7. Commercial Harvest of Marine Algae Sea Palm (*Postelsia*)**Today's Item**Information Action

Receive and discuss Department-recommended regulations governing commercial harvest of sea palm; develop potential committee recommendation.

Summary of Previous/Future Actions

- MRC received updates on commercial kelp and algae harvest management review 2015-2019; MRC
- Department presented initial draft regulations; MRC recommended additional outreach March 2020; MRC
- Department proposed formation of stakeholder working groups, starting with bull kelp, followed by edible seaweeds; MRC recommendation, with Commission approval in December 2020 November 2020; MRC
- Commission referred sea palm review to MRC June 2021
- Received Department overview of sea palm and recommendation to prioritize management review; MRC recommendation March 2022; MRC
- Department provided TC an update on sea palm review April 2022; TC
- Commission approved MRC recommendation to prioritize review of sea palm commercial harvest before other edible species April 2022
- TC received Department updates related to kelp and edible algae management April 2022, August 2022, and April 2023; TC
- MRC received Department update on development of proposed changes to commercial harvest of marine algae sea palm July 17-18, 2024; MRC and August 13, 2024; TC

Background

Kelp and edible seaweed are managed with other marine algae through the Department's kelp management program. The Department and Commission have been working to revise antiquated commercial kelp regulations over more than ten years through a three-phase approach, to improve management and enforceability. Phase 1 was completed in 2013 and implemented in 2014; Phase 2 has been underway since late 2016.

Phase 2 is focused on both regulatory clean-up and broader management and regulation overhaul in consultation with commercial kelp and algae (seaweed) harvesters. Originally planned for completion in 2020, the Commission subsequently approved continuing Phase 2 while the Department worked more directly with growers and other interested stakeholders on proposed changes.

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In November 2020, the Department proposed to form two separate working groups — one for bull kelp harvest and one for edible seaweeds harvest — to collaboratively develop regulation change proposals, including regional approaches, harvest methods, and data needs. MRC recommended and the Commission prioritized bull kelp harvest review first, in light of bull kelp condition and recovery needs on the north coast. The commercial kelp harvest review and associated rulemaking effort was completed in 2021. The next part to review regulations for commercial harvest of all edible seaweed species, including sea palm, was initiated in 2022.

Reviewing Commercial Harvest of Sea Palm (*Postelsia*)

During the Commission's May 2021 meeting, a commenter expressed concern about long-term monitoring data sets documenting declines in abundance of *Postelsia*, a marine algal species known as sea palm that is commercially harvested as edible seaweed. The commenter advocated for immediate focus on protecting sea palm. In July 2021, the InterTribal Sinkyone Wilderness Council — a consortium of ten federally-recognized tribes in northern California — proposed a 10-year moratorium on commercial harvest of bull kelp, giant kelp, and sea palm.

The Commission referred the topic of commercial harvest of sea palm to the March 2022 MRC meeting, to consider whether to prioritize sea palm harvest review ahead of the review of other edible seaweed species. At the March meeting, the Department presented an overview of sea palm distribution and harvest. In light of public, tribal, and Department reporting, MRC recommended prioritizing commercial sea palm harvest review before other edible species; in April 2022, the Commission approved the recommendation.

Update

The Department has evaluated data, researcher and harvester information, and management needs for sea palm since its review was prioritized. Today, the Department will present an overview of sea palm harvest over 20 years and information about sea palm density across the state (Exhibit 1); it will also present proposed changes to both sea palm regulations and all marine algae for MRC consideration and potential recommendation. Proposed sea palm regulation changes are to: (1) define allowable harvest methods; (2) require central latitude/longitude coordinates of harvest location; and (3) prohibit harvest in the southern portion of the species' range (south of Pigeon Point, San Mateo County). Additionally, the Department will propose amendments to regulations for all marine algae, to require that harvesters: (1) identify the day of harvest in harvest reporting; (2) specify if take is "drift" or "beached"; (3) include additional information on harvest effort (details will be shared during the meeting); and (4) clarify language and update outdated references.

The Department will also highlight its outreach to and engagement with sea palm harvesters, researchers, and the public when exploring management options. Department staff provided updates at Commission Tribal Committee meetings in 2022, 2023 and 2024, sent tribal notification letters in the fall of 2024, and reached out directly to tribes and tribal councils that previously expressed interest. To date, the Department has not received feedback from any tribes.

Significant Public Comments (N/A)

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Recommendation

Commission staff: Advance for consideration in a rulemaking the proposed changes to commercial harvest of sea palm on a timeline to commence with authorizing public notice in February, as recommended by the Department.

Department: Advance to rulemaking for public notice in February 2025 proposed regulation changes for commercial sea palm harvest to: (1) define allowable harvest methods; (2) require central latitude/longitude coordinates of harvest location; and (3) prohibit harvest in the southern portion of its range (south of Pigeon Point, San Mateo County). In the same rulemaking, include regulation changes for commercial harvest of all marine algae to: (1) identify the day of harvest in harvest reporting; (2) specify if take is “drift” or “beached”; (3) include additional information on harvest effort, as described today; and (4) clarify language and update outdated references.

Exhibits

1. [Department presentation](#)

Committee Direction/Recommendation

The Marine Resources Committee recommends that the Commission advance to rulemaking the proposed regulation changes as recommended by the Department, and schedule the rulemaking to commence with authorizing public notice in February 2025.

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8. Experimental Fishing Permit (EFP) Program**Today's Item****Information** **Action**

Receive Department update on the box crab EFP research project and broader EFP program, including other EFPs testing pop-up gear.

- (A) Box crab exploratory fishing research project
- (B) EFP program overview, including pop-up gear testing

Summary of Previous/Future Actions**A. Box Crab Exploratory Fishing EFP Research Project**

- Commission approved requests for box crab experimental gear permits (EGPs) for cooperative research and exploratory fishing under the authority of a law that has been repealed December 12-13, 2018
- Under the authority of a replacement statute, the Commission adopted EFP Program Phase 1 regulations to allow for issuing EFPs to fishermen who were issued EGPs in the box crab EGP research project October 9-10, 2019
- Commission approved EFPs to continue the brown box crab research project 2020-2022
- Commission referred to MRC an update on the brown box crab EFP research project February 2022
- Commission received and approved MRC recommendation related to a new EFP with a modified purpose and goals April 2022
- Commission approved EFP application #2023-01 for exploratory fishing for brown box crab with pop-up gear in southern California June 14-15, 2023
- Commission denied EFP application #2024-01 for the time being, and requested an update on the status of the box crab EFP research project at November 2024 MRC meeting June 19-20, 2024; FGC
- **Today receive an overview of the history and status of the box crab EFP research project** **November 6-7, 2024; MRC**

B. EFP Program Overview, Including Pop-up Gear testing

- Commission adopted EFP Phase 2 regulations to formally establish EFP Program December 15-16, 2021
- New EFP program in effect April 1, 2022
- Commission approved three EFPs to test pop-up gears in the Dungeness crab fishery 2023-2024
- **Today receive an overview and discuss the EFP program, and pop-up gear testing** **November 6-7, 2024; MRC**

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Background

The Commission and Department jointly administer the EFP Program, authorized by the California Fisheries Innovation Act of 2018 (California Fish and Game Code Section 1022) and established through Commission regulations adopted in December 2021. The program fosters innovation and experimentation in California's commercial and recreational marine fisheries through limited-term exemptions from fishing laws and regulations. For additional information, see the Department's EFP Program webpage: <https://wildlife.ca.gov/Conservation/Marine/EFP>.

A. Box Crab Exploratory Fishing Research Project

The Commission has supported exploratory fishing for brown box crab, a deep water species, since late 2017, when the Department began developing a collaborative research project with California Sea Grant, commercial partners, and other stakeholders to study brown box crab through Commission-approved experimental gear permits (EGP). EGPs were to be issued to commercial trap fishermen that desired to target and market brown box crab and were willing to meet conditions necessary for the project. The collaborative research project was designed to support emerging fisheries, as mandated by the Marine Life Management Act, by providing the necessary information to determine if the box crab resource represents a viable new fishing opportunity. In December 2018, the Commission approved eight EGPs to participate in the collaborative research program using traditional commercial trap gear. The research continued from 2019 to 2023 under new EFPs authorized through provisions of the California Fisheries Innovation Act of 2018.

The research program's primary objectives were to gather essential fishery information for brown box crab and California king crab and to evaluate potential for and design of a commercial box crab fishery. The program included exploratory fishing, a tag-recapture study, and life history studies for brown box crab in southern California and, originally, in northern California (the northern participants dropped out of the project). While there was a growing market and increasing interest from the fishing community to participate, after four years of collaborative research the Department indicated it needed more information to be able to make a final recommendation on whether a sustainable commercial fishery could be established and what would be the necessary management measures and regulations. The Commission referred the topic to MRC for discussion.

MRC Review of Box Crab EFP Research Project

In Mach 2022, MRC received a Department update on box crab EFP research activities and discussed potential pathways for pursuing next steps in reviewing a potential targeted fishery. MRC expressed support for a new EFP with modified purpose and goals. Specifically, MRC recommended, and the Commission approved in April 2022:

- Support developing a new experimental fishing permit to continue researching brown box crab and California king crab with revised research goals related to filling information gaps and giving attention to whale entanglement issues, as recommended by the Department; and
- support prioritizing current/prior box crab experimental fishing permit participants to participate in the new experimental fishing permit.

Committee Staff Summary for November 6-7, 2024 MRC

Sustainable Seas Technology EFP (#2023-01) for Southern California

Following conclusion of the collaborative research project and the Commission's stated support for a new EFP with a modified purpose and goals, the Commission received an application for a Tier 4 EFP from Sustainable Seas Technology (Commission ID #2023-01). The application stated an intent to build upon the original research project with revised goals; the Commission approved the EFP in June 2023. The EFP focuses on gathering additional biological and fishery data on brown box crab and California king crab in southern California (south of Point Conception); and testing pop-up gear for effectiveness in this deep-water fishery.

The Sustainable Seas EFP was issued in January 2024 and has experienced high turnover in authorized agents and vessels; only two authorized agents are conducting exploratory fishing. In October 2024, participants cited short gear service intervals as a core reason for the turnover; the Commission approved a major amendment to extend the service interval from four days (96 hours) to seven days (168 hours).

2024 EFP Application for Northern California

In 2024, an EFP application (#2024-01) was submitted to expand exploratory fishing for brown box crab and California king crab north of Point Conception (between Pigeon Point, San Mateo County, and the Sonoma/Mendocino county line). The application aimed to build on the research in southern California, and explore filling markets with alternative crab species during Dungeness crab season delays or closures.

The Department recommended to deny the application for now, prioritizing the completion and evaluation of existing EFPs focused on similar gear testing and species in southern California before expanding research. The Commission agreed and denied the application, requesting the Department provide a program overview at today's MRC meeting to understand when a northern EFP might be reconsidered.

Today's Update

The Department will present an overview of the previous box crab experimental gear research project; the current Sustainable Seas Technology EFP; the EFP's preliminary results, including essential fishery information, gear performance, and information gaps; and the Department's planned next steps.

B. EFP Program Overview, Including Pop-up Gear Testing

Implemented through sections 91 and 704 of Title 14 of the California Code of Regulations, the EFP Program has introduced new opportunities for coastal fisheries since its inception in April 2022.

EFP Applications and Amendments

The Department reports that since 2022 it has received 23 pre-application consultation requests and 9 formal applications. The Commission approved 7 EFPs and, to date, the Department has issued 5. Additionally, 11 minor amendments, 6 major amendments, and 1 Department-initiated amendment have been approved.

Committee Staff Summary for November 6-7, 2024 MRC

Pop-up gear EFPs

Out of the 7 approved EFPs, 3 are specifically focused on testing various types of pop-up releases, including timed and acoustic mechanisms. A total of 9 different pop-up release types are currently being evaluated across 3 issued EFPs. The success of the testing could lead to authorization of pop-up gear within the Dungeness crab fishery and potentially other trap fisheries in California.

EFP Challenges

While this program has opened doors for innovation, the Department reports that it has also presented unique challenges in its implementation, including administrative workload from unlimited amendments, and strained capacity for some subject matter experts.

Looking Ahead

Today, the Department will present a comprehensive overview of the EFP program, including current EFPs and their locations, details on pop-up gear being tested, EFP program challenges, and opportunities for program improvement. MRC may wish to clarify when the Department anticipates information will be available to determine whether implementing EFP-tested gear in California fisheries is supported.

In January 2025, the Department will submit a report on the EFP program to the California State Legislature, and will share the report with the Commission. The Department will also continue to coordinate with Commission staff to develop programmatic improvements and consider a prioritization system for future applications.

Significant Public Comments (N/A)**Recommendation (N/A)****Exhibits**

1. [Department presentation](#), Item 8(A)
2. [Department presentation](#), Item 8(B)

Committee Direction/Recommendation (N/A)

Committee Staff Summary for November 6-7, 2024 MRC

9. Red Abalone Recovery Plan: Risk Tolerance for Harvest

Today's Item

Information

Action

Discuss risk tolerance for reopening red abalone fishery harvest in the context of statewide recovery plan development.

This item is not ready for Committee discussion. Staff recommends this item be continued to a future meeting.

Summary of Previous/Future Actions (N/A)

Background (N/A)

Significant Public Comments (N/A)

Recommendation

Commission staff: Under Agenda Item 1, continue this item to a future meeting.

Exhibits (N/A)

Committee Direction/Recommendation (N/A)

Committee Staff Summary for November 6-7, 2024 MRC

10. Staff and Agency Updates**Today's Item**Information Action

Receive updates from staff and other agencies, including the 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. Members of the public will have an opportunity to share their thoughts and questions, although the level of in-meeting discussion will be at the discretion of the Marine Resources Committee (MRC) co-chairs.

A. OPC

OPC staff will provide an update on topics of interest to MRC.

B. Department**I. Law Enforcement Division (LED)**

LED will provide an update on recent law enforcement cases.

II. Marine Region

Marine Region staff will provide updates on various work plan topics, including:

- a. Kelp recovery and management plan development

C. Commission Staff**I. Coastal Fishing Communities Policy – Initial Implementation Steps**

Since the July 2024 MRC meeting, the Commission's Sea Grant state fellow has been preparing updates for the Commission's Coastal Fishing Communities [Project webpage](#), up through adoption of the policy in April 2024. She is developing an ArcGIS StoryMap as a stakeholder education and engagement tool and is conducting outreach to coastal fishing community members, fisheries stakeholders, and partners directly (Exhibit 1) to invite them to help explore implementation of the new Coastal Fishing Communities Policy.

II. California Sea Grant 2025 State Fellowship

Commission staff are pleased to announce the selection of our 2025-2026 California Sea Grant state fellow, Caroline Newell! In September 2024, Caroline received her master of science degree in ecology through her work at the Center for Watershed Science at the University of California, Davis. She earned her bachelors of science in wildlife, fish, and conservation biology in 2019. And, she is a hunter and angler excited to participate in the Commission's important work. Staff looks forward to introducing Caroline at the March 2025 MRC meeting after she begins her fellowship in early 2025.

Committee Staff Summary for November 6-7, 2024 MRC

Significant Public Comments (N/A)

Recommendation (N/A)

Exhibits

1. [Letter from Commission staff to stakeholders](#) regarding Coastal Fishing Communities policy update and initial implementation steps, dated August 9, 2024

Committee Direction/Recommendation (N/A)

Committee Staff Summary for November 6-7, 2024 MRC

11. Future Agenda Items

Today's Item	Information <input type="checkbox"/>	Action <input checked="" type="checkbox"/>
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- | | | |
|--|--|--|
| (A) Review work plan agenda topics, priorities, and timeline | | |
| (B) Potential new agenda topics for Commission consideration | | |

Summary of Previous/Future Actions

- | | |
|---|--------------------------------|
| • Commission approved Marine Resources Committee (MRC) agenda and work plan | July 17-18, 2024; MRC |
| • Today's review and discussion | November 6-7, 2024; MRC |
| • Next MRC meeting | March 13, 2025; 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 2025 MRC meeting are shown in the March column of the work plan in Exhibit 1.

Proposed Updates

- Staff recommends that the topic "Red Abalone Recovery Plan: Risk Tolerance for Harvest", continued from this meeting, be tentatively scheduled for March 2025.
- The "Commercial Fisheries Logbook Forms and Fishing Block Charts" topic is complete and has been removed from the work plan.

Next Meeting

There are currently six topics identified for potential discussion in March 2025: five current work plan topics, plus one additional topic proposed for referral under part (B). At the February 2025 Commission meeting, staff may recommend changes to proposed agenda topics after assessing readiness closer to that date. Staff welcomes guidance from MRC regarding scheduling specific topics identified in the work plan. In addition, based on the effectiveness of this meeting's format, MRC may want to consider requesting a similar, two-day format for the March meeting.

(B) Discuss and Recommend New MRC Topics

Today's meeting provides an opportunity to identify any potential new agenda topics to recommend to the Commission for referral to MRC.

Committee Staff Summary for November 6-7, 2024 MRC

Department and Commission staff anticipate there will be a need to continue discussions about the EFP Program after the subject is introduced at today's meeting, and suggest MRC consider requesting the Commission add it to the work plan for March 2025.

Significant Public Comments (N/A)**Recommendation**

Commission staff: Review the list of topics identified for the March 2025 MRC meeting, determine if topics should be revised, or if any additional topics on the work plan should be scheduled for March 2025. Provide direction on any other additions or removals, including recommending the Commission add an "EFP Program Review" topic to the work plan for March 2025 discussion, and potentially scheduling a two-day meeting.

Exhibits

1. [MRC work plan](#), updated October 28, 2024

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, with the additional recommendation(s) to: _____.

Committee Staff Summary for November 6-7, 2024 MRC

12. General Public Comment**Today's Item**Information Action

Receive public comment regarding topics that are not included on today's agenda.

Summary of Previous/Future Actions (N/A)**Background**

The Marine Resources Committee (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

One commenter requests the Commission to continuously track at all meetings the status of all salmon species until they are no longer considered "endangered" or "threatened"; expresses concern over the southern resident Pacific orca population decline; and urges the Department and Commission to investigate the impact of offshore wind turbines, pollution, and habitat loss on coastal mammals such as mink, fisher and river otter (Exhibit 1).

Recommendation (N/A)**Exhibits**

1. [Email from Phoebe Lenhart](#), received October 23, 2024

Committee Direction/Recommendation (N/A)

Staff Summary for October 9-10, 2024

10C. Department Marine Region Report

Today's Item	Information <input checked="" type="checkbox"/>	Action <input type="checkbox"/>
I.	Update on developing recommendations for marine protected area (MPA) regulation changes for Bin 1 petitions (near-term) and proposed next steps for commencing Bin 2 (longer-term) petition evaluations.	

Summary of Previous/Future Actions

- Received MPA Decadal Management Review (DMR) report and recommendations February 8-9, 2023
- Received 20 MPA regulation change petitions December 13-14, 2023
- Referred 20 MPA petitions to Department for review and to the Commission Marine Resources Committee (MRC) for discussion February 14-15, 2024
- MRC received and discussed Department-proposed approach for reviewing and evaluating petitions for MPA regulation changes March 19, 2024; MRC
- Requested Department update on status of adaptive management actions June 19-20, 2024
- Department presented proposed Phase 1 “binning” of MPA petitions into bin 1 and 2, and MRC developed recommendation July 17 2024; MRC
- Approved MRC recommendation for bin 1 and bin 2 petitions; requested update on process for bin 2 petitions and proposed timeline August 14-15, 2024
- **Today's update** **October 9-10, 2024**

Background

MPA Regulation Change Petitions Review and Evaluation Process Update

In February 2024, the Commission referred 20 MPA regulation change petitions, submitted by the public in December 2023, to the Department for review, evaluation, and recommendation. The Department developed a 3-phased evaluation framework (Exhibit 1) with specific evaluation criteria to begin sorting petitions, which the Commission concurred with in April 2024 based on an MRC recommendation.

The Department subsequently completed Phase 1 of the evaluation process and presented results to MRC in July 2024. In August 2024, the Commission approved the Phase 1 binning as proposed and recommended by MRC (Exhibit 2). The Department highlighted mapping visualization tools — under development in partnership with the California Ocean Protection Council — to assist with understanding and evaluating petitions. The Commission requested that the Department provide a progress update in October 2024 (this meeting) on the evaluation process and timeline.

As requested, for today's meeting the Department has prepared an update on the MPA petition evaluation process and timeline (Exhibit 3) that includes a presentation focused on orienting the full Commission to the work underway through MRC as directed by the Commission. The presentation includes the status of petition evaluation efforts under the approved MPA petition evaluation framework, proposed next steps for pursuing phases 2 and 3 of the petition evaluation framework, and a look ahead at near-term milestones for MRC and Commission meetings in late 2024 to early 2025.

Finally, the Department has just launched a new [Marine Protected Area \(MPA\) Petitions StoryMap](#). The web-based StoryMap provides information for anyone interested and with internet access to view maps and details for the submitted MPA petitions and view updates on the petition evaluation process. See Exhibit 4 for the [Department blog post](#) announcing the site's availability.

Significant Public Comments (N/A)

Recommendation (N/A)

Exhibits

1. [Department memo with proposed three-phase MPA petition evaluation process and timeline, dated April 2, 2024 \(for background purposes only\)](#)
2. [Department document, "Phase 1 Categorization of MPA Petitions," dated June 20, 2024 \(for background purposes only\)](#)
3. [Department presentation, "MPA Petition Evaluation Process Status and Timeline," received October 2, 2024](#)
4. [Department Marine Management News blog post: New Web Page Provides Information on Proposed Changes to the California Marine Protected Area Network, posted September 30, 2024](#)

Motion (N/A)

Memorandum

Date: April 2, 2024

To: Melissa Miller-Henson
Executive Director
Fish and Game Commission

From: Charlton H. Bonham
Director

Subject: Proposed Marine Protected Area Petition Evaluation Process and Timeline

At their February 14-15, 2024, meeting, the California Fish and Game Commission (CFGF) referred 20 Marine Protected Area (MPA) regulation change petitions to the California Department of Fish and Wildlife (CDFW) for review, evaluation, and recommendation. In addition, the CFGF requested CDFW develop a proposed approach to evaluate the petitions to discuss at the Marine Resources Committee (MRC) meeting on March 19, 2024. After discussion and input from interested stakeholders, the MRC recommended approval of CDFW's proposed 3-phase approach to evaluate MPA petitions. The proposed approach is briefly described below and in the enclosed presentation that was provided to the MRC on March 19, 2024.

Proposed 3-Phase Approach to MPA Petition Evaluation

Phase 1: Petitions will be categorized into two bins using the criteria outlined below to determine which petitions can be evaluated in the near-term and which petitions will require additional policy guidance, information, and/or resources prior to evaluation.

- **Bin 1 petitions:** Petitions that can be evaluated in the *near-term* must meet all the following criteria:
 - Policy direction not needed for next phases.
 - Within CFGF authority.
 - Immediate evaluation possible.
 - Limited clarification needed from petitioner.
 - Limited controversy anticipated.
- **Bin 2 petitions:** Petitions that do not meet all the above criteria will be categorized into Bin 2. The analysis of these petitions will be more complex as they will require additional policy guidance, information, and/or resources before they can be evaluated. Due to the complexity of these petitions, these will be evaluated in the *longer term*.

Melissa Miller-Henson, Executive Director
Fish and Game Commission
April 2, 2024
Page 2

Phase 2: Separate all Bin 1 petitions into individual actions and proceed to phase 3. Separate Bin 2 petitions into individual actions and identify additional policy guidance, information, and/or resources that are necessary to advance individual actions to phase 3.

Phase 3: Adaptive management evaluation and recommendations. Apply the evaluation framework approved by the CFGC to each petition action. The process will identify which petitions, and/or actions within each petition, would be recommended to be granted, denied, or considered through an alternative pathway.

Proposed MPA Petition Evaluation Anticipated Timeline

- **March-April 2024: Development of Evaluation Framework**
 - Receive and discuss proposed 3-phase evaluation process at the March 19 MRC and April 17 CFGC meetings.
- **April-August 2024: Phase 1— CDFW Sort Petitions into 2 Bins**
 - Discuss proposed bins at the July 18 MRC and August 14 CFGC meetings.
- **August 2024 and beyond: Phases 2 and 3—Separate petitions into individual actions**
 - Receive guidance on Bin 2 actions as needed.
 - Move forward with evaluation on both Bin 1 and 2 actions. Evaluation timelines for Bin 1 and Bin 2 actions will vary.

If you have any questions or need more information, please contact Dr. Craig Shuman, Marine Regional Manager, at (805) 568-1246.

Attachment 1: Proposed Marine Protected Area Petition Evaluation presentation.

Attachment 2: Evaluation Framework

cc: Jenn Eckerle, Deputy Secretary for Ocean and Coastal Policy
Natural Resources Agency

Craig Shuman, D. Env., Region Manager
Marine Region

Becky Ota, Environmental Program Manager
Marine Region

Stephen Wertz, Senior Environmental Scientist
Marine Region

Sara Worden, Environmental Scientist
Marine Region

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.

The MRC also received input organized by cornerstone as follows:

- MPA Governance:
 - Simplifies regulatory language or enhances public understanding
 - Addresses inaccuracies or discrepancies in regulations
 - Accounts for regional stakeholder group intent identified during the regional MLPA planning process (including MPA-specific goals/objectives and design considerations)
 - Accounts for CDFW's [MPA design and management feasibility guidelines](#)
 - Advances tribal stewardship and co-management, consistent with the CFGC [Co-Management Vision Statement and Definition](#)
 - Improves access for traditionally underserved or marginalized communities, consistent with the [CFGC Policy on Justice Equity, Diversity and Inclusion](#)
 - Acknowledges socio-economic implications, such as access for consumptive or non-consumptive users
- MPA Management Program Activities:
 - Clearly addresses or identifies scientific need for MPA Network based on best available science and scientific advancement since Network completion
 - Improves compliance and/or enforceability
- MPA Network Performance:
 - Maintains or enhances the protections and integrity of the MPA Network
 - Maintains or enhances habitat and species connectivity
 - Adheres to science guidelines, such as maintaining minimum size and spacing, and protection of diverse habitats
 - Enhances climate resilience and/or helps mitigate climate impacts

Memorandum

Date: June 27, 2024

To: Melissa Miller-Henson
Executive Director
Fish and Game Commission

From: Craig Shuman, D. Env. 
Marine Regional Manager

Subject: **Draft Proposed Phase 1 Categorization of Marine Protected Area Petitions**

At their February 14-15, 2024 meeting, the California Fish and Game Commission (CFGC) referred 20 MPA petitions received to the California Department of Fish and Wildlife (CDFW) for review, evaluation, and recommendation. In addition, they requested CDFW provide an administrative update at their March 19 Marine Resources Committee (MRC) meeting on the approach to evaluate the petitions. After discussion and input from interested stakeholders, the MRC recommended approval of CDFW's proposed 3-phase approach to evaluate petitions, and the CFGC approved the approach at their April 17 meeting. CDFW has completed Phase 1 of the 3-phase approach and will present the proposed draft binning at the July 17, 2024, MRC meeting.

Phase 1 petitions are categorized into two bins using the criteria outlined in the 3-phase approach to determine which petitions can be evaluated in the near-term (Bin 1) and which petitions will require additional policy guidance, information, and/or resources prior to evaluation (Bin 2). CDFW released the draft Phase 1 outcomes to California Native American tribes and the public on May 31, which includes tables that outline the proposed Bin 1 and Bin 2 petitions with brief justifications that describe why petitions are categorized into each bin.

If you have any questions or need more information, please contact Dr. Craig Shuman, Marine Regional Manager, at (805) 568-1246.

Attachment 1: 3-phase approach for MPA Petition review and evaluation

Attachment 2: Draft Proposed Phase 1 Categorization of Marine Protected Area Petition background, Bin 1 and Bin 2 tables, and brief justifications

Attachment 3: Power Point presentation outlining process, proposed binning, and next steps

ec: Jenn Eckerle, Deputy Secretary for Ocean and Coastal Policy
Natural Resources Agency

Stephen Wertz, Senior Environmental Scientist Supervisor
Marine Region

Draft Proposed Phase 1 Categorization of Marine Protected Area Petitions

In 2023, the California Department of Fish and Wildlife (CDFW) publicly released the first 10-year [comprehensive review](#) of California's Marine Protected Area (MPA) Network that included [28 adaptive management recommendations](#) prioritizing strategies for the next decade of MPA management. One of the near-term priority recommendations called for applying what was learned from the comprehensive management review to support proposed changes to the MPA Network and Management Program. To advance this recommendation, the California Fish and Game Commission (CFGC) requested that MPA regulation change petitions be submitted for their December 2023 meeting. CFGC received [20 petitions](#) with over 80 unique requests for changes to the MPA Network.

At their February 14-15, 2024 meeting, CFGC referred the 20 MPA petitions received to CDFW for review, evaluation, and recommendation. In addition, they requested CDFW provide an administrative update at their March 19 Marine Resources Committee (MRC) meeting on the approach they would take to evaluate the petitions. After discussion and input from interested stakeholders, the MRC recommended approval of CDFW's [proposed 3-phase approach](#) to evaluate MPA petitions, and the CFGC approved the approach at their April 17 meeting. CDFW has completed Phase 1 of the 3-phase approach and will present the proposed binning of petitions for discussion and consideration at the July MRC meeting. In addition to the MRC's regularly scheduled July 18 meeting, the CFGC approved a separate day on July 17 be added to the meeting for this discussion. There will be an update about the outcomes from this meeting at the August 14-15 CFGC meeting.

Petitions are categorized into two bins (Tables 1 and 2) using the criteria outlined below to determine which petitions can be evaluated in the near-term (Bin 1) and which petitions will require additional policy guidance, information, and/or resources prior to evaluation (Bin 2). The proposed binning of petitions by CDFW are recommendations for the MRC to consider at their July 17 meeting. It is anticipated the MRC will make a recommendation on the binning of petitions for the CFGC to consider at their August meeting. ***Inclusion in Bin 1 does not automatically mean the requests in any given petition will be granted.*** Following approval of the binning of petitions by CFGC, CDFW will move forward with the evaluation of Bin 1 petitions for subsequent discussion and consideration by the MRC and CFGC.

Bin 1: Petitions that can be evaluated in the ***near-term*** must meet all the following criteria:

- Policy direction not needed for next phases: The requested changes are consistent with existing policies regarding the MPA Network.
- Within CFGC authority: CFGC has clear regulatory authority over the changes requested in the MPA petitions.
- Immediate evaluation possible: Information and resources are available to evaluate petitions in the near-term
- Limited clarification needed from petitioner: The changes requested in the petitions are clear and understandable.
- Limited controversy anticipated: Changes that have limited impact on human uses and network design, such as minor boundary changes and/or updating regulatory language, are expected to cause limited controversy.



Bin 2: Petitions that do not meet all the above criteria are categorized into Bin 2. The analysis of these petitions will be more complex as they will likely require additional policy guidance, information, and/or resources *before* they move forward into the evaluation phase. Bin 2 petitions that could move forward based on CFGC guidance will be evaluated in the *longer-term*. In addition, due to the larger breadth and scope of these petitions, they will likely require more extensive coordination with California Native American Tribes, other government agencies, partners, and stakeholders.

The tables below outline the proposed Bin 1 and Bin 2 petitions. There are brief justifications following each table that describe why a metric was met or not, and why petitions are categorized into Bin 1 or Bin 2. CFGC is seeking feedback on the draft proposed binning of petitions into either Bin 1 or Bin 2. Comments should be sent directly to CFGC to inform the discussions scheduled for July 17, 2024 at the MRC meeting. Written comments must be received by CFGC by July 5 to be included in the July MRC meeting materials. The CFGC website includes [instructions for how to submit written comments](#) and a [schedule of upcoming Commission meetings](#).



Table 1: Proposed Bin 1 Petitions. N=No, Y=Yes. Y/N in the “Within CFGC Authority?” column indicates that some of the actions proposed in the petition do fall within the regulatory authority of the CFGC, while others are non-regulatory requests. MPA designations state marine reserve (SMR), state marine conservation area (SMCA).

CFGC Tracking No.	Name of Petitioner	Short Description	Policy guidance needed?	Within CFGC Authority?	Evaluate in the near-term?	Clarification needed from petitioner?	Limited controversy anticipated?
2023-22MPA	Wendy Berube, Orange County Coast Keeper	Change color coding on outreach maps, add language to tidepool take prohibitions, modify definition of tidepools, and allow research, monitoring, restoration, and education in Orange County MPAs, with the exception of Upper Newport Bay (Bolsa Chica, Laguna Beach, Crystal Cove, and Dana Point)	N	Y/N	Y	N	Y
2023-25MPA	Burton Miller	Change color designation of Blue Cavern Onshore and Casino Point SMCAs, change boundary of Long Point SMR, and remove allowance for feeding fish and Lover's Cove and Casino Point SMCAs.	N	Y/N	Y	N	Y
2023-26MPA	Lisa Gilfilan, WILD Coast	Shift Swami's SMCA south from the lifeguard tower to the State/Solana Beach line to cover tidepools on the south side and change map color of no-take SMCAs at Batiquitos Lagoon, San Elijo Lagoon, and Famosa Slough from purple to red.	N	Y/N	Y	N	Y
2023-30MPA_1	Robert Jamgochian	Change gear restrictions within Big River SMCA to only allow Type A hoop nets that are compatible and eliminate the hoop net Type B option (rigid frame) from general provisions, reduce the number of set traps allowed from 10 to 5, and reduce the bag and possession limit for recreational take of crabs from 10 to 5.	N	Y	Y	N	Y
2023-31MPA_1	Ashley Eagle-Gibbs, Environmental Action Committee of West Marin	Subsume Drake's Estero SMCA into Estero de Limantour SMR to create a single SMR.	N	Y	Y	N	Y



Justifications for Proposed Bin 1 Petitions

Proposed Bin 1 petitions do not need policy direction from the CFGC to move forward with evaluation, are within CFGC regulatory authority, can be evaluated in the near-term, require minimal follow-up with the petitioner, and limited controversy is anticipated regarding petition requests. Justifications for each criterion are outlined below.

Petition Number: 2023-22MPA

Petitioner: Wendy Berube, Orange County Coastkeeper

- **Is policy guidance needed for the next phase of evaluation? (N):** Changes requested do not require policy guidance from CFGC.
- **Does the petition fall within CFGC regulatory authority? (Y/N):**
 - Modifying the descriptions of specific MPAs and updating regulatory language are within CFGC authority.
 - Changing the color of a purple no-take SMCA to red *on outreach materials only* is a non-regulatory request. However, alternative pathways for this and other similar non-regulatory requests may be explored as a part of the 3-phase approach to evaluate petitions.
- **Is immediate evaluation possible? (Y):** Related information and data needed to evaluate petition are currently available.
- **Is clarification needed from the petitioner? (N):** Changes requested are straightforward and do not require detailed clarification from petitioner.
- **Is limited controversy anticipated? (Y):** Limited controversy anticipated because the requested changes are to simplify and clarify regulatory language.

Petition Number: 2023-25MPA

Petitioner: Burton Miller

- **Is policy guidance needed for the next phase of evaluation? (N):** Changes requested do not require policy guidance from CFGC.
- **Does the petition fall within CFGC regulatory authority? (Y/N):**
 - Boundary clarification at Long Point SMR, and the proposed removal of fish feeding from the regulations all fall within the CFGC's authority.
 - Changing the color of a purple no-take SMCA to red *on outreach materials only* is a non-regulatory request. However, alternative pathways for this and other similar non-regulatory requests may be explored as a part of the 3-phase approach to evaluate petitions.
- **Is immediate evaluation possible? (Y):** Related information and data needed to evaluate petition are currently available.
- **Is clarification needed from the petitioner? (N):** Changes requested are straightforward and do not require detailed clarification from petitioner.
- **Is limited controversy anticipated? (Y):** Limited local controversy is anticipated regarding the request to end fish feeding within the Lover's Cove and Casino Point SMCAs.



Petition Number: 2023-26MPA

Petitioner: Lisa Gilfillan, WILD Coast

- **Is policy guidance needed for the next phase of evaluation? (N):** Changes requested do not require policy guidance from CFGC.
- **Does the petition fall within CFGC regulatory authority? (Y/N):**
 - Changing the boundaries of an MPA is within CFGC authority.
 - Changing the color of a purple no-take SMCA to red *on outreach materials only* is a non-regulatory request. However, alternative pathways for this and other similar non-regulatory requests may be explored as a part of the 3-phase approach to evaluate petitions.
- **Is immediate evaluation possible? (Y):** Related information and data needed to evaluate petition are currently available.
- **Is clarification needed from the petitioner? (N):** Changes requested are straightforward and do not require detailed clarification from petitioner.
- **Is limited controversy anticipated? (Y):** Limited local controversy is anticipated regarding the proposed boundary shift.

Petition Number: 2023-30MPA

Petitioner: Robert Jamgochian

- **Is policy guidance needed for the next phase of evaluation? (N):** Changes requested do not require policy guidance from CFGC.
- **Does the petition fall within CFGC regulatory authority? (Y):** The proposed amendments to the allowed take and gear type are within CFGC authority.
- **Is immediate evaluation possible? (Y):** Related information and data needed to evaluate petition are currently available.
- **Is clarification needed from the petitioner? (N):** Limited clarification with the petitioner may be necessary to determine the request for Type A hoop nets only.
- **Is limited controversy anticipated? (Y):** Limited local controversy is anticipated regarding proposed change in Dungeness crab take regulations.

Petition Number: 2023-31MPA

Petitioner: Ashley-Eagle Gibbs, Environmental Action Committee of West Marin

- **Is policy guidance needed for the next phase of evaluation? (N):** Changes requested do not require policy guidance from the CFGC. The requested redesignation aligns with the intent of this MPA identified during the north central coast marine life protection act (MLPA) Initiative design and siting process to redesignate as an SMR once the pre-existing aquaculture lease was terminated.
- **Does the petition fall within CFGC regulatory authority? (Y):** The proposed amendments to the allowed take and gear type are within CFGC authority.
- **Is immediate evaluation possible? (Y):** Related information and data needed to evaluate petition are currently available.



- **Is clarification needed from the petitioner? (N):** Changes requested are straightforward and do not require detailed clarification from petitioner.
- **Is limited controversy anticipated? (Y):** Limited local controversy regarding ending recreational clamming. This petition is consistent with the recommendation of the northcentral coast MLPA regional stakeholder group at the end of the MLPA Initiative design and siting process.



Table 2: Proposed Bin 2 Petitions. N=No, Y=Yes. Y/N in the “Within CFGC Authority?” column indicates that some of the actions proposed in the petition do fall within the regulatory authority of the CFGC, while others are non-regulatory requests. MPA designations state marine reserve (SMR), state marine conservation area (SMCA).

CFGC Tracking No.	Name of Petitioner	Short Description	Policy guidance needed?	Within FGC Authority?	Evaluate in the near-term?	Clarification needed from petitioner?	Limited controversy anticipated?
2023-14MPA	David Goldberg, California Sea Urchin Commission	Allow commercial take of sea urchins in 9 SMCAs.	Y	Y	N	N	N
2023-15MPA	Blake Hermann	Reclassify three SMRs in the northern Channel Islands, Santa Barbara County, as SMCAs and allow either the limited take of highly migratory species and possession of coastal pelagic species, or allow the take of pelagic finfish.	Y	Y	N	N	N
2023-16MPA	Richard Ogg	Reclassify Stewarts Point and Bodega Head SMRs and SMCAs to allow commercial take of salmon by trolling.	Y	Y	N	N	N
2023-18MPA	Greg Helms	Create small SMCA within Vandenberg SMR; modify multiple MPAs within the Santa Barbara Channel to allow range of activities, from changes to take of natural resources restrictions to vessel landing requirements.	Y	Y/N	N	N	N
2023-19MPA	Sam Cohen, Santa Ynez Band of Chumash Mission Indians	Designate new Chitaqwi SMCA with a tribal take-exemption for the Santa Ynez Band of Chumash Indians along the central coast.	Y	Y	N	Y	N
2023-20MPA	Sam Cohen, Santa Ynez Band of Chumash Mission Indians	Add a tribal take exemption to Point Buchon SMCA for co-management with Santa Ynez Band of Chumash Indians, and modify northern boundary of the Point Buchon SMR.	Y	Y	N	Y	N
2023-21MPA	Rosa Laucci, Tolowa Dee-ni' Nation	Modify take allowances in Pyramid Point SMCA to no-take with tribal exemption and change northern boundary to align with California/Oregon border.	Y	Y	N	Y	N



CFGC Tracking No.	Name of Petitioner	Short Description	Policy guidance needed?	Within FGC Authority?	Evaluate in the near-term?	Clarification needed from petitioner?	Limited controversy anticipated?
2023-23MPA	Keith Rootsart, Giant Giant Kelp	Reclassify three SMCAs as SMRs, designate Tanker's Reef as an SMR, allow kelp restoration in these four MPAs as follows: allow unlimited urchin take, allow outplanting of kelp, kelp spore dispersal, and kelp canopy pruning without a DFW scientific collecting permit (SCP). Proposes several actions to support kelp restoration such as placement of buoys at restoration sites, establishing a new process for restoration permits in DFW SCP program, designating "adopted reefs," and others.	Y	Y/N	N	Y	N
2023-24MPA	Mike Beanan, Laguna Bluebelt Coalition	Extend Laguna no-take SMCA southern boundary to the southern border of City of Laguna Beach, which will require modification of northern boundary of Dana Point SMCA.	N	Y	N	N	N
2023-27MPA	Azsha Hudson, Environmental Defense Center	Reclassify Anacapa SMCA as an SMR or reclassify the portion of the SMCA from shore to at least 30 meters deep.	Y	Y	N	N	N
2023-28MPA	Lisa Suatoni, Natural Resources Defense Council	Designate a new SMR around Point Sal in central California and consult with tribes first to determine whether an SMCA with exemptions for cultural and subsistence purposes.	Y	Y	N	N	N
2023-29MPA_1	Lisa Suatoni, Natural Resources Defense Council	Designate Mishopshno SMCA, a California-Chumash co-management MPA that allows take by members of Santa Ynez Band of Chumash Indians for traditional, ceremonial, cultural, and subsistence purposes.	Y	Y	N	Y	N
2023-32MPA_1	Ashley Eagle-Gibbs, Environmental Action Committee of West Marin	Change Duxbury Reef SMCA to an SMR, extend the southern boundary further south, and extend the northern boundary to the Double Point Special Closure.	Y	Y	N	N	N
2023-33MPA_1	Laura Deehan, Environmental California Research and Policy Center and Azul	Expand boundaries of SMCAs and SMRs, and designate new MPA.	Y	Y	N	N	N



CFGC Tracking No.	Name of Petitioner	Short Description	Policy guidance needed?	Within FGC Authority?	Evaluate in the near-term?	Clarification needed from petitioner?	Limited controversy anticipated?
2023-34MPA_1	Laura Deehan, Environmental California Research and Policy Center and Azul	Reclassify Point Buchon SMCA as an SMR, and modify regulations of Farnsworth Onshore and Offshore SMCAs to allow only recreational spearfishing.	Y	Y	N	N	N



Justifications for Proposed Bin 2 Petitions

Petitions that do not meet the above criteria for Bin 1 petitions are categorized into Bin 2. The analysis of these petitions will be more complex as they will likely require additional policy guidance, information, and/or resources, before they can be evaluated. Below are brief justifications that describe why a metric was met or not.

Petition Number: 2023-14MPA

Petitioner: David Goldenberg, California Sea Urchin Commission

- **Is policy guidance needed for the next phase of evaluation? (Y):** Requires guidance regarding changing take regulations in SMCAs over a large geographic scale.
- **Does the petition fall within CFGC regulatory authority? (Y):** All requested regulatory changes are within CFGC authority.
- **Is immediate evaluation possible? (N):**
 - Requested changes will require coordination with other management priorities such as the Kelp Restoration, Recovery, and Management Plan (KRMP) and updates to invertebrate take regulations.
 - A more in-depth examination of the original MPA design guidance will be needed for this petition before staff can analyze the proposed change.
- **Is clarification needed from the petitioner? (N):** Changes requested are straightforward and do not require detailed clarification from petitioner.
- **Is limited controversy anticipated? (N):** Changing take regulations in several MPAs statewide is likely to be controversial.

Petition Number: 2023-15MPA

Petitioner: Blake Hermann

- **Is policy guidance needed for the next phase of evaluation? (Y):** Requires guidance regarding re-designation of entire SMRs into SMCAs.
- **Does the petition fall within CFGC regulatory authority? (Y):** All requested regulatory changes are within CFGC authority.
- **Is immediate evaluation possible? (N):** Requested changes will require in-depth analysis of many resources and extensive coordination with external partners, including but not limited to the Channel Islands National Marine Sanctuaries, National Parks Service, and National Marine Fisheries Service.
- **Is clarification needed from the petitioner? (N):** Changes requested are straightforward and do not require detailed clarification from petitioner.
- **Is limited controversy anticipated? (N):** Redesignating SMRs to SMCAs is likely to be controversial.

Petition Number: 2023-16MPA

Petitioner: Richard Ogg

- **Is policy guidance needed for the next phase of evaluation? (Y):** Requires guidance regarding re-designation of entire SMRs to SMCAs.
- **Does the petition fall within CFGC regulatory authority? (Y):** All requested regulatory changes are within CFGC authority.



- **Is immediate evaluation possible? (N):** Requested changes will require coordination with other management efforts regarding the ocean salmon fishery.
- **Is clarification needed from the petitioner? (N):** Changes requested are straightforward and do not require detailed clarification from petitioner.
- **Is limited controversy anticipated? (N):** Redesignating SMRs to SMCA is likely to be controversial.

Petition Number: 2023-18MPA

Petitioner: Greg Helms

- **Is policy guidance needed for the next phase of evaluation? (Y):** Requires guidance regarding partial designation change of an SMR to an SMCA and modifications to special closures.
- **Does the petition fall within CFGC regulatory authority? (Y/N):**
 - Creation of an SMCA and modifications to, or removal of, an existing state MPA or special closure are within CFGC authority.
 - Continued support of M2 radar is a non-regulatory request. Changing the color of a purple, no-take SMCA to red *on outreach materials only* is a non-regulatory request. However, alternative pathways for this and other similar non-regulatory requests may be explored as a part of the 3-phase approach to evaluate petitions.
- **Is immediate evaluation possible? (N):** Evaluation of this petition will require coordination with many external partners including National Marine Sanctuaries and the National Park Service. A more in-depth examination of the original MPA design guidance will also be needed to analyze the proposed changes.
- **Is clarification needed from the petitioner? (N):** Changes requested are straightforward and do not require detailed clarification from petitioner.
- **Is limited controversy anticipated? (N):** The partial redesignation and changes to special closures around the Channel Islands are likely to be controversial.

Petition Number: 2023-19MPA

Petitioner: Sam Cohen, Santa Ynez Band of Chumash Mission Indians

- **Is policy guidance needed for the next phase of evaluation? (Y):** Requires guidance regarding approach to co-management of MPAs with California Native American Tribes and creation of new MPAs.
- **Does the petition fall within CFGC regulatory authority? (Y):** All requested regulatory changes are within CFGC authority.
- **Is immediate evaluation possible? (N):** Requested changes will require coordination with the California Natural Resources Agency, other state and federal agencies, local jurisdictions, and other partners regarding policies for co-management of the state's natural resources with California Native American Tribes.
- **Is clarification needed from the petitioner? (Y):** Additional clarification needed from the petitioner regarding the definition of tribal co-management in the context of this petition and proposed regulation changes.
- **Is limited controversy anticipated? (N):** Establishing a new MPA is likely to be controversial.



Petition Number: 2023-20MPA**Petitioner:** Sam Cohen, Santa Ynez Band of Chumash Mission Indians

- **Is policy guidance needed for the next phase of evaluation? (Y):** Requires guidance on approach to co-management of MPAs with California Native American Tribes and changes in take regulations of an SMCA.
- **Does the petition fall within CFGC regulatory authority? (Y):** All requested regulatory changes are within CFGC authority.
- **Is immediate evaluation possible? (N):** Requested changes will require coordination with the California Natural Resources Agency, other state and federal agencies, local jurisdictions, and other partners regarding policies for co-management of the state's natural resources with California Native American Tribes.
- **Is clarification needed from the petitioner? (Y):** Significant clarification is needed from the petitioner regarding the definition of tribal co-management in the context of this petition.
- **Is limited controversy anticipated? (N):** Decreasing the level of protection of an SMCA and proposed differences in take allowances by diverse sectors are likely to be controversial.

Petition Number: 2023-21MPA**Petitioner:** Rosa Laucci, Tolowa Dee-ni' Nation

- **Is policy guidance needed for the next phase of evaluation? (Y):** Requires guidance on approach to co-management of MPAs with California Native American Tribes and the creation of a tribal take-only MPA.
- **Does the petition fall within CFGC regulatory authority? (Y):** All requested regulatory changes are within CFGC authority.
- **Is immediate evaluation possible? (N):** Requested changes will require coordination with the California Natural Resources Agency, other state and federal agencies, local jurisdictions, and other partners regarding policies for co-management of the state's natural resources with California Native American Tribes.
- **Is clarification needed from the petitioner? (Y):** Clarification is needed from the petitioner about the tribal take exemption.
- **Is limited controversy anticipated? (N):** Creating a tribal-take only MPA and proposed differences in take allowances by diverse sectors are likely to be controversial.

Petition Number: 2023-23MPA**Petitioner:** Keith Rootsart, Giant Kelp Restoration

- **Is policy guidance needed for the next phase of evaluation? (Y):** Requires guidance regarding redesignation of entire MPAs and creation of new MPAs.
- **Does the petition fall within CFGC regulatory authority? (Y/N):** Several requested changes are within CFGC authority, while many are non-regulatory requests.
- **Is immediate evaluation possible? (N):** Several requested changes will require coordination with other management priorities such as the KRMP and updates to statewide invertebrate take regulations. Evaluation of the requested changes will require in-depth analysis and coordination with many partners including National Marine Sanctuaries and several other state agencies.
- **Is clarification needed from the petitioner? (Y):** The scope of changes requested in this petition are extensive and complex and will require extensive coordination with the petitioner.



- **Is limited controversy anticipated? (N):** Establishment of new MPAs is likely to be controversial. Stakeholders in the Monterey area have consistently provided public comments on prior CFGC actions like those proposed within the petition, indicating a high degree of anticipated controversy on other petition components.

Petition Number: 2023-24MPA

Petitioner: Mike Beanan, Laguna Bluebelt Coalition

- **Is policy guidance needed for the next phase of evaluation? (N):** Changes requested do not require policy guidance from the CFGC.
- **Does the petition fall within CFGC regulatory authority? (Y):** All requested regulatory changes are within CFGC authority.
- **Is immediate evaluation possible? (N):** A more in-depth examination of the original MPA design guidance will be needed for this petition to analyze the proposed change.
- **Is clarification needed from the petitioner? (N):** Changes requested are straightforward and do not require detailed clarification from petitioner.
- **Is limited controversy anticipated? (N):** Public comments/letters have already been received by CDFW and CFGC about this petition, indicating a high degree of anticipated controversy.

Petition Number: 2023-27MPA

Petitioner: Azsha Hudson, Environmental Defense Center

- **Is policy guidance needed for the next phase of evaluation? (Y):** Requires guidance regarding re-designation of SMCA to SMR. The requested change does not align with the intent of this MPA identified during the Channel Islands planning process and would affect current tribal take allowances.
- **Does the petition fall within CFGC regulatory Authority? (Y):** All requested regulatory changes are within CFGC authority.
- **Is immediate evaluation possible? (N):** Evaluation of this petition will require coordination with the Santa Ynez Band of Chumash Mission Indians and many external partners including National Marine Sanctuaries, National Marine Fisheries Service, and the National Park Service. A more in-depth examination of the original MPA design guidance will also be needed to analyze the proposed changes.
- **Is clarification needed from the petitioner? (N):** Changes requested are straightforward and do not require detailed clarification from petitioner.
- **Is limited controversy anticipated? (N):** Re-designation of entire MPA, effects on tribal take exemptions, and effects of proposed changes to the commercial and recreational lobster fisheries are likely to be controversial.

Petition Number: 2023-28MPA

Petitioner: Lisa Suatoni, Natural Resources Defense Council

- **Is policy guidance needed for the next phase of evaluation? (Y):** Requires guidance regarding the creation of new MPAs.
- **Does the petition fall within CFGC regulatory authority? (Y):** All requested regulatory changes are within CFGC authority.



- **Is immediate evaluation possible? (N):** Requested changes will require coordination with the California Natural Resources Agency, other state and federal agencies, local jurisdictions, and other partners regarding policies for co-management of the state's natural resources with California Native American Tribes.
- **Is clarification needed from the petitioner? (N):** Changes requested are straightforward and do not require detailed clarification from petitioner.
- **Is limited controversy anticipated? (N):** Establishment of a new MPA is likely to be controversial.

Petition Number: 2023-29MPA

Petitioner: Lisa Suatoni, Natural Resources Defense Council

- **Is policy guidance needed for the next phase of evaluation? (Y):** Requires guidance regarding the creation of new MPAs.
- **Does the petition fall within CFGC regulatory authority? (Y):** All requested regulatory changes are within CFGC authority.
- **Is immediate evaluation possible? (N):** Requested changes will require coordination with the California Natural Resources Agency, other state and federal agencies, local jurisdictions, and other partners regarding policies for co-management of the state's natural resources with California Native American Tribes. A more in-depth examination of the original MPA design guidance will be needed for this petition before staff can analyze the proposed change.
- **Is clarification needed from the petitioner? (Y):** Changes requested are straightforward and do not require detailed clarification from petitioner.
- **Is limited controversy anticipated? (N):** Establishment of a new MPA is likely to be controversial.

Petition Number: 2023-32MPA

Petitioner: Ashley Eagle-Gibbs, Environmental Action Committee of West Marin

- **Is policy guidance needed for the next phase of evaluation? (Y):** Requires guidance regarding the redesignation of an SMCA to an SMR that does not align with MLPA design process intent of the MPA and expansion of the existing MPA.
- **Does the petition fall within CFGC regulatory authority? (Y):** All requested regulatory changes are within CFGC authority.
- **Is immediate evaluation possible? (N):** A more in-depth examination of the original MPA science design guidance will be needed to analyze the proposed change.
- **Is clarification needed from the petitioner? (N):** Changes requested are straightforward and do not require detailed clarification from petitioner.
- **Is limited controversy anticipated? (N):** Due to this site being a popular area for human use, a designation change and boundary expansion are likely to be controversial.

Petition Number: 2023-33MPA

Petitioner: Laura Deehan, Environment California Research and Policy Center and Azul

- **Is policy guidance needed for the next phase of evaluation? (Y):** Requires guidance regarding the redesignations of SMCAs to an SMRs that do not align with MLPA design process intent of the MPA, creation of a new MPA, and expansion of existing MPAs.



- **Does the petition fall within CFGC regulatory authority? (Y):** All requested regulatory changes are within CFGC authority.
- **Is immediate evaluation possible? (N):** Because this petition's stated intent is to assist in kelp forest recovery, this petition will need to be evaluated in concert with the KRMP, which is not yet complete.
- **Is clarification needed from the petitioner? (N):** Changes requested are straightforward and do not require detailed clarification from petitioner.
- **Is limited controversy anticipated? (N)** Creation of a new MPA and large expansion of existing MPAs are likely to be controversial. There has already been significant local stakeholder discussion regarding the proposed Pleasure Point MPA in Santa Cruz County.

Petition Number: 2023-34MPA

Petitioner: Laura Deehan, Environment California Research and Policy Center and Azul

- **Is policy guidance needed for the next phase of evaluation? (Y):** Requires guidance on the redesignation of the SMCA to an SMR that does not align with MLPA design process intent of the MPA.
- **Does the petition fall within CFGC regulatory authority? (Y):** All requested regulatory changes are within CFGC authority.
- **Is immediate evaluation possible? (N):** Analysis will require a more in-depth examination of the original MPA design guidance regarding the proposed changes.
- **Is Clarification needed from the petitioner? (N):** Changes requested are straightforward and do not require detailed clarification from petitioner.
- **Is limited controversy anticipated? (N):** Anticipated to be highly controversial with the recreational and commercial fishing communities in the areas of the proposed changes.





Draft Phase 1 Proposed Marine Protected Area Petition Bins

17 July 2024

Presented to:

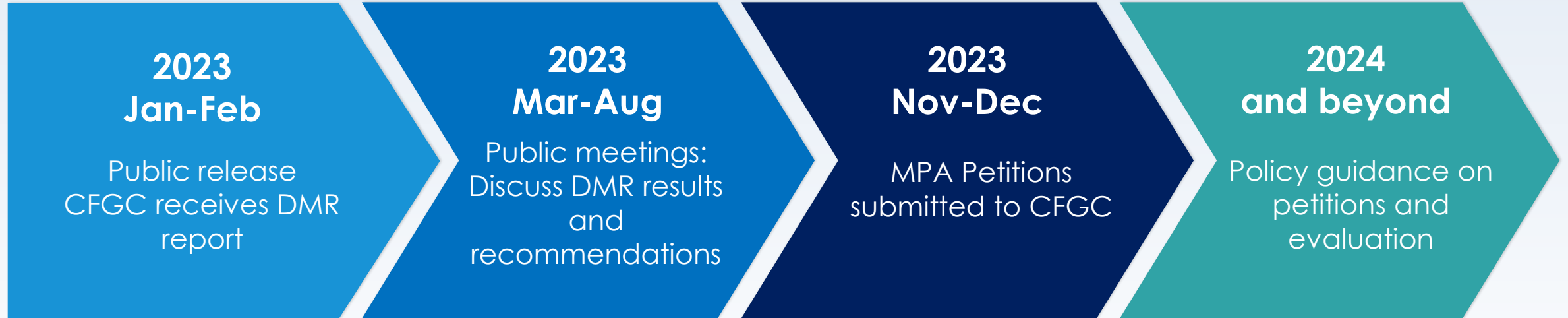
Marine Resources Committee
California Fish and Game Commission

Presented by:

Dr. Craig Shuman
Marine Regional Manager



How We Got Here: DMR Report and Petition Timeline



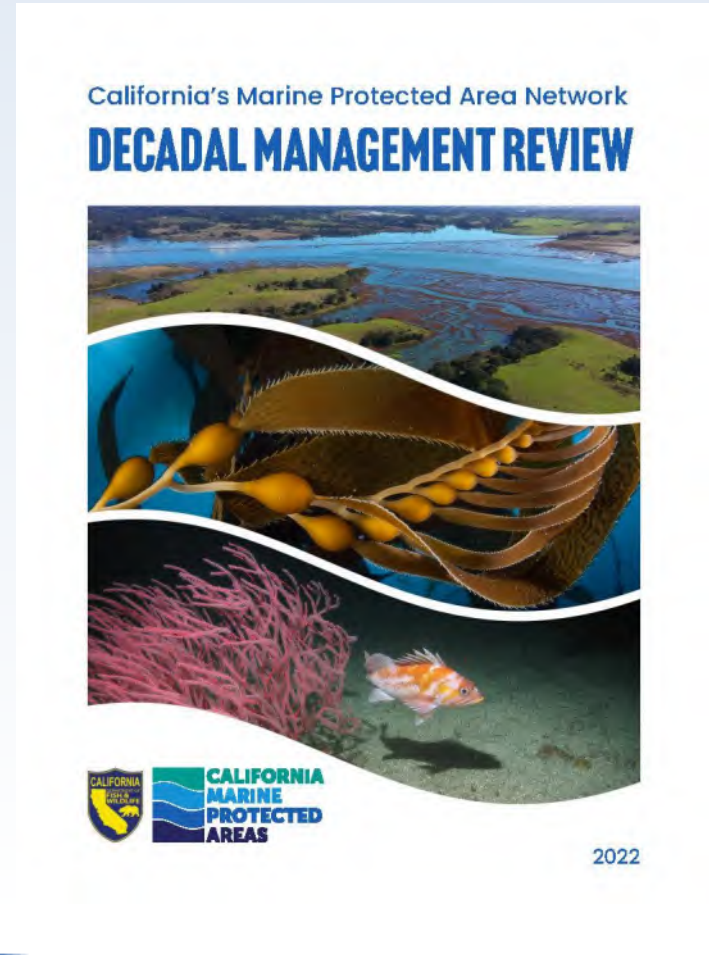
CFGC=California Fish and Game Commission
CDFW=California Department of Fish and Wildlife
DMR=Decadal Management Review





Petitions for Proposed MPA Network Changes

- CFGC received **20 petitions** to change MPAs at the December 2023 meeting
- **16 individual organizations** submitted petitions
- Petitions include **80+ proposed petition actions**
- **49+ MPAs and special closures affected** by proposals





Where We Are: MPA Petition Process 2024

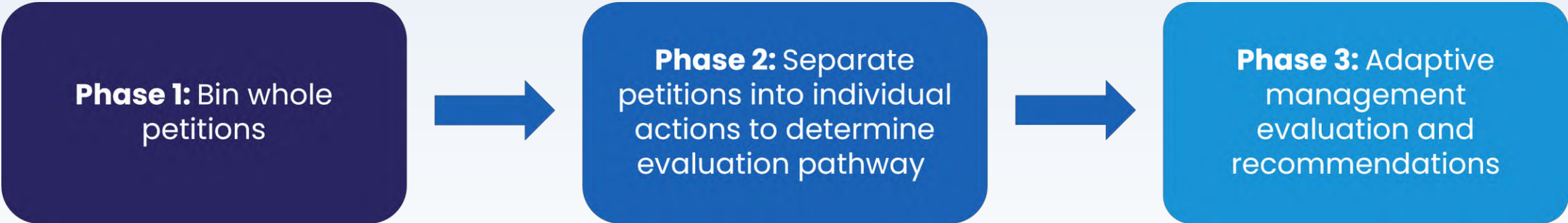
**2024
and beyond**

Policy guidance on
petitions and
evaluation

- **February 2024** - CFGC referred all petitions to CDFW for evaluation
- **March 2024** – CDFW proposed 3-phased approach to petition evaluation process
- **April 2024** – CFGC accepted CDFW's approach
- **May 2024** – CDFW released a blog with the draft petition binning for public review
- **July 2024** - Marine Resources Committee discussion



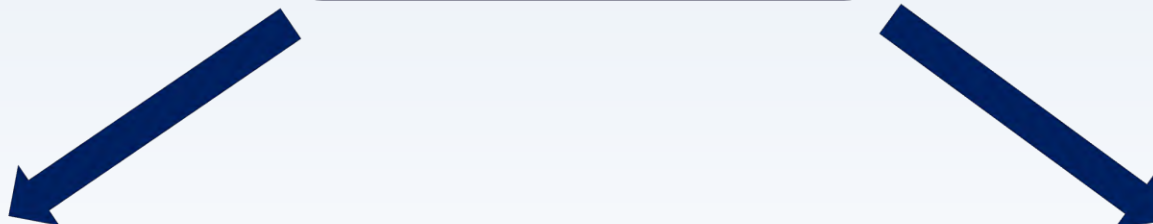
Petition Evaluation Framework: 3-phase Approach





Phase 1: Bin Whole Petitions

Phase 1:
Bin whole petitions



Bin 1

- Policy direction not needed for next phases
- Within CFGC authority
- Immediate evaluation possible
- Limited clarification needed from petitioner
- Limited controversy anticipated

Bin 2

Do not meet criteria for Bin 1



Draft Proposed Bin 1 Petitions

CFGC Tracking No.	Brief description	Policy guidance needed?	Within CFGC authority?	Evaluate in the near-term?	Clarification needed from petitioner?	Limited controversy anticipated?
2023-22MPA	Orange County MPAs; change color coding on outreach maps, update regulatory language	N	Y/N	Y	N	Y
2023-25MPA	Catalina Island MPAs; change color coding on outreach maps, remove fish feeding; boundary update	N	Y/N	Y	N	Y
2023-26MPA	San Diego County MPAs; change color coding on outreach maps; Swami's SMCA boundary shift	N	Y/N	Y	N	Y
2023-30MPA_1	Big River SMCA; change Dungeness crab gear and take limits	N	Y	Y	N	Y
2023-31MPA_1	Drake's Estero SMCA; subsume into Estero de Limantour SMR	N	Y	Y	N	Y



Draft Proposed Bin 2 Petitions (1 of 3)

CFGC Tracking No.	Brief description	Policy guidance needed?	Within CFGC authority?	Evaluate in the near-term?	Clarification needed from petitioner?	Limited controversy anticipated?
2023-14MPA	Allow commercial take of sea urchins in 9 SMCAs	Y	Y	N	N	N
2023-15MPA	Northern Channel Island MPAs; allow take of highly migratory species; pelagic finfish	Y	Y	N	N	N
2023-16MPA	Bodega Head and Stewarts Point SMRs; redesignate to SMCAs to allow commercial salmon trolling	Y	Y	N	N	N
2023-18MPA	Santa Barbara County MPAs; modify take allowances; modify special closures; create small SMCA within Vandenberg SMR	Y	Y/N	N	N	N
2023-19MPA	Designate new tribal SMCA with take exemption for the Santa Ynez Band of Chumash Mission Indians	Y	Y	N	Y	N



Draft Proposed Bin 2 Petitions (2 of 3)

CFGC Tracking No.	Brief description	Policy guidance needed?	Within CFGC authority?	Evaluate in the near-term?	Clarification needed from petitioner?	Limited controversy anticipated?
2023-20MPA	Point Buchon MPAs; tribal take exemption for Santa Ynez Band of Chumash Mission Indians, boundary shift	Y	Y	N	Y	N
2023-21MPA	Pyramid Point SMCA; tribal take only for Tolowa Dee-ni' Nation, boundary adjustment	Y	Y	N	Y	N
2023-23MPA	Monterey County MPAs; designation changes, new permitting process, various other activities	Y	Y/N	N	Y	N
2023-24MPA	Laguna Beach no-take SMCA boundary shift	N	Y	N	N	N
2023-27MPA	Anacapa SMCA; redesignation to SMR, or partial redesignation	Y	Y	N	N	N




Draft Proposed Bin 2 Petitions (3 of 3)

CFGC Tracking No.	Brief description	Policy guidance needed?	Within CFGC authority?	Evaluate in the near-term?	Clarification needed from petitioner?	Limited controversy anticipated?
2023-28MPA	San Luis Obispo County; new MPA near Point Sal	Y	Y	N	N	N
2023-29MPA_1	Santa Barbara County; new tribal co-management MPA with Santa Ynez Band of Mission Indians	Y	Y	N	Y	N
2023-32MPA_1	Duxbury Reef SMCA; redesignate to SMR and expand boundaries	Y	Y	N	N	N
2023 33MPA_1	Expand boundaries of multiple SMCAs and SMRs; designate new MPA	Y	Y	N	N	N
2023-34MPA_1	Redesignate Point Buchon SMCA to SMR; modify take allowances in Farnsworth SMCAs	Y	Y	N	N	N



Next Steps: Implement DMR Recommendations

Near-Term (ongoing – 2 years)

- Rec 1: Improve state agencies tribal engagement
- Rec 4: Apply Review knowledge to Network/Management changes 
- Rec 7: Expand outreach and education materials
- Rec 9: Continue OPC coordination
- Rec 10: Improve coordination across Management Program pillars
- Rec 11: Update Action Plan
- Rec 16: More targeted outreach to specific audiences
- Rec 17: Improve SCP process
- Rec 18: Use policy to review MPA restoration/mitigation efforts
- Rec 20: Increase enforcement capacity
- Rec 21: Enhance citation record keeping and management
- Rec 25: Implement MPA climate change research
- Rec 27: Improve understanding of MPA effects on fisheries

Mid-Term (2 – 5 years)

- Rec 2: Create pathway to tribal MPA management
- Rec 3: Build tribal capacity to participate in MPA management
- Rec 6: Include and fund more diverse researchers and stakeholders
- Rec 8: Evaluate MPA accessibility
- Rec 12: Improve understanding of human dimensions
- Rec 13: Explore innovative technologies
- Rec 14: Develop MPA community science strategy
- Rec 15: Evaluate Outreach needs and resource effectiveness
- Rec 22: Increase knowledge on MPA judicial outcomes
- Rec 23: Examine MPA Network design attribute more effectively
- Rec 26: Consider climate change in human dimensions monitoring
- Rec 28: Integrate influencing factors into MPA performance evaluations

Long-Term (5- 10 years)

- Rec 5: Establish targets to meet MLPA goals
- Rec 19: Create MPA Enforcement Plan
- Rec 24: Better incorporate marine cultural heritage into MPA Network

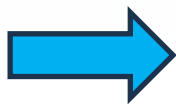




Roadmap for Today's Discussion

- **Draft bins and justifications**
 - Move petitions?
 - Change criteria outcomes and justifications?
- **Evaluation process and timeline**
 - Phase 2: Individual actions
 - Policy guidance
 - Extent of evaluations and trade-offs
- **Next steps and MRC recommendations for August CFGC meeting**

Scan for draft bins and justifications



A. Van Diggelen



Marine Protected Area Petition Evaluation Process Status and Timeline

9 October 2024

Presented to:

**California Fish and Game
Commission**

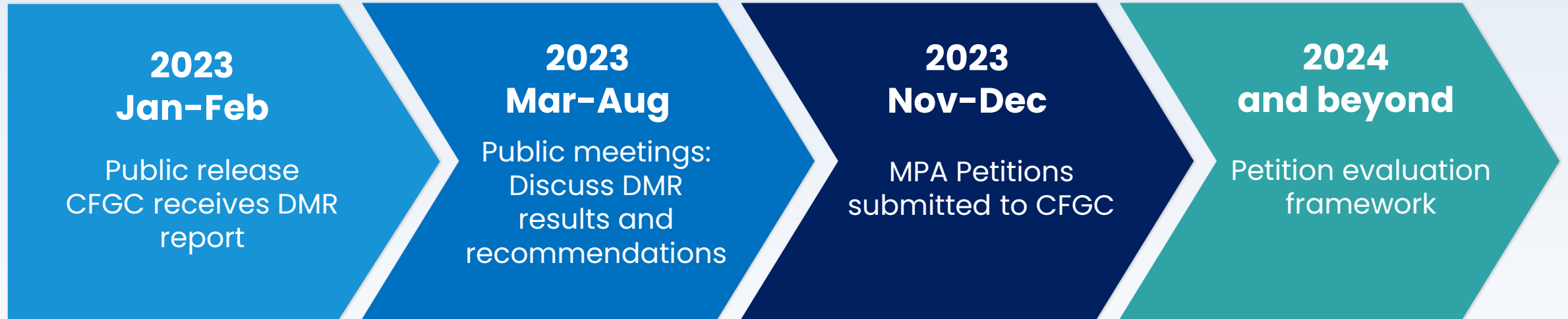
Presented by:

Dr. Craig Shuman

Marine Regional Manager



Recap: Decadal Management Review and Petition Timeline



Common acronyms:

CFGC=California Fish and Game Commission
CDFW=California Department of Fish and Wildlife
DMR=Decadal Management Review





Where We Are: MPA Petition Process

**2024
to date**

Petition evaluation
framework

- **February:** CFGC referred all 20 received petitions to CDFW for evaluation.
- **March – May:** CFGC approval of CDFW's proposed 3 phase evaluation approach; CDFW completes phase 1.
- **June:** CFGC requested an update on the other DMR recommendations.
- **July:** Marine Resource Committee (MRC) approved phase 1 outcomes.
- **August:** CFGC approved phase 1 outcomes, requests update in Oct. meeting and draft recommendations for Bin 1 petitions at Nov. MRC.



Petition Evaluation Framework: Status





Proposed Next Steps For Bin 2 Petitions: Phases 2 and 3

**Bin 2 Petition
Actions**



Do they meet Bin 1 criteria?

- Policy direction not needed for next phases
- Within CFGC authority
- Immediate evaluation possible
- Limited clarification needed from petitioner
- Limited controversy anticipated

YES

NO

**Move forward to
Phase 3 evaluation**

**Policy guidance,
information, resources**



Approved MPA Petition Evaluation Framework

- 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 community support; and/or
- Advance DMR adaptive management recommendations.





Petition Evaluation Framework Example Considerations

Compatible with MLPA goals and MPA Master Plan Guidelines, e.g.

- **Maintains or enhances the protections, resiliency, connectivity, of the MPA Network**
- **Adheres to science design and CDFW management feasibility guidelines**
- **Accounts for the regional stakeholder group intent**
- **Improves enforceability and compliance**

Advances DMR Recommendations, e.g.

- **Advances tribal stewardship and co-management**
- **Improves access for traditionally underserved communities**
- **Acknowledges socioeconomic implications**
- **Clearly addresses scientific need based on DMR results**
- **Simplifies/clarifies regulatory language**

Garners Community Support

- **Commission Guidance needed to define "community support"**
- **Example: Aligns with management priorities of other agencies with overlapping jurisdictions**



Looking Ahead: MPA Petition Evaluation Process

**2024
and beyond**


Petition evaluation
framework

- **November Marine Resources Committee:**
 - Draft Bin 1 actions and CDFW recommendations
 - Draft sorting of Bin 2 actions and next steps
- **December CFGC:**
 - Final CDFW Bin 1 recommendations and next steps
 - MPA Management Program annual report
- **March 2025 Marine Resources Committee:**
 - Draft CDFW recommendations on Bin 2 actions



Next Steps: Implement DMR Recommendations

Near-Term (ongoing – 2 years)

- Rec 1: Improve state agencies tribal engagement
- Rec 4: Apply Review knowledge to Network/Management changes 
- Rec 7: Expand outreach and education materials
- Rec 9: Continue OPC coordination
- Rec 10: Improve coordination across Management Program pillars
- Rec 11: Update Action Plan
- Rec 16: More targeted outreach to specific audiences
- Rec 17: Improve SCP process
- Rec 18: Use policy to review MPA restoration/mitigation efforts
- Rec 20: Increase enforcement capacity
- Rec 21: Enhance citation record keeping and management
- Rec 25: Implement MPA climate change research
- Rec 27: Improve understanding of MPA effects on fisheries

Mid-Term (2 – 5 years)

- Rec 2: Create pathway to tribal MPA management
- Rec 3: Build tribal capacity to participate in MPA management
- Rec 6: Include and fund more diverse researchers and stakeholders
- Rec 8: Evaluate MPA accessibility
- Rec 12: Improve understanding of human dimensions
- Rec 13: Explore innovative technologies
- Rec 14: Develop MPA community science strategy
- Rec 15: Evaluate Outreach needs and resource effectiveness
- Rec 22: Increase knowledge on MPA judicial outcomes
- Rec 23: Examine MPA Network design attribute more effectively
- Rec 26: Consider climate change in human dimensions monitoring
- Rec 28: Integrate influencing factors into MPA performance evaluations

Long-Term (5- 10 years)

- Rec 5: Establish targets to meet MLPA goals
- Rec 19: Create MPA Enforcement Plan
- Rec 24: Better incorporate marine cultural heritage into MPA Network





MPA Petition Updates: StoryMap



Marine Protected Areas (MPA) Petition Process

California Department of Fish and Wildlife

Click through the collection to:

- See an **overview** of the petition process, petition evaluation framework, and anticipated timeline
- Dive into an **interactive map** to visualize proposed changes
- Explore **petitions sorted** by numerical order, change category, or county, and click the links to learn more about each petition. Any petition proposing a change that can be visualized on a map (e.g., boundary or designation change) will have an image with a slider to swipe between the existing network and the proposed change. Any petition proposing a non-spatial change (e.g., take allowance or regulatory language change) will have a static image showing the location of the affected MPA(s).



Explore and stay up-to-date!



storymaps.arcgis.com/collections/27e78c677dc-a484ebfb37120abc59d10



Thank You

Questions?

fgc@fgc.ca.gov

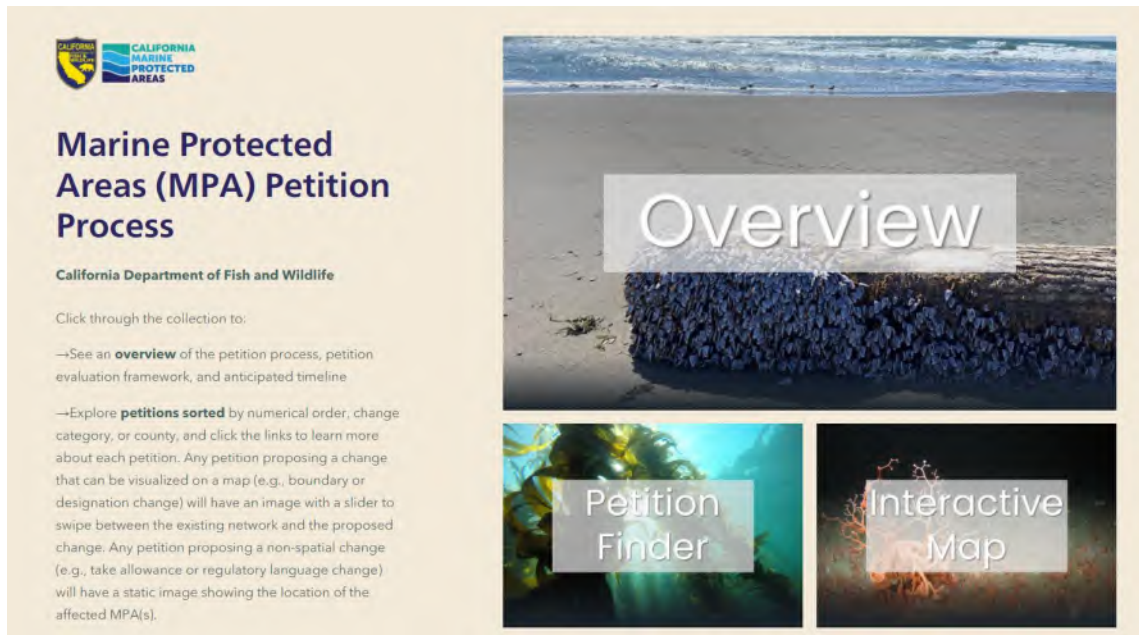
mpamanagementreview@wildlife.ca.gov



[Marine Management News](#)

New Web Page Provides Information on Proposed Changes to California Marine Protected Area Network

September 30, 2024



Landing page for CDFW's new MPA StoryMap, which describes petitions for changes to California MPAs

The California Department of Fish and Wildlife is happy to announce the launch of a new [Marine Protected Area \(MPA\) Petitions StoryMap](#) to help provide information about 20 petitions for changes to the [California MPA Network](#). These petitions collectively propose more than 80 individual changes to California MPAs.

Each of these proposed changes can be visualized on maps housed in the MPA Petitions StoryMap. Visitors may browse among individual web pages that provide maps and details on each petition.

The [MPA Petitions StoryMap overview page](#) includes:

Up-to-date information on the individual petitions

An overview of the petition process and timeline

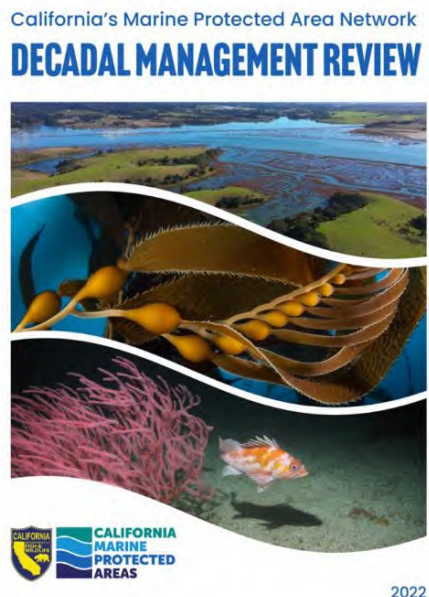
Status updates on the individual petitions

Instructions for how to engage in the public process through the California Fish and Game Commission as they consider the petitions

You can easily find [petitions proposing changes in certain counties or proposing specific types of change](#) to help pinpoint the petitions most important or relevant to you.

An [interactive map](#) also allows you to see the locations of key marine habitats in relation to both existing MPAs and proposed changes.

The California Fish and Game Commission received the petitions from Tribes and the public in December 2023, and referred the petitions to CDFW for evaluation in February 2024 as part of the MPA adaptive management process.



MPA Decadal Management Review cover

The new, publicly available MPA Petitions StoryMap aims to provide information to anyone interested in the MPA petitions and facilitate a transparent petition evaluation process. We invite you to bookmark the landing page and check back regularly for updates!

Questions or comments about the new [MPA Petitions StoryMap](#)? [Contact the MPA team!](#)

post by Kara Gonzales, CDFW Environmental Scientist



Marine Protected Area Petition Evaluation Status and Next Steps

6 November 2024

Presented to:

Marine Resources Committee
California Fish and Game Commission

Presented by:

Dr. Craig Shuman
Marine Regional Manager



Road Map for Today's Discussion

- Brief history and status updates
- Walk through DRAFT Bin 1 recommendations
- Status and next steps for Bin 2 petition evaluation and amendments
- December Commission meeting discussion and MRC recommendations



A. Van Diggelen





MPA Petition Updates: StoryMap



Marine Protected Areas (MPA) Petition Process

California Department of Fish and Wildlife

Click through the collection to:

→ See an **overview** of the petition process, petition evaluation framework, and anticipated timeline

→ Dive into an **interactive map** to visualize proposed changes

→ Explore **petitions sorted** by numerical order, change category, or county, and click the links to learn more about each petition. Any petition proposing a change that can be visualized on a map (e.g., boundary or designation change) will have an image with a slider to swipe between the existing network and the proposed change. Any petition proposing a non-spatial change (e.g., take allowance or regulatory language change) will have a static image showing the location of the affected MPA(s).



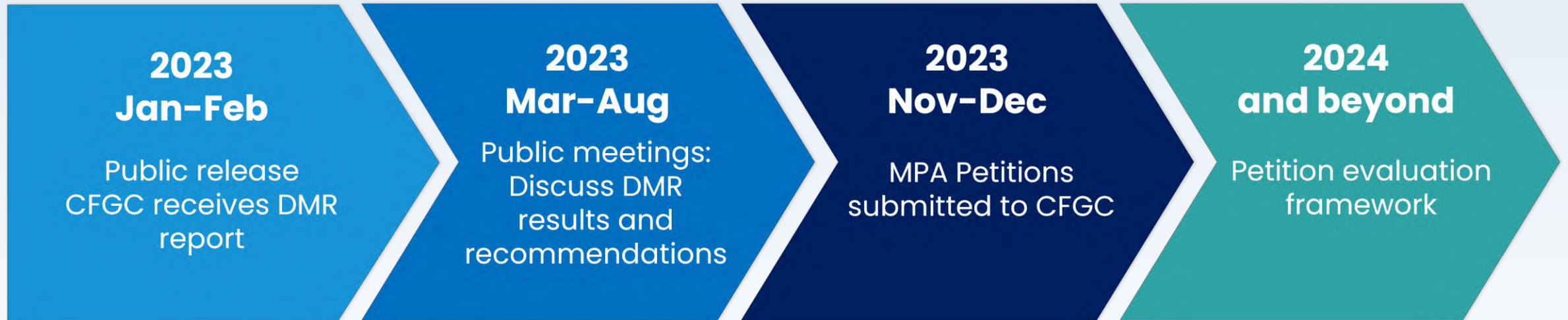
- Current status:
 - CDFW is in Phase 2 of its 3-phased petition evaluation framework and splitting each petition into individual action items
 - ***NEW*** CDFW released its [draft recommendations](#) for the Commission's consideration of Bin 1 petitions

Explore and stay up-to-date!





Recap: Decadal Management Review and Petition Timeline



Common acronyms:

CFGC=California Fish and Game Commission
CDFW=California Department of Fish and Wildlife
DMR=Decadal Management Review
MRC=Marine Resources Committee





Where We Are: MPA Petition Process

**2024
to date**

Petition evaluation
framework

- **February:** CFGC referred all 20 received petitions to CDFW for evaluation.
- **March – May:** CFGC approval of CDFW's proposed 3 phase evaluation approach.
- **June-August:** CFGC receives update on the other 27 DMR recommendations; MRC and CFGC approve Phase 1 outcomes.
- **October-November:** CDFW provides status update on Bin 1 evaluation; CFGC, MRC discuss process and next steps for Bin 2 petition amendments.



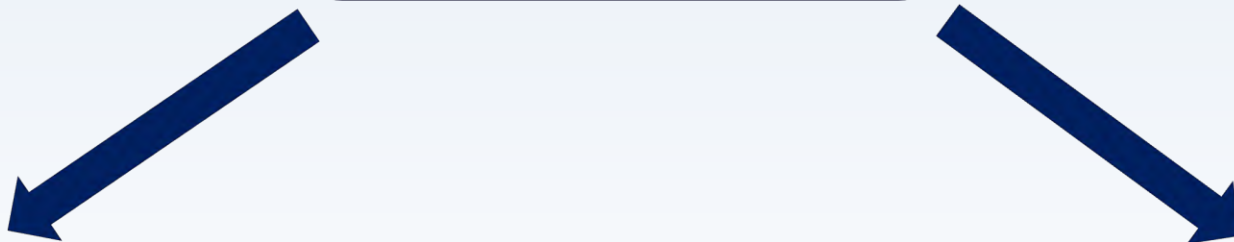
Petition Evaluation Framework: Status





Phase 1: Bin Whole Petitions

Phase 1:
Bin whole petitions



Bin 1

- Policy direction not needed for next phases
- Within CFGC authority
- Immediate evaluation possible
- Limited clarification needed from petitioner
- Limited controversy anticipated

Bin 2

Do not meet criteria for Bin 1



Bin 1 Petitions Summary

CFGC Tracking No.	Petition Contact	Affected MPA(s)	Description
2023-22MPA	Wendy Berube, Orange County Coastkeeper	Various Orange County MPAs	Change color coding on outreach maps, add language to tidepool take prohibitions, modify definition of tidepools, and allow research, monitoring, restoration, and education in Orange County MPAs, with the exception of Upper Newport Bay (Bolsa Chica, Laguna Beach, Crystal Cove, and Dana Point).
2023-25MPA	Burton Miller	Various Catalina Island MPAs	Change color designation of Blue Cavern Onshore and Casino Point SMCAs, change boundary of Long Point SMR, and remove allowance for feeding fish in Lover's Cove and Casino Point SMCAs.
2023-26MPA	Katie O'Donnell, WILDCOAST	Various San Diego County MPAs	Shift Swami's SMCA south from the lifeguard tower to the State/Solana Beach line to cover tidepools on the south side and change outreach map color of no-take SMCAs at Bautiquitos Lagoon, San Elijo Lagoon, and Famosa Slough from purple to red.*
2023-30MPA	Robert Jamgochian	Big River Estuary SMCA	Change gear restrictions within Big River SMCA to only allow Type A hoop nets that are compatible and eliminate the hoop net Type B option (rigid frame) from general provisions, reduce the number of set traps allowed from 10 to 5, and reduce the bag and possession limit for recreational take of crabs from 10 to 5.
2023-31MPA	Ashley Eagle-Gibbs, Environmental Action Committee of West Marin	Drake's Estero SMCA / Estero de Limantour SMR	Reclassify Drakes Estero SMCA to an SMR to prohibit take, and combine with Estero de Limantour into a single SMR.



Next Steps for Bin 2 Action Evaluation

- CDFW completed preliminary sorting Bin 2 petitions into actions and scoring against Bin 1 criteria.
- Process to sort and evaluate Bin 2 petitions
 - Amendments?
 - Feasibility and science guidelines



Steve Lonhart, NOAA



Proposed Process and Timeline for MPA Petition Amendments

- December Commission meeting:
 - Consider acting on Bin 1 petitions.
 - Guidance for Bin 2:
 - Petition amendment process
 - Other
 - CDFW presents Annual MPA Management update.



Thank You

Questions?

fgc@fgc.ca.gov

mpamanagementreview@wildlife.ca.gov



Memorandum

Date: October 25, 2024

Received 10/25/24;
Original signed copy on file

To: Melissa Miller-Henson
Executive Director
Fish and Game Commission

From: Craig Shuman, D. Env.
Marine Regional Manager

Subject: Agenda Item 2 A and B, Marine Protected Area Regulations Change Petitions-Evaluation Process

At its February 14-15, 2024 meeting, the California Fish and Game Commission (CFGF) referred 20 Marine Protected Area (MPA) petitions to California Department of Fish and Wildlife (CDFW) for review, evaluation, and recommendation. CDFW developed a draft [3-phase approach](#) to evaluate MPA petitions that was supported by the Marine Resources Committee (MRC) and approved by CFGF in April. CDFW completed Phase 1, which involved sorting the petitions into two bins, Bin 1, which are “near-term” petitions where CDFW had enough information to evaluate the petition and make a recommendation, and Bin 2, petitions that are longer-term because there is a need for policy guidance, additional data or information, and/or resources to support evaluation. CDFW presented the draft proposed binning of petitions for tribal and public input and discussion at the July 17 MRC meeting. Five petitions were sorted into Bin 1 and the remaining 15 were sorted into Bin 2. MRC supported the [draft outcomes from binning](#), which were subsequently approved by CFGF in August. CFGF requested that CDFW bring draft recommendations on Bin 1 actions to the November 2024 MRC meeting.

In response to the CFGF’s request in August 2024, CDFW prepared [draft recommendations](#) for each Bin 1 petition action (attachment 1) evaluated against the applicable metrics in CFGF’s approved [petition evaluation framework](#) (see attachment 6, page 232 of CFGF meeting materials) for consideration by MRC at the November 6-7, 2024 meeting. Bin 1 petitions are split into their individual actions, and CDFW has provided recommendations for each action and brief justifications on how they do or do not meet the petition evaluation framework. CDFW will also provide an update on progress with sorting Bin 2 petitions into actions and scoring them against the Bin 1 criteria.

If you have any questions or need more information, please contact Dr. Craig Shuman, Marine Regional Manager, at (805) 568-1246.

Attachment 1: Draft CDFW recommendations on Bin 1 petition actions

Attachment 2: Marine Protected Area Petition Evaluation Status and Next Steps Power Point

ec: Jenn Eckerle, Deputy Secretary for Ocean and Coastal Policy
Natural Resources Agency

Claire Waggoner, Environmental Program Manager
Marine Region

Stephen Wertz, Senior Environmental Scientist Supervisor
Marine Region

DRAFT California Department of Fish and Wildlife Recommendations for California Fish and Game Commission Action on Bin 1 Marine Protected Area Petitions

In 2023, the California Department of Fish and Wildlife (CDFW) released the first 10-year [comprehensive review](#) of California's Marine Protected Area (MPA) Network and Management Program that included [28 adaptive management recommendations](#) for the next decade of MPA management. One of the near-term priority recommendations (#4) called for applying what was learned from the review to support proposed changes to the [MPA Network and Management Program](#). To help advance this recommendation, the California Fish and Game Commission (CFGC) informed members of the public that they could submit petitions to amend MPA regulations for receipt at CFGC's December 2023 meeting. California Native American Tribes and tribal communities were invited to submit MPA petitions by the February 2024 meeting. CFGC received [20 petitions](#) with over 80 unique requests for changes to the MPA Network.

At its February 14-15, 2024 meeting, CFGC referred all 20 MPA petitions received to CDFW for review, evaluation, and recommendation. CDFW developed a draft [3-phase approach](#) to evaluate MPA petitions that was supported by the Marine Resources Committee (MRC) and approved by CFGC in April. CDFW completed Phase 1, which involved sorting the petitions into two bins, Bin 1, which are "near-term" petitions where CDFW had enough information to evaluate the petition and make a recommendation, and Bin 2 petitions, which are longer-term because there is a need for policy guidance, additional data or information, and/or resources to support evaluation.

CDFW presented the draft proposed binning of petitions for tribal and public input and discussion at the July 17 MRC meeting. Five petitions were sorted into Bin 1 and the remaining 15 were sorted into Bin 2. MRC supported the [draft outcomes from binning](#), which were subsequently approved by CFGC in August. CFGC requested that CDFW bring draft recommendations on Bin 1 actions to the November 2024 MRC meeting.

In response to CFGC's request in August 2024, CDFW has prepared draft recommendations for each Bin 1 petition action evaluated against the applicable metrics in CFGC's approved [petition evaluation framework](#) (see attachment 6, page 232) for consideration by MRC at its November 6-7, 2024 meeting. The approved framework includes metrics such as, but not limited to:

- Compatibility with [Marine Life Protection Act](#) goals and [MPA Master Plan guidelines](#) including CDFW's design [feasibility guidelines](#) and existing regulations.
- Ability to help advance any of the 28 Decadal Management Review recommendations.
- Garners community support from diverse sectors.

Table 1 includes the Bin 1 petitions split into their individual actions, recommendations on how to proceed on each action, and brief justifications on how each action does or does not meet the petition evaluation framework. Each action is identified by the CFGC tracking number and action ID assigned by CFGC when petitions were first received, the MPA affected by the proposal, action category (e.g. modify existing regulations, establish new MPA and no action), and action type (e.g. MPA classification change, boundary change, or change in take).

Table 1. DRAFT Bin 1 recommendations for each petition action with brief justifications, and preferred pathway. More information regarding current regulations referenced below can be found at the following links: [California Code of Regulations \(CCR\) Title 14 \(Section 632\)](#), [California Fish and Game Code \(FGC Sections 2850-2863\)](#), and [Public Resources Code \(PRC Sections 36600-36690\)](#).

CFGC Tracking No.	Petitioner Contact	Action ID	Affected MPA	Action Category	Action Type	Petition Proposed Action	CDFW Recommendation	Brief Justification and Proposed Action
2023-22MPA	Wendy Berube, Orange County Coastkeeper	2023-22MPA_1	Bolsa Chica Basin SMCA	No Action	Non-regulatory	Change color of no-take SMCA from purple to red on outreach maps.	Support w/ alternative pathway	This proposed action does not require a change to existing regulations. Discuss alternative pathway to identify how best to implement the change.
		2023-22MPA_2	Laguna Beach SMCA	No Action	Non-regulatory	Change color of no-take SMCA from purple to red on outreach maps.	Support w/ alternative pathway	This proposed action does not require a change to existing regulations. Discuss alternative pathway to identify how best to implement the change.
		2023-22MPA_3	Crystal Cove SMCA	Modify	Allowable Uses	Add "non-living, geological or cultural" to marine resource tidepool take prohibition for consistency with 632(a)1(C).	Deny w/ alternative pathway	Redundant with 632(a)1(C) that already prohibits tidepool take. Recommend striking specific language regarding tidepools from the Crystal Cove SMCA regulations for clarity and consistency.
		2023-22MPA_4	Crystal Cove SMCA	Modify	Allowable Uses	Change description of tidepools to "rocky intertidal zone" with a modified definition, "the rocky intertidal zone includes all hard substrate between the highest high tide and lowest low tide."	Grant w/ alternative pathway	Simplifies regulatory language and could help enhance public understanding. Recommend striking from regulations for this individual MPA and add a definition of rocky intertidal habitat to general provisions in a new subsection 632(a)(16).
		2023-22MPA_5	Dana Point SMCA	Modify	Allowable Uses	Add "non-living, geological or cultural" to marine resource tidepool take prohibition for consistency with 632(a)1(C).	Deny w/ alternative pathway	Redundant with 632(a)1(C) that already prohibits tidepool take. Recommend striking specific language regarding tidepools from the Crystal Cove SMCA regulations for clarity and consistency.
		2023-22MPA_6	Dana Point SMCA	Modify	Allowable Uses	Change description of tidepools to "rocky intertidal zone" with a modified definition, "the rocky intertidal zone includes all hard substrate between the highest high tide and lowest low tide."	Grant w/ alternative pathway	Simplifies regulatory language and could help enhance public understanding. Recommend striking from regulations for this individual MPA and add a definition of rocky intertidal habitat to general provisions in a new subsection 632(a)(16).
		2023-22MPA_7	All Orange County MPAs, except Upper Newport Bay	Modify	Allowable uses	Add an amendment that "Scientific research, monitoring, restoration, and education is allowed pursuant to any required federal, state, or local permits, or as otherwise authorized by the department.	Deny	Redundant with what is already allowed in SMCAs pursuant to statute (PRC sections 36600-36690).

CFGC Tracking No.	Petitioner Contact	Action ID	Affected MPA	Action Category	Action Type	Petition Proposed Action	CDFW Recommendation	Brief Justification and Proposed Action
2023-25MPA	Burton Miller	2023-25MPA_1	Blue Cavern Onshore SMCA	No Action	Non-regulatory	Change color of no-take SMCA from purple to red on outreach maps.	Support w/ alternative pathway	This proposed action does not require a change to existing regulations. Discuss alternative pathway to identify how best to implement the change.
		2023-25MPA_2	Casino Point SMCA	Modify	Allowable uses	Remove allowance for feeding fish.	Deny	Fish feeding has been a long-standing practice in this area associated with local tourism that outdates the MLPA planning process. Because of this, and the enhancement of wildlife viewing, and educational opportunities provided by the practice, the MLPA Initiative Blue Ribbon Task Force recommended, and CFGC adopted, an exemption for feeding fish in subsection 632(a)(6) if specifically authorized in 632(b) to continue to allow the practice for this MPA.
		2023-25MPA_3	Casino Point SMCA	No Action	Non-regulatory	Change color of no-take SMCA from purple to red on outreach maps.	Support w/ alternative pathway	This proposed action does not require a change to existing regulations. Discuss alternative pathway to identify how best to implement the change.
		2023-25MPA_4	Long Point SMR	Modify	Boundaries	Change the type of boundary from a latitude and longitude to a certain, specified distance from shore. To maintain overall size, the northeast corner could be trimmed and fitted to western edge of offshore boundary to create a standard distance from shore (in similar fashion to Arrow Point to Lion Head SMCA).	Deny	Requested change does not align with CDFW's Feasibility Guidelines to align MPA boundaries with whole minutes of latitude and longitude whenever possible to enhance enforceability. Using distance from shore is also inconsistent with this guidance. CDFW Law Enforcement Division is not supportive because it could decrease enforceability and result in reduced protection of marine resources.

CFGC Tracking No.	Petitioner Contact	Action ID	Affected MPA	Action Category	Action Type	Petition Proposed Action	CDFW Recommendation	Brief Justification and Proposed Action
2023-25MPA (continued)	Burton Miller	2023-25MPA_5	Lover's Cove SMCA	Modify	Allowable uses	Remove allowance for feeding fish.	Deny	Fish feeding has been a long-standing practice in this area associated with local tourism that outdates the MLPA planning process. Because of this, and the enhancement of wildlife viewing, and educational opportunities provided by the practice, the MLPA Initiative Blue Ribbon Task Force recommended, and CFGC adopted, an exemption for feeding fish in subsection 632(a)(6) if specifically authorized in 632(b) to continue to allow the practice for this MPA.
2023-26MPA	Katie O'Donnell, WILDCOAST	2023-26MPA_1	Swami's SMCA	Modify	Boundaries	Shift the entire MPA boundary shape south (from lifeguard tower to State/Solana Beach line to cover tidepool on south side).	Deny	Northern boundary change was not evaluated at request of petitioner. Requested change at southern boundary does not align with CDFW's Feasibility Guidelines to align MPA boundaries with whole minutes of latitude and longitude whenever possible to enhance enforceability. CDFW Law Enforcement Division is not supportive because it could decrease enforceability and result in reduced protection of marine resources.
		2023-26MPA_2	Batiquitos Lagoon SMCA	No Action	Non-regulatory	Change color of no-take SMCA from purple to red on outreach maps.	Support w/ alternative pathway	This proposed action does not require a change to existing regulations. Discuss alternative pathway to identify how best to implement the change.
		2023-26MPA_3	San Elijo Lagoon SMCA	No Action	Non-regulatory	Change color of no-take SMCA from purple to red on outreach maps.	Support w/ alternative pathway	This proposed action does not require a change to existing regulations. Discuss alternative pathway to identify how best to implement the change.
		2023-26MPA_4	Famosa Slough SMCA	No Action	Non-regulatory	Change color of no-take SMCA from purple to red on outreach maps.	Support w/ alternative pathway	This proposed action does not require a change to existing regulations. Discuss alternative pathway to identify how best to implement the change.
2023-30MPA	Robert Jamgochian	2023-30MPA_1	Big River Estuary SMCA	Modify	Take	Make recreational take of Dungeness crab more restrictive by changing crab gear regulations to only allow Type A hoops and eliminate hoop net Type B option.	Deny	Outside the scope of MPA management. Action more appropriate to be considered through fishery management process.

CFGC Tracking No.	Petitioner Contact	Action ID	Affected MPA	Action Category	Action Type	Petition Proposed Action	CDFW Recommendation	Brief Justification and Proposed Action
2023-30MPA (continued)	Robert Jamgochian	2023-30MPA_2	Big River Estuary SMCA	Modify	Take	Make recreational take of Dungeness crab more restrictive by reducing the number of set traps from 10 to 5 for recreational take of Dungeness crab.	Deny	Outside the scope of MPA management. Action more appropriate to be considered through fishery management process.
		2023-30MPA_3	Big River Estuary SMCA	Modify	Take	Make recreational take of Dungeness crab more restrictive by reducing the recreational bag limit from 10 to 5 crabs per person.	Deny	Outside the scope of MPA management. Action more appropriate to be considered through fishery management process.
2023-31MPA	Ashley Eagle-Gibbs, Environmental Action Committee of West Marin	2023-31MPA_1	Drake's Estero SMCA	Modify	Classification/Take	Reclassify Drakes Estero SMCA to an SMR to prohibit take.	Grant	Drake's Estero was designated as an SMCA to allow the existing aquaculture activities to continue operating. The MLPA North Central Coast Regional Stakeholder Group recommended changing the classification from an SMCA to an SMR if it is feasible to do so. Aquaculture activities ceased in 2014. Redesignation to an SMR could help protect biodiversity in the eelgrass beds that have recovered since the removal of the aquaculture infrastructure. There is limited recreational clamming activity that would be displaced by the classification change.
		2023-31MPA_2	Estero de Limantour SMR	Modify	Boundaries	Combine SMR with a reclassified Drake's Estero SMR into one single SMR.	Grant	Creating one SMR would eliminate the confusing boundary between the current SMCA and SMR.

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE REPORT ON THE CALIFORNIA MARINE PROTECTED AREA PETITION PROCESS

At the Council’s June 2024 meeting, a petition for changes to specific California Marine Protected Areas (MPAs) was presented by Mr. Blake Hermann in public comment (Agenda Item C7, [Public Comments](#)). This petition involved potential changes to MPAs around the California Channel Islands (Figure 1), which would allow fishing for specific pelagic species in MPAs that extend into federal waters with shared jurisdiction between California and the Channel Islands National Marine Sanctuary (CINMS). The California Department of Fish and Wildlife (CDFW) and California Fish and Game Commission (CFGC) are currently in the process of considering petitions requesting such amendments to [California’s Marine Protected Area \(MPA\) Network](#). CDFW acts as the lead management and enforcement agency for the MPA Network, while CFGC has regulatory authority to create, remove, or modify State MPAs (California Fish and Game Code, §1590).

In 2022, CDFW publicly released the first 10-year comprehensive review of the MPA Network and Management Program ([Decadal Management Review](#)) that included 28 recommendations for the next decade of MPA management. One priority recommendation called for applying what was learned from the Decadal Management Review to support adaptive management actions, including proposed amendments to the MPA Network. To advance this recommendation, the CFGC requested petitions be submitted for their December 2023 meeting. They received 20 petitions with more than 80 unique requests to amend the MPA Network, including addition of new MPAs, changing the levels of protection in existing MPAs, and minor clarifications to regulatory language. Mr. Hermann’s petition was one of the 20. All 20 MPA petitions received were referred to CDFW for review, evaluation, and recommendation at the February 14-15, 2024, CFGC meeting. CDFW recommended a [3-phase approach](#) to evaluate the MPA petitions that was approved by the CFGC in April 2024. This approach included the following:

- **Phase 1** – Categorize petitions into two bins to determine which petitions can be evaluated in the near-term (Bin 1) and which will require additional policy guidance, information, and/or resources prior to evaluation (Bin 2).
- **Phase 2** – Separate all Bin 1 petitions into individual actions and proceed to phase 3. Separate Bin 2 petitions into individual actions and identify additional policy guidance, information, and/or resources necessary to advance individual actions to phase 3.
- **Phase 3** – Evaluate specific petition actions using a framework to identify which will be recommended to be granted, denied, or considered through an alternative pathway.

CDFW completed Phase 1 with recommended bin designations for each petition, and the CFGC approved these recommendations in August 2024. Mr. Hermann’s petition was included in Bin 2, requiring additional guidance before proceeding with full evaluation. The rationale for this included the fact that the proposal would change a no-take State Marine Reserve into a limited-take State Marine Conservation Area, thus reducing its relative level of protection, and the

changes would require extensive coordination with external partners, including but not limited to CINMS, National Park Service, and National Marine Fisheries Service (NMFS). It is important to note that the federal waters portions of MPAs around the Channel Islands were established under both Magnuson authority for the prohibition on bottom contact fishing (via the groundfish regulations in 50 CFR §660.12) and CINMS regulations for ecosystem-level protection prohibiting all take (via the regulations in 15 CFR §922.71 and 922.73). As such, changes to federal waters MPAs in these areas would require amendment to CINMS regulations and may require both Council and NMFS input and action.

The timeline to consider specific actions for Bin 2 petitions is still being developed. At the August 2024 CFGC meeting, CFGC discussed a potential timeline and next steps for the petition evaluation process for the remainder of 2024, including:

- **October 2024 CFGC meeting:** CDFW provided an update on the petition process and discussion points for the November CFGC Marine Resources Committee meeting.
- **November 2024 MRC meeting:** CDFW will present draft Bin 1 proposed petition actions and recommendations for discussion and draft approach for Bin 2.
- **December 2024 CFGC meeting:** CFGC considers near-term Bin 1 petition recommendations and discusses next steps for the petition evaluation process.
- **March 2025 MRC meeting:** Further discussion on CDFW recommendations for Bin 2 remaining proposed actions and next steps.

For more information on the current MPA petitions, CDFW has created an [online story map](#) that provides detailed information on all of the petitions received by the Commission with location and regulatory proposals. CDFW and CFGC will continue to work closely with agency partners at the Office of National Marine Sanctuaries, NMFS, and the Council on evaluation of petitions that apply to areas where there are adjoining and/or overlapping jurisdictions.

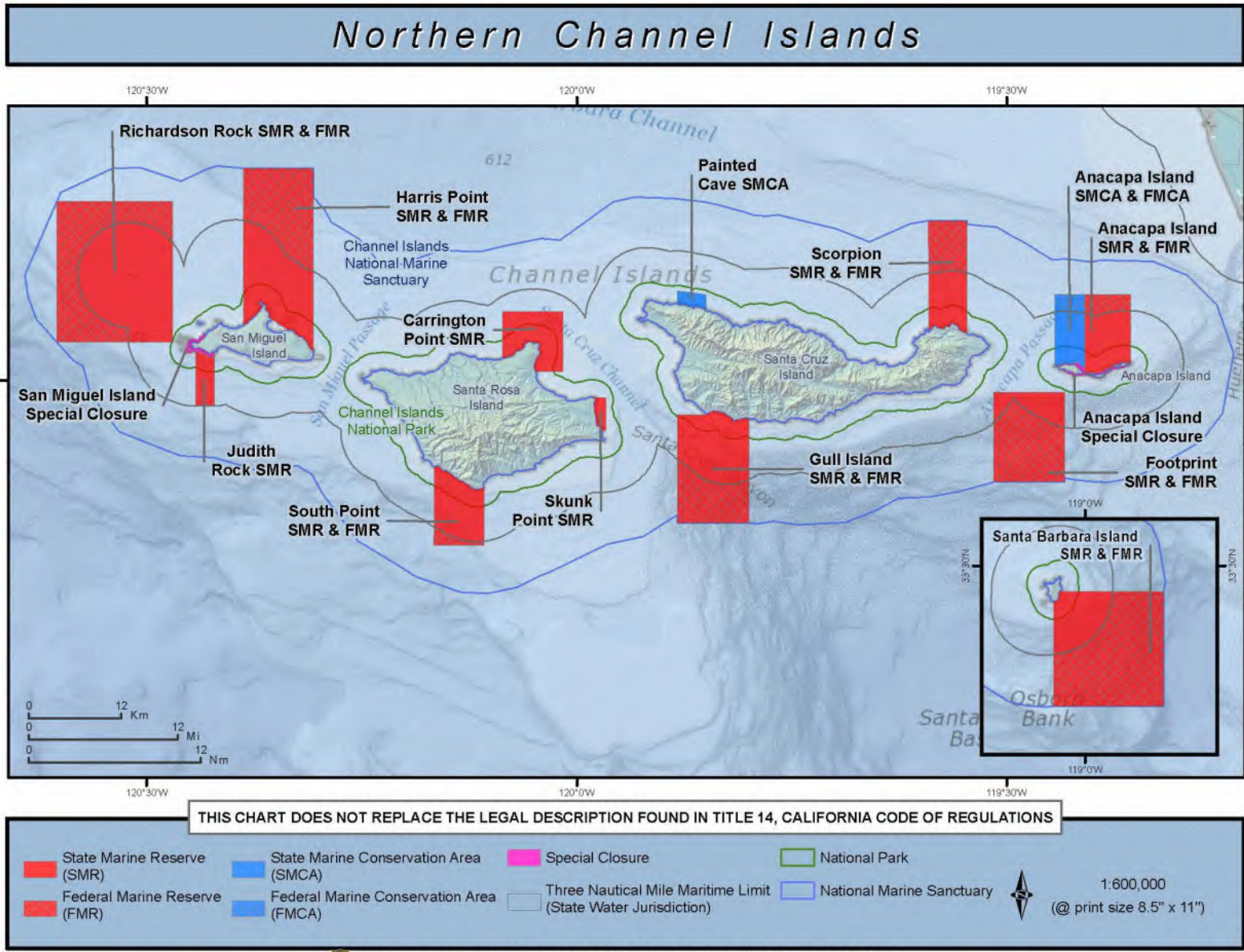


Figure 1 – Map of the Channel Islands state and federal marine protected areas.

California Fish and Game Commission
Staff-Proposed Process for Submitting Revisions to an Existing
Marine Protected Area (MPA) Regulation Change Petition

October 25, 2024

At its December 2023 meeting, the California Fish and Game Commission (Commission) received 20 regulation change petitions proposing changes to California's MPA network. In most cases, multiple requested MPA changes were bundled into single petitions; over 80 individual requested actions were included in the 20 petitions. Based on a recommendation from the California Department of Fish and Wildlife (CDFW), in August 2024 the Commission divided petitions into two categories: Bin 1 (with five petitions identified for near-term evaluation) and Bin 2 (with fifteen petitions identified for longer-term evaluation). In December 2024, the Commission is expected to receive a recommendation for proposed actions for the Bin 1 petitions.

Over the last ten months, many Bin 2 petitioners have been engaged in dialogue with other stakeholders, local communities, government agencies, and Native American tribes and tribal communities, to help ensure the actions proposed in their petitions are supported and appropriate for the relevant area. During conversations, petitioners have noted the desire to make revisions to their original petition and have inquired about the process for making such changes. The Commission has agreed to accept requests from MPA petitioners to revise petitioned actions within their original MPA petition; this document proposes a process and parameters for revisions to the 15 MPA petitions.

Who: Petitioners with a petition in Bin 2 may submit a request to amend their original petition. There are 15 petitions included in Bin 2.

Format: Submit to fgc@fgc.ca.gov a revised version of Form FGC 1 (petition for regulation change) that you originally submitted to the Commission.

- Please show revisions in strike-out (~~for deletions~~) and underline (for new content). Alternatively, you may use the track changes function in word processing software.
- Create a cover message detailing which petition action(s) you request to change, what is the specific change, and the rationale (what is the purpose).

Extent of changes: Only revisions to or withdrawal of petition actions in the original petition may be requested. *No new proposed actions will be accepted as revisions to a petition.*

Deadline: All requests must be received by the Commission no later than [to be determined: mid-to-late January 2025 at 5:00 p.m.]

Commission receipt and action: The Commission will receive requests for MPA petition revisions at its February 12-13, 2025 meeting.

- Petition numbers will remain the same, with an "R" added at the end to indicate it is a revised version.
- Staff will recommend the Commission refer revised MPA petitions to the Department and the Commission Marine Resources Committee.



OPC Investments for MPA Petition Evaluation

Staci Lewis, Ph.D., Marine Protected Area Network Program Manager

November 6, 2024



CALIFORNIA
**OCEAN
PROTECTION
COUNCIL**

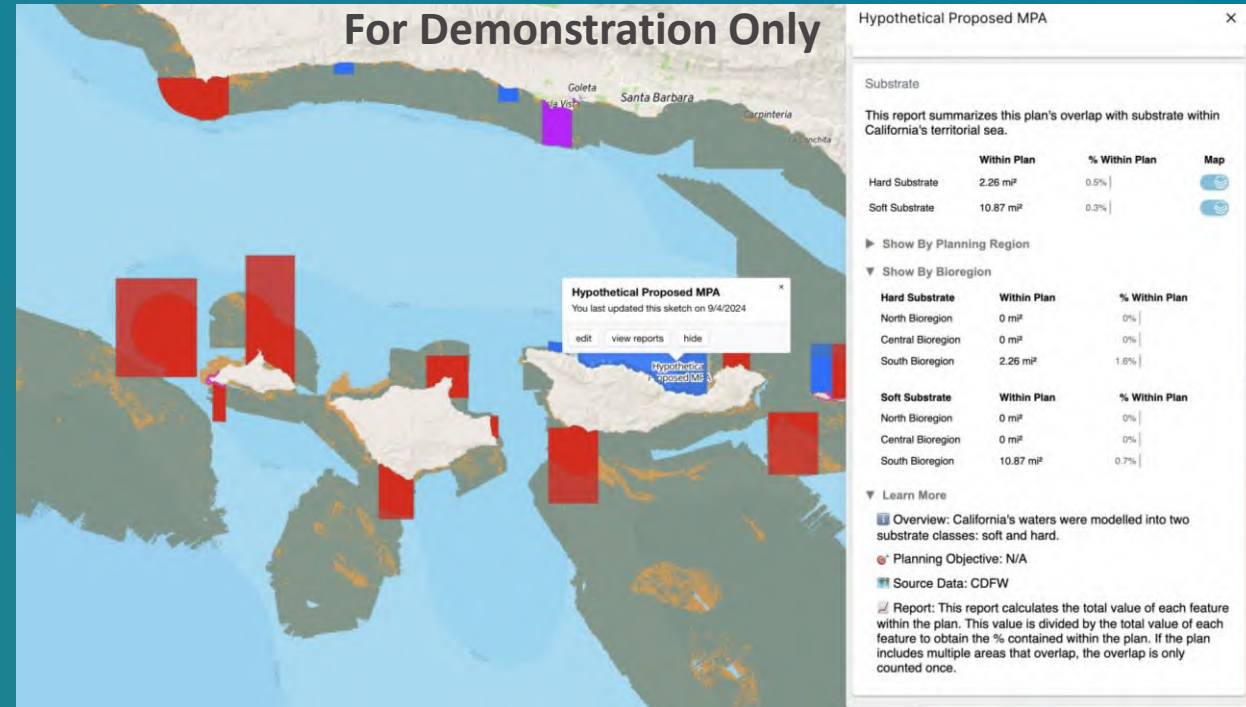
SeaSketch -- Mapping Tool of the MPA Network

University of California, Santa Barbara

Public platform to clearly visualize habitats and other features within California state waters

The platform can be used to visualize proposed changes to the network including:

- Changes to MPA size and spacing
- Overlap of MPA petitions with important locations and habitats



Anticipated release date in Winter/Spring 2025

Updating the Connectivity Model

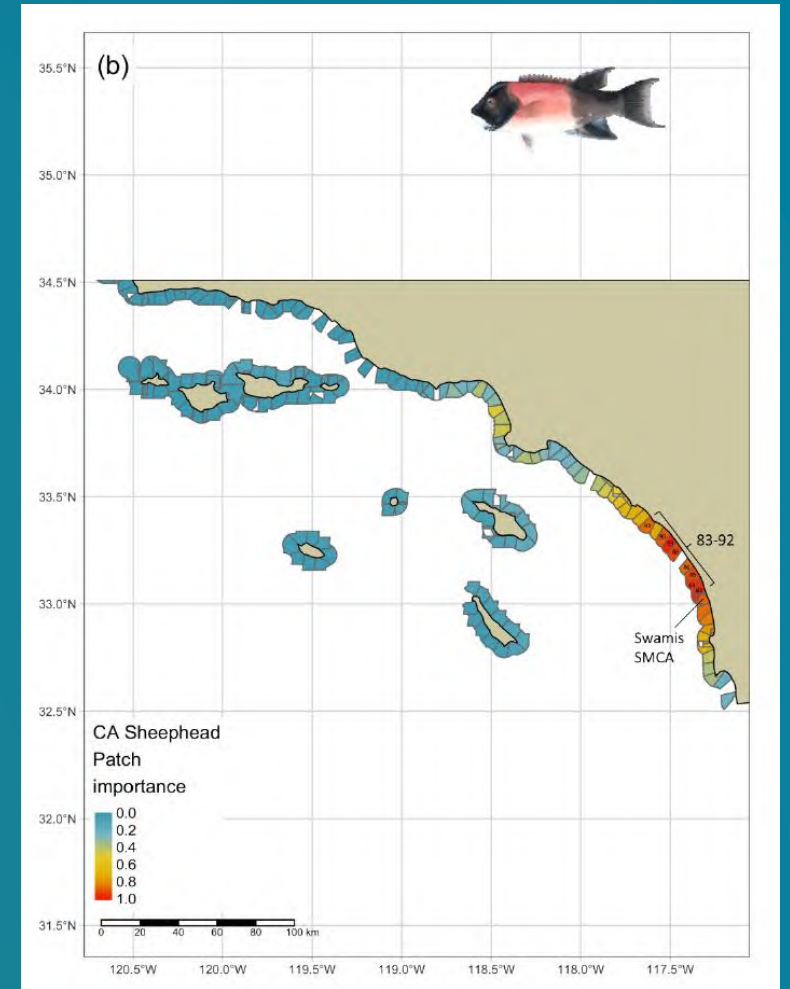
University of California, Santa Cruz

Model updates are needed to:

- Ensure results are more representative of current and future ocean conditions
- Fill some gaps in near-shore habitat mapping

These updates would produce a more accurate assessment of network connectivity and ecological stability

Updated preliminary results anticipated by Summer 2025



From: Katie O'Donnell <[REDACTED]>
Sent: Tuesday, October 22, 2024 3:09 PM
To: Ashcraft, Susan@FGC <[REDACTED]>
Cc: Wertz, Stephen@Wildlife <[REDACTED]>; Waggoner, Claire@Wildlife <[REDACTED]>; Miller-Henson, Melissa@FGC <[REDACTED]>; [REDACTED]
Subject: WILDCOAST MPA Petition Change - Removal of Boundary Change Action

Hi Susan,

Hope you're doing well! Thanks again for chatting with me the other week about WILDCOAST's MPA petition. We greatly appreciate your partnership!

My team and I have discussed the next steps for our petition and have decided to withdraw the Swami's boundary change proposal part of our petition. We would only like to move forward with the color change for no-take SMCAs at Batiquitos Lagoon, San Elijo Lagoon, and Famosa Slough from purple to red on outreach materials only.

Please let me know if there is anything else we need to do to formally withdraw the Swami's boundary change portion of our petition!

We are working on our next steps in our conservation work and looking forward to our continued partnership with you all! I am happy to set up a call if you'd like to discuss anything further at this time!

Thank you,

Katie



Katie O'Donnell

US Ocean Conservation Manager

she/her/hers



From: Joel Weltzien <[REDACTED]>
Sent: Wednesday, October 23, 2024 9:46 PM
To: FGC <FGC@fgc.ca.gov>
Subject: BHA's Written Comments for the November 6-7th MRC Meeting

Please see attached comments. Thank you.



Joel Weltzien | California Chapter Coordinator (CA)

Backcountry Hunters & Anglers

Phone: [REDACTED]

www.backcountryhunters.org





BACKCOUNTRY
HUNTERS & ANGLERS
CALIFORNIA

Marine Resources Committee
California Fish and Game Commission
1416 9th Street, Room 1320
Sacramento, CA 95814

RE: Action item 2a - Receive and discuss Department evaluation and recommendations for MPA petitions in Bin 1

On behalf of the California chapter of Backcountry Hunters & Anglers (BHA), the voice for our wild public lands, waters and wildlife, we wish to comment on the California Department of Fish & Wildlife's (the Department) recommendations regarding the petitions currently placed into the California Fish & Game Commission's (the Commission) Bin 1. BHA is a North American, grassroots non-profit with chapters and members in 49 states, Washington D.C., two Canadian provinces and one Canadian territory. With a membership that is young, politically diverse and tremendously engaged, our chapters consistently advance policies and projects that ensure our North American heritage of hunting and fishing in a natural setting through education and work on behalf of wild public lands, waters and wildlife.

Barring the finding of any significant impacts to overall ecosystem integrity or species health in the Department's review and recommendations, we request that petitions 2023-26MPA (Swami's SMCA), 2023-30MPA_1 (Big River SMCA restrictions) & 2023-31MPA_1 (Drakes Estero) be denied. All these petitions seek to reduce or eliminate recreational harvest, yet none of them provide sufficient scientific documentation for doing so. As we have stated previously, the reduction of recreational harvest without adequate scientific rationale is not in the best interests of our at-risk marine ecosystems, but instead disenfranchises a portion of the public from a food source, their connection to the ocean and a constitutional right to fish. BHA, and indeed the vast majority of responsible recreational anglers, have supported restrictions on recreational harvest when there was a clear negative impact on an ecosystem associated with the continuation of harvest, and when reduced harvest could be reasonably shown to improve the health of the ecosystem or species of concern. Unless the Department can provide a logically sequential demonstration of how reducing recreational harvest could help significant ecological outcomes at Swami's, Big River and Drakes Estero, we encourage the Commission to recommend denying these petitions.

In addition to prior comments submitted to the Commission in February and the Marine Resources Committee in July of 2024 regarding the Big River and Drakes Estero petitions, we would like to express our concern and opposition to Petition 2023-26 MPA, in particular the



WWW.BACKCOUNTRYHUNTERS.ORG/CALIFORNIA_BHA
CALIFORNIA@BACKCOUNTRYHUNTERS.ORG

proposal to move the Swamis SMCA shape southward. The redrawn SMCA boundary would partially cover Tabletops / Seaside Reef, a popular diving site where Californians have been sustainably harvesting reef fish and lobsters for generations. The cultural impact of a loss of access to Tabletops / Seaside Reef, without any scientific justification, would be devastating to our community.

We are concerned with what may have been a lack of stakeholder engagement in the creation of the petition. The petitioner, Wildcoast, alleges to have discussed the proposal and secured the support of fishing groups during a meeting of the San Diego MPA Collaborative on June 26th, 2023. However, a review of MPA Collaborative members on the organization's website shows a lack of substantive engagement with the broader fishing community. We feel anglers were not adequately consulted and that, if successful, the closure of Tabletops / Seaside Reef would have occurred without sufficient consultation with the angling community.

Wildcoast cites the negative effects of tide-pooling, and SMCA enforcement challenges as reasons to shift the SMCA shape south. We believe both issues could be easily resolved with the appropriate allocation of the City of Solana Beach and State Parks resources. Changing the location of the SMCA shape is simply the wrong tool for the job. More concerning, this petition risks alienating the angling and diving community from state policymakers and conservation organizations in our shared goal of conserving and celebrating our coastal ecosystems. We recommend the Commission deny this petition.

Further, BHA and other members of the public eager to engage in the MPA petition process would continue to encourage Commission staff and Department staff to share recommendations and analysis concerning petitions currently in Bin 1 as quickly as possible prior to the Marine Resource Committee (MRC) meeting on November 6-7th, 2024. Having the Department's recommendations and being able to study and respond to them in our comments that we submit prior to MRC meetings would result in a more informed discussion and process.

Thank you for your time.

Joel Weltzien

Chapter Coordinator – Backcountry Hunters & Anglers



From: Volker Hoehne <[REDACTED]>
Sent: Wednesday, October 16, 2024 4:35 PM
To: [REDACTED]
Cc: [REDACTED]; fgc@fgc.ca.gov
Subject: Swamies MPA expansion Petition 2023-26

My name is Volker Hoehne,

I'm from Carlsbad CA and I am speaking to oppose and express concerns with Petition **2023-26** MPA, specifically for expanding the Swamies MPA south 300 ft.

I started diving table top reef in while attending Skyline Elementary School in fourth grade. I have seen this reef thrive over the years.

Expanding the Swamies MPA south 300 ft closes 4.8 million square feet to recreational fishing because the closure goes out to sea by 3 miles. Moving the country from 33.000 N to 32.998N splits tabletop reef which confuses tide pool enforcement.

Species diversity and density on table tops intertidal reef is low because it is regularly buried under sand by the U.S. Army Corps of Engineers sand pumping . The U.S. Army Corps of Engineers restoration dumps 50-foot-wide beach fill along a 7,800-foot-long stretch of shoreline using 340,000 cubic yards of compatible sediment, with re-nourishment (in the amount of 220,000 cubic yards) every 5 years on average over a 50-year period of Federal Los Angeles District > Missions > Civil Works > Projects and Studies > Solana-Encinitas Shoreline Study (army.mil)

This MPA expansion negatively impacts recreational and commercial fishing. It will confuse tide pooling enforcement by bisecting the tide pooling area.

It

Please oppose expanding the Swamies MPA.

From: David Clutts <[REDACTED]>
Sent: Monday, October 21, 2024 11:20 AM
To: FGC <FGC@fgc.ca.gov>
Subject: Letter of Opposition to Swami's, Py Loma MPA expansion

Dear California Fish & Wildlife,

I am writing to express my opposition to the proposed expansions of both the Swami's Marine Protected Area (MPA) and the Point Loma MPA.

Swami's already experiences minimal recreational fishing pressure. Access to the current fishing area from the shore is critical, and the expansion would complicate enforcement due to the difficulty in determining the new boundary lines. Expanding the MPA further would significantly limit fishing opportunities in Solana Beach, which has been a vital fishing area for decades. Closing additional area makes little sense while the Army corps of engineers routinely covers much of the reef with the sand replenishment at Solana beach. Therefore, I respectfully urge the California Department of Fish & Wildlife to deny the proposed expansion of the Swami's MPA.

Similarly, I oppose the expansion of the Point Loma MPA. This area contains some of the last remaining healthy kelp beds that can support fishing activities in southern San Diego County. The argument presented by the organization petitioning for the expansion, claiming it is necessary to save the kelp, is unfounded. Fishermen have protected and sustained these kelp beds as valuable fishing grounds for over a century. Expanding the MPA will only displace fishing pressure to other areas, disrupting a balanced ecosystem and limiting sustainable fishing opportunities.

I strongly urge the Department to deny the expansion of the Point Loma MPA, as it will negatively impact both the environment and the fishing community.

Thank you for your consideration.

Sincerely,

David Clutts

Member: San Diego Freedivers, Norcal skindivers, Richmond Pelican Skindivers

Spearg fisherman, Fisherman, Diver, Scuba Diver

DAVID CLUTTS

Broker Associate

C: [REDACTED] (San Diego) | C: [REDACTED] (Northern CA)

[REDACTED]

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David Clutts]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

10/21/2024

California Department of Fish and Wildlife

[Address if available]

Dear California Fish & Wildlife,

I am writing to express my opposition to the proposed expansions of both the Swami's Marine Protected Area (MPA) and the Point Loma MPA.

Swami's already experiences minimal recreational fishing pressure. Access to the current fishing area from the shore is critical, and the expansion would complicate enforcement due to the difficulty in determining the new boundary lines. Expanding the MPA further would significantly limit fishing opportunities in Solana Beach, which has been a vital fishing area for decades. Closing additional area makes little sense while the Army corps of engineers routinely covers much of the reef with the sand replenishment at Solana beach. Therefore, I respectfully urge the California Department of Fish & Wildlife to deny the proposed expansion of the Swami's MPA.

Similarly, I oppose the expansion of the Point Loma MPA. This area contains some of the last remaining healthy kelp beds that can support fishing activities in southern San Diego County. The argument presented by the organization petitioning for the expansion, claiming it is necessary to save the kelp, is unfounded. Fishermen have protected and sustained these kelp beds as valuable fishing grounds for over a century. Expanding the MPA will only displace fishing pressure to other areas, disrupting a balanced ecosystem and limiting sustainable fishing opportunities.

I strongly urge the Department to deny the expansion of the Point Loma MPA, as it will negatively impact both the environment and the fishing community.

Thank you for your consideration.

Sincerely,

David Clutts

Member: San Diego Freedivers, Norcal skindivers, Richmond Pelican Skindivers

Spearg fisherman, Fisherman, Diver, Scuba Diver

From: Ashley Eagle-Gibbs <[REDACTED]>

Sent: Thursday, October 24, 2024 04:28 PM

To: FGC <FGC@fgc.ca.gov>

Cc: Eric Sklar <[REDACTED]>; Samantha Murray

<[REDACTED]>; Ashcraft, Susan@FGC <[REDACTED]>;

Rogers, Kimberly@fgc <[REDACTED]>; Leslie Adler-Ivanbrook

<[REDACTED]>; Worden, Sara@Wildlife <[REDACTED]>; Wertz,

Stephen@Wildlife <[REDACTED]>; Waggoner, Claire@Wildlife

<[REDACTED]>

Subject: EAC Comments re. Agenda Item 2(A), MPA Petition for Drakes Estero (2023-31MPA)

Dear Commissioners and staff,

Please find attached a short comment letter for the November MRC related to Item 2A and bin 1 petition, Drakes Estero (2023-31MPA). I look forward to the meeting.

Thank you,

Ashley Eagle-Gibbs

--

Ashley Eagle-Gibbs, Esq. (She/Her)

Executive Director & Legal and Policy Director

Environmental Action Committee of West Marin (EAC)

PO Box 609 | 65 Third Street, Suite 12

Point Reyes Station, CA | 94956

[REDACTED]

ashley@eacmarin.org

Protecting and Sustaining the Lands, Waters, and Biodiversity of West Marin Since 1971

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October 24, 2024

Marine Resources Committee
California Fish and Game Commission
P.O. Box 944209,
Sacramento, CA 94244-2090
Via Electronic Mail: fgc@fgc.ca.gov

RE: *Agenda 2(A), Marine protected area (MPA) regulation change petitions – evaluation process, MPA Petition for Drakes Estero (2023-31MPA)*

Dear Commissioners,

The Environmental Action Committee of West Marin's mission is to protect and sustain West Marin's lands, waters, and biodiversity. On November 30, 2023, we submitted a petition to change the regulations for Drakes Estero State Marine Conservation Area (SMCA); petition no. 2023-31MPA. While we are eager to review the staff report and participate in the November 6th Marine Resources Committee meeting, we submit this short letter to reiterate our original petition request and summarize some of the background and support for this petition.

Our petition request was preceded by our participation in the decadal management review (DMR) process including analysis of our existing local MPAs, informed by our leadership of Marin MPA Watch at Drakes Estero and other sites in Marin County, which includes data collection. We also submitted prior letters voicing the need for regulatory change at this location as early as March 2023. All of these letters are included in the record.

We note that there is significant support on the record for the petition including support from at least 22 NGOs, the National Park Service, and Marin County Supervisor Rodoni, who represents this region in his district. The record also includes support from scientists, community-based organizations, local individuals, and tribal support.

We have also participated in two Golden Gate Collaborative meetings on August 24, 2023, and September 26, 2024. At the August 24th Golden Gate Collaborative meeting, a full consensus in support of this petition was reached by the participants.¹

The requested change is consistent with DMR goals and adaptive management under the Marine Life Protection Act.

We encourage the Marine Resources Committee and the full Commission to lend their support for this request. If you have questions, please contact me at [REDACTED]. Thank you for your dedication to the conservation of our shared marine resources.

Sincerely,



Ashley Eagle-Gibbs, Esq.
Executive Director
Environmental Action Committee of West Marin

¹ Also included with our petition, see rows 50-51,
<https://docs.google.com/spreadsheets/d/1Eu1efUliHZ2bazdKM5IK5UKzsIEluHEU9k9HdR1oudo/edit#gid=0>

From: Kim Selkoe <[REDACTED]>

Sent: Thursday, October 24, 2024 02:28 PM

To: FGC <FGC@fgc.ca.gov>

Cc: Ava Schulenberg <[REDACTED]>; [REDACTED]
<[REDACTED]>

Subject: Written Comment for the upcoming MRC re MPA Petition Process

Dear Fish and Game Commissioners,

Please see the attached letter.

Thank you,

Kim

--

Kim Selkoe, Ph.D.

~~~~~

Executive Director

Commercial Fishermen of Santa Barbara

[REDACTED]

[REDACTED]

[REDACTED]



COMMERCIAL FISHERMEN OF SANTA BARBARA

Commercial Fishermen of Santa Barbara, Inc.,  
6 Harbor Way, #155 Santa Barbara, CA 93109

[www.cfsb.info](http://www.cfsb.info)

October 23, 2024

**To:** The California Fish and Game Commission  
[fgc@fgc.ca.gov](mailto:fgc@fgc.ca.gov)

**Re:** November 6th, 2024 FGC MRC Meeting Agenda Item 2 - Marine protected area (MPA) regulation change petitions – Evaluation process

Dear Commissioners,

For over 40 years, The Commercial Fishermen of Santa Barbara (“CFSB”), a 501(c)3 non-profit organization, has been committed to making our local fishing community resilient and effective by providing healthy, high quality seafood to local and global markets, ensuring the economic and biological sustainability of fisheries, and maintaining California's fishing heritage. CFSB is a highly-respected organization within the California fishing community and represents the interests of a diverse set of vastly experienced fishermen, aquaculturists, and seafood processors and distributors who are leaders in the commercial fishing industry.

**This petition process should not be used for creating new MPAs or significant changes to the boundaries of MPAs.**

It is our stance that we categorically oppose the Marine Resources Committee (“MRC”) and Fish & Game Commission’s (“FGC”) usage of the petition process to expand existing Marine Protected Areas (“MPAs”) and create new MPAs. While the petition process is a reasonable adaptive management tool required by the Marine Life Protection Act, it should *not* be used to make the proposed significant changes to the existing MPA network due to a lack of: (1) scientific data, (2) clear and measurable goals and objectives, and (3) an effective and reasonable system for stakeholder engagement.

Please recognize the devastating amount of spatial loss that our commercial fishing fleet has already endured in past years *and* all the newly proposed spatial take on the horizon. California has one of the most comprehensive MPA networks in the US, with 124 designated protected areas and 16% of waters closed. Furthermore, there are many other large areas off limits to our state’s largest fisheries, such as Rock Cod Conservation Areas, whale entanglement prevention zones, no-trawl zones, and massive spatial closures to gillnet



fisheries. There are additionally many de-facto fishing closures currently and imminently coming from: oil and gas leases, military uses, shipping lanes, offshore wind, aquaculture, wave energy, and the 30x30 Initiative. Rocket launch frequency at Vandenberg has rapidly increased, such that a large area is closed to fishing for over two months out of the year (72+ days). At the same time, California has lost two thirds of its active fishing boats over the past 30 years. California fisheries management is successful and effective. The net result of all of these factors is that there are no overfished marine species in California, and many fish populations are increasing in abundance, such as many key groundfish species.

**The science of MPAs is not being properly applied nor evaluated in context, violating the MLPA.**

The first goal of the Marine Life Protection Act (“MLPA”) states that MPAs must, “Protect the natural diversity and abundance of marine life, and the structure, function and integrity of marine ecosystems,” and the fifth rule states that MPAs must, “Ensure California’s MPAs have clearly defined objectives, effective management measures and adequate enforcement and are based on sound scientific guidelines.” Adding to California’s MPA network must be done with a scientific process, not a haphazard undefined one such as the petition process. It must also consider the many de-facto MPAs and the success of fisheries regulations in protecting biodiversity without new MPAs. These factors make it far from clear that adding new MPAs will achieve any measurable enhancement in marine biodiversity or climate change resilience.

In fact, adding new MPAs may unintentionally hurt the large-scale coastal marine ecosystem’s resilience to climate change if the effects of new closures on fishing behavior and ecosystems outside of MPAs are not considered. The health and functioning of the ecosystem at the regional scale is far more relevant to climate resilience than the local scale. Renowned fisheries scientist Ray Hilborn asks the important question, “If the MPAs show more stability because fishing effort was removed, would we not expect the reference sites to show less stability because fishing efforts increased there?” But this is not the case. A net positive impact of new MPAs on biodiversity and/or climate resilience should be demonstrated at the regional scale, not just within the bounds of the MPAs, with new, peer-reviewed scientific models that consider the de-facto no-fishing zones that currently exist and the impacts to spatial patterns of fishing pressure before approving more MPAs.



In the July 2024 MRC FGC Meeting, Commissioner Murray stated that, “MPAs are not fisheries management tools,” and that “They’re not going to launch new monitoring projects to help this process.” She emphasized that her “Current questions are about the data they already have,” and stated that essentially there will not be any opportunities to collect new data when evaluating these petitions. Not investing in efforts to collect sound scientific data given the vast implications of such proposed new/expanded MPAs is a violation of the fifth rule of the MLPA. Relying on stale data, and a process without a clearly defined role for science is an irresponsible way to evaluate any controversial initiative, especially when evaluating these disputed petitions that have the potential to substantially change people’s lives for the worse and threaten collapse of our working waterfronts.

Section 2861 (a) of the MLPA states that “The commission shall, annually until the master plan is adopted and thereafter at least every three years, receive, consider, and promptly act upon petitions from any interested party, to add, delete, or modify MPAs, *favoring those petitions that are compatible with the goals and guidelines of this chapter.*” Goal number two of the MLPA states that MPAs must “Help sustain, conserve and protect marine life populations, ***including those of economic value,*** and rebuild those that are depleted.” It is impossible to comply with this regulation without scientific evaluation and clear metrics.

**The rationale of adding new no-take MPAs to increase climate resilience is faulty and unclear.**

There is a great deal of controversy around the theory that MPAs protect us from the effects of climate change. An MPA has not been proven to keep water cooler, nor has it been proven to lower the acidity of water, or even prevent or reverse urchin barrens. Furthermore, MPAs do not prohibit any land or air-based pollution sources. As we have seen on the North Coast of CA, the kelp populations have severely diminished and there exists now an ecological upheaval from purple urchins invasions inside and outside of MPAs. In fact MPA regulations make it hard to implement active habitat restoration to help increase kelp density and abundance. Without sound science to back it up, it is inappropriate to characterize expanding the MPA network as a means to buffer the effects of climate change.

If anything, more MPAs will only increase our carbon footprint by being more dependent as a society on foreign-caught/farmed seafood due to the damage to our local commercial fisheries. The demand for seafood has only increased in recent years and if our communities are not able to access seafood harvested by our local commercial fishermen, people will still buy seafood,



they will just be forced to buy it from unknown sources with unknown environmental/human rights regulations from unknown distances. This is the wrong direction for our society to go.

**This process flies in the face of the FGC's new Coastal Fishing Communities policy.**

The FGC recently adopted a new Coastal Fishing Communities (CFC) policy that states "Coastal fishing communities are facing unprecedented and dynamic challenges that strain and disrupt their social and economic fabric...The challenges coastal fishing communities face pose a significant threat to their sustained existence." It is tragic that the Commission followed this achievement with a direct assault on the fishing community. This totally chaotic petition process has drastically increased the strain on the fishing community to engage and fight to protect the survival of our State's working waterfronts.

The tenants of the CFC policy must be applied when evaluating new and potentially expanding MPAs. Scientific analysis of socio-economic impacts of any new or expanded MPAs on the commercial and recreational fishing industries must be found to be compatible with the CFC policy. Adding more closures to fishing grounds only further fractures our fleets' ability to provide for their families. There are few commercial fishermen remaining in the State of CA and those that are left have already been subjected to extreme regulations and spatial loss. Not to mention introducing more closures has a compounding ripple effect on the job security of processors, wholesalers, food establishments, and more. It also impacts the food security of all who individually consume locally harvested seafood.

**This petition process is bad governance.**

This petition process is not to be used for a 30x30 agenda, according to the Fish and Game Commission's official position. Having the 30x30 process going on concurrently with this new, untested and unclear petition process is especially crippling for the fishing community and it leads to confusion, bad governance and waste of government resources. Note Commissioner Murray's quote in the July 2024 MRC meeting that "we are making this up as we go along." Having two separate initiatives, one driven by The Ocean Protection Council ("OPC") 30x30, and another driven by the MRC/FGC with the petition process, is an example of the State making a mistake by pursuing two separate, essentially MPA, initiatives, made more crippling for us as small-scale fishermen who are already facing established area loss proposals from the numerous aforementioned factors.





From an enforcement perspective, the California Department of Fish and Wildlife (“CDFW”) is currently inundated with the work associated with just entertaining the challenges of analyzing the efficacy of new or expanded MPAs. The question of how CDFW’s bandwidth will abruptly expand to be able to regulate and sustain all the hypothetically new/expanded MPAs has yet to be addressed. The infrastructure to support the proposed substantial new/expanded MPAs and then monitor their efficacy does not seem to exist nor have we seen any potential plans or cost-benefit analysis to materialize such a shift in the current framework should that become necessary. Nor has there been an effort to clearly articulate measurable goals tied to their establishment.

The entire petition process has complicated this landscape to a ridiculous degree when the topic of MPAs and other state-wide conservation initiatives are wildly complicated to begin with. Two state fisheries with gear types widely regarded as most threatening to biodiversity, trawling and set gillnets, were recently reviewed for their actual impacts to biodiversity. The scientific analysis of the set gill net and halibut trawl fisheries bycatch impacts were determined to be insignificant in relation to biodiversity and habitat impacts. Fisheries management measures have been effective in mitigating biodiversity impacts of our fisheries. Trawl grounds and set net grounds were severely reduced and are closely monitored. This is an example of how well-founded scientific data collection steered the FGC and CDFW in the direction of effective and science-based conservation decisions.

In conclusion, we ask the FGC to please seriously consider our rational, sound and evidence-based arguments for curtailing and revising the dysfunctional and unscientific MPA Petition Process that is unfolding. We ask that there be rigorously comprehensive justifications provided to the public before any expansion/introductory MPA petitions are approved. The implications of this petition process on the Santa Barbara commercial fishing industry and all CA commercial fishing fleets along with our subsequent consumers/beneficiaries are, in short, insidious.

Thank you for your time and consideration,

Chris Voss  
President, CFSB

Kim Selkoe, Ph.D.  
Executive Director, CFSB

Ava Schulenberg  
Assistant Director, CFS

**From:** Kim Selkoe <[REDACTED]>

**Sent:** Thursday, October 24, 2024 02:49 PM

**To:** FGC <FGC@fgc.ca.gov>

**Cc:** [REDACTED] <[REDACTED]>

**Subject:** Written Comment from Get Hooked Seafood

Dear Fish and Game Commission,

Please find attached written comments from Get Hooked Seafood about the MPA Petition process in advance of the upcoming MRC meeting.

Thank you,

Kim Selkoe

--

Kim Selkoe

~~~~~

Founder & CEO

Get Hooked Seafood

[REDACTED]

[REDACTED]



GET HOOKED

Date: 10/24/2024

From:
Kimberly Selkoe, CEO
Get Hooked Seafood LLC



Dear Fish and Game Commissioners,

Get Hooked Seafood is a Community Supported Fishery program with a mission to support the public's access to local and sustainable seafood, and to add resilience to our fishing community and local food systems. We have operated since 2018 and have recently expanded to service not just households and restaurants but school districts and food banks. In addition, we are turning fish scraps into soil amendments that build soil health, sink carbon and reduce ocean pollution.

We stand with our fishing community in protesting the use of the MPA petition process to allow the proposal and consideration of new no-take MPAs. Our fisheries are a world leader in sustainable management and our MPA network covers a larger percentage of state waters and fishing grounds than what has been achieved in the vast majority of other US states. Our marine fish stocks are flourishing and none are experiencing overfishing. At the same time, our fishing communities are struggling to persist, and the number of fishing families is dwindling.

Taking away more fishing grounds will not protect us from climate change and will not reduce our contribution to climate change. In fact, it will increase our contribution to climate change because more seafood will need to be imported and marine ecosystems in other parts of the world where fisheries management is not effective will suffer.

The survival of Get Hooked Seafood and the access to healthy sustainable seafood that we provide to thousands of Californians is directly threatened by taking away fishing grounds and accelerating the attrition of our environmentally-friendly fishing fleets.

The MPA Petition process is deeply flawed and non-transparent. There is no science framework to it, and highly inadequate stakeholder engagement. It is a waste of state resources and the public's time and energy to evaluate every possible petition that any individual or group chooses to submit. The majority of the petitions are a distraction from solving major pressing problems for our environment and our health and wellbeing.

This process is pitting the fishing community against both the environmental community and the native nations communities which will destroy our ability to come together and address real climate issues.

Please pause the petition process to redesign it and get public input on the redesigned petition process. We need a just, equitable, transparent, science-driven and fiscally responsible process to move forward.

Thank you,



Kimberly Selkoe

CEO

Get Hooked Seafood LLC



Victoria Voss,

COO

Get Hooked Seafood LLC

From: miles wallace <[REDACTED]>

Sent: Thursday, October 24, 2024 03:20 PM

To: FGC <FGC@fgc.ca.gov>

Subject: Nov. 6 2024 FGC MRC meeting

Good afternoon,

Thank you for taking the time to read my submission.

Miles Wallace



Miles Wallace
Owner, Open Ocean Seafood

October 23, 2024

TO: The California Fish and Game Commission
Attn: fgc@fgc.ca.gov
715 P Street, 16th Fl.
Sacramento, CA, 95814

RE: November 6th, 2024 FGC MRC Meeting Agenda Item 2 - Marine protected area (MPA) regulation change petitions – Evaluation process

For over 25 years, The California Lobster & Trap Fishermen’s Association (“CLTFA”), a 501(c)3 non-profit organization, has been established as a corporation to aid, encourage, and promote activities and affairs that maintain the populations of the California Spiny Lobster species and other kinds of fish and crustaceans off the coast and islands of the State of California. CLTFA has continued to maintain levels of maximum sustained yields, to aid, encourage, and promote activities and affairs that further the goal of viable and equitable access to such living marine resources by commercial fishermen licensed by the State of California. As a well-respected organization within the California fishing community, it represents the interests of vastly experienced trap fishermen from a variety of regions, from Point Conception to San Diego. It is our stance that we vehemently oppose the Marine Resources Committee (“MRC”) and Fish & Game Commission’s (“FGC”) usage of the petition process to expand existing Marine Protected Areas (“MPAs”) and create new MPAs. While the petition process is a reasonable adaptive management tool required by the Marine Life Protection Act, it should *not* be used to make the proposed significant changes to the existing MPA network due to a lack of scientific data and stakeholder engagement.

We ask that you please recognize the devastating amount of spatial loss that our commercial fishing fleet has already endured in past years and all the newly proposed

spatial take on the horizon. Currently, fishing communities along the California coast are faced with significant area loss associated with offshore wind, aquaculture, wave energy, and the 30x30 Initiative. Additionally, anticipated aggressive spatial and temporal closure, such as Rock Cod Conservation Areas, whale entanglement prevention zones, and Elon Musk's SpaceX rocket launch initiatives, would ban fishing in the surrounding offshore areas of the Vandenberg Base over two months out of the year (72+ days). Sixteen percent of highly valuable marine habitats are already closed in the State of California, with no sign of that figure decreasing any time soon. Adding more closures to fishing grounds only further fractures our fleets' ability to do their job and provide for their families. Introducing more closures has a compounding ripple effect on the job security of processors, wholesalers, food establishments, and families. Moreover, it also impacts the food security of all who individually consume locally harvested seafood.

The first goal of the Marine Life Protection Act ("MLPA") states that MPAs must, "Protect the natural diversity and abundance of marine life, and the structure, function and integrity of marine ecosystems," and the fifth rule states that MPAs must, "Ensure California's MPAs have clearly defined objectives, effective management measures and adequate enforcement and are based on sound scientific guidelines." According to renowned scientist Ray Hilborn's recent [article](#), there is no scientific evidence to prove that MPAs promote biodiversity any more than in an unprotected area. He asks the important question, "If the MPAs show more stability because fishing effort was removed, would we not expect the reference sites to show less stability because fishing efforts increased there?" In the July 2024 MRC FGC Meeting, Commissioner Murray stated that, "MPAs are not fisheries management tools," and that "they're not going to launch new monitoring projects to help this process." Commissioner Murray emphasized that her "current questions are about the data they already have," and stated that essentially there will not be any opportunities to collect new data when evaluating these petitions. Not investing in efforts to collect sound scientific data given the vast implications of such proposed new/expanded MPAs is a violation of the fifth rule of the MLPA. Relying on stale data, and an immense lack of scientific data in general, especially in an environment as hostile as the ocean, is not only irresponsible, but not the fair way to evaluate any controversial initiative, especially when evaluating these disputed petitions that have the potential to drastically change people's lives for the worse.

Section 2861 (a) of the MLPA states that "the commission shall, annually until the master plan is adopted and thereafter at least every three years, receive, consider, and promptly act upon petitions from any interested party, to add, delete, or modify MPAs, favoring those petitions that are compatible with the goals and guidelines of this chapter." Goal number two of the MLPA states that MPAs must "help sustain, conserve and protect marine life populations, including those of economic value, and rebuild those that are depleted." If the Commission approves and implements petitions that aim

to expand/introduce new MPAs and our ability to fish in more areas is severed, marine populations of economic value *may* be more conserved (though this has not been scientifically proven), but there is no economic value to populations unharvested? The goal of specifically protecting marine populations of economic value would become a moot point.

With regard to the 30x30 Initiative, it is crucial for us as community organizers and commercial fishermen, to have two separate processes with the same objective (30x30 Initiative and the petition process). If we can eliminate the ability to close significant areas through the petition process and focus solely on the 30x30 Initiative, we would be able to concentrate our efforts to deal with that initiative, albeit one that is also designed to take massive fishing areas away from us, in a more reasonable fashion. Having two separate initiatives, one driven by The Ocean Protection Council (“OPC”) which is the 30x30 Initiative, and another driven by the MRC/FGC with the petition process, is an example of the State making a mistake by pursuing two separate, essentially MPA initiatives, creating intentional struggles for us as small-scale fishermen, who are already facing established area loss proposals from the numerous aforementioned factors.

Additionally, there is a great deal of controversy around the theory that MPAs protect us from the effects of climate change. An MPA has not been proven to keep water cooler, nor has it been proven to lower the acidity of water. Furthermore, MPAs do not prohibit any land or air-based pollution sources, if anything, they will only increase our carbon footprint by being more dependent on foreign-caught/farmed seafood due to our local commercial fishermen being zoned out by the introduction of the very initiative (new/expanded MPAs) designed to “help mitigate climate change” in the first place; The claims that more MPAs are going to build climate change resilience in the marine environment are not well grounded in legitimate science. As we have seen on the North Coast of CA, the kelp populations have severely diminished and there exists now this ecological upheaval of purple urchins dominating - This occurrence may be the result of climate change causing warmer water, but kelp die-offs are happening in *and* outside MPAs, so it’s inappropriate to characterize expanding the MPA network as a means to buffer the effects of climate change. We understand that MPAs cannot do everything and that we are not just looking at one single aspect of climate change - Kelp loss/marine heat waves are just an example. There are plenty of reasons to use and not use MPAs, but the demand for seafood has only increased in recent years and if our communities are not able to access seafood harvested by our local commercial fishermen, people will still buy seafood, they will just be forced to buy it from unknown sources with unknown environmental/human rights regulations from unknown distances traveled; This is not the direction our society should be going in, we urge the Commission to make decisions that steer us away from that path.

From an enforcement perspective, the California Department of Fish and Wildlife

("CDFW") is currently inundated with the work associated with just *entertaining* the challenges of analyzing the efficacy of new or expanded MPAs; The question of how CDFW's bandwidth will abruptly expand to be able to regulate and sustain all the hypothetically new/expanded MPAs has yet to be addressed. The infrastructure to support the proposed substantial new/expanded MPAs does not seem to exist nor have we seen any potential plans or cost-benefit analysis to materialize such a shift in the current framework should that become necessary.

The entire petition process has complicated this landscape to an unreasonable and unmanageable degree when the topic of MPAs and other state-wide conservation initiatives are wildly complicated to begin with. There are few commercial fishermen remaining in the State of CA, and those that are left have already been subjected to extreme regulations and spatial loss. We ask the FGC to please seriously consider how much we have to respond to and keep ourselves on top of just in order to keep our head above water and make a living fishing in an already extensively regulated space. The implications of this petition process on the CA commercial trap fisheries and all CA commercial fishing fleets, along with our subsequent consumers/beneficiaries, are profoundly insidious, and we therefore ask that there be rigorously comprehensive justifications provided to the public before any expansion/introductory MPA petitions are approved.

Thank you for your time and consideration.

Miles Wallace
Owner, Open Ocean Seafood

From: Matthew Bond [REDACTED]
Sent: Thursday, October 24, 2024 8:28 AM
To: fgc@fgc.ca.gov
Cc: Christopher Killen
Subject: Nov. 6th 2024 MRC Meeting Agenda Item 2 a&b Commnet.

Dear Members of the California Fish and Game Commission,

Thank you for the difficult work you are doing as volunteers to steward California's natural resources.

In light of some concerning comments and exchanges by Commissioners and Department leadership at recent Commission and MRC meetings about how MPA petitions may or may not be scientifically analyzed, which forum (full commission or MRC) should be used to discuss these petitions, and if petitioners should be allowed to modify their petitions (contrary to the normal petition process), we bring the Commission's attention to Section 2855 (a) of the MLPA, which called for the creation of a guiding document for the creation and implementation of the MLPA:

“The commission shall adopt a master plan that guides the adoption and implementation of the Marine Life Protection Program adopted pursuant to Section 2853 and **decisions regarding the siting of new MPAs and major modifications of existing MPAs.**”

In sending this passage to the Commission we hope to remind you that your group is a constitutional rule making body that was vested the authority to implement the MLPA. The Commission, through an extensive, science based, costly, and public process, adopted a network of MPAs and the guidance document for their management. The management document was adopted through your authority in August 2016 and is known as **the Master Plan for MPAs (Master Plan)**. This plan lays out clearly how any amendments to the network should be considered. If the Commission determines they need to change the adaptive process, they

have the authority to amend that plan through their deliberate process. We can find no mention in the Master Plan of an instance where the creation of a completely new process to consider MPAs, like the one you are following now, is authorized or even recommended.

It is our opinion that the choice to abandon the Master Plan and instead implement the ad hoc process you are currently following is directly contrary to the expectation the public has from your creation and adoption of the Master Plan. The aforementioned problematic comments by leadership are an example of the resulting confusion and lack of rigid guidance due to this choice. The Master Plan was specifically designed for this very situation. It calls for a science-based process, with clear funding mechanisms, and provides a very detailed description of how changes to MPAs must be approached. The following excerpt from the 2016 Master Plan, Appendix A, Page A-13 makes abundantly clear the creation of any new, or major modification to existing, MPAs is expected to follow the same process as the original MLPA:

“The MLPA also requires that MPAs be managed as a network, to the extent possible, implying a coordinated system of MPAs. MPAs might be linked through biological function, as in the case of adult and juvenile movement or larval transport. However, MPAs managed as a network might also be linked by administrative function. The important aspects of this interpretation are that MPAs are linked by common goals and a comprehensive management and monitoring plan, and that they protect areas with a wide variety of representative habitats as required by the MLPA. **MPAs in a network should be designed based on the same guiding principles, design criteria, and processes for implementation. In this case, a statewide network could be one that has connections through design, funding, process, and management. At a minimum, the Master Plan should insure that the statewide network of MPAs reflects a consistent approach to design, funding, and management.** The desired outcome would include components of both biological connectivity and administrative function to the extent that each are practicable and supported by available science.”

On July 28th, 2024 we sent a message to Executive Director Miller-Hensen and Director Bonham expressing serious concerns with the

decision by The Department and Commission to design a new process to evaluate the MLPA DMR related petitions before the Commission and ignore the policy mandates and very clear process guidance included in the Master Plan on how new, or major changes to existing, MPAs should be considered. Our July comment is included in its entirety below:

The MLPA, and the 2008 and 2016 Master Plans for Marine Protected Areas (Master Plans) lay out clear processes and public expectations for how decisions regarding the siting of new MPAs and major modifications of existing MPAs will be handled, with particular focus on the areas of stakeholder and tribal input, independent scientific and economic impact review, and the necessity of securing sufficient funding in MLPA related MPA creation and expansion. We feel many key tenets of these Commission adopted documents are being ignored.

There are numerous sections of directives contained in MLPA, and the 2008 and 2016 Master Plans which are not being followed because of what we are being told are budgetary/resource shortfalls. Instead of the robust, inclusive, objective, process promised in the MLPA, followed in the 2008 Master Plan, and delineated in the 2016 Master Plan, The Department and Commission have decided on a process which relies on only The Department's and their own subject matter expertise, admittedly has no dedicated funding source for both the mandated analysis, creation, implementation, management, outreach, education, monitoring, and enforcement of any new or expanded MPAs which may result, and only allows for public input leading up to or during Commission meetings.

We feel this approach to public comment and stakeholder engagement is particularly harmful. It only allows for a very select class to be able to participate. The vast majority of Californians have no idea this process is taking place. Of those who do, the chosen plan allows for input from only those privileged few who work for an entity with interest in the outcome of this process, or from those individuals whose economic or life circumstance allows them the luxury of time to either follow remotely and write public comment, or show up to a live meeting during the work week. At live meetings, comment is almost always limited to 90 seconds; not nearly enough time to express detailed and nuanced opinions and

concerns. Those vulnerable individuals and communities, who rely most on the health of our ocean and their local access to catch fish in order to feed their families, are mostly excluded by the current process. The only language being spoken at the commission meetings is English and we know of no outreach or education in an effort to include the voices in this already live process of communities that do not call English their native tongue.

The Commission and Department have publicly recognized shortcomings with the lack of inclusion of the Tribal Community and traditional knowledge in the first phase of the MLPA process. A lot of great work has been done by those agencies to avoid future harm to that very important and historically mistreated group in our marine ecosystems and fisheries management decisions. The addition of a new tribal liaison to The Commission team is a wonderful example of this commitment to justice and inclusion. But we fear the approach The Commission and Department are now taking toward stakeholder input has the potential to create the circumstance for other marginalized and unrecognized communities and people to be excluded from, and hurt by, the ultimate decisions around these petitions.

The adherence to the prescribed process The MLPA included for stakeholder participation, science and economic advisory panels, secured funding sources, and interagency cooperation, and their execution in the carrying out of the 2008 Master Plan established for the public at minimum a strong expectation, and likely an actual precedent, that a mostly identical process would be followed going forward, should new MPAs or major modifications to existing MPAs be considered.

A second but related concern is that there is an arbitrary haste in this petition review process which is absolutely counter to the importance of the task. It is dangerous to ignore the fine detail the drafters of the MLPA and Master Plans very purposefully gave us in how to design, implement, and adaptively manage the most successful MPA network in existence. In fact, the stakes are even higher now in our management of our marine environments as compared to when the MLPA was written and our network implemented. In light of what we now know about the potential ravages of climate change, marine heat waves, and a myriad of

other potential harm causing stressors to our marine ecosystem, we need to act with extreme care and be incredibly methodical in analyzing every aspect of management decisions. This critical work cannot be done properly without a sufficient budget and without as much time as it takes to do it right.

Department staff and Commission members both have repeated the sentence “we can’t (or don’t want to) do a “MLPA 2.0”” in public meetings. We again are told that this is because of lack of resources. It is very clear in the examples the two failed attempts to initiate the original MLPA provide us that proper funding is critical to the ultimate success of MPA projects. The MOU between our state and Resource Legacy Fund, which was the differentiator between the two failures and our current success, was so pivotal in its enablement of our network that the need to secure similar, sufficient, funding for new MPAs or expansions of existing MPAs has been enshrined as one of the core tenants of the 2016 Master Plan. This begs the question, if there isn’t now enough money or time to do this as prescribed in the MLPA and Master Plans, why aren’t these petitions tabled until proper resources can be allocated?

It is easily argued that California’s ocean and marine resources are both one of its most valuable attributes as well as one of its most complex and fragile. More than 20 years ago concerns of severe degradation and future risks facing these resources, voiced by leading environmental groups, scientists, members of the fishing community, and many other diverse stakeholder groups, the state legislature passed the MLPA and The Department, Commission and other state and private organizations dutifully and successfully implemented one of the most extensive marine conservation projects ever undertaken. The MLPA serves as a global model of exceptional marine conservation.

We now find ourselves with a warming climate and many unknowns with regard to the future health of our marine ecosystems. What the MLPA and Master Plans provide us in these challenging circumstances are proven methodologies to follow in the consideration of the use of MPAs as part of an overall ecosystem level protection strategy. To deviate from this guidance now, particularly in light of the aforementioned increased

risk factors and because of budgetary shortfalls, is not only shortsighted, but could result in tremendous wasted resources, loss of public support, and actual harm to our ocean and our state's population who depend on it for their health, recreation, nutrition, and income.

Because of these concerns and the provided rationale, we ask that you dismantle the current process you have adopted and replace it with the one prescribed in the MLPA, which resulted in the 2008 and 2016 Master Plans and which was followed to create and manage the amazing network of MPAs now off our coast. And further, if lack of dedicated funding and resources, as demanded in the 2016 Master Plan, are not allowing The Department and Commission to carry out the robust, objective, and inclusive review process of these petitions, we expect you to wait until the promised and proven process can be successfully carried out.

Respectfully,

Matt Bond
Allwaters PAC

From: CLTFA ██████████
Sent: Thursday, October 24, 2024 1:27 PM
To: fgc@fgc.ca.gov
Cc: Ray Kennedy
Subject: Written Public Comment Regarding November 6th FGC/MRC Meeting Agenda Item Number Two
Attachments: CLTFA FGC MRC 11_6 Meeting Written Public Comment Letter (signed).pdf

Dear Commissioners,

My name is Ava Schulenberg and I am a commercial fisherman from Santa Barbara, CA. I am also the Executive Director of the California Lobster & Trap Fishermen's Association - Please see our attached letter on agenda item two of the upcoming November 6th FGC/MRC meeting.

Thank you for your time spent reviewing our letter. Please confirm if it's been received.

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Kind Regards,
Ava Schulenberg
Assistant Director | [Commercial Fishermen of Santa Barbara \(CFSB\)](#)
Manager | [Saturday Fishermen's Market of Santa Barbara](#)
Executive Director | [CA Lobster & Trap Fishermen's Association](#)
Laboratory Assistant II | [CA Sea Grant](#)
Deckhand | F/V Drema
(805) 403-4811



California Lobster & Trap Fishermen's Association 315 Meigs Rd., STE A 279, Santa Barbara, CA 93109 <https://www.californialobstertrapfishermensassociation.org/>

October 23, 2024

To:

The California Fish and Game Commission
fgc@fgc.ca.gov

Re: November 6th, 2024 FGC MRC Meeting Agenda Item 2 - Marine Protected Area (MPA) regulation change petitions – Evaluation process

For over 25 years, the California Lobster & Trap Fishermen's Association (CLTFA), a 501(c)3 non-profit organization, has been established as a corporation to aid, encourage, and promote activities and affairs that maintain the populations of the California Spiny Lobster species and other kinds of fish and crustaceans off the coast and islands of the State of California at levels of maximum sustained yields, and to aid, encourage, and promote activities and affairs that further the goal of viable and equitable access to such living marine resources by commercial fishermen licensed by the State of California. CLTFA is a well-respected organization within the California fishing community and represents the interests of vastly experienced trap fishermen from a variety of regions from Point Conception to San Diego. It is our stance that we vehemently oppose the apparent process being used by the Fish and Game Commission (FGC) to amend the existing network of Marine Protected Areas (MPAs). It was our expectation that the 2016 Master Plan adopted by the FGC would guide the approval process for future modifications to the network of MPAs. Unfortunately, the FGC has apparently decided to abandon that guidance and instead has tried to shortcut that process through the Marine Resources Committee (MRC) and FGC usage of the petition process to expand existing MPAs and to create new MPAs. While the petition process is a reasonable adaptive management tool required by the Marine Life Protection Act, it should *not* be used to make the proposed significant changes to the existing MPA network simply because of insufficient funding and an unwillingness to spend the time needed to conduct the science and stakeholder engagement.

We ask that you please recognize the devastating amount of spatial loss that our commercial fishing fleet has already endured in past years *and* all the newly proposed spatial take on the horizon. Currently, California coastal fishing communities are faced with significant area loss associated with offshore wind, aquaculture, wave energy, and the 30x30 Initiative. There are also aggressive proposed spatial and temporal closures such as Rock Cod Conservation Areas, whale entanglement prevention zones, and Elon Musk's SpaceX rocket launch initiatives which would ban fishing in the surrounding offshore areas of the Vandenberg Base over two months out of the year (72+ days). Sixteen percent of highly valuable marine habitats are already closed in the State of California, with no sign of that figure decreasing any



time soon. Adding more closures to fishing grounds only further fractures our fleets' ability to do their job and provide for their families. Not to mention that introducing more closures has a compounding ripple effect on the job security of processors, wholesalers, food establishments, and more, and also impacts the food security of all who individually consume locally harvested seafood.

The first goal of the Marine Life Protection Act (MLPA) states that MPAs must "Protect the natural diversity and abundance of marine life, and the structure, function and integrity of marine ecosystems," and the fifth rule states that MPAs must "Ensure California's MPAs have clearly defined objectives, effective management measures and adequate enforcement and are based on sound scientific guidelines" According to a recent [article](#) by renowned scientist Ray Hilborn, there is no scientific evidence to prove that MPAs promote biodiversity any more than in an area under modern fishery management. He asks the important question, "If the MPAs show more stability because fishing effort was removed, would we not expect the reference sites to show less stability because fishing efforts increased there?" In the July 2024 MRC FGC meeting, Commissioner Murray stated "MPAs are not fisheries management tools" and "They're not going to launch new monitoring projects to help this process." Commissioner Murray emphasized that her "Current questions are about the data they already have" and stated that essentially there will not be any opportunities to collect new data when evaluating these petitions. Not investing in efforts to collect sound scientific data given the vast implications of such proposed new/expanded MPAs is a violation of the fifth rule of the MLPA and the Master Plan the FGC adopted to guide this very effort. Relying on stale data, and a massive lack of scientific data in general, especially in an environment as hostile as the ocean, is an irresponsible way to evaluate any controversial initiative, especially when evaluating these disputed petitions that have the potential to drastically change people's lives for the worse.

Section 2861 (a) of the MLPA states "The commission shall, annually until the master plan is adopted and thereafter at least every three years, receive, consider, and promptly act upon petitions from any interested party, to add, delete, or modify MPAs, *favoring those petitions that are compatible with the goals and guidelines of this chapter.*" Goal number two of the MLPA states that MPAs must "Help sustain, conserve and protect marine life populations, including those of economic value, and rebuild those that are depleted." If the Commission approves and implements petitions that aim to expand/introduce new MPAs and our ability to fish is eliminated in more areas, marine *populations* of economic value *may* be more conserved (though this has not been scientifically proven), but the economic value of those unharvested populations will be unrealized. The goal of specifically protecting marine populations of economic value would become a moot point.

It is confounding for us as community organizers and commercial fishermen to have two separate processes (the Ocean Protection Council 30x30 initiative and the current FGC MPA petition process) with the same basic objective. It is unreasonable for the State to be conducting these two processes simultaneously, unless the State is seeking to divide and confuse those trying



to engage in an effort to protect access to the public's sustainable natural resources. By pursuing two separate, essentially MPA, initiatives, the State is making participation more difficult for us as small-scale fishermen who are already facing established area loss proposals from the numerous aforementioned factors. This is an insensitive effort that leads to exclusion, inequity, injustice, and a lack of diversity in the decision-making process.

An example of our concerns over this apparent rush to add and expand MPAs is the justification that they will help protect our coastal ecosystems from the effects of climate change. The claims that more MPAs are going to build climate change resilience in the marine environment are not well grounded in legitimate science. As we have seen on California's North Coast, the kelp populations have severely declined, which has resulted in an ecosystem dominated by purple urchins. This occurrence may be the result of climate change causing warmer water, but kelp die-offs are happening in *and* outside MPAs, which suggests that expanding the MPA network is unlikely to buffer even this one possible effect of climate change. Moreover, we have not seen the science demonstrating that MPAs will alter any of the larger climate change issues, such as lowering the temperature and acidity of the marine environment.. Furthermore, MPAs do not prohibit any land- or air-based pollution sources; If anything, they will only increase our carbon footprint by increasing our dependence on foreign-caught/farmed seafood as local commercial fishing activities are restricted by new/expanded MPAs adopted under the very initiative designed to "help mitigate climate change.

We understand that MPAs are not expected to address every aspect of climate change, kelp loss/marine heat waves are just an example. There are multiple factors to consider when adopting or not adopting MPAs; However, it should be recognized that the demand for seafood has only increased in recent years. If our communities are not able to access seafood harvested by our local commercial fishermen, they will instead be forced to buy it from distant sources with unknown environmental/human rights regulations from unknown distances traveled. This only increases the carbon footprint of the product and is contrarian to the current emphasis in society to "buy local." We urge the Commission to make decisions that steer us away from that path.

From an enforcement perspective, the California Department of Fish and Wildlife (CDFW) is currently inundated with the work associated with just *entertaining* the challenges of analyzing the efficacy of new or expanded MPAs, the question of how CDFW's bandwidth will abruptly expand to be able to regulate and sustain all the hypothetically new/expanded MPAs has yet to be addressed. The infrastructure to support the proposed substantial new/expanded MPAs does not seem to exist nor have we seen any potential plans or cost-benefit analysis to support such an expansion should that become necessary.

The topic of MPAs and other statewide conservation initiatives was convoluted to begin with, and the entire petition process has now complicated this regulatory landscape to a ridiculous degree. There are few commercial fishermen remaining in California and those that



are left have already been subjected to extreme regulations and spatial loss. We ask the FGC to please seriously consider how much our industry must address and monitor just to keep our head above water and make a living fishing in an already extensively regulated space. The implications of this petition process on the California commercial trap fisheries and all California commercial fishing fleets, along with our subsequent consumers/beneficiaries, are profoundly insidious. We therefore ask that the process outlined in the 2016 Master Plan be followed and that the scientific and stakeholder engagement be extensive and thorough. The costs/benefits of any changes must be well documented and understood so that you as decision-makers can be confident of making wise, effective, and just decisions for the future of California and all its citizens.

Thank you for your time and consideration.

A handwritten signature in black ink, appearing to read "AS", written in a cursive style.

Ava Schulenberg
Executive Director, CLTFA

A handwritten signature in black ink, appearing to read "Ray", written in a cursive style.

Ray Kennedy
President, CLTFA

From: Ava Schulenberg <[REDACTED]>

Sent: Thursday, October 24, 2024 04:45 PM

To: FGC <FGC@fgc.ca.gov>

Cc: Ava Schulenberg <[REDACTED]>

Subject: Written Public Comment Regarding November 6th FGC/MRC Meeting Agenda Item Number Two

Dear Commissioners,

My name is Ava Schulenberg and I am a commercial fisherman from Santa Barbara, CA. Please see my attached letter on agenda item two of the upcoming November 6th FGC/MRC meeting.

Thank you for your time spent reviewing our letter. Please confirm if it's been received.

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Kind Regards,

Ava Schulenberg

Assistant Director | [Commercial Fishermen of Santa Barbara \(CFSB\)](#)

Manager, [Saturday Fishermen's Market of Santa Barbara](#)

Secretary, [CA Lobster & Trap Fishermen's Association](#)

Deckhand F/V Never Satisfied

[REDACTED]

October 24, 2024

To: The California Fish and Game Commission, fgc@fgc.ca.gov

Re: November 6th, 2024 FGC MRC Meeting Agenda Item 2 - Marine Protected Area (MPA) regulation change petitions – Evaluation process

Dear Commissioners,

My name is Ava Schulenberg and I am a 28 year-old second-generation commercial fisherman from Santa Barbara, California. I have a degree in Environmental Studies and Philosophy from Tulane University, and in addition to crewing on various fishing vessels (I primarily have fished for Spiny Lobster, Rock Crab, Halibut, and Rockfish), I work for the Commercial Fishermen of Santa Barbara Association and the California Lobster & Trap Fishermen's Association, both of which are 501(c)3 non-profit organizations. I do contracted projects with California Sea Grant as well, and crew as a stewardess on charter boats in any spare time I have. I am a proud daughter of a lifelong commercial fisherman and am grateful to have been raised in the Santa Barbara harbor where the importance of local food production was instilled in me from a young age.

I will not duplicate here what I have submitted in other letters on behalf of the organizations I work for, I instead am submitting this additional letter to speak to the emotional impact these closures would have should they come to fruition.

Of all my jobs, being a deckhand is by far the most rewarding. As you all likely know, commercial fishing is a wonderful, dangerous, exhilarating, and fulfilling job that transcends most occupational norms to say the least. It is a job that humbles you and keeps you on your toes; You are invariably at the mercy of the weather and Mother Nature is your one true boss. Commercial fishing is a great equalizer - Our fleet is comprised of people with different socio-economic backgrounds, religions, educations, ethnicities... but on the water we are all the same. This industry represents a craft that has been handed down to us through hundreds of generations, and it's a craft that will hopefully be here long after we are gone because of our actions now.

With that said, this petition process has been exceptionally threatening to our industry's future and devastatingly debilitating to us as a fleet. As you all know, fishermen are not paid for anything other than fishing and landing product. Yet the level of advocacy that has been required for this treacherous fight on top of all the other opposing forces we face (30x30, aquaculture, offshore wind, SpaceX, to name a few) has been enormous and often impossible given that fishermen are at the mercy of the weather and often do not have reception to be able to chime into important meetings. From the advocacy efforts we have been able to perform, we have voiced our respect for the beautiful environment we are fortunate to work in, and we have reminded our community and all stakeholders that as fishermen/ocean harvesters, we care a great deal about the wellbeing of the planet and our local habitats. Commercial Fishermen are largely a misunderstood group - Speaking to Santa Barbara's fleet specifically, the vast majority are

extremely hard-working, conscientious individuals who make a living by working *with* the environment and think and act in three dimensions in order to make do. At the end of the day, feeding people healthy, sustainably caught seafood is the most important element of the job that drives us, and the ability for us to do that hinges substantially on our access to healthy fishing grounds.

Moreover, I have yet to see an independent, comprehensive study that exhibits data that justifies the expansion and/or introduction of new Marine Protected Areas. Show us the science in absolute terms, and *then* force us to lose more areas (which would be devastating, but at least would be backed by proof), but to even *entertain* the proposed spatial loss put forth by some of the Bin 2 petitions without proper scientific evidence and stakeholder engagement is ludicrous and a neglectful, offensive assault on all commercial fishermen, who, as you know, are axiomatically the people who spend the most time on the ocean and in the areas being potentially subjected to restriction.

Surely you have all been told this several times, but I want to again underscore the fact that commercial fishing is more than just a job to us, it is everything. It is the heartbeat of our livelihoods and our passions and it is a way of life that we will do anything to preserve. We work seven days a week and commute on an erratic freeway that changes every night. There are no “days off” - Any time spent not fishing leads a fisherman’s mind to the same questions: What is the weather doing? Is the gear ok? What is the market doing? Do I need bait? Do I need fuel? Is anything wrong with the boat? The list goes on... It is so rare that you come across individuals that exhibit this level of sweeping dedication to their careers. Therefore it would be in the best interest of all Californians if our Fish and Game Commission and regulatory agencies held our industry in a higher regard, because if statewide/domestic commercial fishing activity becomes more scarce, our society will become forcibly dependent on imported/farmed seafood, thereby drastically increasing our carbon footprint. The demand for seafood has only increased in recent years and if our communities are not able to access seafood harvested by our local commercial fishermen, people will still buy seafood, they will just be buying it from unknown sources with unknown environmental/human rights regulations from unknown distances traveled.

From a personal perspective, growing up with a dad who was a commercial fisherman was something of a dream. There is no influence that has been more significant in my life than the time I spent working with him and being embraced by the special fishing community that the Santa Barbara Harbor holds. My dad passed when I was 12, but the lessons he impressed upon me drive me to this day; Some of which include the fact that working with mother nature is one of the most difficult yet illuminating jobs in the world, you must always treat the environment with the utmost gratitude and respect, consuming locally sourced food is paramount to the planet’s health and your personal health, you must be there for your comrades implicitly, and my favorite pearl of wisdom he shared is, that when we are out fishing, we are able to deeply appreciate and acquaint ourselves with the world in which we came from. There is something really beautiful about that - I take pride in knowing that most of the gear we use has been used for centuries, and the areas we fish are sacred and prehistoric; We are connected to eras that no longer exist, yet it is still our reality.

As I touched upon earlier, commercial fishing humbles you in ways you cannot imagine unless you have done the job, and there has never been a more important time to build consistent touchpoints into our lives that do that... touchpoints that bring us back to Earth and remind us that we are small, but the impact our work has on the wellbeing of others is still profound. The collective wealth of knowledge held by all California commercial fishing fleets is precious and something that ought to be approached with a goal of perpetuation, not inhibition; Once it is gone, it is gone for good.

In case it has not yet been evident, the goal of keeping commercial fishing alive has been the throughline of my life, and it would be heart-breaking to see family legacies end due to an unviable industry for future generations to be a part of... An unviable industry caused by fleets being zoned out until there are so few remaining areas left to fish that it becomes impossible due to more MPAs on top of the aforementioned spatial threats.

All this to say, *please* consider investing in more legitimate scientific research pertaining to each expansion/introductory MPA petition in Bin 2 before initiating the evaluation process. California is already home to some of the most regulated fisheries in the world, and losing more fishing grounds backed by unfounded justifications would be a crime against history, all commercial fishermen, all of our subsequent consumers and beneficiaries, and all citizens of the State of California. When we look back, I hope that this period of impending change will show an outcome that is well-grounded in science, and enables small-scale food producers like California's commercial fishermen to thrive and persist for generations to come.

Thank you for your time and consideration.



Ava Schulenberg
Assistant Director | [Commercial Fishermen of Santa Barbara \(CFSB\)](#)
Manager | [Saturday Fishermen's Market of Santa Barbara](#)
Executive Director | [CA Lobster & Trap Fishermen's Association](#)
Laboratory Assistant II | [CA Sea Grant](#)
Deckhand
E: [REDACTED]
P: [REDACTED]

Exhibit 19

Agenda Item 2, Marine Protected Areas Petitions Evaluation

Received by the California Fish and Game Commission for the November 6-7, 2024
Marine Resources Committee Meeting

List of Public Comments and Attachments

1. [Email from Chris Killen, All Waters PAC](#), transmitting op ed from Dr. Ray Hillborn, Professor, posted online at Santa Barbara Independent, and an article by Dr. Jason Johns, Conservation Scientist, posted to sbfreedivers.com, received October 9, 2024
2. [Email from Bill Shed, CCA California](#), transmitting two attachments: Op ed from Dr. Ray Hillborn, Professor, posted online at Santa Barbara Independent (see comment 1), received 10/22/24
3. [Email from Bill Shed, CCA California](#), transmitting two journal articles: Ceccarelli et al, 2024, and Hopf et al, 2024.

From: Christopher Killen <[REDACTED]>

Sent: Wednesday, October 9, 2024 11:50 AM

To: [REDACTED]; Ashcraft, Susan@FGC

<[REDACTED]>; [REDACTED]; FGC

<FGC@fgc.ca.gov>; [REDACTED]; [REDACTED]

Cc: [REDACTED]

Subject: A few recent papers about the effectiveness of MPA's

Hi all,

I hope my messages find you all well and good.

Attached is a collection of papers for your review as we continue in our efforts to pull together data and science around MPAs.

The first, which I'm assuming you have all seen by now, is from Ray Hilborn; a Professor in the School of Aquatic and Fishery Sciences at the University of Washington and served on the Science Advisory Team for 2 of the 4 regions during MLPA planning. He has been awarded the World Fisheries Science Prize and the Volvo Environmental Prize.

The second is from Jason Johns, a PHD out of Santa Barbara who founded One People One Reef.

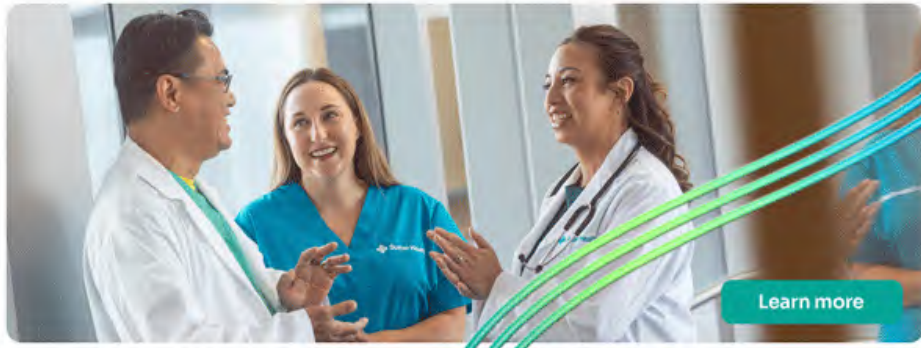
Post-Doctoral Fellow

- Post-doctoral fellow with OPOR; using genomic tools to understand connectivity between the islands of Ulithi
- PhD in Ecology, Evolution, and Marine Biology, University of California Santa Barbara, September 2023
- Jason is interested in coupling vast indigenous knowledge earned over time with modern tools to better understand the management of ecosystems and natural resources.
- Jason has spent most of his life in the ocean surfing, fishing, and free diving, but is beginning his professional marine science career with OPOR, as his background is in plant biology and genetics. He is looking forward to blending his love for the ocean and learning from people from different parts of the world with his love for doing science.

Would love to know your thoughts!

Respectfully,

Chris



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on your team.

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Show Me the Benefits

10 Years in, What Have Marine Protected Areas Accomplished?



By **Ray Hilborn**

Tue Oct 01, 2024 | 4:49pm



More fish, more sustainable fisheries, and an ecosystem better protected from threats was the promise of the Marine Life Protection Act (MLPA) and the 124 MPAs now in place in California. Ten years on, what have they accomplished? The recently completed 10-year review by the California Department of Fish and Wildlife, as well as numerous scientific papers, suggest that our hopes were misplaced. The review concludes “statewide and regional trends across habitats showed no difference in biodiversity inside compared to outside MPAs.” As to the very real threats to California’s coastal ecosystems, climate change and recent marine heat waves, the review is decidedly not sanguine “analysis across habitats in the central coast revealed that MPAs did not provide strong resilience against the marine heatwave.” Ouch! Finally, there is not even evidence that there are any more fish in California state waters now, except for some of the areas that are closed to fishing. The only study to look at whether there were more fish overall suggests that the answer is no. Where fishing is intense, there are definitely more fish inside the closed area, but the fishing boats simply moved outside the boundary and caught them there.

The structure of the 10-year review alone squashes any expectations that the MPAs might be protecting our ocean from any threats. The review devotes 9 pages to governance and partnerships, 22 pages to research, 15 pages to outreach and education, and 14 pages to enforcement. A paltry 4 pages deal with how marine species have changed, and another 4 pages deal with climate resilience. The blatant absence of “good news” is spun into research, public engagement and enforcement as if those had been the goals the MPAs were meant to achieve.

Unsurprisingly, the only threat the MPAs do address is overfishing, and that is not a problem in state waters. The Marine Life Protection Act was conceived and implemented at a time of serious concerns about declines in many rockfish species in federal waters, but are not the focus of fisheries in state waters and are rarely found there. One should not

expect major benefits from no-fishing zones when there is no overfishing to begin with.

Make no mistake, California coastal ecosystems face many threats. These include climate change related warming, ocean acidification, storm severity and sea level rise. Moreover, the coasts face a wide range of terrestrial impacts from coastal development, sedimentation, land based runoff of sediments and pollutants, and water diversions. New exotic species and diseases have arrived, and ship traffic is increasing. California's MPA network provides no protection from any of these threats, and yet the MPA advocates are still claiming to have protected the ocean.

The Marine Life Protection Act was born in a research network of academics who formed a group call PISCO that published a report called "The Science of Marine Reserves" in 2007. The opening paragraph states "fish, shellfish, and other species are declining in many places. The changes are impairing the ocean's capacity to provide food, protect livelihoods, maintain water quality, and recover from environmental stress." Whatever happened to food and livelihoods? There is not a whisper or mention of those in the 10-year review.

Does California need even more marine reserves? The public should demand to know what the objectives are, how success is measured, what perceived threats are being addressed, and would the funds be better spent to address the real threats to California's coastal ecosystems. In a pinch, we could say that MPAs to some extent restrict fishing. But wait, we already have an agency that does that, the California Department of Fish and Wildlife (CDFW). Perhaps funding to implement more MPAs should be redirected to CDFW to do its job even better? Perhaps more importantly, the funds could be used to better regulate terrestrial impacts on the coastal ecosystem.

Ray Hilborn is a professor in the School of Aquatic and Fishery Sciences at the University of Washington and served on the Science Advisory Team during MLPA planning for Santa Barbara reserves. He has been awarded the World Fisheries Science Prize and the Volvo Environmental Prize.

Source: <https://sbfreedivers.com/news/a-petition-to-expand-california-marine-protected-areas-contradicts-science-and-itself/>

A Petition To Expand California Marine Protected Areas Contradicts Science And Itself

By Jason Johns, Conservation Scientist

Marine Management and Conservation

Conservation is a critical tool in maintaining the health of our ocean ecosystems. The kelp forests of California are important sources of ecological, cultural, and economic value. Their careful management is one of the highest priority initiatives for all of their stakeholders and stewards, including policy makers, tribes, fishers, divers, conservation biologists, and others.

Building marine management plans is a complex endeavor, and the success of any given initiative relies on its ability to consider multiple, sometimes conflicting perspectives. Each stakeholder group brings unique and important expertise, and each perspective has both assets and limitations. The asset that the scientific perspective brings to management is the ability to produce and analyze objective, tangible evidence.

Using science objectively, not selectively

While it's a no-brainer to use science in conservation decisions, it requires additional effort to use it objectively and comprehensively. Part of this objectivity is being sure to consult all of the science available on the issue at hand. We need to be wary of "using" any science to support a given initiative, especially when we have a personal stake in the outcome. Omitting relevant studies from the conversation undermines both the legitimacy and success of conservation initiatives.

Several organizations recently submitted a petition to the California Fish and Game Commission to protect kelp forests in Southern and Central California. The purpose of this letter is to address their incomplete and improper acknowledgement of the science around kelp health in California.

Let me first establish my biases. I'm fortunate to have a deep relationship with and respect for the ocean, which started in my childhood. I interact with the ocean by any means possible, whether it be riding waves, paddling various crafts, snorkeling, scuba diving, and occasionally sourcing food from it with various tools. I am also a scientist with a keen interest in learning more about the dynamics of the natural world, and a conservation biologist working to support its longevity. Accordingly, I approached this petition with an open mind, and multiple sources of both expertise and motivation.

I looked at the scientific papers and reports cited in the petition to examine the evidence myself. While sharing opinions is an important part of this process, the following are not my opinions - rather objective analyses of two fundamental errors in petition 2023-33MPA that either contradict the scientific literature and/or the petition itself.

Errors in the petition

The first major error that the petition makes is claiming that kelp density itself is positively influenced by MPAs. While we know that some California kelp dwelling species can be positively affected by MPAs, such as lobsters and sheephead (Kay et al., 2012; Hamilton & Caselle, 2015), kelp density has never been shown to be consistently higher in MPAs than outside them. In fact, the vast majority of published science on this topic from California demonstrated that that kelp density is unaffected by MPAs (Malakhoff & Miller, 2021; Smith et al., 2023). The second inconsistency is in the petition's description of the selection process for the sites chosen for MPA expansion or establishment. These two errors are fundamental to the petition, and their lack of rigor substantially undermines its legitimacy.

Error #1: MPAs improve kelp density and resilience to climate change

The petition is written with the intention of protecting kelp itself, which relies on the premise that MPAs enhance the health of kelp. It is true and relatively uncontroversial that MPAs protect many fish and invertebrate species - there are generally more fish and larger fish within MPAs than outside of them (Lester et al., 2009; Rolim et al., 2019). This has been demonstrated many times in various ecosystems around the world. Importantly, though, there is a lack of scientific evidence demonstrating that kelp itself is positively influenced by MPAs (Malakhoff & Miller, 2021; Smith et al., 2023).

However, the petition makes the following claim: "The Decadal Management Review of the statewide MPA network found that, while kelp species across the state experienced large-scale declines during the 2014-2016 marine heatwave, 'overall, kelp canopy was more stable and appeared to be more resilient inside MPAs' (CA MPA DMR 2022)."

The Decadal Management Review (DMR) does state this, but does not show any data to support it, which makes it an inappropriate citation in this context. A more appropriate citation would have been the 2021 report by Carr and colleagues that the DMR authors cited, entitled "Monitoring and Evaluation of Kelp Forest Ecosystems in the MLPA Marine Protected Area Network."

While the Carr et al. report did compare kelp resilience in MPAs and non-MPAs across California, there are multiple factors that make it a less than appropriate citation for this claim, especially considering there is much more directly relevant science to consult on this topic (Malakhoff & Miller, 2021; Smith et al., 2023). First, two out of three

comparisons had no visual difference between MPAs and their “reference” non-MPAs. In addition, when looking specifically at kelp resilience, the DMR lumped all MPAs across California into one analysis (Figure 25), rather than splitting them into Southern, Central, and Northern California regions, as they did with their other analyses. Given the many fundamental differences between these regions, including the species of kelp that dominate them, it is difficult to draw any region-specific conclusions from this analysis. The strong differences between California regions are emphasized elsewhere in the DMR, as well as in two other studies currently (Hall-Arber et al. 2021 and Kumagai et al).

Further, the DMR did not show any statistics in this particular analysis, which is a fundamental part of determining the confidence that any apparent trend is a true representation of the entire population. This is likely why they chose the language, “appeared to be more resilient.” Finally, the authors acknowledge the inherent difficulty in comparing MPAs with non-MPAs, as MPAs are often chosen *because* they are known or suspected to be especially resilient, even before their protection.

A more directly applicable study to the petition’s claim is Smith et al. (2023), which did split their analyses of kelp communities in California MPAs by region, and fortified the trends they found with statistics. They found that “for all habitats except the rocky intertidal, MPAs did not impart increased resistance or recovery from marine heatwave-driven community changes compared to sites outside of MPAs.”

Malakhoff & Miller (2021) would have also been an important study to consider, which found that “no significant effect of reserve status (MPA vs. non-MPA) or time period or the interaction between status and time was evident for kelp stipe density” (Figure 1). They also compared grazing and urchin density inside and outside MPAs, and found “no evidence, therefore, that increases in predators inside Channel Islands MPAs are causing, either through direct or indirect effects, a trophic cascade leading to positive effects on kelp forests via decreased sea urchin biomass and grazing.” They conclude that “urchin biomass overall has increased inside

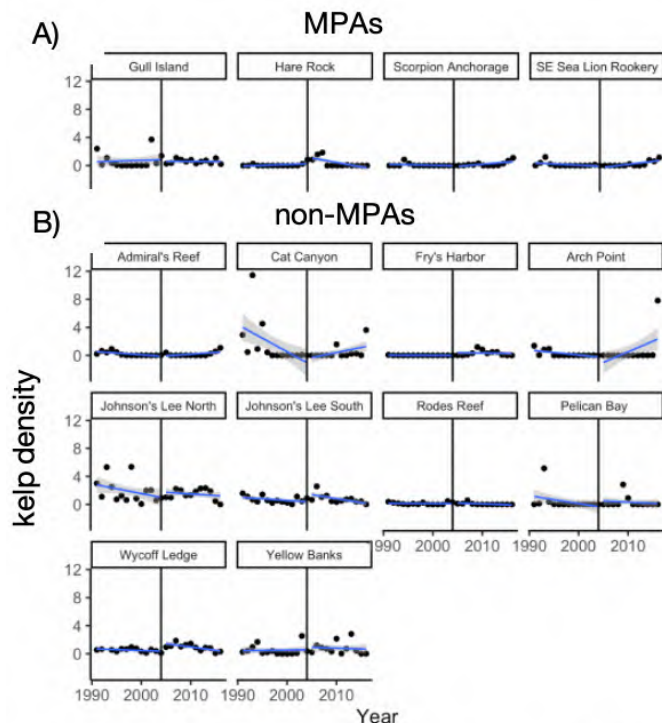


Figure 1. *Adapted from Malakhoff & Miller (2021) Figure S3. “Change in kelp stipe density over time with regression lines fit before and after the establishment of marine reserves in 2004 (vertical lines) at reserves (A) and control (B) sites.”

reserves, and we found no evidence that giant kelp is positively affected by reserves.”

While it is not yet published, it is important to mention a recent study by Kumagai et al. which found that kelp resilience and recovery to the 2014-2016 marine heatwave was slightly more robust inside Southern California MPAs than outside (there was no effect of MPAs in Central California). They do, however, acknowledge that their measurements of kelp resilience and recovery are subject to some amount of error, as they were from satellite imagery. In contrast, both Malakhoff & Miller and Smith et al. measured kelp directly by counting the density of stipes (aka “stringers”) on the reef, which is arguably a more thorough measure of kelp health. They also acknowledge the bias associated with the selection of MPA sites - “Taken together, these results could be biased if MPAs had been non-randomly placed in habitat more favorable to kelp recovery.”

Importantly, this study is in preprint, meaning it has been submitted to a scientific journal and is currently under peer review. The petition does not cite this paper, nor should it, but the preprint is publicly available, thus it is mentioned here for thoroughness.

Another study not cited by the petition, but worth mentioning, is Eisaguirre et al. (2020). Like Kumagai et al., they did not examine the effects of non-random placement of MPAs, which likely could have affected their finding of higher kelp density in MPAs than outside in the Northern Channel Islands. This result contrasts that of Malakhoff & Miller, which found no effect of MPAs on kelp density. Notably, Malakhoff & Miller surveyed 33 sites and analyzed each site both individually and together, with statistics. Eisaguirre et al. surveyed 7 sites and lumped them all together, reporting no statistical hypothesis testing, but rather models that did not fit their data particularly well.

The above literature review demonstrates the objective failure of the petition authors to thoroughly examine the science relevant to their initiatives and claims, rendering the petition illegitimate.

Error #2: Sites were chosen because they were not listed as “high priority” by Giraldo-Ospina et al., 2023.

The second contradiction is in regard to the strategy used to select sites for MPA expansion. This error is not a contradiction or omission of the literature, but rather a contradiction of the petition itself.

The petition narrative states, “we did not focus on ‘high priority’ restoration sites identified by Giraldo-Ospina et al. 2023...” However, Table 1 of the petition suggests that they propose to expand the two MPAs on the Northern Channel Islands *because* they hold portions of high priority sites: “The Northern Channel Islands contain some of the largest remaining resilient kelp beds in state waters, although large portions of the

islands have experienced die-offs and are rated as ‘high priority’ sites by Ospina-Giraldo et al. 2023.”

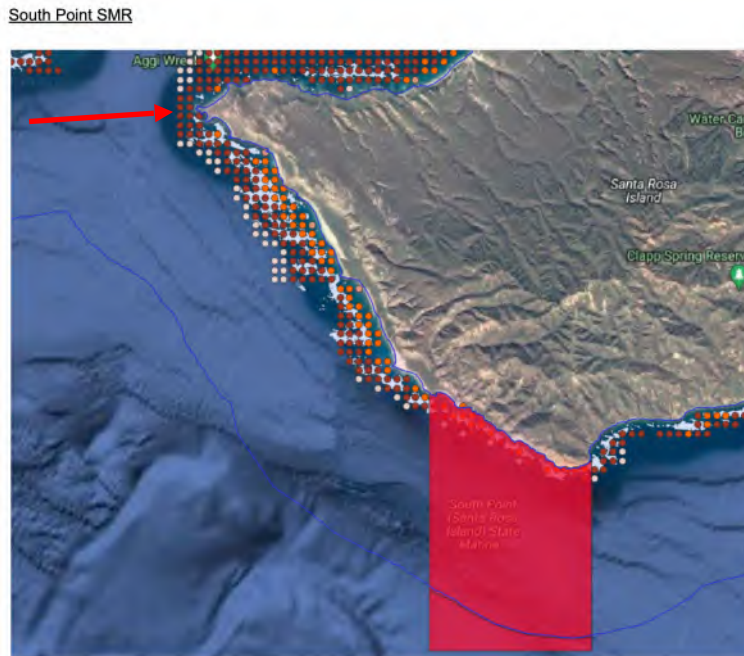


Figure 2. *Adapted from Petition 2023-33 MPA. The red polygon indicates the current South Point MPA on Santa Rosa Island. The red arrow indicates the point to which the MPA is being proposed to expand, 3nm out. Dark red circles indicate “high priority” zones.

Further, Giraldo-Ospina explicitly states that Santa Rosa has a concentration of high priority sites: “Sites in the south coast classified as high priority for giant kelp restoration are visibly clustered around San Miguel and Santa Rosa Islands.” This is clear from the map of Santa Rosa Island included on page 17 of the petition, which proposes to expand the current South Point MPA (red polygon) on the southwest side of Santa Rosa Island all the way to the west end of the island (red arrow; Figure 2). The dark red circles indicate “high priority” areas, which clearly constitute the majority of the proposed expansion area.

and relevance of petition 2023-33MPA. The authors of this petition gathered thousands of signatures on a fundamentally flawed document, which is negligent at best.

This is another egregious error that undermines the legitimacy

Going forward

The intent of this letter is not to denigrate marine management and protection, nor any of the science cited in the petition, rather to expose the lack of foundation for this proposal. The errors identified here not only undermine the legitimacy of the petition itself and its signatures, but demonstrate a lack of regard for complete and objective due diligence for a potentially highly impactful initiative. My hope is that this previously ignored information will be considered in all discussions going forward.

Finally, I remind that the natural sciences, while crucial, are not the only factor to consider. There is also a robust body of social science research examining the effects of marine reserves on other tangible and intangible factors such as livelihoods, cultures (both indigenous and non-indigenous), healthy subsistence, and lifelong passions. These considerations should also be weighed heavily, yet were mostly ignored in this petition. Knowledge is power, and it is our duty to incorporate all of the relevant knowledge available to us in these significant decisions.

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Smith, J. G. *et al.* A marine protected area network does not confer community structure resilience to a marine heatwave across coastal ecosystems. *Glob. Chang. Biol.* **29**, 5634–5651 (2023).

From: Bill Shedd <[REDACTED]>

Sent: Tuesday, October 22, 2024 03:29 PM

To: FGC <FGC@fgc.ca.gov>

Cc: Wayne Kotow <[REDACTED]>; Marc Gorelnik <[REDACTED]>

Subject: Hilborn Editorial for Nov 6 MRC meeting

Dear Sirs:

See the attached editorial from Ray Hilborn. I am requesting this be discussed at the Nov 6 MRC meeting.

My name is Bill Shedd, and I am chairman of the board of CCA Cal. The science is far from settled on the actual value of no-fishing MPAs. Most marine scientists agree that fish populations inside a no-fishing MPA will grow. However, there is no consensus as to whether MPAs actually increase total fish populations as fishing effort simply moves outside the MPA. There are two sides on the issue regarding the value or lack of with no-fishing MPAs. Discussing the attached editorial from Ray Hilborn at the Nov 6 MRC will make it clear there remains serious debate within the marine science community on no-fishing MPAs and whether or not they provide any overall benefit. - Bill

Bill Shedd | Chairman/CEO

AFTCO | [REDACTED]

[REDACTED] | [REDACTED]

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From: Bill Shedd <[REDACTED]>

Sent: Wednesday, October 23, 2024 04:58 PM

To: FGC <FGC@fgc.ca.gov>

Cc: Wayne Kotow <[REDACTED]>; Marc Gorelnik <[REDACTED]>

Subject: MPA science papers for Nov 6

Dear Sirs

Please include the attached 2 papers for discussion during the Nov 6 MRC discussions.

– Bill

The Ceccarelli paper looks at the Great Barrier Reef Marine Park in Australia which has been in place since 1975 and has 33% closed to fishing since 2004, a closed area of 117,000 square km which is 50 times more than the MLPA. The key lessons that have been learned are that the MPAs have had a small impact on the fish communities, and significant effects have only been found for the most heavily fished species.

The Hopf paper is a review of the large literature on the impact of marine protected areas on the abundance of fish, and has two very important results relevant to the MLPA. They compare the estimated change in abundance inside MPAs using three methods, inside-outside comparison, before and after, and the statistical method called before-after-controlled-impact BACI. Almost all evaluation of the increase in fish abundance in MPAs has been done using before-after. This is true for the MLPA. Hopf et al. found that inside-outside comparisons suggested a much higher increase than the before-after or BACI -- roughly 35% increase compared to only 20%. Even more importantly, Hopf found that using before-after or BACI it was almost equally likely that there was no or a negative impact of the MPA closure on the density of fish. The bottom line is that even in the parts of the MLPA that appear to show an increase in fish abundance, it is likely that this increase has been overestimated.

Bill Shedd | Chairman/CEO











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RESEARCH ARTICLE

Regional-scale disturbances drive long-term decline of inshore coral reef fish assemblages in the Great Barrier Reef Marine Park

Daniela M. Ceccarelli^{1,2}  | Murray Logan²  | Richard D. Evans^{3,4}  |
 Geoffrey P. Jones^{1,5}  | Marji Puotinen⁶  | Caroline Petus⁷  | Garry R. Russ^{1,5}  |
 Tane Sinclair-Taylor²  | Maya Srinivasan^{5,7}  | David H. Williamson^{1,8} 

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⁴Oceans Institute, University of Western Australia, Crawley, Western Australia, Australia

⁵College of Science & Engineering, James Cook University, Townsville, Queensland, Australia

⁶Australian Institute of Marine Science, Crawley, Western Australia, Australia

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 Email: d.ceccarelli@aims.gov.au

Present address

Daniela M. Ceccarelli, Australian Institute of Marine Science, Townsville, Queensland, Australia

Funding information

Department of Climate Change, Energy, the Environment and Water; Centre of Excellence for Coral Reef Studies, Australian Research Council

Abstract

Anthropogenic pressure is increasing the variety and frequency of environmental disturbance events, limiting recovery and leading to long-term declines in wild plant and animal populations. Coral reefs and associated fish assemblages are inherently dynamic due to their susceptibility to a host of disturbances, but regional-scale nuances in the drivers of long-term change frequently remain poorly resolved. Here, we examine the effects of multiple potential drivers of change in coral reef fish assemblages across 4 inshore regions of the Great Barrier Reef Marine Park (GBRMP), Australia, over 12–14 years (2007–2021). Each region had a unique disturbance history, in conjunction with long-term changes in physical and habitat variables. Phases of recovery were apparent in the years between disturbance events at all locations, but these were not long enough to prevent substantial declines in reef fish density (by 33%–72%) and species richness (by 41%–75%) throughout the study period. The main drivers of change in fish assemblages varied among regions; however, the most rapid changes followed cyclone and flood events. Limited recovery periods resulted in temporal shifts in fish species composition from typically coral-associated to algae-associated. Most trophic groups declined in density except farmers, grazers, omnivores and parrotfish. No-take marine reserves (NTMRs) had small and inconsistent effects on total fish assemblages, but delivered benefits for fishery-targeted piscivores. Our findings suggest that coral reef responses to local stressors and cumulative escalating climate change impacts are highly variable at regional scales, and that small NTMRs are unlikely to mitigate the impacts of increasingly frequent climatic disturbances. Nearshore coral reefs worldwide are high-value habitats that are either already degraded or vulnerable to degradation and the loss of important fish groups. Global efforts to reduce greenhouse gas emissions must be coupled with effective local management that can support the functioning and adaptive capacity of coral reefs.

KEYWORDS

coral reefs, cyclone, ecological drivers, habitat degradation, marine heatwave, temporal dynamics

1 | INTRODUCTION

Ecological communities are subject to natural intermittent disturbances followed by periods of recovery, resulting in fluctuations over time, both in terms of population abundance and assemblage composition (Dallas & Kramer, 2022; Dayton, 1971; Levin & Paine, 1974; Paine & Levin, 1981). Such disturbances are thought to play a major role in maintaining complex landscapes and promoting species diversity (Connell, 1978; Sousa, 1979, 1984). However, in the Anthropocene, disturbance regimes are changing because of human activities, such as extraction, habitat destruction and increasingly chaotic fluctuations in the weather as the climate changes (Micheli et al., 2016; Turner, 2010). The increasing severity, diversity and frequency of disturbances are combining to shrink the recovery window for many ecosystems (Hughes, Anderson, et al., 2018). Anthropogenic pressures and disturbances threaten the existence of foundation species, degrade landscapes, reduce population sizes and diminish biodiversity (Byrnes et al., 2011; Detmer et al., 2021; Seidl et al., 2022). The processes driving long-term change may be complex, depending on regional differences in disturbance regimes, the resistance of key foundation or habitat-forming species and their ability to recover (Jurgens & Gaylord, 2018; O'Leary et al., 2017; van der Heide et al., 2021). Management actions designed to protect communities from disturbance or promote recovery are urgently needed (Anthony et al., 2015; Pelletier et al., 2020). Additionally, more studies are needed on region-specific disturbance regimes, their long-term effects on community metrics, the biophysical factors that interact with periodic perturbations and the effectiveness of management actions to halt long-term degradation.

Coral reefs are dynamic ecosystems, subject to disturbances such as cyclones, crown-of-thorns starfish outbreaks and bleaching events (Moritz et al., 2021; Plass-Johnson et al., 2018). Unfortunately, coral reefs are also among the ecosystems most vulnerable to the increasing array of anthropogenic stressors, including increasing water temperatures and terrestrial run-off, all of which impact negatively on hard corals, the building blocks of coral reefs and essential habitat for most reef-associated organisms (Nyström et al., 2000). In a rapidly warming climate, coral reefs are the 'canaries in the coalmine' for the impacts of sea surface temperature (SST) increases (Henley et al., 2024). Different growth forms of hard corals vary in their ability to either resist these disturbances or recover rapidly during the intervening disturbance-free periods (Madin, 2005). Long-term studies are increasingly documenting severe degradation of coral reef habitats, declining biodiversity and, in some cases, persistent regime shifts from coral to algal-dominated states (Arias-González et al., 2017; Crisp et al., 2022; McManus & Polsenberg, 2004). However, the suite of anthropogenic stressors impacting reefs, the potential for assemblages to recover and the effectiveness of management actions in mitigating impacts or promoting recovery are still being documented.

Coral reef fishes are significant contributors to important ecological processes and trophic interactions in coral reef ecosystems (Polunin, 1996; Sale, 2002). Reef fishes link pelagic and

benthic communities through larval dispersal, adult movement (Green et al., 2015; Jones et al., 2009) and planktivory (Hobson & Chess, 1978; Morais & Bellwood, 2019), exert top-down control through predation (Brandl et al., 2019; Hixon, 1991), influence the benthos through grazing and invertivory (Graham et al., 2015; Hatcher, 1988; Kramer et al., 2015) and even contribute to primary production by farming or gardening (Ceccarelli et al., 2005). They range from being versatile omnivores (e.g. Mendes et al., 2019), to occupying highly specialised niches such as corallivory (Pratchett et al., 2013), coprophagy (Robertson, 1982) and parasite-cleaning (Grutter, 1995). While affecting coral reef habitats, they also depend on the integrity of the habitat to support the full complement of species, processes and functions (Darling et al., 2017). This extends beyond living corals to the three-dimensional structure of the reef itself (Chong-Seng et al., 2012). Reef fishes also provide extensive socioeconomic benefits through fisheries and tourism revenue (Cinner et al., 2016). Understanding spatial and temporal patterns in reef fish abundance, diversity and species composition, and their key drivers, is fundamental to the design, implementation and evaluation of conservation and management actions to support persistence and productivity (Eggertsen et al., 2019; Sale et al., 2005).

Reef fish assemblages are highly dynamic and subject to changes in abundance, species richness and composition due to a variety of extrinsic (e.g. disturbance events) and intrinsic (e.g. recruitment) factors. Changes to reef fish assemblages over time have been measured in response to fishing (Zgliczynski & Sandin, 2017), marine reserve protection (Hadj-Hammou et al., 2021; Olivier et al., 2022), changes in habitat structure (Lin et al., 2022; Nash et al., 2013), environmental conditions (Benthuisen et al., 2022; Feary et al., 2010), disturbance events (McClure et al., 2019) and stochastic factors such as recruitment pulses (Sale, 2004). Stuart-Smith et al. (2021) found that fish assemblages on tropical reefs are undergoing a shift towards more generalist species in response to climate change, while on temperate reefs there is a distinct 'reshuffling' of fish assemblages towards more warm-adapted species. General declines in abundance and species richness, as well as local extinctions, have been documented following marine heatwaves and other climatic disturbance events (Edgar et al., 2023; Pratchett et al., 2011; Wilson et al., 2006). Global reef fish diversity declines are expected with habitat loss, especially loss of corals (Strona et al., 2021). Other studies have found reef fish assemblages to be remarkably stable, even after repeated disturbance events resulting in profound habitat changes. (Cheal et al., 2008; Sano, 2000; Wilson et al., 2009). However, the perception of stability may depend on the taxonomic resolution of the study (Lamy et al., 2015), as concurrent species-level increases or declines may be masked within families, trophic or functional groups (Ceccarelli et al., 2016; Wilson et al., 2006).

It is well known that the physical disturbances that destroy habitat (e.g. temperature stress, cyclones and destructive fishing), indirectly affect fishes that rely on those habitats (Emslie et al., 2014; Graham & Nash, 2013; Pratchett et al., 2008), but do those physical forces also act on fish assemblages directly? With extreme SST anomalies, acute mortality events of fish are possible, and over time

this may alter the suite of species that occupy any given reef (Stuart-Smith et al., 2015; Stuart-Smith et al., 2018). Direct impact by cyclone waves and wave-born debris may kill some fishes, but the dominant impact of storm events is typically habitat loss (Munday, 2004; Munday et al., 2008; Triki & Bshary, 2019; Wilson et al., 2006). Management and conservation measures superimposed upon these large-scale, dynamic processes may or may not mitigate disturbance impacts on populations, assemblages and habitat structure (Mellin et al., 2019). Teasing apart the forces that act on fish assemblages may not be possible without dedicated experimental research, although advances in statistical techniques that partition the relative importance of a given set of predictor variables is allowing increased insight into drivers of coral reef communities (Samoilys et al., 2019; Zinke et al., 2018).

No-take marine reserves (NTMRs) are a widely used marine conservation tool, with proven benefits for populations of target species (Allard et al., 2022; Emslie et al., 2015; Graham et al., 2011; Mellin et al., 2016). Effects on non-target species, habitats and processes are more equivocal, especially in regions where fisheries target a few select species with non-destructive fishing practices (Emslie et al., 2015). There is some evidence that NTMR reefs can be more resilient (McClure et al., 2020; McCook et al., 2010; Mellin et al., 2016), but this may not hold under a regime of increasing disturbance frequency and intensity. In fact, there is increasing evidence that NTMRs have a limited ability to protect reef habitats from extreme disturbances, leading to similar changes in fish assemblage structure in both NTMRs and fished areas (Graham et al., 2011; Jones et al., 2004; Williamson, Ceccarelli, Evans, Jones, & Russ, 2014).

In seeking to understand temporal dynamics of coral reef fish assemblages, and the ability of NTMRs to support resilience under environmental change, it is important to quantify key drivers of abundance, diversity and species composition. Fish assemblages can be shaped by a combination of interacting physical drivers, which include environmental factors such as temperature, depth or wave exposure (Floeter et al., 2005; Friedlander et al., 2003; Fulton et al., 2005; Jouffray et al., 2015; Maia et al., 2018; Roff et al., 2019), slope steepness, three-dimensional reef habitat structure (Chabanet et al., 1997; Graham & Nash, 2013; Luckhurst & Luckhurst, 1978) and biological drivers such as food availability, recruitment, competition and predation (Roff et al., 2019). The composition of the benthic community also affects the fish assemblage (Chong-Seng et al., 2012; Done, 1992; Gratwicke & Speight, 2005; Halford et al., 2004; Williams, 1982). Changing conditions due to disturbances (e.g. increased wave exposure and turbidity during/after storms) and resulting changes to benthic organisms all have an influence on the temporal dynamics of reef fishes (Pratchett et al., 2011). Superimposed on biophysical drivers are human factors such as exploitation, habitat destruction through coastal development, dredging and destructive fishing, and spatial management such as NTMRs (Pinca et al., 2012).

Multiple-use zoning management was first introduced to the Great Barrier Reef Marine Park (GBRMP, Marine Park) in the late 1980s. Networks of NTMRs were expanded throughout the Marine

Park in 2004 and since that time approximately 33% of the Marine Park area (and 33% of the coral reef habitats) have been protected within NTMRs. Inshore GBR coral reefs are no exception to the alarming rates of global ecosystem degradation caused by the cumulative and escalating effects of global warming (Ceccarelli et al., 2020; Hughes, Kerry, & Simpson, 2018). The proximity to human populations means that pressure from extractive activities like recreational fishing is significant on inshore fringing reefs around islands near the coast (Williamson, Ceccarelli, Evans, Hill, & Russ, 2014; Williamson, Ceccarelli, Evans, Jones, & Russ, 2014). Furthermore, inshore reefs of the GBR are subject to the pressures typical of coastal and inshore reefs worldwide, despite active management of stressors and relatively low human population densities compared with other tropical coastal nations. In this sense, the response of the GBR inshore reefs to these pressures could serve both as a benchmark for thresholds of pressure these systems can withstand, and an example of what a reduction in pressure could result in for marine ecosystems that are much more heavily used and degraded.

In this study, we quantify regional and local differences in the key physical and biological drivers of fish assemblages and the ability of NTMRs to mitigate against multiple cumulative stressors. The primary aim was to examine long-term trends in the abundance, diversity and species composition of fish assemblages on inshore coral reefs within NTMRs and fished zones across four regions of the GBRMP: the Palm Islands, Magnetic Island, the Whitsunday Islands and the Keppel Islands. Specifically, we (1) quantify changes in fish density, species richness, species composition and the abundance of trophic groups over 12–14 years, (2) determine whether NTMRs reduced or halted any long-term declines in the summary metrics and (3) investigate the relative importance of 20 potential predictor variables in explaining the temporal variability of fish assemblages using boosted regression tree (BRT) models.

2 | METHODS

2.1 | Study locations, management zoning and reef survey protocols

The four inshore island regions are located 10–30 km from the mainland coast and span 4.5 degrees of latitude, from 18.603S to 23.19S (Figure 1). Inshore reefs of the GBR are high use and high value, and exist in waters with higher sediment, pesticide and nutrient loads than offshore reefs (Fabricius et al., 2008; Hughes, Kerry, & Simpson, 2018; Negri et al., 2011; Negri & Hoogenboom, 2011), particularly in sheltered (predominantly west-oriented) locations (Fabricius et al., 2008). Coastal waters with a terrestrial influence are often associated with reduced fish biomass and species richness, and a range of water quality parameters may affect fishes both directly and indirectly (Letourneur et al., 1998). Benthic communities on these reefs typically consist of a combination of hard corals, soft corals and macroalgae that are adapted to conditions of high turbidity, nutrients and suspended sediment (Ceccarelli

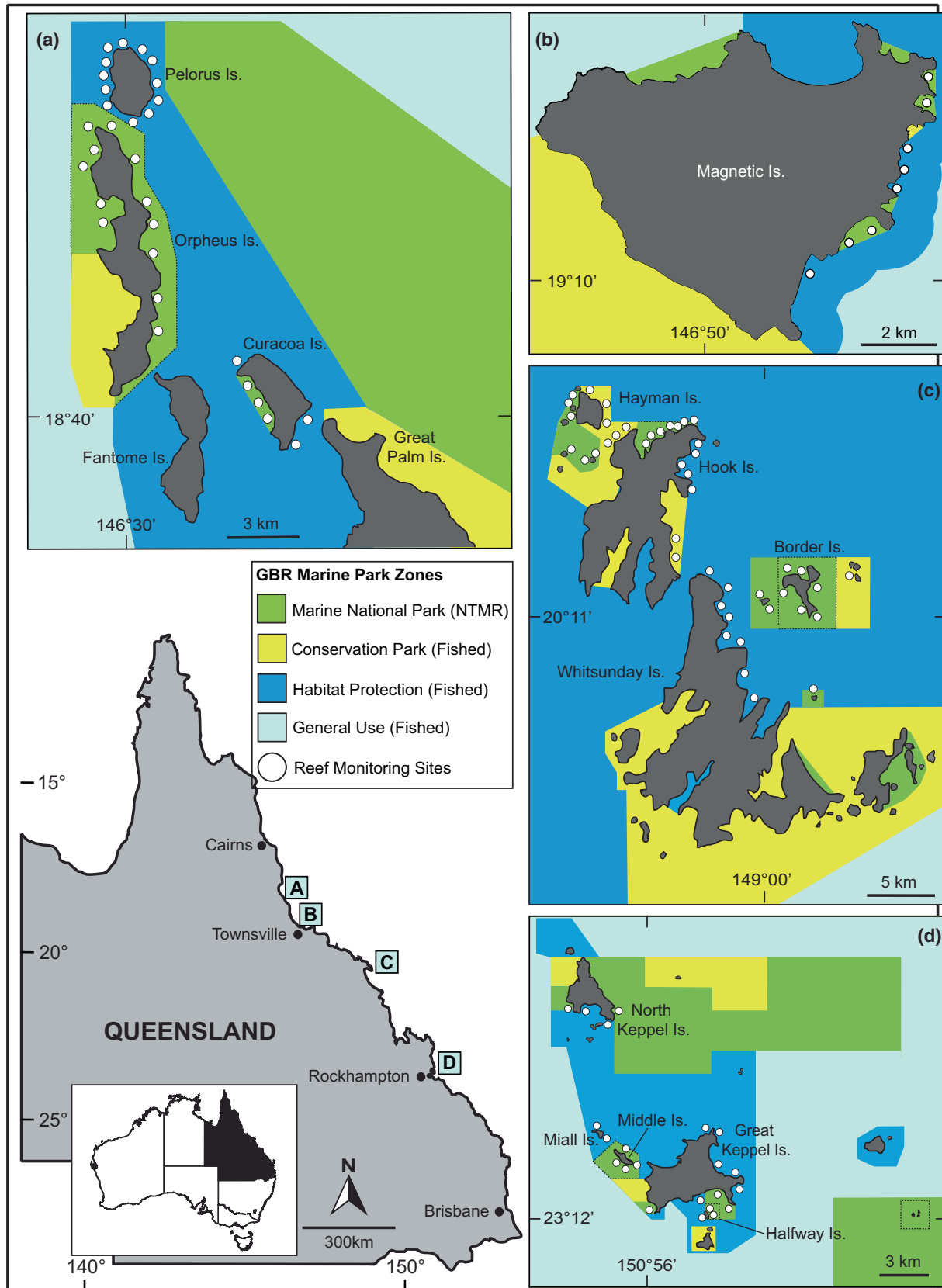


FIGURE 1 Composite map of coral reef monitoring sites in the Palm (a), Magnetic (b), Whitsunday (c) and Keppel (d) Island groups. White dots indicate the approximate position of monitoring sites within each island group. Colour-shaded areas represent the configuration of post-2004 Great Barrier Reef Marine Park (GBRMP) management zones. Light blue, dark blue and yellow zones are open to recreational fishing. Green zones are no-take marine reserves (NTMRs). NTMRs that were established in 1987 are bordered with black dashed lines. All other NTMRs were established in July 2004.

et al., 2020; Flores et al., 2012). Around the islands, reef flats are often exposed to the air on spring low tides, and the reef slopes vary from shallow, gentle inclines on the sheltered (western) sides of the islands to steeper formations and greater depths on the windward (eastern) sides. The reefs are often close to mangroves and seagrass beds, and sediment on inshore reefs has a high terrigenous component, unlike the biogenic carbonate sediments on reefs further offshore. These inshore reefs also tend to occur in shallower waters than those further offshore, with the base of the reef slope rarely exceeding 10 m in depth. Fish assemblages on these inshore reefs are composed of a subset of species that occur on mid-shelf and outer shelf reefs, with a few inshore specialists (Emslie et al., 2017; Emslie et al., 2019; Hoey et al., 2013; Russ, 1984; Williams, 1982).

Standardised underwater visual census protocols were used to survey benthic and fish assemblages at long-term monitoring sites on fringing reefs of the Palm Islands (30 sites), Magnetic Island (8 sites), Whitsunday Islands (42 sites) and Keppel Islands (20 sites) (Figure 1) between four and eight times during the period 2007–2021. The Palm and Whitsunday Islands were surveyed in 2007, 2008, 2009, 2012, 2014, 2016 and 2018, with an additional survey in 2017 at the Whitsunday Islands; the Keppel Islands were surveyed in 2007, 2008, 2009, 2011, 2013, 2015, 2017 and 2021, and Magnetic Island reefs were surveyed just four times due to weather constraints, in 2007, 2012, 2016 and 2019 (Table S1). Within each island group, monitoring sites were evenly distributed among reefs that are open to fishing (General Use, Habitat Protection and Conservation Park Zones) and NTMRs that were closed to fishing in either 1987 or 2004 (Figure 1).

At each of the 100 sites, five 50 m transects were deployed on the reef slope along a single depth contour between 4 and 12 m, depending on the reef slope depth and topography at each site. Fish and benthic surveys were conducted by trained and experienced observers on SCUBA, and all species of diurnal, non-cryptic reef fish were recorded. Large-bodied, mobile fishes were surveyed using a transect width of 6 m (i.e. 300 m² survey area) by two divers swimming side by side, with a third diver laying out the transect tape behind them. Small-bodied fishes (family Pomacentridae and small Labridae) were surveyed by one diver during the return swim along each transect, using a transect width of 2 m (i.e. 100 m² survey area). The same three observers conducted all fish surveys throughout the monitoring period (DHW, DMC and RDE). All recorded fish species were assigned to trophic groups (Table S2; parrotfish include scrapers and excavators), and counts were converted to density (individuals per 1000 m²) for all analyses except the generalised linear mixed model, where individuals per 300 m² were used to satisfy the requirement of integers for the preferred negative binomial distribution (see below).

Benthic communities were surveyed using a standard point-intercept survey method (Williamson, Ceccarelli, Evans, Jones, & Russ, 2014) by one diver during the return swim along each transect. A single benthic point sample was recorded at every 1 m graduation mark along each transect tape (i.e. 50 samples per transect). Benthic

biota and substrata were classified into the following categories: live and dead hard coral with further subdivision into morphological categories (branching, tabular, digitate, solitary, massive, foliose and encrusting), soft coral, sponge, clams (*Tridacna* spp.), other invertebrates (such as ascidians and anemones), macroalgae, coral reef pavement (covered in turf algae), rock, rubble and sand. Additionally, for the live hard coral categories (branching, tabular and digitate), each colony was further classified as either *Acropora* spp. or 'other'. The structural complexity of the reef habitat at each site was estimated using a simple method that gave a rank (1–5) to both the angle of the reef slope and the rugosity of the benthos for each 10-metre section of each transect (see Wilson et al., 2007).

2.2 | Physical predictor variables

2.2.1 | Cyclone wave exposure

We generated quantitative estimates of relative wave exposure at each monitoring site during each relevant cyclone (identified from a dataset described in Puotinen et al. 2016) from 1998 to 2021. We used modelled wave height and direction data from NOAA WAVEWATCH III and the Commonwealth Scientific and Industrial Research Organisation (CSIRO) to identify which cyclones generated significant wave heights (H_s = average of top 1/3 of wave heights) of 3.5 m or more at each monitoring site. For each cyclone at each site, the distance to the nearest wave-blocking obstacle was measured every 7.5 degrees around each site (fetch). These measures were weighted by the relative frequency at which cyclone-generated waves approached the site and their average magnitude. These distances were then summed and normalised to create a dimensionless index of relative cyclone wave exposure, as per previous studies (e.g., Gilmour et al. 2022; Table 1).

2.2.2 | Turbidity exposure

Daily Moderate Resolution Imaging Spectroradiometer (MODIS) Level-0 data were acquired from the NASA Ocean Colour website (<https://oceancolour.gsfc.nasa.gov>) and converted into RGB colour images with a spatial resolution of 500 × 500 m using the SeaWiFS Data Analysis System (SeaDAS; Baith et al., 2001). The images were then (i) spectrally enhanced to transform them from RGB to the Hue-Saturation-Intensity (HSI) colour system and (ii) classified into three distinct water colour categories corresponding to the three optical water types (primary, secondary and tertiary) commonly found in the GBR during the austral wet season (Devlin et al., 2015; Petus et al., 2014; Waterhouse et al., 2018; Wenger et al., 2016). For full detail on the water quality classification, see Appendix S1.

We used the primary water type characterisation to quantify the frequency of exposure of the monitoring sites to highly turbid water from flood plumes and subsequent sediment re-suspension during the 2003–2017 Queensland summer wet seasons

TABLE 1 Predictor variables tested with boosted regression trees, divided into physical forces acting directly on the fish community, habitat variables, prey density and a management variable (zoning). Units of measurement are provided in brackets for each driver.

Type	Driver	Justification
Physical	Cyclone exposure (index)	Different species show different susceptibilities to storms and cyclones (Gerlach et al., 2021)
	Exposure to primary flood-water (weeks)	Strong fluctuations in salinity and turbidity can affect reef fish communities (Johansen & Jones, 2013)
	Kd490 (m)	Changes in turbidity affect abundance, composition and behaviour of reef fishes (Johansen & Jones, 2013)
	Chlorophyll- <i>a</i> (mg L ⁻¹)	Nutrient loads affect the abundance and composition of reef fish assemblages (Sartori et al., 2021)
	Degree heating weeks (°C-weeks)	Thermal stress has lethal and sublethal effects on fishes (Stuart-Smith et al., 2018)
	SST mean (°C)	Reef fishes respond to temperature (Lloyd et al., 2012)
	SST anomaly (°C)	Thermal stress has lethal and sublethal effects on fishes (Pearce & Feng, 2013)
Habitat	Live hard coral (% cover)	Loss of live coral means a loss of food, shelter and recruitment habitat (Russ et al., 2021)
	Soft coral (% cover)	Loss of soft coral means a loss of food and shelter (Epstein & Kingsford, 2019)
	Turf (% cover)	Turf is the preferred food source for several groups of reef fish species (Tootell & Steele, 2016)
	Macroalgae (% cover)	Macroalgae can be food and recruitment habitat for some species, but many reef fishes avoid areas of macroalgal dominance (McClure et al., 2019)
	Unconsolidated substratum (% cover)	Has low structural complexity, but hosts specific types of fishes (Wolfe et al., 2021)
	Coral morphological diversity (index)	Is a measure of the complexity the three-dimensional structure of the habitat. Higher habitat complexity tends to lead to higher abundance and species richness (Graham & Nash, 2013)
	Benthic richness (index)	Is a measure of the complexity the three-dimensional structure of the habitat, and the diversity of food sources. Higher habitat complexity tends to lead to higher abundance and species richness (Graham & Nash, 2013)
	Rugosity (score)	Is a measure of the complexity the three-dimensional structure of the habitat. Higher habitat complexity tends to lead to higher abundance and species richness (Graham & Nash, 2013)
	Slope (score)	Is a measure of the steepness of the reef slope, which can influence the species composition of reef fishes (Graham & Nash, 2013)
	Structural complexity index (index)	Is a measure of the complexity the three-dimensional structure of the habitat. Higher habitat complexity tends to lead to higher abundance and species richness (Graham & Nash, 2013)
Other	Prey density (individuals 1000m ⁻²)	Higher prey density means more food for carnivores and piscivores (Hixon, 1991)
	Prey biomass (kg 1000m ⁻²)	Higher prey biomass means more food for carnivores and piscivores (Hixon, 1991)
	Zoning (NTMR status: Fished, NTMR)	Fishery target species are usually larger and more abundant in NTMR zones (Emslie et al., 2015)

Note: Prey density and biomass were included in the models for carnivores and piscivores only.

(December–April inclusive). The primary water type represents high turbidity (Devlin et al., 2015), and high values of coloured dissolved organic matter (CDOM) and total suspended sediment (TSS) (Devlin et al., 2013). TSS and Secchi disc depth (SDD) in the primary water type are typically around 18.3 ± 45.7 mg L⁻¹ and 1.8 ± 1.8 m (mean \pm 1SD), respectively (Waterhouse et al., 2021). The primary water type is often associated with low salinity from flood plumes, but not always, as high turbidity can also reflect resuspended sediment from wind and tides (Devlin et al., 2012). We created 22 weekly composites of daily images from 1 December to 30 April per wet season, to minimise the amount of area without data per image due to masking of clouds and sun glint (Alvarez-Romero et al., 2013). We assigned each weekly composite a

presence/absence (0/1) value of primary water type in each pixel (500 × 500 m resolution; Table 1).

2.2.3 | Water quality

Two measures of water quality were used: remotely sensed Chlorophyll-*a*, which provides an estimate of phytoplankton biomass and can act as a proxy for seawater nutrient concentrations (Otero & Carbery, 2005), and Diffuse Kd490 (the Diffuse Attenuation Coefficient at 490 nm), which provides an estimate of turbidity (Lee et al., 2005). Chlorophyll-*a* (Hu et al., 2012) and Kd490 composite monthly 4 km data, collected using a

MODIS satellite, from 2003 to 2017 were downloaded from the ERDDAP website. (Chlorophyll-a—<https://coastwatch.pfeg.noaa.gov/erddap/griddap/erdMH1chlamday>; Kd490—<https://coastwatch.pfeg.noaa.gov/erddap/griddap/erdMH1kd490mday>). In situ measurements of these variables are preferred as there is increased uncertainty in turbid waters, however in their absence, remotely sensed measurements can and have been used in a number of other studies (Moustaka et al., 2018; Olsen et al., 2018; Zinke et al., 2018) (Table 1). The Whitsunday Islands data for both Chlorophyll-a and Kd490 were anomalous, so they were excluded from the Whitsundays BRT analyses (see below).

2.2.4 | Degree heating weeks

Degree heating week (DHW) values represent the accumulated thermal stress over the previous 12 weeks at a given pixel. DHW is calculated as the number of degrees above the coral bleaching threshold multiplied by the number of weeks that the elevated temperature persists (Skirving et al., 2020). Coral bleaching is likely at 4 DHW, and this is routinely used to estimate thermal stress on coral reefs (Hajime, 2017). Daily 5 km data from 1998 to 2016 were provided by NOAA Coral Reef Watch (2018). The maximum DHW reported between sequential surveys was used for each year; however, if the period between surveys exceeded 1 year, the maximum DHW within the two previous years was used in the following year of the study (Table 1).

2.2.5 | Mean sea surface temperature and SST anomaly

Annual average SST and SST anomalies were calculated from multi-scale, ultra-high resolution (MUR), SST and sea surface temperature anomaly (SSTA) data (Table 1). Monthly 1 km data from 2002 to 2017 were downloaded from the NOAA ERDDAP website (<https://coastwatch.pfeg.noaa.gov/erddap/griddap/jplMURSST41mday.html> and <https://coastwatch.pfeg.noaa.gov/erddap/griddap/jplMURSST41anomday.html>).

2.3 | Habitat-based predictor variables

The 11 habitat-based predictor variables included per cent cover of live hard coral, soft coral, algal turf, macroalgae and unconsolidated substratum (generally sand or rubble), two measures of benthic diversity (benthic richness: the sum of all broad benthic categories, and hard coral morphological diversity: the sum of all hard coral morphologies), three measures of overall complexity of the habitat (slope, rugosity and a combined structural complexity index) and prey density (specifically to account for variability in carnivores and piscivores) (Table 1).

2.4 | Data analysis

The temporal dynamics of total fish density and species richness were tested for each island group using a generalised linear mixed model with the *glmmTMB* package in R (Brooks et al., 2017). Pairwise comparisons were made between years and between NTMR and fished zones within each year. The analysis was repeated on the total density and species richness of reef fish, excluding the numerically dominant and species-rich Pomacentridae (damsel-fishes). This family has the potential to dominate temporal changes of the fish assemblage and to mask estimates of NTMR effects on inshore reefs, since Pomacentridae are not fished (Williamson, Ceccarelli, Evans, Jones, & Russ, 2014). Consistent spatial differences in fish assemblage structure among island groups and among locations within island groups during the monitoring period were explored using non-metric multidimensional scaling (MDS), using fish densities averaged across all sites for each year-zone combination at each island group. The contributions of individual species to the dissimilarities between years and NTR groups were tested with ANOSIM and SIMPER. The analyses were based on the Bray–Curtis similarity of fourth-root transformed density data with Primer-e Version 7.

Temporal trends in total fish density and hard coral cover were also explored graphically, using *ggplot2*. Third-order polynomials were fitted to fish density and hard coral cover to emphasise trends over time at each island group and zone, in particular to highlight where major changes to hard coral cover were associated with major changes in fish density.

Drivers of fish density and species richness were explored using gradient BRT models (Elith et al., 2008; Hastie et al., 2011). A total of 10,000 trees were fit using a binomial distribution (modified from a Bernoulli) to an interaction depth of 5, with a bag fraction of 0.5 and a shrinkage rate of 0.001. All the trees apply out of bag and cross-validation to minimise overfitting. The optimum number of trees to retain was determined by cross-validation from a total of 10-fold. All continuous covariates were centred, and monotonic forms were imposed when simple scatterplots suggested monotonic forms were appropriate, to increase the stability of the outcomes. All BRTs were fitted using the *gbm* package (Ridgeway, 2017) within the R statistical and graphical environment (R Core Team, 2024). Variable importance was calculated as the frequency of tree splits involving each covariate weighted by the associated square improvement in the model-averaged over all trees and scaled out of 100 such that larger values signify stronger influence. Variable importance values that exceed $1/p$ (where p is the number of covariates included in the model), were considered substantial. Missing data (e.g. where the timescales differ between response and predictor variables) were handled with surrogate splits (Elith et al., 2008).

The partial effects of each substantially important covariate were estimated by back-fitting a vector of covariate levels (1000 evenly spaced values) against the BRT model. For tree splits that do not involve the focal covariate, both branches are traversed in

their entirety and averaged together to form a partial prediction. For each covariate, the covariate value that corresponded to the maximum partial effect was used as an estimate of the value associated with optimum (maximum) cover. A *quasi-R*² for each covariate was calculated as the simple square of correlation between the observed and partial predicted response. The partial effects, optimum and *quasi-R*² values were aggregated over the 10 cross-validation folds so as to yield mean trends along with 95% confidence intervals.

The predictor variables were separated into 7 physical drivers, 11 habitat-based drivers, 2 measures of prey abundance and 1 management driver (NTMR status) that may affect fish density, species richness or species composition (Table 1). The predictor variables identified by the BRT models to be most influential for each fish metric were assigned to physical or habitat drivers and the proportion of each type of driver was calculated for fish density, species richness and the abundance of each fish trophic group. To test the effects of different drivers on reef fish species composition, the BRT models were run on the eigenvalues of PC1 of a principal components analysis for the individual island groups. When running the full analyses, the substantially influential predictors for any single analysis are identified. These predictors are then expressed as their temporal components by centring them against their respective temporal means for each location. The analyses are then repeated using just the important temporal versions of the influential predictors. This second analysis was used to identify which predictors should feature in temporally focussed analyses, as opposed to a spatial focus, and the analysis repeated with those predictors. As with the GLMM analysis, BRT analyses were repeated for total reef fish density, species richness and species composition (PC1) excluding the Pomacentridae (damselfishes), to explore the effects of drivers on the fish community, without the potentially overwhelming effects of this abundant and species-rich family. Furthermore, the fish assemblage was divided into trophic groups, and the BRT models repeated for each individual trophic group. Data and code are available through the Australian Institute of Marine Science Data Repository (AIMS, 2024).

3 | RESULTS

3.1 | Temporal dynamics in fish density, species richness and composition

Acute environmental disturbances led to several periods of decline and subsequent recovery in fish density and species richness that were unique to each island group, but recovery periods were insufficient to prevent an overall decline in both density and species richness over time in all regions (Figure 2, Table 2). Declines in density of between 39% and 72% were recorded on fished reefs, while declines of 33%–60% were recorded on NTMR reefs. Species richness also declined by up to 75% on fished reefs, and up to 63% on NTMR reefs. Despite similar temporal trajectories in total density

and species richness without the Pomacentridae, the declines were not as pronounced (Figure S1, Table S3).

Each major decline followed an acute disturbance, especially cyclones and floods, and to a lesser extent, coral bleaching events. Major declines in fish density and species richness were recorded on reefs at the Palm Islands following Cyclone Yasi in 2011 (Figure 2a,b). There was some recovery in both fish density and species richness between 2012 and 2014 in the Palm Islands; however, there was a further decline in density between 2014 and 2018 following a flood plume in 2014 and coral bleaching in 2016 and 2017, while species richness declined between 2014 and 2016, and then recovered between 2016 and 2018 (Figure 2a,b). There were no significant differences in fish density between fished and NTMR reefs in the Palm Islands throughout the monitoring period, but species richness was significantly lower on NTMR reefs both before and after the disturbance events (Figure 2b). The analysis without the Pomacentridae resulted in lower density and species richness in the Palm Island NTMRs that were significant in several years (Figure S1a,b).

On Magnetic Island, there was no significant change in fish density and species richness between 2012 (after Cyclone Yasi, Figure S2.1) and 2019 in fished zones, but a significant increase in both occurred at NTMR reefs (Figure 2c,d). This pattern was not significant when the Pomacentridae were removed (Figure S1c,d). Overall, there were no differences in fish density and species richness detected between fished and NTMR reefs at Magnetic Island.

In the Whitsunday Islands, total fish density declined between 2009 and 2014, with a small recovery in 2016 (Figure S2.1), followed by a precipitous decline after Cyclone Debbie in 2017 (Figure 2e; Figure S2.1). Cyclone Ului did not appear to affect species richness, and Cyclone Debbie had a much smaller effect on fish species richness than on fish density (Figure 2f). There were no significant differences in fish density and species richness between fished and NTMR reefs (Figure 2e,f), with or without the Pomacentridae (Figure S1e,f).

Reefs in the Keppel Islands experienced a dramatic and significant loss of fish density and species richness following major flood plumes in 2011 and 2013 (Figures 2g, h, S2.2, S2.3). Fish density declined to almost an order of magnitude lower in 2013 compared with 2007–2009, and although it increased between 2013 and 2017, it did not reach the pre-flood levels of 2007–2009 (Figure 2g). Species richness in 2013 was half that in 2007–2009, remained low in 2015, increased between 2015 and 2017, and then declined in 2021 after successive bleaching events in 2017 and 2020 (Figure 2h; Figure S2.5–S2.7). Without the Pomacentridae, fish density and species richness recovered more rapidly in the later survey years (Figure S1g,h).

Species composition shifted over time at all four island groups and, in all cases, was different at the last survey period compared with the beginning of the monitoring programme (Figure 3). Species composition differed between fished and NTMR reefs at the Palm (Figure 3a), Keppel (Figure 3c) and Whitsunday Islands (Figure 3d), but the changes in composition over time occurred in parallel in the two zones. In the Palm and Whitsunday Islands, the

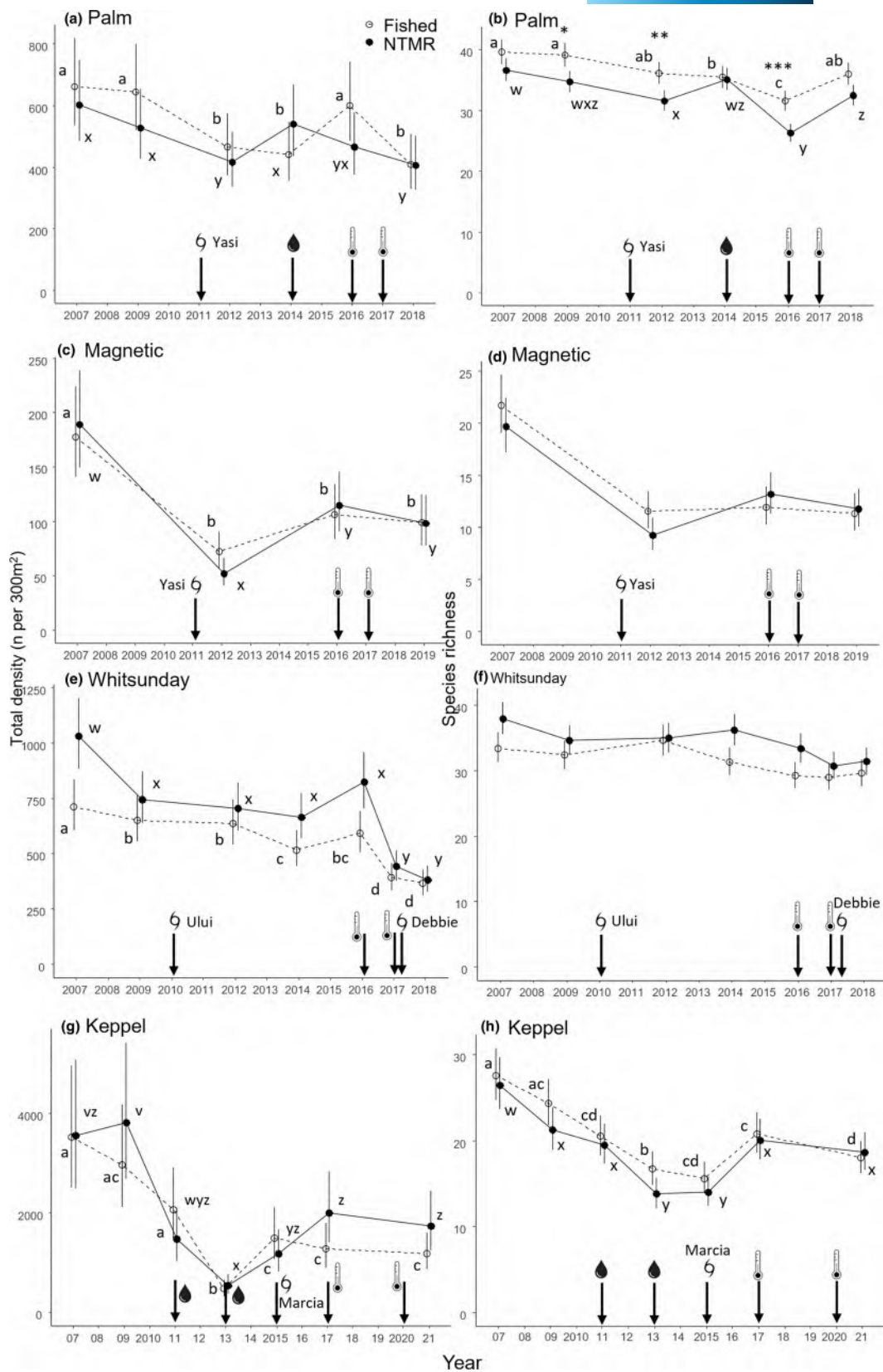


FIGURE 2 Temporal trends in the density (individuals 300 m⁻², a, c, e, g) and species richness (number of species per transect, b, d, f, h) of inshore reef fishes in the Palm (a, b), Magnetic (c, d), Whitsunday (e, f) and Keppel Islands (g, h). Arrows show the years of major disturbance events: spinning wheel: cyclones (named); thermometer: bleaching event; and water drop: flood. Open circles are fished zones and closed circles are no-take marine reserves (NTMRs). Letters mark significant differences among years (years that do not differ share the same letters) for each zone, and asterisks mark significant differences between fished and NTMR zones. **p* < .05, ***p* < .01, ****p* < .001. Error bars are standard errors; note the differences in scale among the y-axes in each panel.

TABLE 2 Results of generalised linear mixed models comparing fish density and species richness across years and zones in each island group.

	Estimate	Std. Error	z Value	Pr (> z)	Estimate	Std. Error	z Value	Pr (> z)
	Palm Islands–density				Palm Islands–species richness			
(Intercept)	6.50	0.11	59.39	<0.001	3.72	0.03	145.20	<0.001
2009	−0.03	0.06	−0.41	0.681	−0.01	0.03	−0.31	0.760
2012	−0.35	0.06	−5.61	<0.001	−0.08	0.03	−3.03	0.002
2014	−0.40	0.06	−6.39	<0.001	−0.10	0.03	−3.90	<0.001
2016	−0.10	0.06	−1.55	0.121	−0.22	0.03	−7.99	<0.001
2018	−0.48	0.06	−7.65	<0.001	−0.08	0.03	−3.05	0.002
Zoning	−0.09	0.15	−0.60	0.547	−0.09	0.04	−2.40	0.016
2009 × Zoning	−0.11	0.09	−1.19	0.235	−0.04	0.04	−1.11	0.269
2012 × Zoning	−0.02	0.09	−0.18	0.861	−0.06	0.04	−1.60	0.109
2014 × Zoning	0.29	0.09	3.29	0.001	0.07	0.04	1.82	0.069
2016 × Zoning	−0.16	0.09	−1.79	0.073	−0.10	0.04	−2.50	0.012
2018 × Zoning	0.09	0.09	0.98	0.327	−0.02	0.04	−0.64	0.523
	Magnetic Island–density				Magnetic Island–species richness			
(Intercept)	5.18	0.12	43.67	<0.001	3.10	0.07	45.87	<0.001
2012	−0.90	0.15	−6.19	<0.001	−0.65	0.09	−6.95	<0.001
2016	−0.51	0.15	−3.55	<0.001	−0.61	0.09	−6.60	<0.001
2019	−0.59	0.15	−4.05	<0.001	−0.66	0.09	−7.07	<0.001
Zoning	0.06	0.17	0.36	0.717	−0.11	0.09	−1.15	0.252
2012 × Zoning	−0.38	0.21	−1.83	0.068	−0.09	0.14	−0.70	0.484
2016 × Zoning	0.02	0.21	0.08	0.933	0.21	0.13	1.61	0.107
2019 × Zoning	−0.06	0.21	−0.31	0.754	0.14	0.13	1.05	0.295
	Whitsunday Islands–density				Whitsunday Islands–species richness			
(Intercept)	6.57	0.08	81.18	<0.001	3.54	0.04	97.20	<0.001
2009	−0.09	0.06	−1.48	0.139	−0.02	0.03	−0.73	0.464
2012	−0.11	0.06	−1.89	0.058	0.06	0.03	2.37	0.017
2014	−0.32	0.06	−5.28	<0.001	−0.04	0.03	−1.42	0.157
2016	−0.19	0.06	−3.08	<0.001	−0.10	0.03	−3.84	<0.001
2017	−0.60	0.06	−9.90	<0.001	−0.13	0.03	−4.90	<0.001
2018	−0.67	0.06	−11.00	<0.001	−0.10	0.03	−3.74	<0.001
Zoning	0.37	0.11	3.26	0.001	0.15	0.05	2.94	<0.001
2009 × Zoning	−0.23	0.08	−2.76	0.006	−0.07	0.04	−2.03	0.043
2012 × Zoning	−0.27	0.08	−3.15	0.002	−0.13	0.04	−3.62	<0.001
2014 × Zoning	−0.12	0.08	−1.40	0.160	0.02	0.04	0.53	0.597
2016 × Zoning	−0.04	0.08	−0.45	0.651	−0.02	0.04	−0.53	0.598
2017 × Zoning	−0.24	0.08	−2.89	0.004	−0.09	0.04	−2.36	0.018
2018 × Zoning	−0.32	0.08	−3.80	<0.001	−0.09	0.04	−2.47	0.013
	Keppel Islands–density				Keppel Islands–species richness			
(Intercept)	8.17	0.17	46.99	<0.001	3.35	0.06	58.58	<0.001
2009	−0.17	0.17	−1.01	0.312	−0.14	0.05	−3.06	0.002
2011	−0.54	0.17	−3.12	0.002	−0.32	0.05	−6.78	<0.001
2013	−2.02	0.18	−11.5	<0.001	−0.51	0.05	−10.50	<0.001
2015	−0.86	0.17	−4.99	<0.001	−0.57	0.05	−11.46	<0.001
2017	−1.02	0.17	−5.96	<0.001	−0.27	0.05	−5.90	<0.001

TABLE 2 (Continued)

	Estimate	Std. Error	z Value	Pr (> z)	Estimate	Std. Error	z Value	Pr (> z)
2021	-1.09	0.17	-6.61	<0.001	-0.45	0.05	-9.55	<0.001
Zoning	0.01	0.25	0.03	<0.001	-0.06	0.08	-0.69	0.488
2009 × Zoning	0.24	0.24	0.99	0.321	-0.09	0.07	-1.36	0.175
2011 × Zoning	-0.34	0.25	-1.40	0.163	0.01	0.07	0.22	0.829
2013 × Zoning	0.13	0.25	0.52	0.605	-0.12	0.07	-1.67	0.095
2015 × Zoning	-0.25	0.24	-1.04	0.230	-0.04	0.07	-0.61	0.544
2017 × Zoning	0.44	0.24	1.78	0.074	0.02	0.07	0.24	0.809
2021 × Zoning	0.38	0.24	1.59	0.111	0.11	0.07	1.59	0.112

Note: Significant differences are highlighted in bold. Site and Transect were included as random factors, and a negative binomial distribution was used.

separation between zones was clearly driven by a higher proportion of *Plectropomus maculatus* and *P. leopardus*, the primary fishery target species, in NTMRs (Figure 3a,c). In the Palm Islands, the greatest dissimilarity in species composition occurred between 2016 and all other years, but no one species contributed more than 2.3% to the overall change, suggesting subtle shifts in the abundances of numerous species. There was less separation between zones at Magnetic Island (Figure 3b) and the Keppel Islands (Figure 3d). The largest shift on Magnetic Island occurred in 2012 (after Cyclone Yasi), driven by a decline in the carnivore *Lutjanus fulvivflamma*, coral-dependent *Pomacentrus moluccensis*, and small changes in the abundance of omnivorous and planktivorous damselfishes (Figure 3b). Similarly, changes between years in the Whitsunday and Keppel Islands were driven by highly abundant planktivorous damselfish species such as *Chromis nitida* (Figure 3c,d), but individual species contributions were never greater than 3.6% in the Whitsunday Islands and 9% in the Keppel Islands (Appendix S2).

3.2 | Regional differences in temporal drivers

3.2.1 | Potential drivers

Temporal changes in the drivers of fish assemblages were unique to each island group and sometimes varied among management zones (Figure S2.1–S2.19). Changes in cyclone exposure reflected the timing of major cyclones in each region. They reached higher index values in NTMRs in the Palm Islands (Cyclone Yasi, in 2011) and in fished zones in the Whitsunday Islands (Cyclone Ului, in 2010). Highly turbid water was measured in all island groups and zones at the beginning of the study, but kd490 and Chlorophyll-a values reflected this only in the Keppel and Palm Islands, and were higher in NTMRs (Figure S2.2,3,4). In contrast, the temperature-related variables (SST mean, SST anomaly, DHW) increased over the study period (Figures S2.5,6,7).

Over the 12–14 years of the study, the island groups experienced a loss and subsequent recovery of hard coral cover, coral morphological diversity and benthic richness (Ceccarelli

et al., 2020). Turf, macroalgae and unconsolidated substratum followed the opposite trajectory to hard coral cover to some degree (Figure S2.8–14). Measures of structural complexity declined in the Keppel Islands, with the most recent estimate half of what it had been at the start of the study (Figure S2.5–7). In the Keppel Islands and on Magnetic Island, the cover of hard and soft corals, benthic diversity and structural complexity metrics were lower in NTMRs. The Whitsunday Islands experienced a relatively stable benthic community until Cyclone Debbie (2017) caused a dramatic loss of hard coral and benthic richness, with a concomitant increase in macroalgal cover (Figure S2.8–S2.19). Prey density and biomass followed the hard coral cover trajectory in the Keppel Islands, and declined at Magnetic Island, in the Palm Islands (with a recent recovery in biomass) and in the Whitsunday Islands (Figure S2.20–2.21).

3.2.2 | Trends in fish density and hard coral cover

Overlaying smoothed trends in live hard coral cover and total fish density shows that the responses to disturbance events occurred in parallel for most combinations of island group and zone (Figure 4). Despite disparate fluctuations in the Palm Islands, both fish and coral showed a downward trend; this decline was steeper in the Whitsunday Islands. On Magnetic Island and in the Keppel Islands, there were signs of recovery for both fish and corals towards the end of the study period (Figure 4).

3.2.3 | Regional drivers of fish assemblages

Across all island groups, the strongest relationships in the temporal dynamics of total fish density were with the cover of unconsolidated substrata, living hard corals, turf and macroalgae, and changes in temperature (mean SST, Figure 5a, Table S4). The strongest positive relationship was with the cover of living hard corals, with fish density rising rapidly to 2500 individuals per 1000m² at 30% coral cover. Relationships with all other influential variables were negative

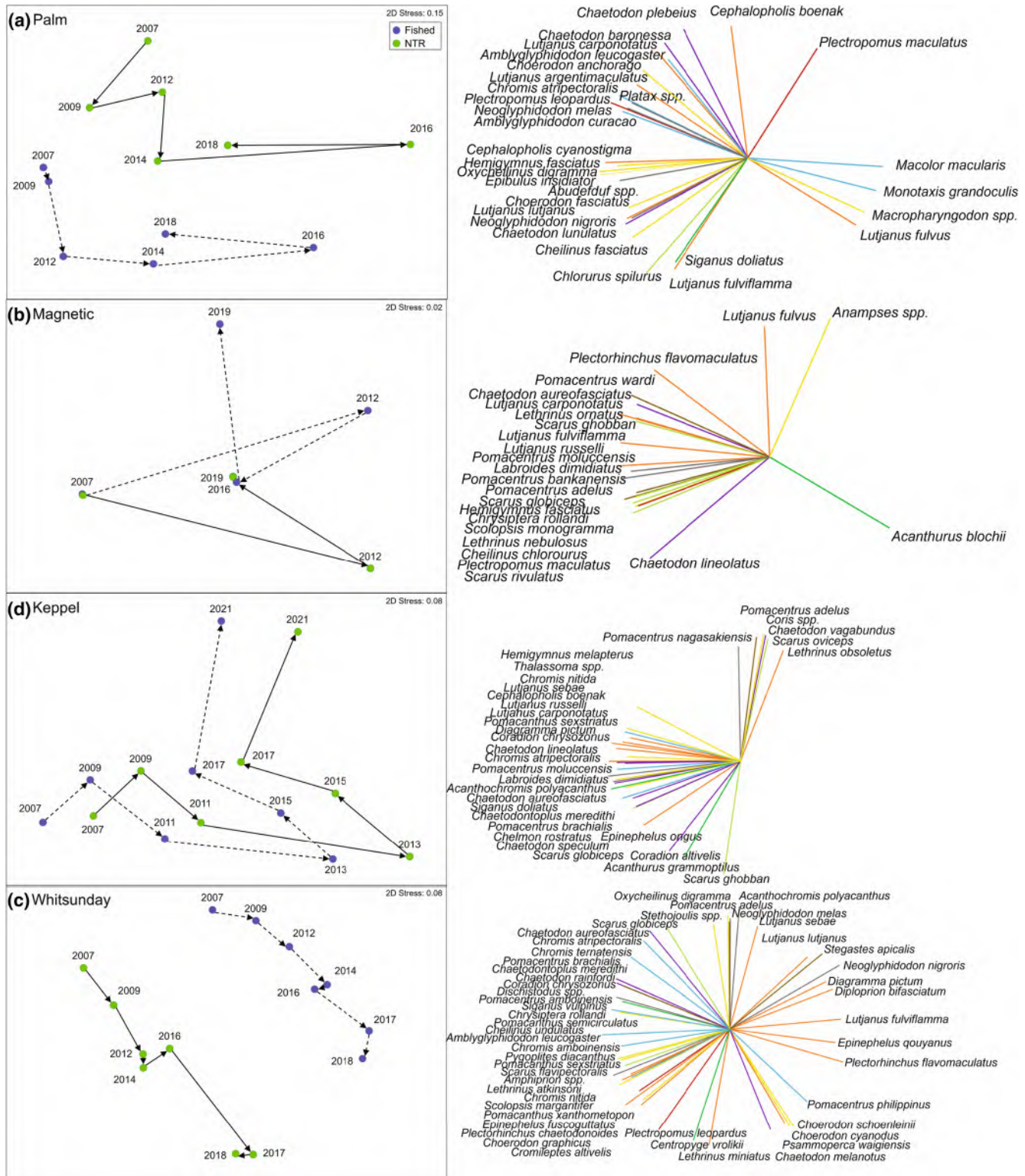
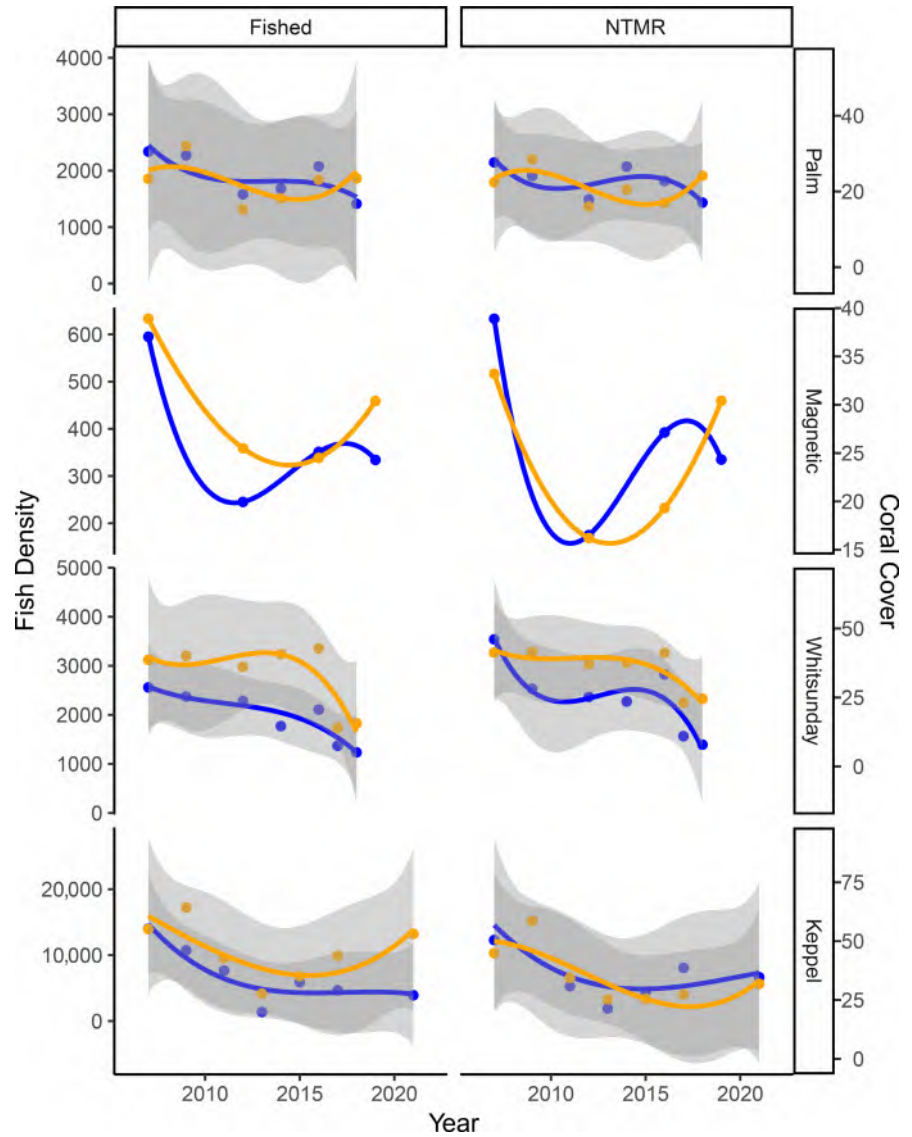


FIGURE 3 Non-metric multidimensional scaling plot (MDS) of temporal trends in fish species composition, performed on the Bray–Curtis dissimilarity matrix of zone-averaged, square-root transformed fish density data for each island group. Blue dots: fished zones and green dots: NTMRs. Vectors are coloured by trophic group: yellow: benthic invertivores; orange: carnivores; purple: corallivores; brown: farmers; dark green: grazers; grey: omnivores; light green: parrotfish; red: piscivores; and blue: planktivores.

(Figure 5a). Without the Pomacentridae, live coral cover was no longer among the most influential predictors (Figure S3a, Table S5). The total density of the remaining fish assemblage declined steeply

with increasing mean SST, and had a positive relationship with the cover of turf and unconsolidated substrata (Figure S3a). Changes in fish species richness over time were positively correlated with

FIGURE 4 Summary trends (2007–2019) of total fish density (blue line) and live hard coral cover (orange line) for each island group and zone. Data points are year-level means across all sites at each island group, trend lines are third-order polynomials, and shading represents 95% confidence intervals. Magnetic Island's small number of sites did not allow the production of confidence intervals.



increases in benthic richness and negatively correlated with increases in mean SST and SST anomaly (Figure 5b). DHW had a weak positive relationship with overall species richness. Excluding the Pomacentridae revealed a positive effect of soft coral cover and mean SST on species richness, and a negative effect of SST anomaly (Figure S3b).

Across all island groups, temporal change in species composition was most strongly correlated with the cover of soft corals ($R^2=0.58$; Figure 5c). Soft coral cover above 5% was associated with a profound shift in species composition of reef fish; in the Palm and Whitsunday Islands, soft coral cover reached 30% at times. Mean SST was by far the most important driver of species composition once the Pomacentridae were removed; assemblage structure changed dramatically at approximately 25°C (Figure S3c). Overall, most trophic groups declined, except farmers, grazers, omnivores and parrotfish. However, the relationships between fish metrics and biophysical drivers varied between island groups.

3.3 | Local drivers of temporal dynamics

3.3.1 | Palm Islands

In the Palm Islands, the total density of reef fishes increased with increasing hard coral cover and had a negative relationship with the relative cover of unconsolidated substrata and changes in DHW (Figure 6a). Fish density decreased rapidly once unconsolidated substrata covered 10% or more of the benthos, but DHW was positively correlated at a value of 2.5, after which fish density plateaued (Figure S4.1, Table S4). Removing Pomacentridae from the model resulted in turf and unconsolidated substrata having a stronger, and positive, relationship with total fish density (Figure S5a, Table S5). DHW also had a positive relationship with species richness, together with the cover of soft corals and higher coral morphological diversity values (Figure 6a, Figure S4.2). Mean SST had a negative relationship with species richness, with richness declining rapidly even with small increases in mean SST

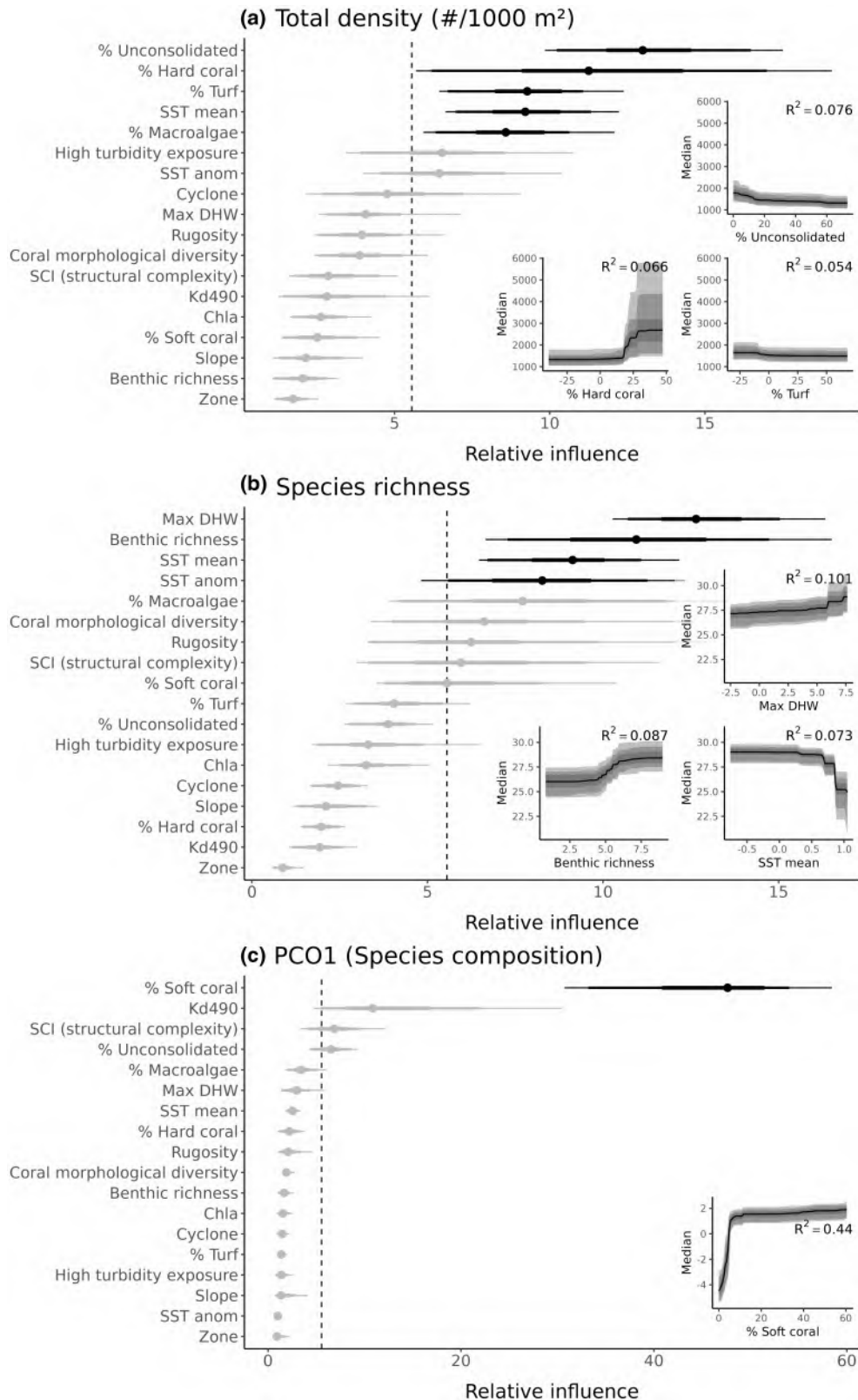


FIGURE 5 Relative importance plot for all predictors of (a) total fish density (individuals 1000 m⁻²), (b) total fish species richness and (c) fish species composition as defined by the first axis of a principle coordinates analysis (PCO1), and partial plots of the most influential predictors across all island groups. Predictors that performed best (i.e. they were disproportionately represented in trees) are highlighted in bold. Confidence bands represent 95% quantiles on bootstrapped estimates; note the differences in the y-axes of the partial plots. The dashed vertical line represents a reference point of relative influence that would be expected if all predictors were equally influential. Values above (to the right of) this reference (black symbols) are therefore considered to exhibit a higher degree of influence than expected by chance.

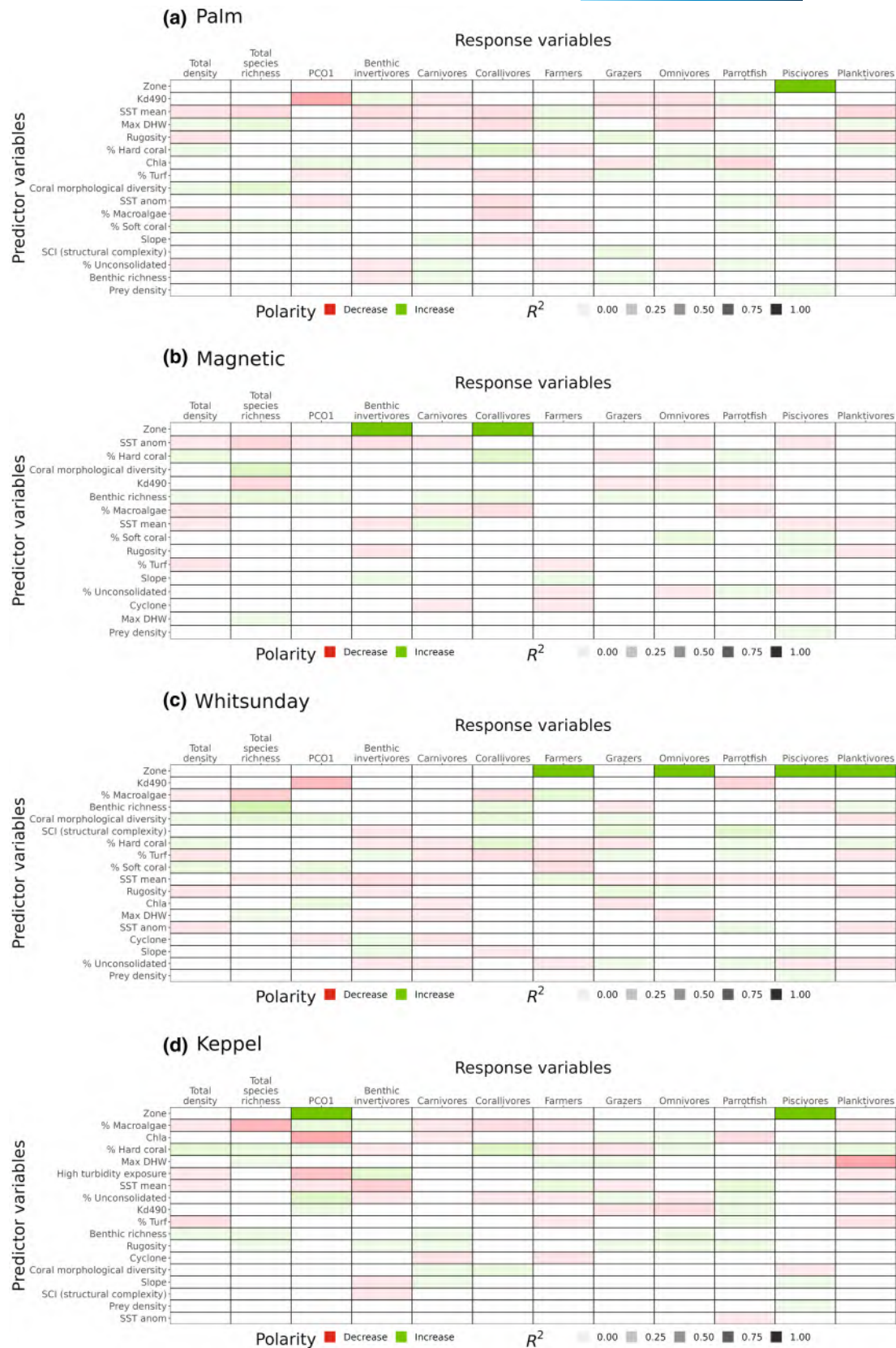


FIGURE 6 Heat map of the level of influence of each predictor variable with fish metrics (total fish density, fish species richness, species composition and density of each trophic group), as expressed by the R^2 value of the relationship, for (a) the Palm Islands, (b) Magnetic Island, (c) the Whitsunday Islands and (d) the Keppel Islands. The quasi- R^2 was calculated as the simple square of the correlation coefficient between the observed and partial predicted response. Warm colours are predictors that had a negative effect on fish metrics, green colours are predictors that had a positive effect on fish metrics. Only predictors that had an effect on at least one response variable are shown.

(Figure S4.2). Removing the Pomacentridae revealed a stronger relationship between species richness and SST anomaly, where there was a stepwise decline in species richness with increasing SST anomaly (Figure S5b). Increased turbidity and SST anomaly were correlated with higher values of PCO1 (Figure 6a), which were associated with a relatively depauperate, post-disturbance composition of fish species in the Palm Islands (Figure 4a; Figure S4.3). This depauperate assemblage was also correlated with higher DHW once Pomacentridae were removed, while higher structural complexity was indicative of a species-rich assemblage (Figure S5c).

All trophic groups except farmers had a negative or no relationship with mean SST, and all groups except farmers had a positive or no relationship with live hard and soft coral cover (Figure 6a, Table S6). Benthic invertivores showed a negative correlation with benthic richness and DHW and a positive correlation with Chlorophyll-a and turbidity (kd490) (Figure S6.1). Carnivores were negatively influenced by DHW (Figure S6.2). Corallivore densities showed neutral or negative relationships with all predictors except hard coral cover, to which they were positively correlated (Figure S6.3). Contrary to expectations, farmers were negatively correlated with soft coral cover and turf cover, and positive associations were found between farmers and mean SST and DHW (Figure S6.4). Grazers responded negatively to increasing turbidity (kd490) and DHW, and positively to increasing turf cover and rugosity (Figure S6.5). Although omnivores increased over time, they responded negatively to turbidity (kd490) (Figure S6.6). Parrotfish densities decreased with increasing Chlorophyll-a and mean SST but had positive or no relationships with all other predictors, including kd490 and hard coral cover (Figure S6.7). Piscivores were the only group that had a strong positive relationship with zoning, and their densities increased with NTMR protection, prey density and slope steepness (Figure S6.8). Planktivores had a negative relationship with turf cover, the cover of unconsolidated substrata and mean SST (Figure S6.9). Planktivores, omnivores and farmers, dominated by small-bodied species of Pomacentridae, nevertheless had different patterns in their associations with biophysical variables. For example, farmers had a negative association with hard coral cover, while planktivores and omnivores had a positive relationship with hard coral cover (Figure 6a). All three groups, however, had a negative relationship with unconsolidated substrata (Figure 6a), but farmers and planktivores appeared to have a threshold at approximately 20% unconsolidated substrata, after which they declined, whereas the threshold for omnivores was between 40% and 60% (Figure S6.6).

3.3.2 | Magnetic Island

At Magnetic Island, temporal changes in total fish density were strongly and positively associated with the cover of live hard corals (Figure 6b). Even small increases in hard coral cover, from 0% to 10%, were associated with steep gains in fish density (Figure S3.4, Table S4). Species richness increased rapidly with increasing benthic richness, but declined dramatically with SST anomaly (Figure S3.5).

Similarly, species composition was correlated with the same two drivers as density, but with weak relationships (R^2 of 0.004 and 0.007, respectively, Figure S3.6). Without Pomacentridae, benthic richness was a more important positive driver of total density (Figure S3d, Table S5), and SST anomaly was the most important driver of species composition (Figure 5f).

Among the trophic groups, management zoning on Magnetic Island had a strong positive relationship with the density of benthic invertivores and corallivores (Figure 6b, Figure S4.10–S4.18, Table S6). SST anomaly, turbidity (kd490) and the cover of macroalgae had a neutral or negative effect on all trophic groups, while benthic richness was a positive driver for many trophic groups (Figure 6b). Carnivores, which included several target species of the recreational fishery, responded positively to benthic richness and mean SST, but had a negative relationship with SST anomaly, cyclone exposure and macroalgal cover (Figure S4.11). Farmers also had negative relationships with cyclone exposure and also responded negatively to the cover of turf and unconsolidated substrata, but increased with increasing slope, albeit at very low slope index values (Figure S4.13). There was a positive correlation between corallivores and parrotfish and hard coral cover (Figure S4.12,16). Piscivores were positively correlated with increasing prey density, but not NTMR protection (Figure S4.17). Planktivores were present in low abundance, and negatively associated with mean SST and rugosity.

3.3.3 | Whitsunday Islands

In the Whitsunday Islands, fish density was strongly positively correlated with increasing per cent cover of hard coral, and negatively correlated with increasing turf and macroalgae (Figure 6c; Figure S3.7, Table S4). Species richness increased with coral morphological diversity and declined with mean SST (Figure S3.8). Years with higher SST, higher turbidity and lower Chlorophyll-a also had higher proportions of planktivores and corallivores, while carnivorous species predominated during times of lower temperatures and turbidity and higher Chlorophyll-a (Figures 4d, 6c; Figure S3.9). Removing the Pomacentridae changed these relationships, whereby total density was positively associated with the cover of turf, unconsolidated substrata and soft coral (Figure S5g, Table S5). The relationship between species richness and mean SST became positive, and there was a stronger positive relationship with the cover of unconsolidated substrata, but SST anomaly had a negative effect on compared species richness (Figure S5h). Macroalgae had a much greater influence on species composition with Pomacentridae removed, as well as mean SST and SST anomaly (Figure S5i).

NTMR protection was positively correlated with piscivores, but also with the Pomacentridae-dominated farmers, omnivores and planktivores, affecting more trophic groups than in the other three regions (Figure 6c; Figure S4.19–S4.27, Table S6). Benthic invertivores showed a negative correlation with mean SST and a positive correlation with cyclone exposure (Figure S4.19). Carnivores were

negatively correlated with hard coral cover, turf cover, cover of unconsolidated substrata and mean SST; there was no discernible effect of zoning on carnivores (Figure S4.20). Corallivores were positively correlated with live hard coral cover and benthic richness, and negatively correlated with slope steepness, macroalgal cover and turf cover (Figure S4.21). Farmers had a negative relationship with hard coral cover and turf cover, and positive associations were found between farmers and mean SST (Figure S4.22). Grazers responded negatively to increasing benthic richness and mean SST, and positively to increasing coral morphological diversity (Figure S4.23). Although omnivores increased over time, they responded negatively to SST anomaly and DHW (Figure S4.24). Parrotfish densities increased with increasing unconsolidated substrata, and declined with turbidity (kd490), mean SST and SST anomaly (Figure S4.25). However, turf cover had a positive relationship with parrotfish density (Figure S4.25). Piscivores declined with increasing benthic richness and were positively correlated with cyclone exposure (Figure S4.26). Planktivores responded positively to increases in hard coral cover and benthic richness, but had a negative association with coral morphological diversity, the cover of algal turf and unconsolidated substrata, rugosity and SST anomaly (Figure S4.27).

3.3.4 | Keppel Islands

Hard coral cover had a strong positive relationship with the temporal dynamics in fish density in the Keppel Islands, while turf cover and mean SST had a negative effect (Figure 6d; Figure S3.10, Table S4). Fish species richness had a positive association with DHW (Figure S3.11). Changes in species composition over time were governed by zoning, macroalgal cover, turbidity and mean SST, with periods in which the fish assemblage was relatively depauperate (higher values of PCO1) associated with periods of higher macroalgal cover and turbidity, and lower temperatures (Figure 4c, Figure 3.12). Without the Pomacentridae, the cover of unconsolidated substrata had a positive effect on total density (Figure S5, Table S5), species richness increased with rugosity and mean SST (Figure S5), and rugosity was the most influential driver of species composition (Figure S5).

The relationships between predictor variables and trophic groups were mixed, except for benthic richness and rugosity, which had only positive relationships with fish groups (Figure 5d, Figure S4.28–S4.36, Table S6). Benthic invertivores were associated with lower hard coral cover, but had (weak) positive relationships with cyclone exposure and slope (Figure 6a; Figure S4.28). Carnivores were most strongly correlated with rugosity, with which they had a positive relationship, and also showed a tendency to increase with increasing benthic richness, coral morphological diversity and slope, but to decline with increasing Chlorophyll-a, cover of macroalgae and cyclone exposure (Figure 6a; Figure S4.29). Coral morphological diversity had the strongest (positive) effect on corallivores, more so than hard coral cover, and even small increases

in macroalgal cover had a negative effect on corallivore densities (Figure 6a; Figure S4.30). Cyclones and higher turf cover led to declines in farmers, but DHW had a positive relationship with farmer density (Figure S4.31). Grazers appeared to benefit from higher DHW and rugosity but declined with increasing hard coral cover and SST (Figure S4.32). Omnivores also preferred higher hard coral cover and rugosity but declined with increasing unconsolidated substratum (Figure S4.33). Parrotfish preferred higher turbidity (Figure S4.34), piscivores responded positively to NTMR protection, higher prey density and hard coral cover (Figure S4.35), and planktivores increased with increasing hard coral and declined with higher cover of turf and macroalgae (Figure S4.36). Similarly to the Palm Islands, hard coral cover affected farmers negatively, but omnivores and planktivores positively, while unconsolidated substrata were negatively correlated with all three Pomacentridae-dominated groups (Figure 6a).

4 | DISCUSSION

Coral reef fish assemblages on inshore GBR fringing reefs showed strong responses to regionally specific disturbance events, with periodic declines over 12–14 years. While increases were observed during disturbance-free years, an overall decline in density (by 33%–72%) and species richness (by 41%–75%) was seen over the study period, driven to a large extent by small-bodied fishes of the family Pomacentridae. Similar declines were observed on both NTMRs and fished reefs, suggesting that inshore NTMR networks provided only a marginal benefit against environmental disturbance events (but see Williamson, Ceccarelli, Evans, Jones, & Russ, 2014) beyond fishery target species. Key drivers of temporal change in fish assemblages most common across regions and trophic groups were living hard coral cover, temperature-related variables (mean SST, DHW), turbidity and the cover of algal turf. Therefore, while changes in fish assemblages over time were influenced by changes in their habitat, the BRT models indicate that they were also affected directly by physical variables such as temperature and water quality. Predicted increases in ocean temperatures (IPCC, 2021) and expected declines in water quality with increasing flooding caused by extreme weather events (Devlin et al., 2012) raise concerns for these inshore reefs and their fish assemblages. These assemblages typically consist of lower numbers of species at lower densities than those further offshore, making the inshore assemblages potentially more vulnerable to disturbances (McClure et al., 2019).

4.1 | Temporal dynamics and disturbance events

Environmental disturbance events over the last 12–14 years were usually followed by a decline in density and species richness of coral reef fish, as well as shifts in species composition. None of these metrics returned to their pre-disturbance state within the study period. Additionally, the phases of recovery were not long enough to

prevent an overall decline in fish total density and species richness over the monitoring period. The smallest overall decline occurred at the Palm Islands, where total density and species richness reached similar levels to the early years by the end of the study. The largest periodic declines occurred in the aftermath of cyclones at the Palm and Whitsunday Islands, and Magnetic Island, and severe floods causing mass coral mortality at the southernmost island location, the Keppel Islands. While cyclones and floods produced the greatest response in fish abundance and richness, our analyses indicate that it was not the direct effect of these events that were the most important drivers of change in fish communities, but rather the indirect effects of habitat loss in the form of hard coral declines. This was further corroborated by the close relationship between the fluctuation in coral cover and total fish density, which was driven by the numerically dominant Pomacentridae and therefore the bulk of the planktivorous, omnivorous and farmer trophic groups.

Compared with storms and floods, fish assemblages responded less to bleaching events that reduced the cover of living corals, likely due to the remaining skeletons continuing to provide structure, at least in the short term (Gerlach et al., 2021; Pratchett et al., 2011). Generally, the physical destruction of the complex structure of reefs has greater consequences for fish than coral mortality events that leave the structure intact (Emslie et al., 2014; Gerlach et al., 2021); structural complexity decline can cause losses in abundance of up to 75% and make local extirpations likely (Emslie et al., 2014). In addition, although many species will have been adversely affected by coral mortality, for example corallivores and some of the planktivores that rely on live corals for shelter, other trophic groups such as grazers increased in abundance (Russ, Questel, et al., 2015), offsetting losses and thereby reducing the decline in total density. In this way, 'winners and losers' alternate in cycles. Fish density and species richness recovered during concurrent periods of coral recovery (usually lasting at least 5 years) documented in Ceccarelli et al. (2020), indicating a period that was conducive to general reef recovery, and that both coral and fish assemblages on the GBR retain the capacity to recover during disturbance-free periods (Emslie et al., 2024; Plass-Johnson et al., 2018).

The species composition of fish assemblages shifted over the duration of the study at all four island groups, with the largest changes occurring after disturbance events. Importantly, species composition at all four island groups did not 'bounce back' to pre-disturbance configurations, remaining different from the 2007 assemblage at the end of the monitoring period. The Palm Islands demonstrated the greatest propensity to return towards the composition of the early years, possibly due to its wide range of different habitat types, exposure levels and high connectivity between them. Magnetic Island and the Keppel Islands had phases where the post-disturbance assemblage was generally depauperate, with losses across the entire fish assemblage, as is common when hard coral loss exceeds 50% (Pratchett et al., 2011). Magnetic Island is unique among the locations in this study in that it is a solitary island, rather than an interconnected group of islands, with a smaller area of available coral reef habitat than the other island groups. Turbidity is typically higher (Fabricius et al., 2005), and anthropogenic pressure through

visitation and recreational fishing is high due to the close proximity of Magnetic Island to the mainland (Ceccarelli et al., 2023). Much of the shallow coral reef habitat around Magnetic Island is seasonally overgrown with brown macroalgae (e.g. *Sargassum* spp.), and habitat complexity of the benthos is lower than at other island groups (Ceccarelli et al., 2020). The trajectory of change in the Whitsunday Island group followed a near-linear pathway. Generally, assemblages shifted towards omnivorous, carnivorous and grazing species, while coral-dependent species declined. Such mixed responses, both taxonomically and geographically, appear typical in studies of disturbance impacts to reef fish assemblages (Fukunaga et al., 2022; Wilson et al., 2006). The changes to fish assemblages due to disturbance measured here are likely to differ from the changes in fish assemblages on reefs further offshore. McClure et al. (2019) suggested that inshore reefs are the most vulnerable to loss of species, traits and functional roles after disturbance events, because of their lower species richness and exposure to chronic environmental stresses near the coast.

Other studies also documented 'winners and losers' after cumulative disturbances, and in many cases, summary metrics such as total density and species richness masked changes in the proportional abundance of different species (Cheal et al., 2008, Wilson et al. 2009, Lamy et al., 2015, Ceccarelli et al., 2016, Triki & Bshary, 2019). As reefs degrade under chronic anthropogenic pressures, there is concern that the highly diverse coral reef fish assemblages of the past will become dominated by generalists, reflecting a decline in the diversity of benthic communities and habitats (Stuart-Smith, 2021). In other studies, species reshuffling occurred, but trophic characteristics and traits, and therefore functional redundancy, were retained despite repeated and chronic stress, maintaining the processes, if not the exact species composition, of coastal reefs (Cook et al., 2022). It is therefore concerning that the reefs in our study did display such significant declines in coarse summary metrics such as total density and species richness.

4.2 | Drivers

Disturbance-induced coral loss, regime shifts to macroalgal dominance and the decline in overall structural complexity are repeatedly correlated with declines in fish density, biomass and diversity (Graham & Nash, 2013; Pratchett et al., 2008; Wilson et al., 2006). In contrast, certain groups of fishes have been shown to increase after coral mortality, such as parrotfish that can benefit from the sudden increase in carbonate substratum covered in turf and blue-green algae (Clements et al., 2017, Nicholson & Clements, 2023, Russ et al. 2021). Here, we show that benthic habitat was certainly a driver for temporal changes in coral reef fish assemblages on inshore reefs of the GBR, but that physical forces also acted directly upon reef fish assemblages. Where the relationships we explored were weak (in the form of low R^2 values), we acknowledge that forces other than those we tested are also important drivers of change in reef fish assemblages, such as recruitment patterns (Sale, 2004),

connectivity (Gerlach et al., 2021), historical biogeographical and geomorphological factors (Bennett et al., 2018; Samoilyis et al., 2019) or reef size (Dames et al., 2020). Furthermore, we offer any generalisations with caution, given that the temporal dynamics and drivers that affect inshore reefs are likely to be different from those that influence mid-shelf or outer shelf reefs, both on the GBR and elsewhere (Dubuc et al., 2023; Emslie et al., 2017; Emslie et al., 2019; Malcolm et al., 2010). However, GBR inshore reefs do serve as useful representatives for a large proportion of coastal reefs worldwide. Over 75% of the world's coral reefs occur within 20km of the coast (UNEP-WCMC et al., 2021) and are therefore similarly vulnerable to overexploitation, land-based run-off and the impacts of environmental disturbance events exacerbated by climate change.

4.2.1 | Physical variables

Temperature variables were the most consistently influential physical drivers of temporal change in fish assemblages. Of these, mean SST and DHW were most frequently among the key drivers of change, with mostly negative effects, indicating thermal stress in coral reef fishes. These results therefore show that predicted climate change-driven increases in global ocean temperatures will not only have devastating effects on reef-building corals (Frieler et al., 2013), but will directly affect reef fish assemblages. However, in the Palm, Keppel and Whitsunday Islands, increasing SST had positive effects on farming damselfish. This trophic group also responded positively to DHW in the Palm Islands, while in the Keppel Islands, DHW was positively correlated with species richness and the density of farming damselfish and grazing fishes.

Water temperature can be positively correlated with fish species richness due to increased metabolic potential of many species (Allen et al., 2002; Parravicini et al., 2013). In our study, small-bodied fishes of the family Pomacentridae tended to respond positively to increasing mean temperature, but were negatively affected by SST anomalies. Fishes also have an upper-temperature threshold above which they experience sublethal and perhaps even lethal stress (Shultz et al., 2016). SST increases and changes in the upper limits of temperature anomalies with climate change have already altered the distribution and community interactions of marine species (Poloczanska et al., 2013).

Temperature tolerance can be species- or even size-dependent, potentially resulting in the re-assembly of fish communities over time (Clark et al., 2017). However, declines in density or biomass following heat stress can simply be due to vertical movements to deeper waters, rather than mortality; in such cases, repeated monitoring usually finds a rapid return to previous population abundance (Magel et al., 2020). Mellin et al. (2016) found a strong decline in the density of large-bodied species and those with small geographic ranges when certain temperature thresholds were exceeded. On the inshore GBR, where the maximum depth is 12m and fish have no escape from shallow warming, this study suggests that with increasing water temperatures and recurrent bouts of heat stress, we may

lose density of all fish groups except grazing and farming species. In some parts of the world, an increase, or a dominance, in farming damselfish is viewed as a sign of reef degradation (Han et al., 2016).

After temperature, fish assemblages were influenced most by water quality variables and the exposure to cyclones. Turbidity, as measured by kd490, was a key driver of species composition in all island groups except Magnetic Island, which was the most uniformly turbid region throughout the study period. Generally, highly turbid reefs are thought to be associated with lower habitat quality and lower richness and abundance of reef fishes (Bejarano & Appeldoorn, 2013). On the inshore GBR, periods of greater turbidity can be associated with the aftermath of disturbance events (Luter et al., 2021), which, in the Keppel Islands, led to a low-diversity fish assemblage and an increase in parrotfish numbers taking advantage of the additional bare substratum. However, the more equivocal results (e.g. higher diversity in the Whitsunday Islands) may be due to the nature of these inshore reefs, where even periods of high wind speeds can resuspend the terrigenous sediment from the shallow seafloor (Ceccarelli et al., 2020). Similar cautions can be made for the interpretation of the effects of primary water, which is highly turbid and usually associated with freshwater flood plumes, but can also be the result of periods of high wind. Physical impacts on fish from being thrown around by cyclone waves are the most likely direct effect from cyclones, the other possibility (which is beyond this paper's scope) is fish response to cyclone cooling. Changes in abundance could occur due to emigration to calmer areas (Bacheler et al., 2019), or mortality (Gavriel et al., 2023). Further research is needed to disentangle the relative importance of cyclonic waves and cooling from the effects of habitat loss.

While turbid water may help hide prey from predators (Hess et al., 2019) and lead to more detritus for detritivores and omnivores (Brown et al., 2017), it also blocks visual cues (Newport et al., 2021), reduces the feeding efficiency and productivity (Tebbett et al., 2023) of some species directly or through sediment deposition (Goatley et al., 2016) and smothers the benthic habitats of some species (Cook et al., 2022). Furthermore, when turbidity is increased in the wake of disturbance events, it may be the effects of these same disturbances, rather than the turbidity itself, that elicits a response. High nutrients and turbidity have been a feature of these inshore reefs for decades or perhaps centuries, and most coral reef fish are likely to have acclimated to the conditions before our study began. Furthermore, short-term turbidity changes may not be captured in our data because fish surveys were not conducted in visibility below ~5m, and surveys were conducted over annual or multi-year scales.

Productivity gradients as measured by Chlorophyll-*a* can also explain variability in fish assemblages (Samoilyis et al., 2019). Across the Pacific, productivity was associated with higher biomass not only of predators but also of planktivores (Williams et al., 2015). Here, Chlorophyll-*a* was not a universally positive driver of fish density, with negative (albeit weak) relationships with carnivores and parrotfish in the Keppel and Palm Islands, and grazers in the Whitsunday and Palm Islands.

4.2.2 | Habitat-based variables

The most important habitat-based drivers of change in coral reef fish assemblages were the cover of live hard coral, macroalgae, turf and unconsolidated substratum. Additionally, some fish groups responded to changes in habitat complexity. Overall, the total density of coral reef fish, and that of coral-dependent species, increased with increasing hard coral cover; this was highlighted by the almost ubiquitously parallel trajectories of hard coral cover and fish density, and confirmed by the results of the BRT models. Periods of higher hard coral cover in these regions occurred in the absence of disturbance events (Ceccarelli et al., 2020), and these were the periods in which fish density also recovered. Additional analyses to partition out the influence of small-bodied Pomacentridae revealed that these small-bodied planktivorous and omnivorous species are especially vulnerable to reductions in live coral cover. However, groups such as grazers and farmers, as well as carnivores and benthic invertivores, were negatively affected by higher hard coral cover in some instances. When hard coral cover is very high, the habitat can be relatively uniform, such as when reef slopes are dominated by monotypic stands of branching *Acropora* spp. (Diaz-Pulido et al., 2009). Previous studies have shown negative relationships between parrotfish and live hard corals (Russ, Questel, et al., 2015) and highlighted that certain families, such as goatfishes, wrasses and detritivorous surgeonfishes respond to different elements of the benthos, such as rubble and sand patches, soft corals or carbonate pavement covered in turf (Lowe et al., 2019; Russ et al., 2017; Russ et al., 2018; Russ, Bergseth, et al., 2015).

Reef fish recovery to pre-disturbance assemblage structure can be closely linked to coral recovery (Williamson, Ceccarelli, Evans, Jones, & Russ, 2014), or a new suite of macroalgal associated fish species may replace them if coral recovery fails (Evans et al., 2014; Robinson et al., 2019). Macroalgal dominance benefits certain species, such as some wrasse species (Fulton et al., 2019; Lowe et al., 2019), and macroalgal beds are known to play a positive role in the recruitment of lethrinids, siganids and *Choerodon* spp. (Evans et al., 2014; Wilson et al., 2008). Therefore, although a shift to macroalgal dominance can reduce overall fish diversity, it can bring some benefits to important fisheries species. However, our study showed that an increase in macroalgae caused declines in almost all trophic groups of fishes, whether this effect was among the most influential or not.

We found a negative association between the cover of unconsolidated substratum (sand, rubble) and fish density, which was often reversed towards a positive association in the absence of small-bodied Pomacentridae, likely due to the shift in dominance to Labridae and their subfamily Scarinae (parrotfish). This is also consistent with the observed declines in fish abundance after disturbance events that cause coral mortality and produce rubble. A spatial analysis of the same sites found some positive effects of increasing unconsolidated substratum, whereby a disturbance-mediated benthic shift towards patches of coral, macroalgae and rubble at small scales could increase the overall patchiness of the habitat, providing opportunities for species other

than those that prefer live corals, and therefore increasing species richness overall (Ceccarelli et al., 2023). This pattern was corroborated by removing small-bodied fishes from the analysis. However, this temporal analysis suggests that over time, more rubble leads to an eventual erosion of the positive effect on species richness as overall fish density declines (Wilson et al., 2006), and it would appear that this is driven by the response of small-bodied species. Habitat degradation in the form of coral loss and a flattening of habitat complexity has been shown to benefit only few trophic groups, such as farmers, some benthic invertivores and parrotfish (Graham, 2014).

Living hard coral is most important for species that directly rely on it for food and shelter. At a whole-assemblage level, live coral is rarely found to be among the most important drivers; a global meta-analysis found that associations between fish and corals are generally positive but weak (Muruga et al., 2024). However, every time a major disturbance impacted the inshore GBR, coral reef fish density (and to a lesser extent, species richness) declined, due to either mortality or, most likely, temporary movement. The link between live coral and the species that depend on it can also break down when those species are capable of broadening their habitat and dietary choices following coral loss (Semmler et al., 2022). Furthermore, the relationship between fish species richness and coral cover varies with increasing or declining coral cover, with a suggested threshold at around 10% coral cover, below which the relationship is strongly positive and above which it asymptotes (see also Beldade et al., 2015). At global scales, it has been projected that a hypothetical loss of all coral would result in a halving of fish diversity (Strona et al., 2021).

Structural complexity was generally not one of the most important drivers in this study, although it is known to be a strong driver of reef fish assemblage structure and abundance (Bell & Galzin, 1984; Chabanet et al., 1997; Emslie et al., 2014; Graham & Nash, 2013; Messmer et al., 2011; Sabater & Tofaeono, 2007; Samoilys et al., 2019). This is true not just for overall three-dimensional habitat structure but also for the variety of growth forms of corals and other benthos (Gratwicke & Speight, 2005), as we found in this study. In their review, Graham and Nash (2013) found overwhelmingly positive associations between reef fishes and structural complexity, but, once broken down into family groups, the associations were not universally significant. Higher structural complexity can provide more niche space to mediate density-dependent competition, refuge for prey and therefore more predators, hiding places for ambush predators and shelter from high water flow rates (Gratwicke & Speight, 2005). Different trophic groups of coral reef fishes tend to respond differently to changes in their structural environment, based on their resource and habitat requirements and interactions with other organisms (Graham et al., 2017; Jennings & Polunin, 1996; Ruppert et al., 2017; Russ & Alcala, 1989).

4.3 | No-take marine reserves

Temporal changes in total density and species richness in NTMR and fished zones were generally similar. The Whitsunday Islands was

the only region where density and species richness were generally higher in NTMRs; in the Palm Islands, species richness was higher in fished zones. This is not necessarily surprising in an ecosystem where fisheries only target a small number of largely piscivorous species, and it is highly likely that the differences in fish metrics are due to other attributes of those particular sites, and not due to management zoning (but see below). For example, a spatial analysis of the fish assemblages at these sites found that routine wave exposure was one of the key structuring forces of species composition, along with benthic habitat variables such as coral, macroalgae and rubble (Ceccarelli et al., 2023). NTMRs did have different species composition from fished zones in the Palm, Keppel and Whitsunday Island groups, but the changes in composition over time largely occurred in parallel in the two zones. In the Palm and Whitsunday Islands, the separation between zones was clearly driven by a higher proportion of *Plectropomus maculatus* and *P. leopardus*, the primary fishery target species, in NTMRs. Here, the density of target species remained higher in NTMRs than in fished zones throughout the study period.

Management zoning was an important driver of density only for piscivores, which was expected for a system in which the main commercial and recreational fishery targets a small number of predatory species such as *Plectropomus* spp. and large snappers and emperors (Emslie et al., 2015; Williamson et al., 2004). In fact, the NTMR effect in the BRT models was somewhat diluted by the fact that *Plectropomus* spp. were combined with some snappers, emperors and other groupers, some of which are not as strongly targeted by fisheries as *Plectropomus* spp. alone. Studies of NTMR effects on *Plectropomus* spp. alone on inshore GBR coral reefs often show strong, positive NTMR effects on density, biomass and reproductive output, sometimes despite evidence of poaching (Emslie et al., 2015; Evans et al., 2008; Harrison et al., 2012; Williamson et al., 2004; Williamson, Ceccarelli, Evans, Hill, & Russ, 2014; Williamson, Ceccarelli, Evans, Jones, & Russ, 2014). In other systems, fishing, or the absence of successful management, can be an important driver of overall coral reef fish density and biomass (McClanahan & Arthur, 2001; Russ & Alcala, 1989; Sandin et al., 2008).

There are a number of necessary design principles that facilitate the achievement of common NTMR goals (Edgar et al., 2014), such as the recovery of exploited populations (Graham et al., 2011), biodiversity conservation and improving ecosystem resilience. It is widely agreed that NTMRs are most effective when they are no-take, effectively enforced and managed, old (>10 years), large (>100 km²) and isolated from other areas by sand or deep water. The NTMR networks in the inshore island groups were up to 14 years old at the time of writing (Fernandes et al., 2005), but most of them are small, shallow and there is evidence that compliance is poor (Bergseth et al., 2015). For example, of the total reef slope area around Magnetic Island only 17% of this is protected within a series of six NTMRs that measure between 0.002 and 24 hectares (Williamson et al., unpubl. data). The Whitsunday Islands, where a larger effect of NTMRs was measured, has 24 NTMRs ranging up to over 200 hectares, protecting 20% of the reef slope habitats (Williamson et al., unpubl. data). While the NTMRs studied here are enough to protect

target species (Williamson et al., 2004), their small effect of the fish assemblages as a whole may be due to their small size, imperfect compliance and largely shallow habitats. More research could explore the influence of regional NTRM network design within the GBR on their abilities to buffer fish assemblages from disturbance.

5 | CONCLUSIONS

Anthropogenically driven climate change is already causing changes in ocean temperatures, acidity and environmental disturbance regimes worldwide (Henley et al., 2024; Hughes et al., 2017). Increasing temperatures are leading to range shifts of species and communities from tropical to subtropical and temperate marine habitats (Horta e Costa et al., 2014), and repeated heatwaves have caused global coral bleaching events of increasing spatial extent, frequency and intensity (Hoegh-Guldberg et al., 2023). Acidification is reducing growth rates and stability in organisms that rely on, or produce, calcium carbonate structures (Wei et al., 2009). On the GBR, the past decade has seen an unprecedented frequency and intensity of disturbance events, and coral populations—the primary ecosystem engineers—have become increasingly erratic and unstable (Emslie et al., 2024). It is against this backdrop that we present the concerning decline of a reef fish assemblage that is, in addition, subject to the chronic anthropogenic pressures typical of the coastal setting of 75% of the world's coral reefs.

This study revealed long-term declines in total reef fish density (up to 72%) and species richness (up to 75%), as frequent acute disturbances subjected coral habitats to multiple successive shocks that eroded abundance and biodiversity, and limited recovery. Our findings are concerning and at odds with previous GBR studies that have generally shown stability in these metrics in the face of environmental disturbances, albeit on reefs further from the coast (Cheal et al., 2008; Ceccarelli et al., 2016; Wilson et al. 2009). It is possible that we are witnessing a step change in benthic and reef fish community dynamics in the face of increasingly frequent disturbances. Additionally, our removal of the Pomacentridae from the Whole assemblage points to a risk of losing the numerically dominant and species-rich, small-bodied fish planktivores and omnivores. Such fish make up a large part of the food of piscivores and omnivores, and their small body size makes them highly productive, and they are thus an important part of the food web. Small-bodied prey fish species can affect the abundances of carnivorous species, and their decline may lead to losses of commercially and recreationally important predatory species (Carbone et al., 2011; Graham et al., 2003; Williamson, Ceccarelli, Evans, Jones, & Russ, 2014).

Environmental disturbances can reduce fish density and richness quickly, but recovery is typically slower in coral reef systems. We show that long-term decline in the quality of benthic habitat and physical environmental conditions led to demonstrable shifts in reef fish assemblage structure. NTMRs had little effect on total fish density, and in fact, species richness was higher on fished reefs than on NTMR reefs at three of four island groups. This result is

not surprising, considering the fishery predominantly targets larger piscivorous species and top-down predation pressure can drive prey fish species abundance and assemblage structure (Graham et al., 2003). In fact, our results do show NTMR benefits to target species (piscivores), but on reefs that experience high levels of acute and chronic pressure, small NTMRs in shallow habitats may not be as effective as they could be, given that their primary purpose on the GBR is the conservation of biodiversity (Fernandes et al., 2005). Studies that specifically quantify NTMR effects on fishery target species, on the GBR and elsewhere, confirm their efficacy in boosting populations of these species (Rodríguez-Rodríguez & Martínez-Vega, 2022; Russ et al., 2008; Williamson, Ceccarelli, Evans, Jones, & Russ, 2014). There is also evidence of indirect effects of NTMRs on assemblage structure, trophic dynamics, ecosystem recovery potential and pest outbreaks (Allard et al., 2022; Kroon et al., 2021; Topor et al., 2019). NTMRs remain one of the only large-scale tools for protecting marine environments, but there is increasing evidence that without global action on climate change, spatial protection and management alone are not sufficient for safeguarding coral reefs in the Anthropocene.

AUTHOR CONTRIBUTIONS

Daniela M. Ceccarelli: Conceptualization; data curation; formal analysis; methodology; visualization; writing – original draft; writing – review and editing. **Murray Logan:** Data curation; formal analysis. **Richard D. Evans:** Conceptualization; data curation; formal analysis; investigation; methodology; project administration; writing – review and editing. **Geoffrey P. Jones:** Conceptualization; funding acquisition; investigation; methodology; project administration; resources; supervision; writing – review and editing. **Marji Puotinen:** Resources; writing – review and editing. **Caroline Petus:** Methodology; resources. **Garry R. Russ:** Conceptualization; funding acquisition; investigation; methodology; project administration; supervision; writing – review and editing. **Tane Sinclair-Taylor:** Visualization. **Maya Srinivasan:** Investigation; writing – review and editing. **David H. Williamson:** Conceptualization; data curation; formal analysis; funding acquisition; investigation; methodology; project administration; writing – review and editing.

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CONFLICT OF INTEREST STATEMENT

The authors state that there is no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are openly available in Dryad at <https://doi.org/10.5061/dryad.jsxksn0k6>. The code that supports the findings of this study are openly available in Zenodo at <https://doi.org/10.5281/zenodo.3441725>.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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ARTICLE

Ecological success of no-take marine protected areas: Using population dynamics theory to inform a global meta-analysis

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Abstract

Adaptively managing marine protected areas (MPAs) requires accurately assessing whether established MPAs are achieving their goals of protecting and conserving biomass, especially for harvested populations. Ecological MPA assessments commonly compare inside of the MPA to a reference point outside of and/or before implementation (i.e., calculating “response ratios”). Yet, MPAs are not simple ecological experiments; by design, protected populations interact with those outside, and population dynamic responses can be nonlinear. This complicates assessment interpretations. Here, we used a two-patch population model to explore how MPA response ratios (outside–inside, before–after, and before–after–control–impact [BACI]) for fished populations behave under different conditions, like whether the population is receiving a sustainable larval supply or if it is declining despite protection from harvest. We then conducted a Bayesian evaluation of MPA effects on fish and invertebrate populations based on data collected from 82 published studies on 264 no-take MPAs worldwide, using the results of an earlier global meta-analysis as priors. We considered the effects of calculating different summary metrics on these results, drawing on the theoretical insights from our population model as a comparative framework. We demonstrate that not all response ratio comparison types provide the same information: For example, outside–inside and BACI comparisons can fail to detect population decline within MPAs, whereas before–after comparisons likely detect that pattern. Considering these

limitations, we nonetheless found that MPAs globally are producing positive outcomes, with on average greater biomass, density, and organism size within their boundaries than reference sites. However, only a small portion of studies (18 of 82) provided the temporal data necessary to determine that protection, on average, has led to increased abundance of populations within MPAs over time. These findings demonstrate the importance of considering the underlying system dynamics when assessing MPA effects. Assuming that large outside–inside or BACI response ratios always reflect large and net positive conservation effects may lead to misleading conclusions, we recommend that: (1) when assessing specific MPA effects, empirical findings be considered alongside theoretical knowledge relevant to that MPA system, and (2) management should respond to the local conditions and outcomes, rather than a blanket expectation for positive MPA effects.

KEYWORDS

adaptive management, before–after–impact–control, marine protected area, marine reserves, meta-analysis, modeling, population dynamics

INTRODUCTION

Marine protected areas (MPAs) are important tools for managing and conserving marine ecosystems globally. In particular, no-take MPAs in which all extractive and destructive activities are banned are typically established to conserve biomass and protect species from direct human activities (Grorud-Colvert et al., 2021; Horta e Costa et al., 2016). The global coverage of MPAs is rapidly increasing (UNEP-WCMC, IUCN, and NGS, 2018), and likely to continue in the future due to recent international commitments to protect biodiversity (IPBES, 2019). The last two decades have consequently seen a rise in the number of studies evaluating the effects of MPAs on marine ecosystems, as well as meta-analyses synthesizing these studies (Appendix S1: Table S1; Woodcock et al., 2017). Long term, large-scale monitoring and assessments are also underway for multiple MPA networks globally (e.g., CDFW, 2022; Emslie et al., 2020). As these studies and monitoring programs inform the adaptive management of current MPAs, and decision making about future MPAs, accurate assessments of the ecological effects of MPAs relative to their stated goals and objectives are critical.

Through spatial closure, MPAs are expected to protect and conserve species within their boundaries that have been impacted directly by human activity (IUCN WCPA, 2018). Indeed, numerous studies have demonstrated that MPAs increase local densities and biomass, average individual size, species richness, and benthic cover of habitat-forming species, and that these effects are especially strong for harvested species (Appendix S1:

Table S1 summarizes a non-exhaustive list of such prior work). In some cases, these species-level recoveries may also lead to local ecosystem recovery and larger-scale population effects through spillover and larval export (Di Lorenzo et al., 2020; Kerwath et al., 2013). There is also a rich empirical and theoretical literature documenting how ecological responses inside of MPAs are affected by features of the system, such as MPA characteristics, species and ecosystem traits, and local fisheries management (e.g., White et al., 2011, 2024). However, there has been little consideration of how the estimated magnitude and direction of those ecological responses may be impacted by the *assessment approach* used.

Practical assessments of the formal goals of MPAs—to protect and conserve species and ecosystems—require evaluation metrics that reflect achieving those goals. Two such metrics of MPA success are (1) that increases in ecological variables (e.g., local population density or biomass) are observed within the MPA relative to a reference point and (2) that ecological measures, at a minimum, do not decline within the MPA following implementation. The first metric indicates that protection is occurring, relative to any larger-scale factors affecting both the MPA and the reference point, and the second metric indicates that there is successful long-term conservation of the local population. While more complex approaches can be used (e.g., Osenberg et al., 2011; Ovando et al., 2021), the effects of MPAs are often distilled into a *response ratio* value, typically calculated as the logarithm of the ratio of the response variable (e.g., population density) inside of the MPA to a reference site outside, to data collected before MPA implementation, or both. Positive log

response ratios are typically taken to indicate success in achieving an MPA's conservation goals. The use of response ratios is particularly common in meta-analyses, which require comparisons across studies with different sampling approaches and techniques (Hedges et al., 1999). Previous meta-analyses demonstrate that empirical studies overwhelmingly use spatial comparisons between the MPA and a relevant reference site (outside–inside), compared with comparisons across time (before–after) or both (before–after–control–impact, aka “BACI”) (Halpern, 2003; Lester et al., 2009). Reflecting this, meta-analyses tend to focus on calculating outside–inside comparisons, sometimes intentionally excluding temporal data (Appendix S1: Table S1). While this outside–inside focus is often unavoidable (e.g., funding or logistics dictate that sampling begins after MPA implementation), it may create biases in MPA assessments (Claudet, 2018; Osenberg et al., 2011). Furthermore, as a summary metric, response ratios can provide little, and sometimes erroneous, insight into the underlying system dynamics and whether the MPA is achieving longer-term conservation goals (Moffitt et al., 2013).

The comparison approach used by MPA studies is based on the concept of detecting ecological impacts, such as the effects of a localized habitat disturbance (Schmitt & Osenberg, 1996). However, MPAs are not simple ecological experiments; by design, they have effects outside of their boundaries (Di Lorenzo et al., 2020; Grorud-Colvert et al., 2014; Ovando et al., 2021), are impacted by external factors (e.g., increased fishing pressure outside; Hopf et al., 2016b), and the dynamic responses can be nonlinear (Hopf et al., 2016a; White et al., 2013). For example, non-protected (reference) areas may be better off than expected due to larval export or adult spill-over from MPAs (e.g., Le Port et al., 2017), worse due to displaced fishing effort (e.g., Suuronen et al., 2010), or one may also off-set the other (Halpern et al., 2004). This confounds the use of these areas as independent controls. Indeed, ecological theory demonstrates that outside–inside and before–after response ratios are smaller for species with longer larval dispersal distances or larger adult home ranges, all else being equal (Moffitt et al., 2013).

The dynamics of a system also affect comparison metrics differently: Outside–inside MPA comparisons are more robust to high larval recruitment variability and acute disturbance events (Hopf et al., 2022; Hopf & White, 2023), but are unlikely to detect that a local population is declining despite protection (Hopf et al., 2022; Moffitt et al., 2013). Conversely, comparisons calculated over time can detect a population trajectory, but are more influenced by population fluctuations unrelated to protection. BACI-style designs are considered more robust to system heterogeneity (Halpern et al., 2004; Schmitt &

Osenberg, 1996; Stewart-Oaten et al., 1986), yet they can be sensitive to periodic variations in the system (Hopf et al., 2022), reflecting a tendency to have higher false-positive detections with population dynamics that are autocorrelated (Rassweiler et al., 2021). As different comparison types are likely to reflect different characteristics of a system, it is therefore important to understand the theoretical benefits and limitations of each type.

To help inform the synthesis of observed ecological MPA effects, we used a two-patch population model of a harvested species to demonstrate how the magnitude and build-up of MPA effects—measured as log-response ratios (logRR; Hedges et al., 1999)—can vary when calculated using different comparison types (outside–inside, before–after, and BACI) and biological response variables (biomass density, abundance density, and mean individual size). Importantly, we also show how logRR values can vary under different scenarios, such as whether the population is demographically open or closed, if fishing is reallocated at the time of implementation, or if the population is declining despite no-take protection (indicating that conservation goals may not be fully met). We focus on MPA effects on single species (as opposed to community-scale or indirect effects), as there is the clearest mechanistic link between the cessation of fishing and the increase in abundance and size at the level of individual populations. Using these model insights as a comparative framework, we then evaluate MPA effects for single species based on a meta-analysis of data collected from published studies on no-take MPAs from around the world. Overall, we propose that assessing MPA effects requires considering the interplay between context dynamics (MPA, environmental, and population traits), sampling approach (comparison and variable types), and the criterion being used to assess effectiveness. By considering the strengths and challenges of different comparison types and measurement variables, we make a more conservative and informed estimate of the effectiveness of no-take MPAs to protect and conserve populations within their boundaries.

METHODS

Population model

To demonstrate how logRR can vary by comparison types, measurement variables, and under different environmental or management scenarios, we used an age-structured, density-dependent, two-patch (one fished local population and one protected) model of Blue Rockfish (*Sebastes mystinus*; Sebastidae), a common, harvested, nearshore rocky reef and kelp forest fish on the US west

coast. Throughout this paper, we refer to the groups of individuals within an MPA patch as the “local population,” “MPA population,” or “protected population,” as distinct from a population that spans across MPAs and fished areas. We assume the spatial scale of the patches is large enough that adult fish do not move between them. The overall structure of the baseline model follows recent work examining the effect of environmental variability on MPA monitoring (Hopf et al., 2022; Kaplan et al., 2019; Nickols et al., 2019). Parameter descriptions and values can also be found in Appendix S1: Table S2.

Population dynamics over time tracked the state variables abundance ($N_{a,i,t}$) and biomass ($B_{a,i,t}$), of fish age a , in patch i , in year t . Recruitment to patch i at time t ($N_{1,i,t}$), is a product of larvae arriving ($L_{i,t}$), and recruit survival ($s_{1,i,t}$):

$$N_{1,i,t} = s_{1,i,t} L_{i,t}.$$

Our baseline scenario considered the case where patches have stable abundances prior to MPA establishment. Then, following implementation, fishing pressure is removed from the protected patch, allowing biomass to increase within MPA boundaries. This reflects the case where protection is successful and long-term conservation of harvested species is occurring within the MPA.

As the broader population consequences of increasing biomass within MPAs depend on scale, we consider both open and closed population scenarios. In the demographically open population, patches received an equal, constant, sustainable supply of arriving larvae ($L_{i,t}$). The parameter value for $L_{i,t}$ is arbitrary as our model is dimensionless with outcomes measured relative to $t = 0$ (initial conditions). This open scenario reflects a case where an MPA and a reference site are embedded within a larger metapopulation, with most larval production occurring outside of the two study sites (e.g., some portions of the California Channel Islands; Watson et al., 2010). Here, MPA effects are expected to be seen within the MPA, but not outside. At the other extreme, the closed population scenario, where larval production is a function of total adult biomass across both sites, reflects the case where an MPA contributes substantially to broader metapopulation dynamics through larval export (e.g., Harrison et al., 2012). In the closed population scenario, larval arrival ($L_{i,t}$) from a well-mixed larval pool was the summed product of fecundity of all fish age a (f_a) that was distributed proportional to the area in patch i (A_i):

$$L_{i,t} = A_i \sum_{i=1}^2 \sum_{a=a_{\text{mat}}}^{a_{\text{max}}} f_a N_{a,i,t-1},$$

where a_{mat} and a_{max} are the age of maturity and maximum age, respectively.

In all scenarios, post-settlement density-dependent survival ($s_{1,i,t}$) followed the Beverton–Holt functional form:

$$s_{1,i,t} = \frac{\alpha}{1 + \frac{\alpha L_{i,t}}{\beta}}.$$

We (1) set the slope at origin (α) so that the population collapses if fishing decreases the average lifetime egg production to below 25% of the unfished maximum (Botsford et al., 2019) and (2) set the theoretical maximum density of recruits (β) set to a constant value (1000). As with $L_{i,t}$ from the open scenario, the parameter value for β is arbitrary.

Once recruited, we assumed that fish remained within their local patch. Post-recruitment yearly survival depended on natural mortality rate M and, in non-MPA patches, fishing mortality rate F for fish over the minimum capture age (a_c), with units of years⁻¹ for both mortality rates:

$$s_{a,i,t} = \begin{cases} e^{-M}, & a \in [2, a_c) \\ e^{-(M+F)}, & a \geq a_c \end{cases}.$$

Prior to MPA implementation F was identical in both patches. We used a medium fishing pressure estimated for Blue Rockfish in the Channel Islands, California, USA (Nickols et al., 2019). Following MPA implementation, F was set to zero in the MPA patch and left unchanged in the fished patch (but see the alternative scenarios below).

We included process error as “pink,” or $1/f$, noise, common in many natural systems (Denny et al., 2004; Vasseur & Yodzis, 2004). Noise from randomly generated pink noise time-series, $\epsilon(t)$, were applied independently to each patch in each time step, reflecting spatial-temporal variability between patches (but see the alternative scenarios below).

Total patch abundance density (accounting for area) at time t was, therefore,

$$N_{T,i,t} = \frac{1}{A_i} \epsilon_{i,t} \sum_1^{a_{\text{max}}} s_{a,i,t} N_{a-1,i,t-1},$$

and biomass density was

$$B_{T,i,t} = \frac{1}{A_i} \epsilon_{i,t} \sum_1^{a_{\text{max}}} w_a s_{a,i,t} N_{a-1,i,t-1},$$

where w_a is fish biomass at age a , as a function of length at age a (L_a). L_a was used to calculate average individual size for local populations in each patch.

Because field sampling rarely captures the true population density, we also included measurement error in our model, where the sampled population abundances were drawn from a negative binomial distribution with a mean equal to the modeled density; this distribution was used because the variance in blue rockfish densities is greater than the mean (Hopf & White, 2023). We estimated the negative binomial distribution shape parameter (aggregation parameter: k) using publicly available blue rockfish data (Hopf & White, 2023).

In addition to the baseline, we also considered three alternative scenarios that are representative of some of the conditions that could confound the detection of increases in biological variables during ecological monitoring:

1. A *fishery squeeze scenario* in which fishing pressure (F) following MPA establishment was increased proportional to the area that remains open to fishing.
2. A *declining population scenario* where the density of incoming recruits linearly declines 50% over 50 years, reflecting a moderate decline in the population due to extrinsic factors (e.g., environmental degradation). The declining scenario represents a scenario where protection is occurring, but the MPA is not achieving the goal of conserving the local population long term.
3. A *correlated noise scenario* where the same pink noise time-series was applied to both patches, which assumes all patches experience similar environmental fluctuations (results presented in Appendix S1).

We simulated 2000 replicates of each scenario, and all scenarios had a 200-year burn-in period prior to MPA implementation, long enough to reach a stable distribution of abundance.

We calculated modeled response ratios over time for abundance density, biomass density, and mean fish size (“biological variables”) for all scenarios by comparing inside of the MPA to outside at the same point in time ($t \geq 0$; “*outside-inside*”), inside of the MPA before implementation ($t = 0$) to after ($t > 0$; “*before-after*”), and the ratio after-inside/before-inside to after-outside/before-outside (BACI). Simulated response ratios were then natural log transformed to calculate logRR values.

All population model simulations were implemented in MATLAB 2022b (The MathWorks Inc., 2022).

Literature meta-analysis

We undertook a comprehensive meta-analysis of the peer-reviewed scientific literature documenting ecological effects of designated no-take MPAs published between 2006 and June 2020 (i.e., the literature spanning

the period after the Lester et al. (2009) meta-analysis, up to the time we began our analysis). We were unable to include the data from the Lester et al. (2009) meta-analysis as those data were aggregated across taxa rather than analyzed at the species level. As such, we took a Bayesian approach, using the Lester et al. (2009) results as priors and updating the posterior estimates of MPA effects using data collected since then (see details below).

In December 2020, we searched the Web-of-Science database for articles that included “marine protected area” and associated search terms (see Appendix S1 for further details). Our initial search resulted in 7213 studies, of which 490 were manually selected based on title and abstract context. These studies were then read in detail to assess if they matched our selection criteria. Our filtering approach largely followed Lester et al. (2009): We only included studies that measured variables before–after, outside–inside, or both, for fully protected, individual no-take MPAs with suitable paired-reference sites. “Before” data was classified as before the MPA was enforced or during the first year of enforcement. “After” data was the most recent data available in the study, representing the longest duration of protection. Whether the study included time-series data was also noted. Studies must have measured at least one of three biological variables: abundance density, biomass density, and average organism size. While studies may have collected data at higher taxonomic levels, for the final analysis we only included species-level data. As population dynamics depend on species-specific demographic time lags, there is no simple way to scale model results to higher taxonomic levels. Studies that selectively presented only positive MPA effects, as declared in the studies’ methods or elsewhere, were not included.

The resulting database used in our analysis consisted of 708 “entries” (data points at the level of unique combinations of location—species—state variable—comparison type) from 82 studies, for which we extracted the relevant data. Where data were only available in plots, we extracted values using an online plot digitizer (WebPlotDigitizer v4.6; <https://automeris.io/WebPlotDigitizer.html>). We then calculated the logRR value (Hedges et al., 1999) as per the comparison used in the study (i.e., outside–inside, before–after, or BACI). Since zero-valued data points result in undefined or infinite logRR values, entries containing zeros were not included (this was 121 of the 728 entries). For each species we assigned harvest status (harvested or not), based on the status provided in the study. If no status was provided, we assigned status based on expert opinion and primary literature searches. Further details of the meta-analysis criteria and data collected are in Appendix S1, and datasets are available in JKHopf (2024) at <https://doi.org/10.5281/zenodo.12697206>.

To provide updated estimates of literature-based MPA effects, we took a Bayesian approach using effect estimates (measured as percentage change) from Appendix S1: Table S1 in Lester et al., 2009 as priors to estimate mean logRR values for the three biological variables. As Lester et al. (2009) pooled data by biological variable, we used these data as priors for estimates of the mean (μ) in all models, with weakly informative priors for interaction terms ($\beta_0, \beta_1, \beta_2, \beta_3$) and SD (σ) (Table 1). For each of the biological variables, we estimated (1) overall logRR, (2) logRR as predicted by the categorical predictors Harvest Status (harvested or not) and Comparison Type (outside–inside, before–after, or BACI), and (3) logRR as predicted by Harvest Status and MPA age (Table 1). To avoid bias toward more frequently studied MPAs, we averaged logRR values across individual MPAs at the relevant level of analysis. Sample sizes were low for entries that had only collected before–after data, especially those measuring biomass density and size (Appendix S1: Figure S34). Therefore, we supplemented the before–after dataset with before–after data extracted from BACI entries when testing for the effects of Harvest Status \times Comparison Type. There were too few data to test for the effects of MPA age at the level of comparison type (Appendix S1: Figure S35).

For each model, we estimated posterior distributions using Markov chain Monte Carlo (No-U-Turn sampler variant) with four chains of 5000 iterations each and a burn-in of 5000 iterations. We confirmed model convergence using visual inspections of chain convergence (trace, density, and autocorrelation plots; Appendix S1: Figures S1–S27), following best practices

(Johnson et al., 2022). All Bayesian analyses were done in R (R Core Team, 2022) using the “rstan” (Stan Development Team, 2022) and “rstanarm” (Goodrich et al., 2023) packages.

All code is publicly available in JKHopf (2024) at <https://doi.org/10.5281/zenodo.12697206>.

RESULTS

Modeled response ratios

Our open-population, baseline model scenario for a harvested species—where patches received a sustainable larval supply, fishing pressure was not reallocated, and patches were stable prior to MPA establishment—represented a case in which the predicted logRR was not affected by the comparison type used (Figure 1). In this scenario, all three biological metrics (abundance, age structure, size) used in calculating logRR captured patch dynamics well: Local population density remained constant outside of the MPA while increasing steadily inside of the MPA (Figure 1). Consequently, logRR increased asymptotically over time. Response ratio magnitudes, however, depended on the biological variable measured: logRR of biomass density was largest, followed by abundance density, and then average individual size (Figure 1). Note that the magnitude of the response ratio for individual size was limited in our model by the asymptotic maximum size fish can reach, which reflects the decelerating growth in size with age that most fishes exhibit.

TABLE 1 Model and prior distributions (by biological variable) used in Bayesian estimation of log-response ratios (logRR) for marine protected area (MPA) effects.

Model name	Model	Prior distributions
Basic	$\text{LogRR}_i \mid \mu, \sigma \sim N(\mu, \sigma^2)$	Biomass density: $\mu \sim N(0.567, 0.371)^a$ Abundance density: $\mu \sim N(0.282, 0.324)^a$ Size: $\mu \sim N(0.096, 0.097)^a$ All: $\sigma \sim \text{Exp}(1)^b$
Harvested \times Comparison type	$\text{LogRR}_i \mid \mu, \sigma \sim N(\mu_i, \sigma^2)$ with $\mu_i = \beta_0 + \beta_1 \text{HarvestStatus}_i + \beta_2 \text{ComparisonType}_i$	Biomass density: $\beta_0 \sim N(0.567, 0.371)^a$ Abundance density: $\beta_0 \sim N(0.282, 0.324)^a$ Size: $\beta_0 \sim N(0.096, 0.097)^a$ All: $\beta_1, \beta_2, \beta_3 \sim N(0, 2.5)^b$ $\sigma \sim \text{Exp}(1)^b$
MPA age \times Harvested	$\text{LogRR}_i \mid \mu, \sigma \sim N(\mu_i, \sigma^2)$ with $\mu_i = \beta_0 + \beta_1 \text{MPAage}_i + \beta_2 \text{HarvestStatus}_i + \beta_3 \text{MPAage}_i \text{HarvestStatus}_i$	Biomass density: $\beta_0 \sim N(0.567, 0.371)^a$ Abundance density: $\beta_0 \sim N(0.282, 0.324)^a$ Size: $\beta_0 \sim N(0.096, 0.097)^a$ All: $\beta_1, \beta_2, \beta_3 \sim N(0, 2.5)^b$ $\sigma \sim \text{Exp}(1)^b$

^aCalculated from mean and SD of data in Appendix S1: Table S1 in Lester et al. (2009).

^bWeakly informative prior.

When patch dynamics differed from those in our baseline scenario, the response ratios were affected. Importantly, logRR values sometimes described different temporal trends depending on how they were calculated, and the different comparisons did not always capture

both of the metrics of MPA conservation success we described in the introduction: higher values inside of the MPA relative to outside, and non-decreasing values inside of the MPA (Figure 2). We demonstrated this with our example alternative scenarios, focusing on

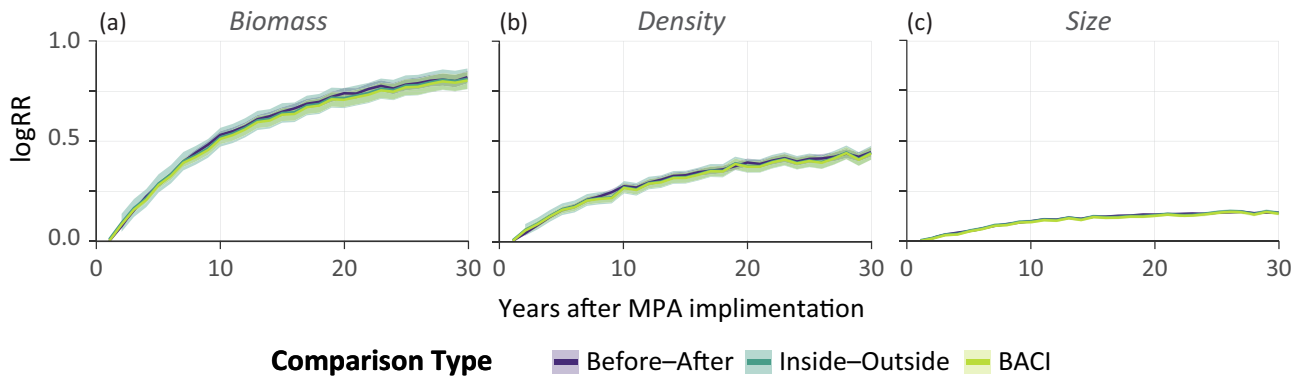


FIGURE 1 Modeled log response ratios (logRR) of a harvested species over time using different comparison ratios (colors), and biological measurement metrics (biomass density, abundance density, individual size). Baseline scenario: Open population, no correlation in variance, and no fishery squeeze. BACI, before–after–control–impact; MPA, marine protected areas.

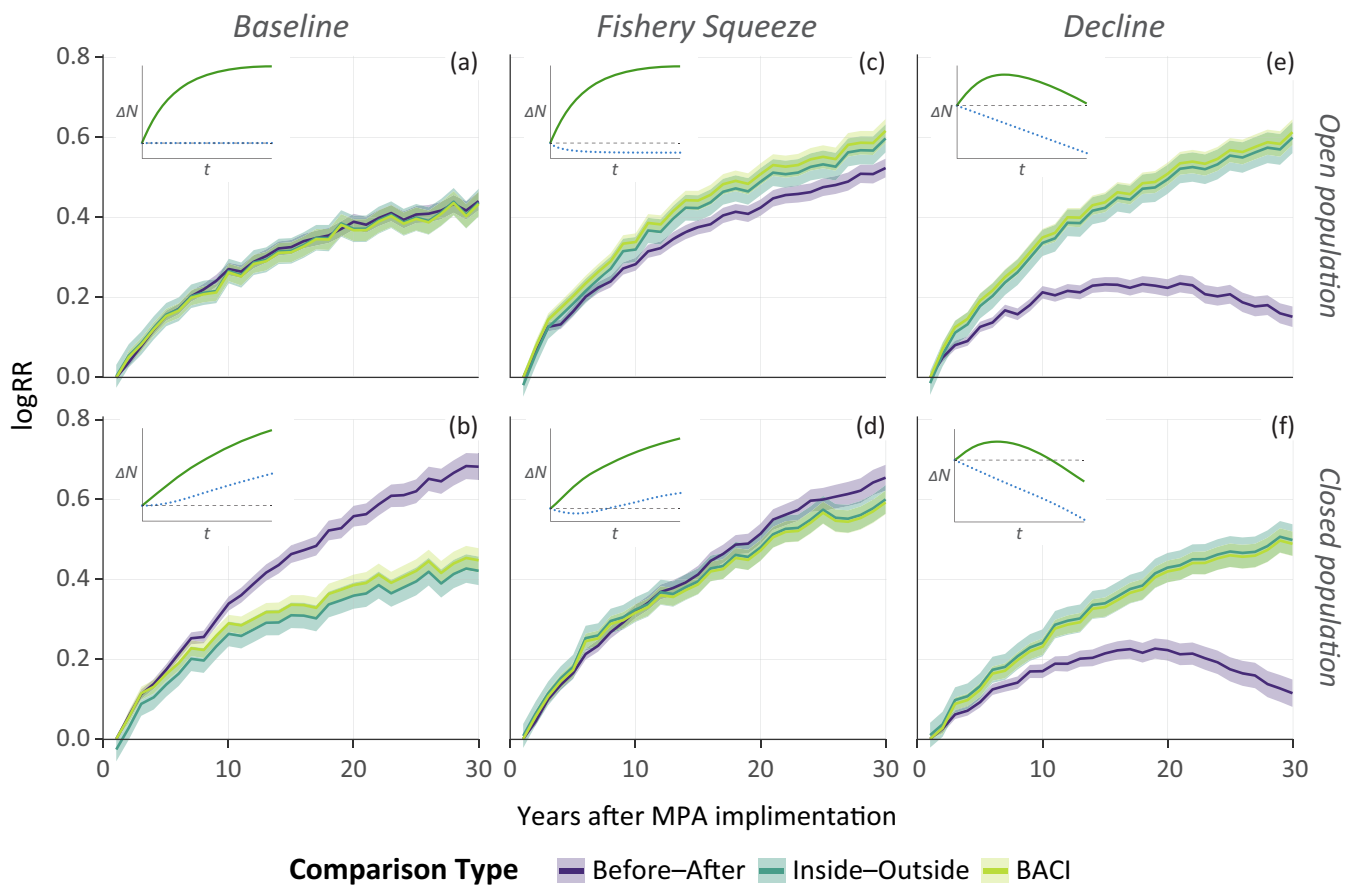


FIGURE 2 Modeled log-response ratio (logRR) of the abundance density of a harvested species over time using different comparison ratios (colors), for a range of scenarios. Solid lines indicate the mean with SE envelopes (shading) for 2000 replicate runs. In all scenarios, both patches experience independent pink noise. Inset plots show average modeled trends of patch abundance densities (ΔN) over time (t), relative to the time of marine protected areas (MPA) implementation (dashed horizontal line) for the MPA (green solid line) and fished (blue dotted line) patches. BACI, before–after–control–impact.

abundance density only (see Appendix S1: Figures S28 and S29 for biomass density and size results, which have similar trends). When interpreting the trajectories in Figure 2, a manager may not have access to the full time-series of observations depicted in the figure, but instead may only be able to sample one point in time along the trajectory, and must make adaptive management decisions accordingly.

In all scenarios considered, before–after comparisons most accurately reflected the true local population trajectory within the MPA (Figure 2). Scenarios that increased the difference between the protected and fished populations led to higher logRR values with outside–inside and BACI comparisons, than with before–after comparisons. This was exemplified by our open population, fishery squeeze scenario, where reallocated fishing pressure resulted in an initial decline (at the minimum) in biomass density outside of the MPA, enhancing the difference between the two patches (Figure 2c). This difference, however, was offset by net larval export in the closed population scenario, which led to densities in the fished area recovering over time due to larval export from the MPA (Figure 2d). Except for before–after comparisons, which are not affected by outside densities, logRR increased marginally slower in the closed population, reflecting the decreased difference between patch densities (Figure 2b,d,f).

Patterns of overall population decline (despite protection) were only captured with before–after comparisons, at least in the first 30 years (Figure 2e,f). Critically, BACI performed similarly to outside–inside in the declining scenario: The difference between patches was greater than the rate of decline over the 30-year simulation period (insets in Figure 2e,f).

Our modeled results were also true when patches experienced correlated pink noise (Appendix S1: Figures S30–S32). CIs, however, were smaller for outside–inside and BACI comparisons when noise was correlated, as patches fluctuated synchronously over time.

Meta-analysis: MPA studies

In our meta-analysis of MPA studies from 2006 to 2020, we found that most studies (86.6%) were focused on, or included, outside–inside comparisons, followed by BACI (18.3%) and before–after (3.8%) (Figure 3). Almost half of the studies (45.1%) also included some time-series data. Notably, 36.6% of studies with outside–inside data also included time-series data; these data were unable to be used in a true BACI comparison, however, as data collection began after the

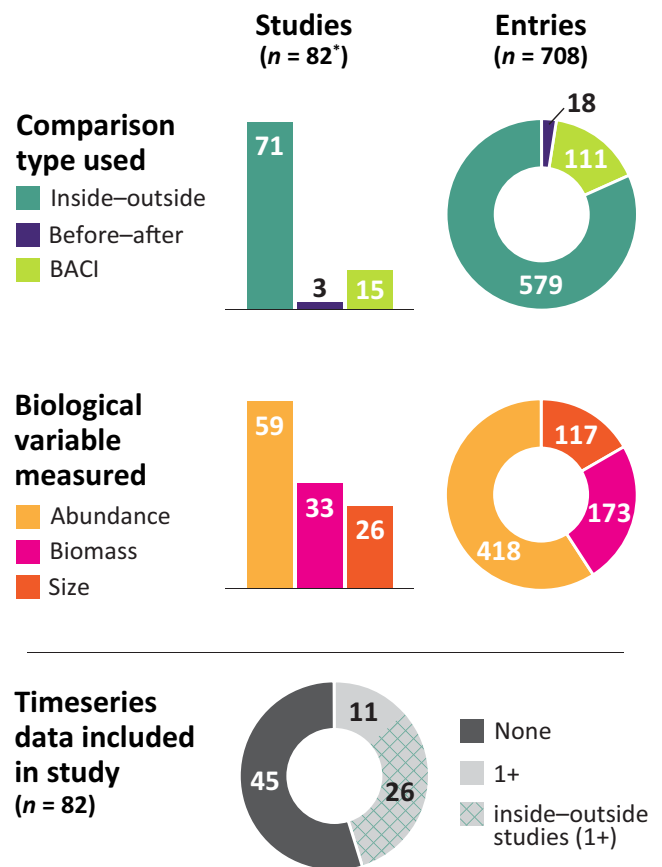


FIGURE 3 Number of studies and number of entries from the meta-analysis that included a given comparison type and biological (response) variable, and the number of entries that did or did not include time-series data. Note that the total number of studies is less than plot totals as some studies included multiple comparison types. BACI, before–after–control–impact.

MPA was established. Most studies included abundance density data (71.2%), followed by biomass density (40.2%) and then organism size (31.7%).

Reflecting the study bias toward outside–inside, most entries (data points) were collected on outside–inside comparisons (81.8%), followed by BACI (24.4%) and before–after (2.5%) (Figure 3). Likewise, most entries used abundance data (59%), followed by biomass (24.4%) and size data (16.5%) (Figure 3).

Meta-analysis: MPA effects

In general, we found a positive MPA effect for all three response variables. The estimated posterior mean logRR values were positive across all metrics, when not accounting for comparison type (Figure 4, Appendix S1: Figures S36–S39). Biomass density had the largest effect, followed by abundance density and then size, as predicted by our baseline population model.

The overall positive MPA effect was driven by harvested species, with posterior predicted distribution of logRR values consistently higher for harvested

species than non-harvested species across all biological variables and comparison types (Figure 5, Appendix S1: Figures S40–S45). Posterior mean logRR values for non-harvested species were close to zero except for biomass outside–inside and BACI comparisons, both of which had low sample sizes ($n \leq 2$; Appendix S1: Figure S34). For abundance and size, outside–inside had the highest predicted posterior logRR, followed by BACI and then before–after. Conversely, outside–inside had the lowest mean logRR for biomass. Despite positive posterior means, all posterior-predicted logRR distributions had considerable density below zero (30.1% for biomass, 37.4% for abundance, and 39.9% for size). Additionally, there was greater confidence in the mean logRR values for size than for biomass or abundance, as indicated by the widths of the posterior distributions (Figure 5).

We found little evidence for an effect of MPA age on logRR, for any of the three biological variables considered (Figure 6, Appendix S1: Figures S46–S48). Estimated posterior mean slope values for fitted linear models were close to zero, with non-harvested species having marginally higher, but less confident, slope estimates than harvested species (Figure 6). Intercept values were estimated with low confidence, with estimated posterior density spanning across zero for all biological variables: Intercepts greater than zero were consistently estimated for harvested species, and less than zero for non-harvested species.

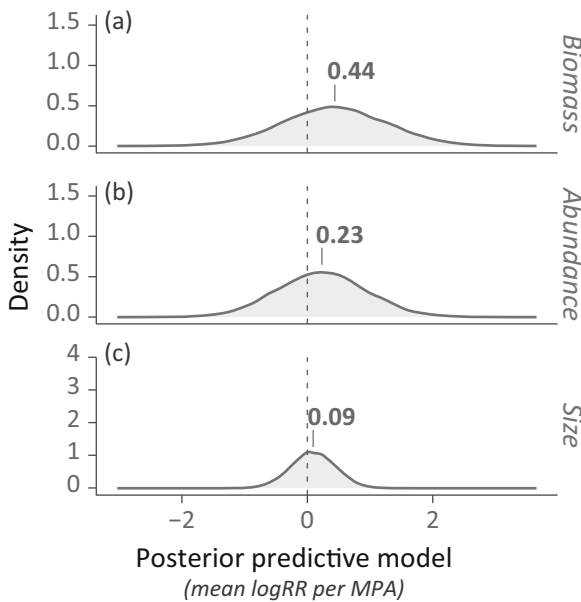


FIGURE 4 Predicted overall marine protected area (MPA) effects. Posterior predictive distributions of log response ratio (logRR) by biological (response) variable (rows). Text annotations indicate estimated posterior means.

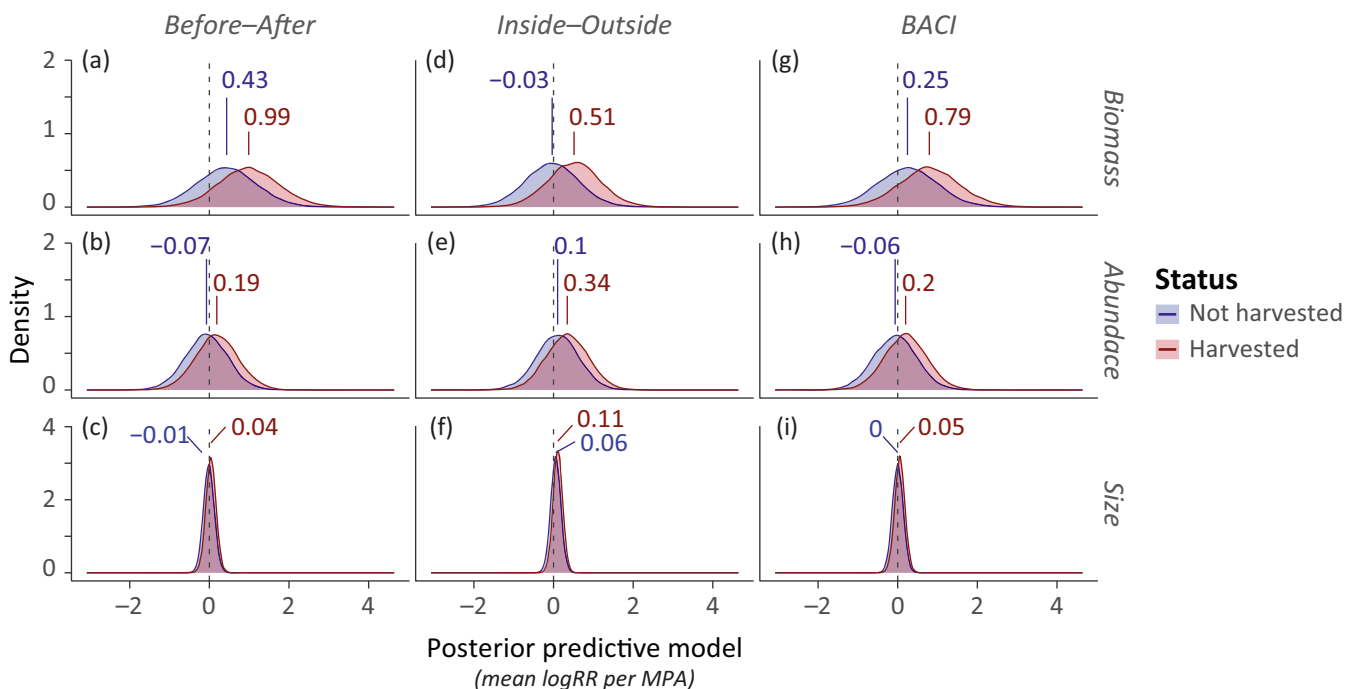


FIGURE 5 Predicted marine protected area (MPA) effects. Posterior predictive distributions of log response ratio (logRR) by harvest status (colors), comparison type (columns) and biological (response) variable (rows). Text annotations indicate estimated posterior means. Note that before–after data for all biological variables has been supplemented with before–after data extracted from before–after-control-impact (BACI) studies (see *Methods* for further details).

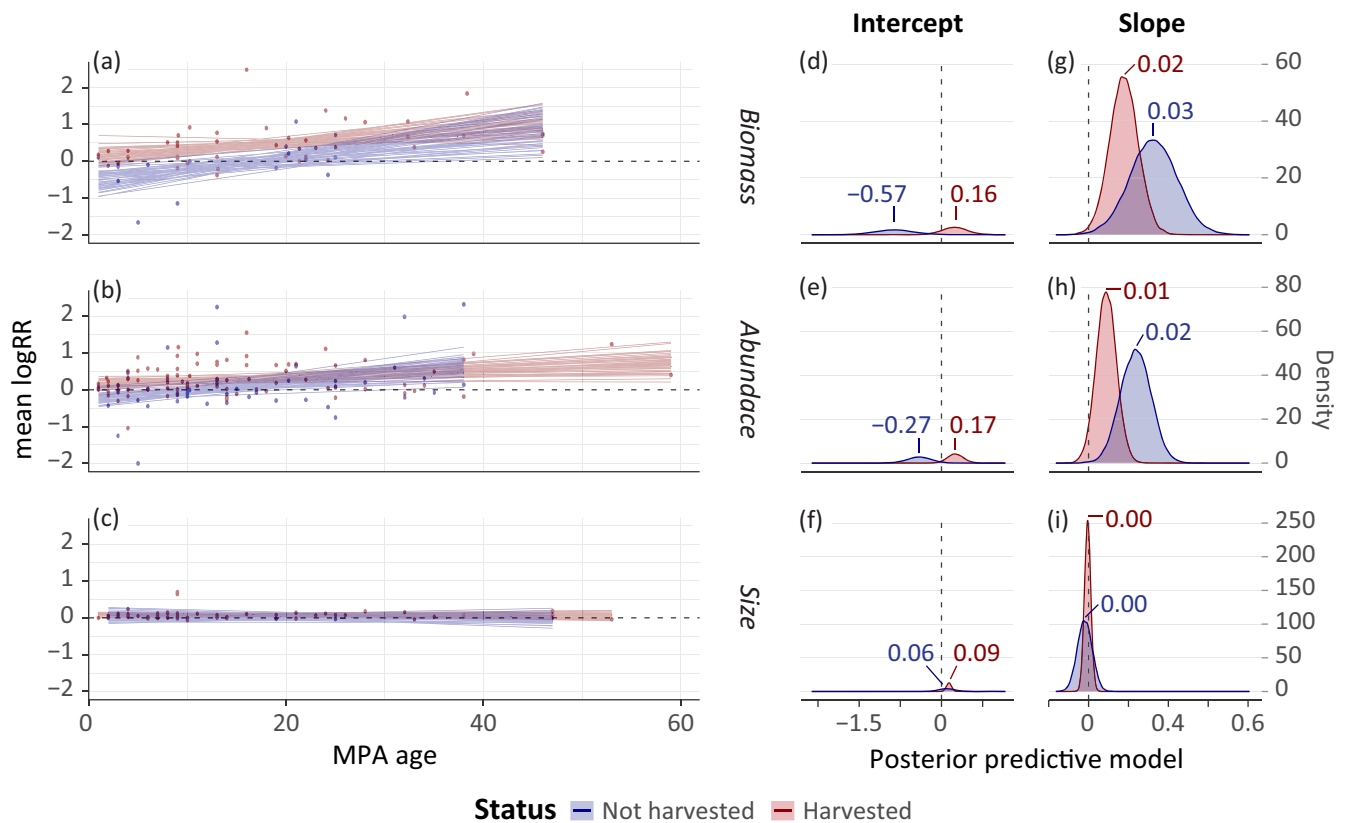


FIGURE 6 Estimated effects of marine protected areas (MPA) age on biological responses. (a–c) Mean log response ratio (logRR) for biomass, abundance, or size versus MPA age, with separate models for harvested (red) and non-harvested species (blue). Points indicate collected meta-analysis data (MPA \times age average), and lines indicate sampled posterior model fits for a linear regression ($n = 50$ samples). (d–i) The corresponding posterior predictive distributions of coefficients (d–f: Intercept; g–i: Slope), with text annotations indicating the mean of each posterior.

DISCUSSION

Accurate assessments of MPA effects are required to inform the adaptive management, and future planning, of MPAs. Here, we have focused on the MPA objectives to increase and conserve local populations. Reflecting previous meta-analyses (e.g., Giakoumi et al., 2017; Lester et al., 2009; Sciberras et al., 2013), we found that no-take MPAs globally are providing positive outcomes within their boundaries, especially for harvested species. However, we show that these benefits may be smaller and more uncertain than previously reported in Lester et al. (2009), particularly when considered in the context of how we expect observed effects to change under different dynamics (MPA, environmental, and population traits) and sampling approaches (comparison types and biological variables measured).

Through simulating sampling of MPAs under a range of ecological scenarios, we were able to demonstrate that not all response ratio comparison types provided the same information. Critically, both outside–inside and BACI approaches failed to reflect patterns of long-term

population decline within the MPA (Figure 2). The implications of this depend on the question being addressed: If the goal is to evaluate whether an MPA only achieved greater density, biomass, or average individual size than fished areas (i.e., protection is achieved), then all comparison metrics reflected that information accurately. However, as MPAs typically aim to also conserve populations over the long term (Grorud-Colvert et al., 2021; IUCN WCPA, 2018), it is also important to assess whether local populations are not declining (i.e., they are preserved or being restored). When addressing this question, we showed how BACI or outside–inside comparisons failed to provide insight into whether an MPA may be preventing decline. Furthermore, due to stochasticity and disturbances, a positive before–after effect is not absolute evidence of local population growth, only long-term time-series data can clarify this. However, before–after comparisons are more likely to provide insight into population trends.

In our global meta-analysis of empirical data, all three of the response ratios had positive posterior means for all three biological variables (at least for harvested species).

Our simulation results allow us to interpret the before–after results as evidence for where MPA protection is likely associated with an overall increase in the local population following implementation, while the other two types of response ratios reflect scenarios where biomass is greater inside of the MPA than outside but provide no evidence that those MPAs are preserving or restoring local populations. Thus, assuming that large outside–inside or BACI response ratios always reflect large and net positive MPA effects may lead to misleading conclusions about MPAs and possibly poor adaptive management. This is especially important as the majority of empirical studies use outside–inside data to evaluate MPA success (Appendix S1: Table S1; Figure 3; Lester et al., 2009).

Additionally, our simulated response ratios calculated using biomass density had notably larger increases in magnitude over time than abundance density or size. This is to be expected, as biomass increases reflect both changes in numerical abundance and the population size distribution after protection. Changes in average size, however, are limited by the maximum size for species with determinate or asymptotic growth and could be muted if there is an increase in the recruitment of smaller individuals that balances out the growth of larger individuals due to greater longevity. These patterns were reflected in our meta-analysis: The posterior estimate of MPA effects was highest overall for data that measured biomass, regardless of comparison type or harvest status, and the posterior mean response ratios were all near zero for size.

It is important to note that though the posterior mean response ratios for all three biological variables were positive for fished species, indicating a positive MPA effect, the posterior predictive distributions all had considerable (>30%) probability density below zero, reflecting large uncertainty that any given MPA would be expected to have a positive effect. In fact, our posteriors had a central tendency very similar to the corresponding priors, but much wider uncertainty bounds (Appendix S1: Figures S36–S48). There are a few potential explanations for this. First, the data from Lester et al. (2009) that we used for our priors were only available aggregated across taxa, not species, and may have had lower variability by virtue of that averaging process. Second, this could be an example of the repeatability crisis observed in some scientific fields, in which repeated studies of the same phenomenon produce results with weaker effect sizes and less statistical confidence (Filazzola & Cahill, 2021). We argue that this is unlikely as different MPAs are not true replicates of one another, and the actual “MPA effect” would be expected to differ because of differing ecological and management contexts. Rather, we suggest that the

greater uncertainty could reflect the placement of more MPAs in more places, possibly with poorer management, or more studies reporting results on a broader suite of species (as opposed to a few species of specific interest to fisheries), leading to a broader array of outcomes. Publication bias toward positive MPA results may also contribute to more certainty in previous positive MPA assessments (Woodcock et al., 2017), and we did not include any study that acknowledged reporting only positive MPA effects. Nonetheless, our results highlight the need for localized adaptive management to respond to the local conditions and outcomes, rather than a blanket expectation for positive MPA effects.

The confounding effects of MPAs beyond their borders (through larval export, adult spillover, fishery displacement etc.) have long been recognized as a potential bias in quantifying MPA effects (e.g., Claudet et al., 2010; Lester et al., 2009; Osenberg et al., 2011; White et al., 2011), especially when considering outside–inside data. Positive MPA effects result in a self-contradictory approach to detecting those effects: MPAs are expected to perform better than the reference site, but they are also expected to produce spillover and larval export, which makes it harder to detect increasing MPA effects, as demonstrated by our modeled closed population scenario (Figure 2). How much and under what scenarios these biases are likely to happen has not been previously explored alongside empirical data. While we have taken steps toward resolving this, we have not considered the full gamut of scenarios possible. For example, we did not explore the implications of adult spillover, although it would likely lead to response ratios similar to those in our closed-population scenario (Moffitt et al., 2013). Likewise, we focused on a single species (blue rockfish) for our model. Numerous studies have demonstrated how MPA effects are likely to, and do, vary with MPA characteristics, species and ecosystem traits, local fisheries management, and stochasticity (e.g., reviewed in White et al., 2011). However, the tendency of outside–inside, and to a lesser extent BACI, to less faithfully reflect the underlying MPA trend is likely to be consistent across most cases, as previous modeling studies have demonstrated that outside–inside sampling is the least sensitive to temporal fluctuations in MPA dynamics (Hopf et al., 2022; Hopf & White, 2023). As the species and ecosystems protected, and the specific goals of each MPA are unique to each case, we recommend that modeling of expected trends and effect sizes be undertaken to accompany the analysis of monitoring data for a specific MPA (e.g., Kaplan et al., 2019) to ensure that MPA goals are properly quantified and met.

A surprising outcome from our modeling results is that BACI comparisons performed similarly to

outside–inside comparisons and did not always reflect the underlying temporal dynamics faithfully. By accounting for spatial and temporal variations, even simple BACI designs (which we have considered here) are expected to provide more reliable measures of MPA effects than outside–inside or before–after (Osenberg et al., 2011; Schmitt & Osenberg, 1996; Stewart-Oaten et al., 1986). This expectation implicitly assumes that changes over time due to management intervention will be on the same order of magnitude as, or greater than, changes occurring over space, since the BACI comparison calculates the ratio of changes at spatial and temporal scales. However, in our modeled scenarios, this condition did not hold: The outside–inside difference was notably greater than the before–after difference. To see this, compare the difference between the MPA (green line) and the fished population (blue line), to change within the MPA in the insets of Figure 2. This difference in magnitude of change between space and time resulted in BACI values following outside–inside more closely. This may not occur in scenarios where protected populations recover quickly, but to low densities (e.g., a lightly-fished fast-growing species). More work is required to elucidate this and may partly explain why predicted BACI logRR values were closer to before–after values in our empirical meta-analysis. A solution to this BACI challenge is to separately analyze the before–after data to gain insight into the possible population trends, if this is of importance to the MPA assessment.

It is important to emphasize that our conclusions about outside–inside versus before–after comparisons reflect the reality of many monitoring programs: Sampling is limited to only occasional snapshots of the system, rather than a continuous time-series. It is under those conditions that a large outside–inside response ratio could be deceptive when assessing longer-term conservation goals (Hopf et al., 2022; Moffitt et al., 2013; Rassweiler et al., 2021). If a time-series was used to calculate the outside–inside ratios, then population trends could also be detected. Thus, a key takeaway from our findings is that long-term time-series data, ideally from both MPA and reference area(s) and spanning implementation, are required to make robust and more complete assessments of MPA effects. Indeed, a large portion of the studies in our meta-analysis included at least one temporal data set longer than two time points. While the analysis of these data is outside of the scope of this study, it warrants further study.

The results of our analysis of the effect of MPA age did not match the general expectation that there would be a positive effect of MPA age on harvested species, and no effect on non-harvested species. Instead, there was a greater positive effect of age on non-harvested species,

and overall high uncertainty in the slope of the regression, which explained little of the variation in the data. We propose this result arose because our dataset was sampling multiple different systems with different species traits and population dynamics, at different times in the post-implementation trajectory. For example, in some scenarios one would expect an initial decline in abundance post-implementation, prior to an increase in abundance or biomass, because of age-structured transient dynamics or fishery squeeze (Hopf et al., 2016b; Nickols et al., 2019; White et al., 2013). A better approach to understanding the effects of MPA age would be to compare different MPAs protecting the same or similar species, as Claudet et al. (2010) have done in the Mediterranean Sea. Given that limitation to our study, we do not make further inferences about MPA age effects in our dataset.

Our study demonstrates the importance of considering the assessment goals and the underlying system dynamics when assessing MPA effects and, importantly, demonstrates how they may affect summary metrics. Because it is unfeasible to model the expected dynamics for each unique system and scenario considered in our meta-analysis, we have considered the broader implications of our model findings; that MPA effects are likely to be smaller than suggested in previous meta-analyses that only considered outside–inside comparisons or did not separate analysis by comparison type. Furthermore, the failure to detect population declines using outside–inside comparisons has only been recognized theoretically (Hopf et al., 2022; Moffitt et al., 2013) and is typically overlooked when evaluating empirical data. This is problematic as a key indicator of successful MPA management is maintaining a persistent population (local or global; Botsford et al., 2001), which many studies may incorrectly assume is also occurring if positive increases are observed within MPAs compared with outside. When assessing specific MPAs, we recommend considering empirical findings in conjunction with theoretical knowledge relevant to the context of that MPA system, as previously called for by others (e.g., White et al., 2011; Woodcock et al., 2017).

AUTHOR CONTRIBUTIONS

Jess K. Hopf, Sarah Farnsworth Hayroyan, Sarah E. Lester, Kerry Nickols, and J. Wilson White conceived the ideas and designed methodology. Jess K. Hopf, Victoria Quennessen, Jacob Ridgway, Caren Barceló, Fabio Prior Caltabellotta, Sarah Farnsworth Hayroyan, Derek Garcia, and Montana McLeod collected the data. Jess K. Hopf and J. Wilson White analyzed the data. Jess K. Hopf and J. Wilson White led the writing of the manuscript. All authors contributed critically to the drafts and gave final approval for publication.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

Data, script files, and model code (Hopf, 2024) are available in Zenodo at <https://doi.org/10.5281/zenodo.12697206>.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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From: Blake Hermann <[REDACTED]>

Sent: Tuesday, October 15, 2024 08:14 AM

To: FGC <FGC@fgc.ca.gov>

Cc: Ashcraft, Susan@FGC <[REDACTED]>; Wertz, Stephen@Wildlife
<[REDACTED]>; Shuman, Craig@Wildlife
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Subject: Petition2023-15MPA Clarification/Amendment Letter

Hello all,

See attached comment letter containing an update, stakeholder feedback responses, and amendments regarding the petition I submitted requesting allowing limited-take HMS or pelagic fisheries in 3 Channel Islands MPAs. This can be attached at the next FGC, MRC, or both meetings, wherever it is more applicable. This has also been sent to federal staff at NMFS, CINMS, and PFMC to keep everyone involved with this petition's process updated and up to date.

Thank you,

Blake Hermann

Clarification and Amendments Regarding Petition2023-15MPA

Dear Fish and Game Commission, CDFW, CINMS and PFMC staff,

This comment letter serves as an amendment, update, and reply for those interested regarding this Petition2023-15's requesting a change in take access in 3 MPAs at the Channel Islands State/Federal MPA network.

I would first like to thank CDFW, for completing the binning phases of the petition process, and the FGC, and MRC for their supportive efforts in this first-time evaluation process. Nearing a year following public submittal there has been much feedback regarding this petition, both positive and negative in nature, from the public, and both state and federal bodies. This letter will act as a supplemental add-on to the original petition, further clarifying examples that were perhaps not explained well enough by providing some additional stakeholder rationale, input and answers to a some concerns the have been raised. Additionally, this letter contains a few amendments regarding the original petition.

Several discussions with groups or individuals coming from commercial, recreational, conversationalist, and environmental sectors concerning the petition have continued outside of official meetings. More has certainly come to light after submittal that, as the petitioner, I feel should be acknowledged when decisions are finally made.

Commercial Swordfish:

One of the largest conflicts that comes up with the three mentioned Channel Islands MPAs and the commercial swordfish fishery is the 3 MPA's current no-take allowance, which includes the retrieval of legally taken fish.

The harpoon swordfish fishery takes a swordfish by locating a basking fish on the surface and attempting to hit it with a hand thrust harpoon. Once hit, fish are left to tire on a set of gear marked with a flag, if not immediately retrievable. This soak time varies greatly, from 1-8 hours, but it is typically no longer than 2 or 3 hours. In that time, fish could pull gear several miles, 1-5 on average in my experience participating in the fishery. This movement occasionally brings gear into an MPA before being retrievable. Even if fish are taken miles away, there is still a random chance the legally taken fish on harpoon gear ends up inside the closure come retrieval time. There is nothing we can do to stop a swordfish from swimming where it wants to go while on gear.

Similarly, federally authorized deep-set-buoy-gear (DSBG) sets 10 flags with 10 hooks at 1000ft in open waters for swordfish. Swordfish hooked with this method can move gear similarly to harpoon fish in terms of distance. This is because if a hooked fish does not come to the boat immediately, it normally does not, the gear is placed back in the water to let the fish tire and to monitor the remaining set, leaving legally hooked fish the possibility to move into a closure as well.

Both of these problems are more prevalent around the Channel Islands and the three MPAs mentioned in 2023-15MPA because these MPAs extend an additional 3nm offshore into federal waters, overlapping more with the more offshore swordfish-fishery grounds. Today, retrieving a

dead harpoon fish or fighting/retrieving a hooked fish inside these no-take closures is illegal, something I believe must be resolved some way. This is especially the case for harpoon fish, as unlike DSBG fish that could be cutoff or released with a tag, harpoon fish cannot be let go once hit.

This problem is compounded in the commercial swordfish fishery due to the fishery's reliance on calm waters to eyeball or locate a basking swordfish. Of the northern Channel Islands one MPAs in particular, The Footprint, sits in the lee of the islands, the place where the islands act as a physical weather barrier from the normal westerly wind and swell. This calm section was historically important and remains an essential area to the swordfish fishery more than other fisheries because of its reliance on spotting vs hooking a fish. These weather pockets force the fishery to operate in the lee area regardless of the MPA's presence. The result is a higher effort around the MPA, not because there is any more swordfish there than other places, but because that is the only zone that has fishable conditions most days at the Northern Channel Islands. This closer proximity to the MPA due to weather leads to higher chances of interactions where legally taken fish tow gear into the closures as mentioned above. We can see this higher landing rate and therefore higher chance of interactions by observing commercial block catch data showing the blocks containing and surrounding the Footprint, blocks 707 and 708 are especially productive due to the calmer waters. These two blocks alone captured 2.82% of state swordfish landings, locally comprising 15.63% of the swordfish produced by the Santa Barbara Port Area over the last 18 years (MFDE¹), particularly high values for an HMS.

It is understandable that opening these MPAs simply on the idea that the weather is better than other zones is not a valid reason on its own, but that is not the point. The point is that this calm zone, and the higher effort inside of it, results in higher chances of gear unintentionally moving into the closure. This unique combination of factors gives even more reason to resolve this problem now during this adaptive management process.

As a result, the FGC, CDFW, PFMC, and CINMS should take this interaction into account in order to better consider the individual actions for allowing the harpoon and federal DSBG fishery to operate in or, at the very least retrieve, legally taken swordfish within the 3 requested MPAs because of this gear movement problem. An option can be amended and added onto the original petition if required, but as harpoon and DSBG were included in the original request for allowable methods of take, the individual actions for the gears in each of the three requested MPAs should already exist.

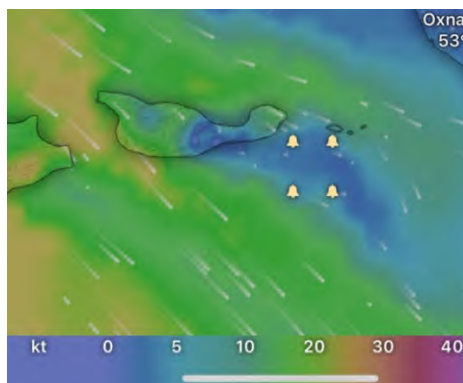


Image depicting average day in the Northern Channel Islands with The Footprint MPA outlined. Displayed wind “lee” for commercial swordfish is predominately around the closure forcing effort and gear interactions with the MPA to be higher (conditions are “fishable” under 10kts, blue color).

Wind model used in the NOAA HRRR model mid-day (12:00) during peak effort time.

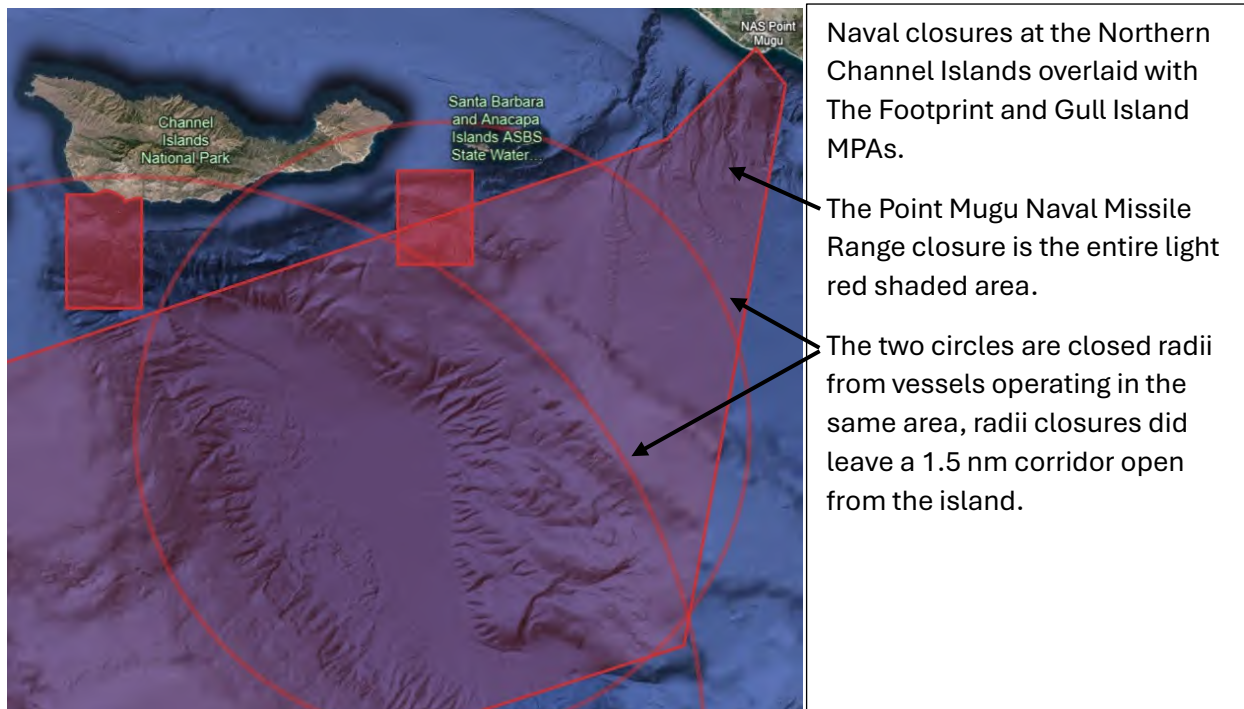
1. MFDE under only swordfish landings from 1/1/2008 to 12/31/2023. The Santa Barbara Port Area was used for the local filters to include Ports around the Channel Islands (petition's area of concern).

Local Naval Closures:

From my talks with general HMS fishermen at as many talks as I could attend locally, the issue of military operations off the southern side of the 4 northern Channel Islands was brought up enough time to look into and warrant discussion. The primary argument brought up is, while HMS cover large areas and are fishable outside of the MPAs, military operations close off most and sometimes all fishable area for HMS around the Channel Islands around the northern Channel Islands for local fleets except small areas largely taken up by the two existing MPAs, The Footprint and Gull Island.

While on the water targeting HMS, I have removed from and forced into a different area where no or less HMS are realistically present (more inshore, into foul weather, or into an MPA). There are two types of naval closures on the southern side of the Channel Islands, total range closures and radius closures. Some days one or the other is active and some days both are active depending on the exercise. The location of closure radiuses from operations does vary, but the missile range closure is constant polygon. This zone covers a large area of offshore waters on the southern side of the islands, where HMS effort locally occurs. Included is an image of the points provided to me by the Naval Warfare Center Pt. Mugu depicting the range closure when they are in a live fire event, shaded in light red. The hollow circles depict radius closures from boat coordinates and restricted distances from said positions are enforced by aircraft. Note, a 1.5 nm corridor from land was still permitted for basic transit, so closures did not go all the way to the island shore. The Footprint and Gull Island MPAs have also been included depicting which areas fall inside and outside the missile range.

Event frequency does vary from 0 to 6 days a week, and closure radiuses from boats change based on the activity and number of vessels participating. Currently the only way of acquiring event data is with direct talks with Naval officers <24hr before an event, and in some cases the day of on the radio.



Adaptive Management, the MLPA, and the Master Plans:

A general comment of concern has been that the petition attempts to reduce protections of the network, does not align with adaptive management, the MLPA, or MPA Master Plans and should be rejected.

Adaptive Management: It should be noted that the adaptive management of the MPA Network is not a one-way street. Adaptive management is defined by Fish and Game Code section 2852(a)² as, “a management policy that seeks to improve management of biological resources, particularly in areas of scientific uncertainty, by viewing program actions as tools for learning...” It is a practice where, as conditions change or we learn more about something, in this case the MPA network, we actively amend management regulations to reflect what currently is known to be a reasonable management method. That being said, consistently increasing protected areas or the level of protection for all species in an area every management cycle is not the only direction this process is allowed to go in order to manage the network. If sufficient evidence is provided and goals can still be met, adaptive management can certainly be used to decrease restrictions in cases where we still accomplish the same goals, something Petition2023-15MPA claims is possible due to the lack of or how little pelagic/HMS interactions are with MPA goals. If we can still accomplish the stated goals of the network in these specific MPAs while allowing some take of HMS or pelagic species, the network can certainly still be considered improved as a result. The latest example of adaptive management lowering regulation was the repealing of the Cowcod Conservation Areas (CCAs) and implementation of the smaller Groundfish Exclusion Areas (GEAs) after the cowcod population was considered rebuilt and healthy.

The MLPA: The goals of the MLPA and accompanying plans are clear. The largest goal being to preserve local ecosystems, allowing them to grow undisturbed as much as possible by people, resulting in higher levels in local species’ abundance and biodiversity for future generations to observe. From the onset of this petition, it has been a foundational idea that allowing take of pelagic or HMS inside these areas will both, not significantly affect local species abundance or populations, as they would still be protected, and that the HMS populations would not be significantly affected by such a change. The argument of lowering protections in a petition like this is understood at face value, but the goal of the petition is to examine if we can accomplish the same or a satisfactory level of the stated goals under these lower protections, and if this is indeed the case, how lower are these protections in reality?

MPA Master Plans: Appendix G of the 2008 Master Plan³ discusses the idea of species affected by MPAs, mentioning pelagic and HMS groups are overall less affected. Additionally, as the original petition mentions, the current 2016 MPA Master Plan for the southern section outlines within its goals⁴ that areas of protection providing limited pelagic take or HMS take be provided. This is something we do not see around the Channel Islands in nearly comparable amounts to the rest of the state network, this effect is worsened by the federal expansions at the Channel Islands encroaching more into offshore waters where more pelagic fishing occurs. Previous FGC MPA discussions provided additional input on MPAs and HMS interactions where the commission stated that MPAs are intended to protect (local) ecosystems, not individual species, especially those that are highly mobile or pelagic⁵. Both FGC comments, and statements from the 2008 and 2016 Master

2. https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=FGC§ionNum=2852.

3. <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=113013&inline#:~:text=Species%20with%20a%20strong%20tendency,their%20entire%20range%20of%20movement.>

4. <http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=112492&inline> (pg. F-5 (Goal 2, specifically point 4))

5. <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=207757&inline> (pg. 9)

Plans support the idea that HMS are both not as affected by these MPAs and that areas allowing take of just HMS be included in the network.

All of the above evidence and precedent came to light after the establishment of the Channel Islands network in 2002, so it is somewhat understandable why the decisions were made back then to leave these areas as no-take zones, we simply did not know as much then as we do now. However, 20 years later with all of this more modern evidence and precedent elsewhere in the 40% of the coastal network that is limited take, it is justifiable to reevaluate the Channel Islands Network and adaptively manage it to our current scientific understanding for pelagic/HMS allowed areas.

Kelp Restoration and Climate Resiliency:

A final comment of concerns mentions granting limited take access to these areas for Pelagic finfish or HMS will negatively impact local species such as groundfish or those important to kelp restoration and therefore climate resiliency, including but not limited to sheephead and spiny lobster.

The preferred option of only allowing take of HMS was preferred with species interactions specifically in mind. The more selective list of HMS avoids pelagic finfish species, like yellowtail, that could be targeted with methods that are more likely to interfere with non-pelagic species (weighted, bottom contact dropper loops). HMS effort for tuna or billfish consists primarily of surface casting a jig/bait, trolling baits on the surface, or fishing in the middle of the water column. It is very unlikely those targeting HMS species this way will have many interactions with non-pelagic species such as groundfish. Additionally, pelagic or HMS fishing is done primarily offshore, away from nearshore kelp ecosystems, and away from nearshore areas spiny lobster and sheephead frequent.

Included in the original petition was an additional option and sub-option for only “surface fishing methods” and nearshore closures respectively. If the preferred option of full water column access with no nearshore closures is still seen as concerning even with its limited interactions with non-HMS, the water column limiting option and/or nearshore closure sub-option can certainly be used.

Water Column Limited Fisheries (Amendment):

Since submittal, talks with officials revealed rather than using surface fishing methods as the allowed take reason, simply aligning with existing closures such as the GEAs and using rather the restriction of “bottom contact gears” will be better applicable. The new term, “bottom-contact-hook-and-line,” would need to be defined in state codes (along with bottom contact gears) to avoid hook-and-line bottom usage as hook-and-line on its own is not a bottom contact fishery per the only existing federal definitions of bottom contact gears. Restriction of bottom contact gears and additional restriction of bottom-contact-hook-and-line would allow for more selective take of HMS, not affect HMS effort significantly, and better protect local non-HMS from incidental catch. Therefore, it is proposed that the petitions options be slightly amended to allow hook-and-line except that of bottom-contact-hook-and-line, and restrict bottom contact gears, vs in the original petition where the allowing surface fishing methods was mentioned in the options.

Due to the regulatory complexity of this change, new definitions, and more complex gear explanations, it is still the petitioner preference to not restrict take to water column specific

variants of hook-and-line (options 3 and 4 in the petition) but the choice will still remain if the department prefers it for other reasons.

Nearshore Closures (Amendment):

In the original petition there was also the sub-option to include nearshore MPAs at two of the three MPAs mentioned, Gull Island and Santa Barbara Island. The Footprint MPA did not include nearshore option as no section of The Footprint is attached to land or is nearshore. My personal petitioner preference of these nearshore choices is still that they are not needed if the preferred Option 2 is selected, but the choice is there if desired. It has been raised that the original nearshore closure boarder for the Santa Barbara Island MPA in the original petition used the island’s 1 nautical mile radius line. This line is not straight, could lead to confusion, and does not align with MPA design criteria of the MLPA (no curves or odd shapes). Therefore, it is now proposed to use a straight line like what is used for all current nearshore closures rather than the original 1 nm line. The coordinates for this line separating the nearshore and offshore regions at Santa Barbara Island MPA will now be the following:

A straight line from 33° 28.500’ N. -118° 59.300’ W. to 33° 26.500’ N. -119° 02.200’ W

The choice to make the nearshore closures either stricter in take allowances or into nearshore no-take areas remains the same. Of the two sub-options, the more-strict limited-take choice is still preferred over a no-take area if nearshore MPAs are implemented. For the possible nearshore limited-take region, feedback and an oversight on my own part (leaving out spear) has led to a rework and amendment of the proposed nearshore MPAs allowable methods of take. See amended Table 2, the Table from the original petition, below (red = new language ~~cross~~ = removed language).

Table 2: Proposed Coordinates and options for the Nearshore limited or no take areas for Gull Island and Santa Barbara Island (Amended)	
Gull Island Nearshore MPA	Santa Barbara Island Nearshore MPA
<p>The nearshore-offshore boarder would be bound by a straight line running from 33° 58.000’ N. lat. 119° 53.000’ W. long, to 33° 55.800’ N. lat. 119° 48.000’ W. long. within the existing MPA.</p> <p>Regulation within nearshore area:</p> <p>Recreational and commercial take of (pelagic finfish or HMS, depending on the state’s choice) is allowed via surface casting, kite fishing, and surface trolling. The commercial take of swordfish by harpoon is allowed. (preferred).</p> <p>The recreational take of (either Pelagic Finfish or Highly Migratory Species (option dependent)) by spear is allowed.</p> <p>The commercial take of swordfish by harpoon is allowed.</p> <p>The possession of Coastal Pelagic Species is allowed. (Only needed if HMS option is selected)</p> <p>Or</p> <p>A no-take region (not preferred)</p>	<p>The 1nm boundary of SBI within the current MPA</p> <p>The nearshore-offshore boarder would be bound by a straight line running from 33° 28.500’ N. -118° 59.300’ W. to 33° 26.500’ N. -119° 02.200’ W within the existing MPA.</p> <p>Regulation within nearshore area:</p> <p>Recreational and commercial take of (pelagic finfish or HMS, depending on the state’s choice) is allowed via surface casting, kite fishing, and surface trolling. The commercial take of swordfish by harpoon is allowed. (preferred).</p> <p>The recreational take of (either Pelagic Finfish or Highly Migratory Species (option dependent)) by spear is allowed.</p> <p>The commercial take of swordfish by harpoon is allowed.</p> <p>The possession of Coastal Pelagic Species is allowed. (Only needed if HMS option is selected)</p> <p>Or</p> <p>A no-take region (not preferred)</p>

The proposed nearshore regions would now only allow take by easily enforceable, selective, non-hook-and-line methods. Recreational spear of pelagic finfish or HMS, and commercial harpoon swordfish are easily recognizable, completely selective in their methods of take, and offer zero bycatch. The methods would make the more non-pelagic prevalent nearshore regions simple to enforce and significantly mitigate any impacts on non-pelagic species if there are concerns with allowing hook-and-line methods nearshore.

Clarification and Amendment Review:

Clarification: Uncontrollable gear movement of commercial swordfish fisheries (Harpoon and DSBG) poses a problem with existing MPAs, namely those in the original petition due to their offshore expansion into federal waters creating more of an overlap with offshore pelagic/HMS fisheries. Individual actions concerning these methods allowance should be more strongly considered because of this problem and some solution should be reached.

Clarification: Large, periodic naval closures offshore restrict most HMS/pelagic fishing areas local to the southern parts of the Channel Islands when active, increasing congestion of both recreational and commercial fisheries toward the open areas just outside of the MPAs.

Clarification: Petition does in fact conform to the goals of adaptive management per its established definitions, has goals aligned by the MLPA, and both Master Plans outline goals concerning allowable pelagic or HMS take and lack of MPA effects on pelagic and HMS.

Amendment: To better conform to existing federal regulations and to make enforcement easier, the mention of “allowance of surface fishing methods” in Options 3 and 4 of the original petition will be replaced with “restriction of bottom contact gears.” Due to regulatory complexity the restriction of bottom-contact-gears in options 3 and 4, it is still not preferred by the petitioner but is still listed as a choice for the department to pick if desired. Option 2 followed by 1 are still the first and second preference. Bottom contact gears would need to be defined in state regulation as a specific list of gear types/configurations as well as bottom-contact-hook-and-line. The original 2 unamended options and 2 amended options would read:

Option 1 (unchanged): **(Petitioner’s 2nd Preferred Option)**

- The recreational take of pelagic finfish is allowed.
- The commercial take of pelagic finfish by hook-and-line and swordfish by harpoon is allowed.
- The use of Deep-Set-Buoy-Gear (DSBG) is allowed in federal waters (federal consideration only)

Option 2 (unchanged): **(Petitioner’s 1st Preferred Option)**

- The recreational take of highly migratory species is allowed.
- The commercial take of highly migratory species by hook-and-line and swordfish by harpoon is allowed.
- The possession of coastal pelagic species is allowed.
- The use of Deep-Set-Buoy-Gear (DSBG) is allowed in federal waters (federal consideration only)

Option 3 (amended): **(Petitioner’s 4th Preferred Option)**

- The recreational take of pelagic finfish is allowed, except through the use of bottom-contact-hook-and-line and bottom contact gears which is restricted.
- The commercial take of pelagic finfish by hook-and-line and swordfish by harpoon is allowed, except through the use of bottom-contact-hook-and-line and bottom contact gears which is restricted.

Option 4 (amended): **(Petitioner’s 3rd Preferred Option)**

- The recreational take of highly migratory species is allowed, except through the use of bottom contact hook-and-line and bottom contact gears which is restricted.
- The commercial take of highly migratory species by hook-and-line and swordfish by harpoon is allowed, except through the use of bottom-contact-hook-and-line and bottom contact gears which is restricted.
- The possession of coastal pelagic species is allowed.

Amendment: To align the proposed nearshore closure of Santa Barbara Island MPA to the required MPA design criteria outlined in the MLPA, the removal of the 1nm line for the proposed nearshore/offshore boarder is replaced with the aforementioned straight line running from 33° 28.500’ N. -118° 59.300’ W. to 33° 26.500’ N. -119° 02.200’ W to separate a possible nearshore/offshore State MPA.



Old – Non MLPA conforming



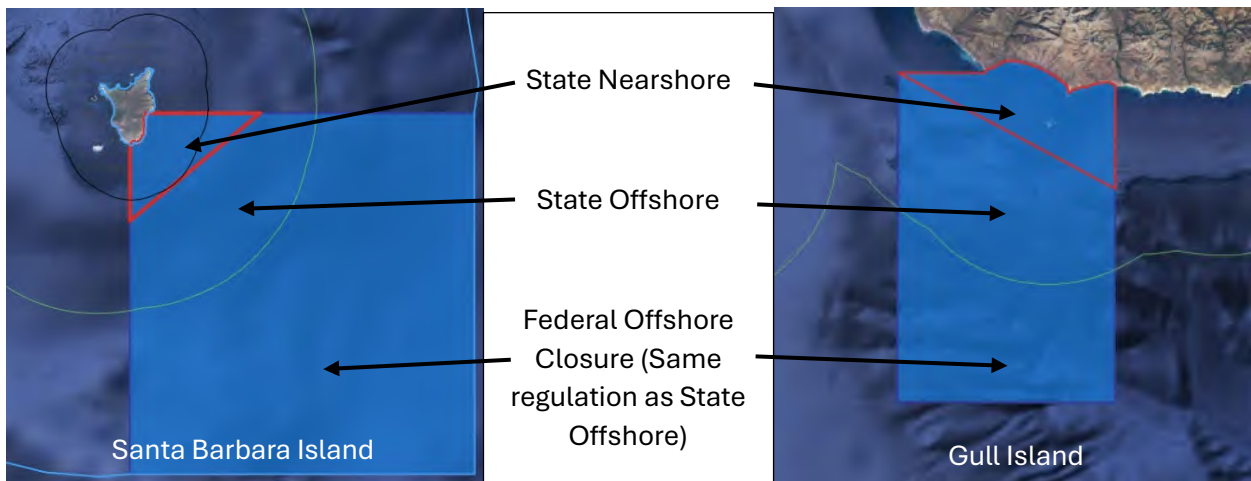
New – Conforms to MLPA design criteria for MPAs

Methods of take in the nearshore regions has also been amended. See the final amended version of table 2 below.

Table 2: Proposed Coordinates and options for the Nearshore limited or no take areas for Gull Island and Santa Barbara Island (Amended)	
Gull Island Nearshore MPA	Santa Barbara Island Nearshore MPA
The nearshore-offshore boarder would be bound by a straight line running from 33° 58.000’ N. lat. 119° 53.000’ W. long, to 33° 55.800’ N. lat. 119° 48.000’ W. long. within the existing MPA.	The nearshore-offshore boarder would be bound by a straight line running from 33° 28.500’ N. -118° 59.300’ W. to 33° 26.500’ N. -119° 02.200’ W within the existing MPA.

<p>Regulation within nearshore area:</p> <p>The recreational take of (either Pelagic Finfish or Highly Migratory Species (option dependent)) by spear is allowed. The commercial take of swordfish by harpoon is allowed. The possession of Coastal Pelagic Species is allowed*. (*Only needed if HMS option is selected) (Preferred)</p> <p>Or</p> <p>A no-take region (not preferred)</p>	<p>Regulation within nearshore area:</p> <p>The recreational take of (either Pelagic Finfish or Highly Migratory Species (option dependent)) by spear is allowed. The commercial take of swordfish by harpoon is allowed. The possession of Coastal Pelagic Species is allowed*. (*Only needed if HMS option is selected) (Preferred)</p> <p>Or</p> <p>A no-take region (not preferred)</p>
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The overall configuration of a possible nearshore/offshore system would involve a nearshore State MPA, an offshore State MPA, and a Federal offshore MPA with the same regulations as the State offshore MPA (DSBG is the exception, being a federally exclusive choice). The nearshore/offshore closure option adds an extra layer of complexity to the system and is not preferred in general, but this amended option would be the best fit if a nearshore region was desired. Below are generated images of possible nearshore/offshore state/federal configurations in the petition.



As of now those are the answers to most of the feedback received, new information that has come to light, and amendments to the original petition.

Thank you,
 Blake Hermann
 Petitioner (2023-15MPA)

Exhibit 21

Agenda Item 2, Marine Protected Areas Petitions Evaluation

Received by the California Fish and Game Commission for the November 6-7, 2024
Marine Resources Committee Meeting

Public Comments

1. [Email from Chris Smith](#), received 10/17/24
2. [Email from Cameron Cribben](#), received 10/24/24
3. [Email from Josh Hernandez](#), received 10/24/24
4. [Email from Mike Isaacman](#), received 10/09/24
5. [Email from Brian Kiyohara](#), received 10/24/24
6. [Email from Gary Sanserino](#), received 10/19/24
7. [Email from Randy Toussaint](#), received 10/24/24
8. [Email from Guy Westgaard](#), received 10/19/24
9. [Email from David Clutts](#), received 10/21/24
10. [Email from Nathan Perez](#), received 10/23/24
11. [Email from Sarah Wallace](#), received 10/24/24

From: Chris Smith [REDACTED]
Sent: Thursday, October 17, 2024 5:17 PM
To: fgc@fgc.ca.gov
Subject: MPA Expansion

Good evening,

I'm writing in opposition to propose MPA additions and expansions across the state. The available science indicates that there is no increase in fish abundance outside the closed areas. This was the stated intention when the closure were initially proposed.

California has robust fisheries and a healthy ecosystem especially compared to other parts of the country and world. We do not need additional unfair limits to access and fishing activity. Closing more areas would concentrate fishermen and pressure on the remaining open areas which would impact livelihoods and threaten biodiversity in certain areas. As a commercial fishermen I take great pride in my work and being an active participant in managing our fisheries. This would severely threaten my ability to support my family, my culture and my way of life. Importing seafood from foreign unregulated fisheries is not the answer. Allowing access and active management and conservation is the answer.

Best regards,

Chris Smith
F/V Pez Blanco

From: cameron cribben <[REDACTED]>
Sent: Thursday, October 24, 2024 05:47 AM
To: FGC <FGC@fgc.ca.gov>
Subject: Fwd: Opposition to Proposed Closure of Point Loma Ocean Waters – MPA Expansion

Begin forwarded message:

From: Paris Cribben <[REDACTED]>
Date: October 24, 2024 at 5:44:36 AM PDT
To: cameron cribben <[REDACTED]>
Subject: RE: Opposition to Proposed Closure of Point Loma Ocean Waters – MPA Expansion

Dear Members of the California Department of Fish and Wildlife,

I am writing to express my strong opposition to the proposed closure of Point Loma ocean waters as part of the Marine Protected Areas (MPA) expansion. As a San Diego-based fisherman with over 12 years of experience fishing for California spiny lobster, I believe that the proposed closure will negatively affect not only my livelihood but also the broader fishing community that depends on these waters.

The California spiny lobster fishery is one of the most sustainable and well-regulated in the state. I have been part of this fishery for more than a decade, working with local fishermen and adhering to strict regulations designed to ensure long-term sustainability. These include trap limits, size restrictions, and seasonal closures—all of which are enforced to maintain a healthy lobster population. The additional closure of Point Loma, an area vital to our operations, would unnecessarily restrict access to one of the most productive fishing grounds for this species.

Throughout my career, I have seen firsthand the positive impact of California's responsible fishery management practices. The spiny lobster population has remained stable, and our industry has been proactive in supporting conservation efforts. Closing Point Loma's waters to commercial and recreational lobster fishing is not only redundant but also harmful to the hardworking men and women who rely on these waters for their livelihood.

Additionally, the economic impact of this closure would be devastating to local businesses. Many of us have deep ties to the San Diego community, working with seafood distributors, restaurants, and markets that depend on a steady supply of local, sustainably caught spiny lobster. Limiting our access to these critical waters could force some of us out of business and disrupt the local seafood economy.

It is also important to consider that closures like this could lead to increased fishing pressure in other, less-regulated areas, potentially harming the very marine ecosystems we all seek to protect. A balanced approach is crucial to maintain both environmental conservation and economic sustainability, and I believe we already have that balance under the current regulations.

As someone who has spent countless hours on the water and has a deep respect for the ocean and its resources and would like to pass on his lobster permit to his young son in the future, I strongly urge the Department to reconsider this proposal. The closure of Point Loma waters is unnecessary and will disproportionately impact the livelihoods of responsible, local fishermen who have long been stewards of these waters.

Thank you for considering my comments. I hope you will consider the voices of the local fishing community when making your final decision.

Sincerely,

Cameron Cribben

California Spiny Lobster Fisherman, San Diego, CA

From: Josh Hernandez <[REDACTED]>

Sent: Thursday, October 24, 2024 03:41 PM

To: FGC <FGC@fgc.ca.gov>

Subject: MpA

Hi my name is Josh Hernandez I am a commercial fisherman from Dana Point, CA. I am emailing in regards to the proposed MPA closure.

I oppose the p Id 2023 -24mpa.

I oppose this closure because there is already a large closure area that closes ninety % of Laguna Beach. Closing more of our local

Coastline would only force the already crowded fishery into a smaller space. Also the reason for making the closure has to do with kelp restoration. The area that might get closed has a kelp forest that is currently thriving, even with continuous fishing efforts. The kelp will come and go whether the area is being fished or not, as we have seen throughout our lives in various areas.

Thank you for your time

Josh Hernandez

From: Michael Isaacman <[REDACTED]>
Sent: Wednesday, October 9, 2024 09:56 AM
To: FGC <FGC@fgc.ca.gov>
Subject: Petition 2023-33MPA Opposition

Hi,

My name is Michael Isaacman and I live in La Jolla, CA and I am writing to oppose and express concerns with Petition 2023-33MPA, specifically for Cabrillo SMR and the proposals for the expanded state marine reserve in San Diego, CA.

I frequently spearfish in that area and this petition would be a devastating loss to the spearfishing community. When spearfishing we only take fish that are within size and take limits and feel that this is the most ethical way to harvest the fish we love.

Please oppose this expansion of prohibited fishing areas as this kelp forest is currently very healthy and full of exceptional fish.

Thank you.

Regards,
Mike

This e-mail and any attachments are confidential and are intended solely for the use of the individual to whom it is addressed. This communication may be legally privileged. If you are not the intended recipient or the person responsible for delivering the e-mail to the intended recipient, please note that any unauthorized use or dissemination of this e-mail and any attachments is expressly prohibited. If you have received this e-mail in error, please delete the original transmission and destroy all copies.

From: Brian Kiyohara <[REDACTED]>
Sent: Thursday, October 24, 2024 06:00 AM
To: FGC <FGC@fgc.ca.gov>
Subject: Fw: Opposition to Proposed MPA Expansion

Begin forwarded message:

On Thursday, October 24, 2024, 5:59 AM, Paris Cribben <[REDACTED]> wrote:

Dear California Fish and Game Commission,

I am writing to express my strong opposition to the proposed closure of the ocean waters off Point Loma as part of the California Marine Protected Areas initiative. As a California spiny lobster fisherman for over 33 years, I have seen firsthand the value of sustainable fishing practices that not only support our local economy but also feed our community.

Fishing is not just a job for many of us in Point Loma; it is a way of life. The ocean provides for us, our families, and our neighbors. The proposed closure threatens to disrupt the livelihoods of hardworking fishermen who rely on these waters to sustain their families and contribute to the local economy. Point Loma is a vibrant community that thrives on the fresh seafood we provide, and our spiny lobster catches are a key part of that.

Moreover, our fishing practices have evolved to prioritize sustainability and environmental stewardship. We work diligently to adhere to regulations that protect marine ecosystems while ensuring that our local community continues to have access to fresh, locally sourced seafood. Closing these waters does not guarantee better conservation; instead, it can create economic hardships and undermine the traditions and values that define our coastal way of life.

I urge the MPA to consider the voices of local fishermen and the importance of maintaining access to these waters. Instead of implementing blanket closures, we should explore collaborative management strategies that involve the local fishing community in decision-making processes. This approach would not only promote conservation but also support the livelihoods that depend on responsible fishing practices.

Thank you for considering my perspective as a lifelong fisherman dedicated to preserving both our marine resources and our community's way of life.

Sincerely,

Brian Kiyohara
California Spiny Lobster Fisherman
Point Loma, CA

From: Gary Sanserino <[REDACTED]>

Sent: Saturday, October 19, 2024 04:25 PM

To: FGC <FGC@fgc.ca.gov>

Subject: Support for Laguna Beach MPA boundary adjustment

Attn: Marine Resources Committee, Nov. 6-7 meeting

Please support the expansion of the Marine Protection Act in the Laguna Beach area as proposed. This area is highly fished. The game and plant life Need a safe area so that it can recover and serve this in future generations well.

Gary Sanserino

From: Tracy <[REDACTED]>

Sent: Thursday, October 24, 2024 01:58 PM

To: FGC <FGC@fgc.ca.gov>

Subject: Opposition to Proposed Closure of Point Loma Ocean Waters – MPA Expansion

RE: Opposition to Proposed Closure of Point Loma Ocean Waters – MPA Expansion

Dear Members of the California Department of Fish and Wildlife,

I am writing to formally oppose the proposed closure of Point Loma ocean waters as part of the Marine Protected Areas (MPA) expansion. As a commercial fisherman who has been fishing California spiny lobsters and other species in these waters for the past 35 years, I know firsthand the impact this closure will have not only on my livelihood but also on the local economy. I also own a local fish market and a fish processing operation, both of which will suffer significantly if this proposal moves forward.

The California spiny lobster fishery, along with the other fisheries I participate in, has been carefully regulated for years to ensure sustainability. We have strict seasonal limits, trap restrictions, and size regulations that ensure we are not overfishing and are leaving the ecosystem in a balanced state. We fishermen, processors, and market owners have long been partners in conservation efforts, and it's important to highlight that these existing measures are already achieving the goal of resource preservation. The proposed closure of Point Loma's waters is not necessary from a sustainability standpoint and would impose undue hardship on those of us who have invested decades in responsible fishing practices.

In addition, the closure will have no meaningful benefit for the state of California, either environmentally or economically. In fact, it will be detrimental. If Point Loma is closed off, it will force many fishermen, myself included, to scale back or cease operations. This means that California will lose out on substantial tax revenues from fish sales, licensing fees, and the economic activity generated by businesses like my market and processing operation. No income or benefit will be generated by the state from a closure that puts responsible fishermen out of work.

The ripple effect will be felt across the entire community. My market employs several local workers, and our processing operation supports even more jobs. We sell directly to restaurants, distributors, and consumers, all of whom want fresh, local seafood. If Point Loma's waters are closed, we will not be able to meet demand, and consumers will be forced to turn to imported or less sustainable options. This is a direct loss for the local seafood industry and for the state, which will lose revenue and jobs as a result.

In addition, closures such as this one could lead to increased fishing pressures in other, less regulated areas, potentially causing harm to fisheries and ecosystems that currently benefit from the sustainable practices of those fishing in Point Loma.

The fishing industry in San Diego has been a cornerstone of the local economy for generations, and we take pride in our role as stewards of the marine environment. The proposed closure of Point Loma will undermine decades of responsible fisheries management and hurt hardworking, local businesses without delivering the intended benefits.

I strongly urge you to reconsider this proposal and to take into account the full economic and environmental consequences before moving forward. The local fishing community, including myself, stands ready to collaborate on solutions that protect both the ocean and our livelihoods.

Thank you for your time and consideration.

Sincerely,

Randy Toussaint

From: Guy Westgaard <[REDACTED]>

Sent: Saturday, October 19, 2024 10:58 PM

To: FGC <FGC@fgc.ca.gov>

Subject: YES on Laguna Beach MPA boundary adjustment No

You have created enough protected space within the city of Laguna beach and should leave what is currently available for our children and grandchildren children to fish and harvest from the sea as we have done for generations. With respect to the sea and all it has to offer. Guy and his family and families in the future.

From: David Clutts <[REDACTED]>
Sent: Monday, October 21, 2024 11:20 AM
To: FGC <FGC@fgc.ca.gov>
Subject: Letter of Opposition to Swami's, Py Loma MPA expansion

Dear California Fish & Wildlife,

I am writing to express my opposition to the proposed expansions of both the Swami's Marine Protected Area (MPA) and the Point Loma MPA.

Swami's already experiences minimal recreational fishing pressure. Access to the current fishing area from the shore is critical, and the expansion would complicate enforcement due to the difficulty in determining the new boundary lines. Expanding the MPA further would significantly limit fishing opportunities in Solana Beach, which has been a vital fishing area for decades. Closing additional area makes little sense while the Army corps of engineers routinely covers much of the reef with the sand replenishment at Solana beach. Therefore, I respectfully urge the California Department of Fish & Wildlife to deny the proposed expansion of the Swami's MPA.

Similarly, I oppose the expansion of the Point Loma MPA. This area contains some of the last remaining healthy kelp beds that can support fishing activities in southern San Diego County. The argument presented by the organization petitioning for the expansion, claiming it is necessary to save the kelp, is unfounded. Fishermen have protected and sustained these kelp beds as valuable fishing grounds for over a century. Expanding the MPA will only displace fishing pressure to other areas, disrupting a balanced ecosystem and limiting sustainable fishing opportunities.

I strongly urge the Department to deny the expansion of the Point Loma MPA, as it will negatively impact both the environment and the fishing community.

Thank you for your consideration.

Sincerely,

David Clutts

Member: San Diego Freedivers, Norcal skindivers, Richmond Pelican Skindivers

Spearg fisherman, Fisherman, Diver, Scuba Diver

DAVID CLUTTS

Broker Associate

C: [REDACTED] (San Diego) | C: [REDACTED] (Northern CA)

[REDACTED]

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David Clutts]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

10/21/2024

California Department of Fish and Wildlife

[Address if available]

Dear California Fish & Wildlife,

I am writing to express my opposition to the proposed expansions of both the Swami's Marine Protected Area (MPA) and the Point Loma MPA.

Swami's already experiences minimal recreational fishing pressure. Access to the current fishing area from the shore is critical, and the expansion would complicate enforcement due to the difficulty in determining the new boundary lines. Expanding the MPA further would significantly limit fishing opportunities in Solana Beach, which has been a vital fishing area for decades. Closing additional area makes little sense while the Army corps of engineers routinely covers much of the reef with the sand replenishment at Solana beach. Therefore, I respectfully urge the California Department of Fish & Wildlife to deny the proposed expansion of the Swami's MPA.

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I strongly urge the Department to deny the expansion of the Point Loma MPA, as it will negatively impact both the environment and the fishing community.

Thank you for your consideration.

Sincerely,

David Clutts

Member: San Diego Freedivers, Norcal skindivers, Richmond Pelican Skindivers

Spearg fisherman, Fisherman, Diver, Scuba Diver

From: Nathan Perez <[REDACTED]>
Sent: Wednesday, October 23, 2024 10:06 AM
To: FGC <FGC@fgc.ca.gov>
Subject: Mlpa

Nathan Perez
Captain F/V Bear Flag 2
Ph: [REDACTED]
E: [REDACTED]

Hello,

My name is Nathan Perez, I participate in the commercial swordfish fishery in Southern California operating FV Bear Flag 2 and participating in the swordfish fishery for over 15 years. I am emailing today to voice my support for Petition 15MPA and call to deny or modify petition 34.

Petition 34 should be disallowed or at the very minimum allow for harpoon swordfish still inside the Farnsworth as it is just as enforceable as recreational spear.

For petition 15, allowing Highly Migratory Species limited take, especially harpoon swordfish and deep-set buoy gear, for commercial fisheries is something we can allow inside of these areas. Allowing this will still protect the nonpelagic fish that benefit more from these areas. Swordfish and other migratory fish do not benefit or provide significant benefits to these areas as they simply pass through, and there is no reason a harpoon boat should be restricted from taking a fish inside of these areas while a longline boat can operate in its entire grounds outside the EEZ, targeting the same fish I will find in the summer when the fish are coastal vs the winter/spring when they are in the longline grounds. These MPAs at the Channel Islands also expand federal and further overlap with our offshore fishery.

The proposed allowable methods for commercial swordfish are highly selective, for harpoon it is 100%, and both harpoon and buoy gear are the most sustainable methods we have for targeting swordfish. Granting selective access to these areas will also allow us to not worry about harpooned or hooked buoy fish swimming gear into the no-take areas which always seems to happen and cause an issue related to retrieving that legally taken fish. This is a problem made worse by these three areas expanding into federal water vs other MPAs that stay more nearshore, away from most swordfish grounds. We occasionally avoid looking in sections of legal water because we know if we hit a fish there the current that day will take it into the closure. That is not fair.

At a time when commercial swordfish is dying due to nets being removed and harpooners and buoy guys having to compete with international longliners and nets from other countries selling cheap fish here locally we need these areas back to be able to keep our clean, and domestic swordfish markets in operation.

Thank you,

Nathan Perez (FV Bear Flag 2)

From: Sarah Wallace <[REDACTED]>

Sent: Thursday, October 24, 2024 03:56 PM

To: FGC <FGC@fgc.ca.gov>

Subject: Written public comment for November 6th MPA meeting

Thank you for your time in reading my comments.

Sarah Wallace

Dear members of the California Fish and Game commission; Marine Resources Committee

I would like you to imagine, a man who works every single day for his family, including weekends, with hopes that the amount of money he brings home is enough to pay for food, clothing, a home and safety for his family. This man is trying to run a small business in an unstable economy with rules that are constantly changing, law enforcement who can investigate him at anytime for any reason without a warrant, in one of the most dangerous and unexplored environments known. He is paying for permits, paying for VMS tracking, paying for fishing gear, vessel repairs and still trying to pay fair wages for those working with him. Now, knowing all this, imagine he is now told that he can no longer fish where he has for the last 20 years, in waters he knows like his own backyard. In waters where he befriends, sheep head, grass bass, seals and other marine life, he knows these ecosystems more intimately than most can claim.

The proposed MPA closures in Petition ID 2023 33 MPA is not founded on science nor was it discussed with those who are in and under those waters on a weekly basis and know them best. May I ask, why is this even an option for closure then? If I am not mistaken, these closures are being driven by the hope to rebuild kelp. With that said, fishing is not known to be detrimental to kelp growth, in fact the harvesting of red and purple sea urchin has been know to help boost kelp growth. Instead of closing the area why not look to other organizations such a NOAA a with their kelp restoration projects and see what can be done to support and help them. Knowing how detrimental it could be to human life by causing families who work hard for a living to potentially need to rely on government financial assistance because the waters they were once allowed to fish in they no longer can.

As I am sure you know the “man” I speak of theoretically consists of a group of upstanding commercial fishermen who have made it their life’s work to fish sustainably, and try to keep the food they catch available to Americans and those who care to purchase sustainably caught seafood.

By pushing these fishermen out of these areas, you are then forcing the American people to rely more heavily on international fishing. These other fisheries have no where near as strict laws or support for sustainability and ecosystem management

Additionally, the waters that then are left as “available” our fishermen will become much more crowded, the biodiversity could potentially dwindle and cause further issues. At this point there is a fair percentage of our waters considered marine protected and we see no further need in creating more unless it is done based on sound scientific evidence and in collaboration with these fishermen who know the waters best.

As a further thought, it would be interesting to see the public’s reaction to a fishing documentary. One where it shows our United States fishermen, who are following all laws and practicing sustainable fishing. Compared to those of other countries- countries we import our fish from, with their disregard for biodiversity, sustainability and lack of deep care of the fish they are selling. Our fishermen take pride in their catch and we as consumers should support them in these efforts and not make it more difficult.

I acknowledge the weight of your responsibility as decision makers for our state waters. Please consider that your decisions impact directly our ability to provide for our children. The ripple effect would not only impact the immediate fisherman and their families but will continue to create tremendous hardships that will be disastrous for many generations to come. Once an area becomes an MPA is rarely ever changes back to “fishable waters”, I urge you to please consider other options besides closing these waters and to please work collaboratively with the fishermen who know the waters best.

Thank you for your time,

Sarah Wallace

From: Keith Rootsart <keith@g2kr.com>
Sent: Thursday, October 24, 2024 3:26 PM
To: FGC <FGC@fgc.ca.gov>
Cc: Ashcraft, Susan [REDACTED]
Subject: MRC meeting 11/6/24

Dear FGC,

Attached are our written comments for inclusion in the MRC meeting materials for Agenda Item 2(B) *Discuss sorting MPA petitions in Bin 2 (petitions that require additional policy guidance, information and/or resources before evaluation), and next steps.*

The G2KR Urchin Petitions Evaluations.xlsx file is best viewed in Excel. There are several tabs.

These comments are submitted prior to the written comment deadline on 10/24/24 at 5:00 PM.

Thank you,

Keith Rootsart

Giant Giant Kelp Restoration
[REDACTED]



Giant Giant Kelp
Restoration Project

G2KR Petitions Summary

Outreach, Objections, Rebuttals, and Compromises. Where policy clarifications are needed.

FGC Petition 2023-23MPA – Culling, baiting, trapping and airlifting urchins recreationally and commercially in MPAs. Planting, transplanting, and pruning kelp by Restoration Management Permit. Managing acid weed and invasive kelp species. Setting buoys and artificial reefs. Changing the SCP portal to accommodate Restoration Management Permits by community groups. FGC education and outreach. Changing three SMCAs to SMRs to protect kelp. Creating a new Tanker’s Reef SMR.

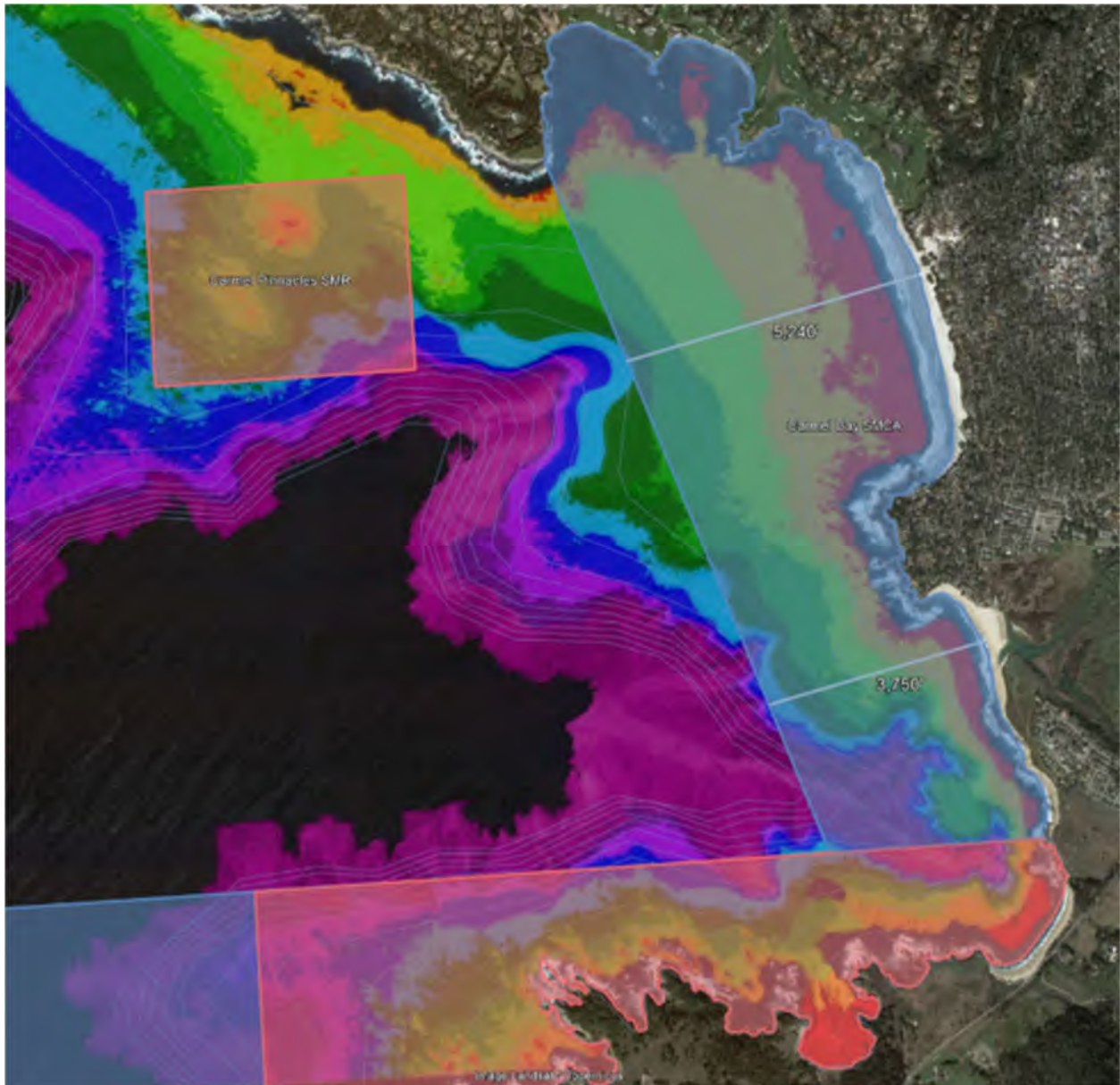
Outreach: FGC, City of Carmel, City of Monterey, City of Pacific Grove, County of Monterey, Monterey Collaborative Network.

Objection 1: Allwaters fishing group objects to SMR redesignations.

Rebuttal 1: Monterey SMCAs and SMRs are not that deep in State water.



In Monterey Bay fishing is allowed seasonally a half mile or less offshore.



In Carmel Bay fishing is allowed seasonally about a mile or less offshore and from shore.

Greyhound Rock, Pt. Lobos, Point Sur, Big Creek, Piedras Blancas, Point Buchan all extend to 3 mile limit.

Objection 2: Monterey Abalone Company objects to SMRs not allowing kelp harvesting.

Rebuttal 2: Need harvester access to kelp bed 220 for restoration purposes in Restoration Management Permit.

Policy clarification needed: Restoration is an allowable activity in SMCA's and SMR's as written under current policy. Culling urchins and restoring kelp is a restoration activity, but OPC is blocking all restoration activities.

Compromise 1: Reduce size of Tanker's Reef SMR to exclude water beyond diving depths,



A revised Tanker's Reef SMR of 193 acres from 685 acres, (23%)

Compromise 2: If setting buoys is clarified as a fishing method which was used at Tanker's Reef for 3 years, then a change of sportfishing regulations is not required.

Compromise 3: Make three SMCA's "no-take SMCAs" except for urchins, seaweed and invasive species for restoration and allow shore fishing and kelp harvesting. SMCA and SMRs both allow restoration. We will need to cull urchins in Point Lobos SMRs in 2026 and Lovers Point SMR in 2028.

FGC Petition 2024-10 – Air lift for urchins. Allow use of an air lift and hookah and modify 2023-23MPA to allow the better method of collecting urchins.

Outreach: FGC, Mexico

Objections 3: Dave Rudie, President CSUC, objects to use of commercial gear for recreational purposes and selling of ranched urchins.

Rebuttal 3: Recreational fishing gear is never certified. Urchins have no value at port and collection is non-commercial by definition; what the processor does with refuse is their own business. If I throw a plastic bottle in the trash and a recycler makes a sweater out of the material, my throwing away trash is not commercial. As a practical application, commercial divers are better equipped to deploy and operate an airlift with hookah, the question is whether they fish under recreational or commercial fishery rules.

Recreational fishing only requires a simpler regulation change to Tit. 14, § 29.06. Commercial urchin fishing is governed by the CSUC and entrenched in Tit. 14, § 120.7. CSUC is not seeking in Petition 2024-04 to change the collapsed red sea urchin fishery into a non-sustainable kelp restoration effort. We asked for changes to their petition at the FGC meeting on 8-14-24. If the CSUC were truly an ally for kelp restoration, petition 2024-10 would not be necessary as this method could remain commercial.

Jon Holcomb, a commercial red urchin fisherman, developed and started using an air lift to collect urchins beginning in 2018 at Fort Bragg. The other red urchin fishermen collect the urchins by hand collects the large heavy urchins but leaves the small ones behind which then allows them to grow and be harvested later. The surviving urchin cohorts are smaller and denser than the initial invasion making removal that much harder. North coast commercial urchin fishermen are working in funded restoration projects but leaving red urchins to eat the kelp forests saved.

Policy clarification needed: Urchin collection & ranching is non-commercial. Urchin air lift is usable for recreational fishing.

Compromise 4: Create a new “Kelp Restoration” commercial fishing license to allow more commercial fishing entrants to work on kelp restoration management permits at the recreational license fee rate. Waive wonton waste rule for urchin pests.

FGC Petition 2024-12 – Allow urchin removal in 7 more coastal counties by all methods.

Outreach: FGC. Seeking to engage MPA Collaboratives and Counties.

Objections: None

Policy clarification needed: Culling red urchins is allowed.

Compromise 5: Delete urchin culling in County of San Francisco. Added for simplicity. No reports of urchins or kelp in SF County.

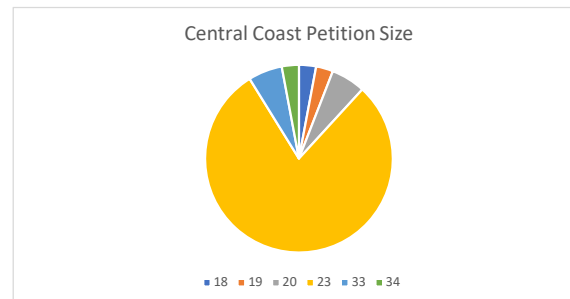
Summary of MPA Petitions

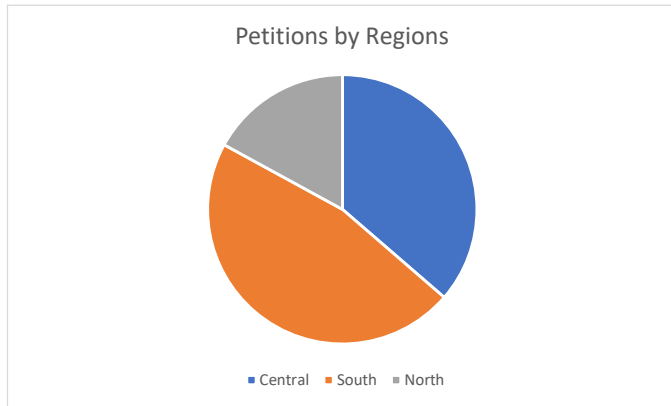
Based on limited descriptions provided by FGC agenda 2/7/24

Order	Petition	Affecting				Boundary			Take Allowance					Clarify Rules	Governance, etc.	sub track	Region				Protection +/-	Similar related petitions	Notes	
		SMCA	SMR	MPAs	Special Closures	Changed	New	Redesignation	Tribal	Rec .	Com.	Species	Allowed Uses				South	Channel	Central	North				
1	2023-14	9									1	Urchins				9	1					-1	See 23	
2	2023-15		3					1			1	palagic				3		1				-1		
3	2023-16		2					1			1	Salmon				2				1		-1		
4	2023-18			4	2								1			8		1				-1		
5	2023-19	1					1									1			1			1		
6	2023-20	1	1			1			1							2			1			-1	See 34	
7	2023-21	1														2	1					1		
8	2023-22			several										1		7	1					0		
9	2023-23	3	5				1	1		1	1	Urchin/Kelp	1		1	27			1			1	See 14	
10	2023-24	2				1										1		1				unknown		
11	2023-25			several		1							1			5		1				unknown		
12	2023-26	4				1								1		4	1							
13	2023-27	1						1								1		1				1		
14	2023-28		1				1		1							1	1					1		
15	2023-29	1							1							1	1					1		
16	2023-30	1								1		Crab				3					1	-1		
17	2023-31	1						1								2					1	1		
18	2023-32	1					1	1								2					1	1		
19	2023-33	1	6			1	1									7			1			1		
20	2023-34	3						1		1						3				1		1	See 20	
Totals		30	18	4	2	5	5	7	4	3	4	5	3	2	1	91	6	5	5	4		4		

20% Net petitions for added protections

Central Coast	
18	1
19	1
20	2
23	27
33	2
34	1





<u>Petition</u>	<u>Part</u>	<u>Region</u>	<u>Central</u>	<u>South</u>	<u>North</u>
14	1	North	FALSE	FALSE	1
14	2	North	FALSE	FALSE	1
14	3	North	FALSE	FALSE	1
14	4	North	FALSE	FALSE	1
14	5	South	FALSE	1	FALSE
14	6	South	FALSE	1	FALSE
14	7	South	FALSE	1	FALSE
14	8	South	FALSE	1	FALSE
14	9	South	FALSE	1	FALSE
15	1	South	FALSE	1	FALSE
15	2	South	FALSE	1	FALSE
15	3	South	FALSE	1	FALSE
16	1	North	FALSE	FALSE	1
16	2	North	FALSE	FALSE	1
18	1	Central	1	FALSE	FALSE
18	2	South	FALSE	1	FALSE
18	3	South	FALSE	1	FALSE
18	5	South	FALSE	1	FALSE
18	6	South	FALSE	1	FALSE
18	7	South	FALSE	1	FALSE
18	8	South	FALSE	1	FALSE
19	1	Central	1	FALSE	FALSE
20	1	Central	1	FALSE	FALSE
20	2	Central	1	FALSE	FALSE
21	1	North	FALSE	FALSE	1
21	2	North	FALSE	FALSE	1
22	1	South	FALSE	1	FALSE
22	2	South	FALSE	1	FALSE
22	3	South	FALSE	1	FALSE
22	4	South	FALSE	1	FALSE
22	5	South	FALSE	1	FALSE
22	6	South	FALSE	1	FALSE
22	7	South	FALSE	1	FALSE
23	1	Central	1	FALSE	FALSE
23	2	Central	1	FALSE	FALSE
23	3	Central	1	FALSE	FALSE
23	4	Central	1	FALSE	FALSE
23	5	Central	1	FALSE	FALSE
23	6	Central	1	FALSE	FALSE
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23	25	Central	1	FALSE	FALSE
24	1	South	FALSE	1	FALSE
25	1	South	FALSE	1	FALSE
25	2	South	FALSE	1	FALSE
25	3	South	FALSE	1	FALSE
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25	5	South	FALSE	1	FALSE
26	1	South	FALSE	1	FALSE
26	2	South	FALSE	1	FALSE

26	3	South	FALSE	1	FALSE
26	4	South	FALSE	1	FALSE
27	1	South	FALSE	1	FALSE
28	1	South	FALSE	1	FALSE
29	1	South	FALSE	1	FALSE
30	1	North	FALSE	FALSE	1
30	2	North	FALSE	FALSE	1
30	3	North	FALSE	FALSE	1
31	1	North	FALSE	FALSE	1
31	2	North	FALSE	FALSE	1
32	1	North	FALSE	FALSE	1
32	2	North	FALSE	FALSE	1
33	1	South	FALSE	1	FALSE
33	2	South	FALSE	1	FALSE
33	3	South	FALSE	1	FALSE
33	4	South	FALSE	1	FALSE
33	5	South	FALSE	1	FALSE
33	6	Central	1	FALSE	FALSE
33	7	Central	1	FALSE	FALSE
34	1	Central	1	FALSE	FALSE
34	2	South	FALSE	1	FALSE
34	3	South	FALSE	1	FALSE

Regional Petition Count	32	41	15
	Central	South	North

Central	32
South	41
North	15

Urchin Petitions

Petition Number	Affected MPA	MLPA Action	Action Type	Proposed Action	Justification by Petitioner	Notes	Priority	Individual Actions	Additional Policy	Add'l info needed	Resources need	Opposition	Collab Net	DMR category
Decadal Management Review Petition 2023-23MPA														
2023-23MPA_1	Edward F. Ricketts SMCA	Modify	Classification/Take	Reclassify SMCA to an SMR to prohibit take	Protect restored kelp forests; improve diver safety from fishing boat propellers and fishing gear.	1	B	Change MPA classification	none	no	none	Allwaters, Rec Fishing	77	4
2023-23MPA_2	Edward F. Ricketts SMCA	Modify	Take	Allow unlimited urchin removal	Restore Kelp Forests	2	A	Change Title 14, § 29.06	Policy established, see also 2024-10,12	no	None Requested	none	78	4
2023-23MPA_3	Edward F. Ricketts SMCA	Modify	unclear if within Commission authority	Allow out-planting kelp on the reef without an SCP	The SCP process is difficult to navigate which makes it harder to protect and restore kelp forests; restore kelp forest	3	C	Allow by Restoration Management Permit	KRMP guidance	yes	Decision tree framework	none		4,18
2023-23MPA_4	Edward F. Ricketts SMCA	Modify	unclear if within Commission authority	Allow spore dispersal by sporophyte bags without an SCP	The SCP process is difficult to navigate which makes it harder to protect and restore kelp forests; restore kelp forest	3	B	Allow by regulation change	KRMP guidance	no	Decision tree framework	none		4,18
2023-23MPA_5	Edward F. Ricketts SMCA	Modify	unclear if within Commission authority	Allow pruning kelp canopy to promote growth and resilience to storms with an SCP	The SCP process is difficult to navigate which makes it harder to protect and restore kelp forests; restore kelp forest	3,4	B	Allow kelp harvesting in SMRs by Restoration Management Permit	Presently allowable to harvest kelp	Kelp landing data	MAC	none		4
2023-23MPA_6	Pacific Grove Gardens SMCA	Modify	Classification/Take	Reclassify SMCA to an SMR to prohibit take	Protect restored kelp forests; improve diver safety from fishing boat propellers and fishing gear.	1	B	Change MPA classification	none	no	none	Allwaters, Rec Fishing	83	4,10
2023-23MPA_7	Pacific Grove Gardens SMCA	Modify	Take	Allow unlimited urchin removal	Restore Kelp Forests	2	A	Change Title 14, § 29.06	Policy established, see also 2024-10,12	no	Private funding	none		4
2023-23MPA_8	Pacific Grove Gardens SMCA	Modify	unclear if within Commission authority	Allow out-planting kelp on the reef without an SCP	The SCP process is difficult to navigate which makes it harder to protect and restore kelp forests; restore kelp forest	3	C	Allow by Restoration Management Permit	KRMP guidance	yes	Decision tree framework	none		4,18
2023-23MPA_9	Pacific Grove Gardens SMCA	Modify	unclear if within Commission authority	Allow spore dispersal by sporophyte bags without an SCP	The SCP process is difficult to navigate which makes it harder to protect and restore kelp forests; restore kelp forest	3	B	Allow by regulation change	KRMP guidance	no	Decision tree framework	none		4,18
2023-23MPA_10	Pacific Grove Gardens SMCA	Modify	unclear if within Commission authority	Allow pruning kelp canopy to promote growth and resilience to storms with an SCP	The SCP process is difficult to navigate which makes it harder to protect and restore kelp forests; restore kelp forest	3,4	B	Allow kelp harvesting in SMRs by Restoration Management Permit	Presently allowable to harvest kelp	Kelp landing data	MAC	none		4
2023-23MPA_11	Carmel Bay SMCA	Modify	Classification/Take	Reclassify SMCA to an SMR to prohibit take	Protect restored kelp forests; improve diver safety from fishing boat propellers and fishing gear.	1	B	Change MPA classification	none	no	none	Allwaters, Rec Fishing		4
2023-23MPA_12	Carmel Bay SMCA	Modify	Take	Allow unlimited urchin removal	Restore Kelp Forests	2	A	Change Title 14, § 29.06	Policy established, see also 2024-10,12	no	Private funding	none		4
2023-23MPA_13	Carmel Bay SMCA	Modify	unclear if within Commission authority	Allow out-planting kelp on the reef without an SCP	The SCP process is difficult to navigate which makes it harder to protect and restore kelp forests; restore kelp forest	3	C	Allow by Restoration Management Permit	KRMP guidance	yes	Decision tree framework	none		4,18
2023-23MPA_14	Carmel Bay SMCA	Modify	unclear if within Commission authority	Allow spore dispersal by sporophyte bags without an SCP	The SCP process is difficult to navigate which makes it harder to protect and restore kelp forests; restore kelp forest	3	B	Allow by regulation change	KRMP guidance	no	Decision tree framework	none		4,18
2023-23MPA_15	Carmel Bay SMCA	Modify	unclear if within Commission authority	Allow pruning kelp canopy to promote growth and resilience to storms with an SCP	The SCP process is difficult to navigate which makes it harder to protect and restore kelp forests; restore kelp forest	3,4	B	Allow kelp harvesting in SMRs by Restoration Management Permit	Presently allowable to harvest kelp	Kelp landing data	MAC	none		4,18
2023-23MPA_16	Point Lobos SMR	Modify	Take	Allow unlimited urchin removal	Restore Kelp Forests	2	B	Change Title 14, § 29.06	Need Policy to work in a SMR	no	Private funding	none	88	4,18
2023-23MPA_17	Point Lobos SMR	Modify	unclear if within Commission authority	Allow pruning kelp canopy to promote growth and resilience to storms with an SCP	The SCP process is difficult to navigate which makes it harder to protect and restore kelp forests; restore kelp forest	3,4	B	Allow kelp harvesting in SMRs by Restoration Management Permit	Presently not allowable to harvest kelp in a SMR	no	MAC	none		18
2023-23MPA_18	Point Lobos SMR	Modify	unclear if within Commission authority	Allow out-planting kelp on the reef without an SCP	The SCP process is difficult to navigate which makes it harder to protect and restore kelp forests; restore kelp forest	3	C	Allow by Restoration Management Permit	KRMP guidance	yes	Decision tree framework	none		18
2023-23MPA_19	Point Lobos SMR	Modify	unclear if within Commission authority	Allow spore dispersal by sporophyte bags without an SCP	The SCP process is difficult to navigate which makes it harder to protect and restore kelp forests; restore kelp forest	3	B	Allow by regulation change	KRMP guidance	no	Decision tree framework	none		18
2023-23MPA_20	n/a	Establish	Establish new MPA	Establish a new SMR at Tanker's Reef	Protect restored kelp forests; improve diver safety from fishing boat propellers and fishing gear.	1,5	B	Add an SMR to inventory	none	Ask tribes for a name	New maps	Allwaters, Rec Fishing		04
2023-23MPA_21	not specified	n/a	unclear if within Commission authority	Create regulatory pathway to allow placing of artificial reef structures and sunken ship for recreational diving	Create new habitat for kelp and other marine life; expand diving opportunities.	6	C	Develop Artificial reef program	OPC, CCC, etc.	Meet and Discuss	Artificial reefs	none		4,18
2023-23MPA_22	not specified	n/a	unclear if within Commission authority	Allow placement of buoys in restoration areas	Protect substrate from anchors in restored kelp forests.	7	A	If buoys are "fishing" this petition can be deleted	Clarify	no	Buoys	none		04
2023-23MPA_23	not specified	n/a	Non-regulatory	Develop a framework to evaluate and approve appropriate restoration and mitigation actions within MPAs and marine managed areas	Allow restoration activities in MPAs	3,8	B	Allow work by Restoration Management Permit	KRMP guidance	Meet and Discuss	Decision tree framework	none		4,16,18
2023-23MPA_24	not specified	n/a	unclear if within Commission authority	Establish a new process in CDFW's scientific collecting permit program for Restoration Management Permits	The SCP process is difficult to navigate; wants to conduct restoration without scientific design to test effectiveness of methods	3	B	Make Restoration Management Permit Process	KRMP guidance	Meet and Discuss	Software development	none		17,18
2023-23MPA_25	not specified		Non-regulatory	Consider proposed kelp restoration sites as G2KR adopted reefs for continued kelp restoration	Protect and restore kelp forests; continued community engagement.	9	B	Make Restoration Management Permit define adoption	KRMP guidance	Meet and Discuss	Private funding	none		4,18
2023-23MPA_26	Various MPAs*	n/a	Commercial	Allow commercial urchin harvest in MPAs for Restoration	Harvest urchins for urchin ranching and other uses.	2,10	B	Make Restoration Management Permit	KRMP guidance	none	Commercial Divers	none		4,18
2023-23MPA_27	Various MPAs*	n/a	Commercial	Exemption for Wonton Waste Rule	Allow commercial to destroy small urchins.	11	B	Make Restoration Management Permit	KRMP guidance	none	Commercial Divers	none		4,18

Other Urchin Petitions

2024-10	Initially outside MPAs	n/a	take	Airlift use by recreational fishers	Airlift is more efficient	2.10	A	Change Title 14, § 29.06	Clarification on commercial use	Evaluation	Compressor	California Sea Urchin Commission	n/a
2024-12	Outside MPAs	n/a	take	Expand culling to 7 more counties	More divers can participate	2.10	A	Change Title 14, § 29.06	Established policy	Kelp Watch	Private funding	none	n/a

* Could be subdivided into 5 MPAs to consider each instance individually.

Justification Notes

- 1 In SMCAs fish stocks are lower than SMRs
Protecting areas increases fish biomass.
Better outcomes for fish and kelp if fishing is prohibited. See DMR report:
[Kelp Forest Technical Report Narratives. See pages 74-80, 83](#)
Safer environment with kelp restoration divers below boats.
These MPAs are not very deep and do not extend to 3 mile state water limit like others.
Traversable in kayaks.
More fishing is done outside of these MPAs anyways.
Low value due to overfishing for Fishers.
High value and importance to Rec. Tourism, Diving, Business, Conservation etc.
Better fishery when rockfish are allowed to become adult in 8-10 years.
Culling urchins benefits snails which eat kelp.
Fish eat snails.
Don't take the fish that eat the snails.
Consumptive nearshore fishing is concentrated in 3 small SMCAs and non-MPAs.
CCFRP determined that SMCAs and non-MPAs have similar lower fish biomass.
PMFC prohibited groundfishing in < 120' for Rec. fishing for 6 months anyways.
Central Groundfish Management Area (North of 36 N lat.), (Title 14 Sec. 27.40)
> 50 fathoms: April, October, December
< 20 fathoms: May, June July, August, September, November

- 2 Culling urchins by recreational divers was allowed at Tanker's Reef from 4-1-21 to 4-1-24
[Resist Strategy as defined in RAD](#)
Reducing urchin grazing pressure restores kelp forests.
Legal recreational effort for 3 years demonstrated:
Well controlled and safe.
Collects data to inform FGC & KRMP.
Verified results by GOs and NGOs
Illegal recreational effort is common:
Unlawful conservation role for divers.
Data is not collected to inform FGC & KRMP.
Benthic disturbance/by-catch inconsequential by MBNMS.
Unforeseen consequences were discovered:
Desmarestia ligulata (acid weed) early colonization.
Spread of invasive bryozoan species.
Marine Heat Waves.
Red tides and darkness affect on giant kelp.
Urchin size frequency decrease by culling makes culling harder.
Current Sea Grant research does not seek to learn other unforeseen consequences.
Improved method discovered:
Air lift.

- 3 In the SCP portal, allow for RMP application and tracking.
"Difficult to navigate" would be better described as "inappropriate for kelp restoration".
The software is horrible for users and should be fixed.

Needs to accommodate "unlimited" and widespread restoration.
 Scientific Collecting Permits don't work for kelp restoration.
 Small area of design.
 Project size allowed is a constant second guessing of what CDFW will accept.
 Can't forecast the acceptable size.
 Size is unnecessarily small for permission, but too small to grow a forest.
 Must have a control area.
 Limit disturbances to a species, which is contradictory to restoration purposes.
 Take limits in Decision Tree are informed by old models, not adaptive.
 Only scientists get applications approved.
 We were denied SCP applications 3 times.
 Written by scientists but submitted under our name.
 SCP have a 98% application success rate.
 Research design changes during the study period require permits to adapt quickly.
 Timing rarely works to have permission, funding, and people.
 Restoration Management Permit application and collaboration.
 Restoration on land is a model
 Allow kelp restoration by removing urchins (conspecifics).
 Restore large kelp forests
 Allow affecting species richness.
 Control areas are simply untreated areas.
 Non-scientists can apply.
 Scientists collaborate with CPUE evaluations and SCPs.

4 Kelp harvesting is needed by the Monterey Abalone Company to feed abalone
 6,000 lbs of kelp canopy per week
 Presently only allowed in SMCAs
 Kelp could feed urchins in existing ranching pens.
 Allow kelp harvesting in association with kelp restoration efforts in SMRs
 Benefit kelp survival
 Proxy for extinct Sea Cow.

5 Majority of public comment supportive of MPAs
[Only 20% of petitions request additional protections.](#)
 30x30 calls for 14.4% of additional protections on the coast.
 Proposed areas of low economic value to the fishing community.
 Tanker's Reef may be partially covered in sand in the future.
 Site of possible artificial reef deployment.

6 OPC recently funded a study to develop an artificial reef siting plan
 Under consideration on Central Coast for 20 years.
 Need Permitting pathway

7 Buoys to guide culling efforts are essential tools
 If considered fishing practice no authorization needed from
 CDFW
 MBNMS

8 OPC's Kelp Restoration Management Permit working group
Resulting recommendation to OPC in 2027
Incorporate guidance into RMP decision tree

9 Similar to adopt a highway for cleaning up litter
Commissioners idea
Control and coordinate several NGOs activities in a single space.
Management point of contact and MOU with practitioners

10 Commercial divers can coordinate with recreational diving efforts
More experienced at urchin diving
Better equipment & safety
Collect at higher workrates
Use air lift more effectively and efficiently
Sell harvested urchins for urchin ranching and sales
Make Commercial Kelp Restoration Diver License
Allow more entrants to Commercial Urchin Fishery
Reduce license fee for Conservation activities.
Allow commercial fishing for urchins without restrictions.
Could allow as recreational activity if 2024-10 is approved by FGC.
Commercial divers could work as recreational divers.

11 Commercial divers should be able to destroy small and unharvestable urchins
Removal of small urchins is required.
Exempt wanton waste rule for restoration activities.

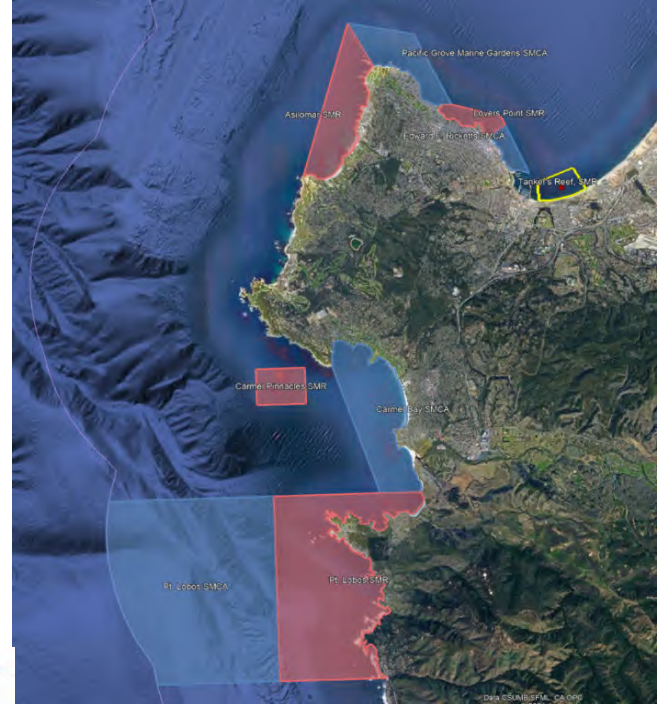
Priority to State calendar

Priority	Date	Milestone for
A	1-Apr-25	Rulemaking calendar
B	1-Apr-26	Guidance from KRMP Decision tree Outplanting Methods Adopt a Reef Commercial Divers Restoration Management Permit Portal
C	1-Apr-27	Guidance from KRMP Artificial Reefs and outplanting guidance

Kelp Restoration Petition 2023-23MPA

[Read petition text](#)

Number	MPA/Description	Change	Action	Description
23_1	Ed Ricketts	Modify	classification/take	SMR
23_2	Ed Ricketts	Modify	take	unlimited urchins
23_3	Ed Ricketts	Modify	unclear	outplanting
23_4	Ed Ricketts	Modify	unclear	Spore bag
23_5	Ed Ricketts	Modify	unclear	Pruning
23_6	PG Gardens	Modify	classification/take	SMR
23_7	PG Gardens	Modify	take	unlimited urchins
23_8	PG Gardens	Modify	unclear	Pruning
23_9	PG Gardens	Modify	unclear	outplanting
23_10	PG Gardens	Modify	unclear	Spore bag
23_11	Carmel Bay	Modify	classification/take	SMR
23_12	Carmel Bay	Modify	take	unlimited urchins
23_13	Carmel Bay	Modify	unclear	Pruning
23_14	Carmel Bay	Modify	unclear	outplanting
23_15	Carmel Bay	Modify	unclear	Spore bag
23_16	Pt. Lobos	Modify	take	unlimited urchins
23_17	Pt. Lobos	Modify	unclear	Pruning
23_18	Pt. Lobos	Modify	unclear	outplanting
23_19	Pt. Lobos	Modify	unclear	Spore bag
23_20	Tanker's Reef	Establish	Establish an MPA	SMR
23_21	Artificial Reefs	n/a	Unclear	Artificial Reef
23_22	Buoys	n/a	Unclear	Allow
23_23	Restoration in MPAs	n/a	non-regulatory	Framework
23_24	Restoration Permits	n/a	Unclear	SCP process
23_25	Adopted Reef commu	n/a	non-regulatory	Adopted
23_26	Commercial Harvest of Sea Urchins in MPAs			
23_27	Commercial restoration exception to Wanton Waste Rule			





Kelp Restoration Proposal in Consideration





- ❑ **Culling urchins**
- ❑ **Baiting and trapping urchins**
- ❑ **Commercial restoration by harvest of purple urchins for urchin ranching**
- ❑ **Managing acid weed**
- ❑ **Removing invasive species**
- ❑ **Kelp planting and transplanting**
- ❑ **Kelp canopy management by pruning**
- ❑ **Prohibit fishing in restoration areas**

Giant Kelp Restoration Project: Tanker's Reef G2KR.com

Reference for MPA locations

California Fish and Game Commission
***Proposed Project: San Andreas Shellfish Company Application for
State Water Bottom Lease in Tomales Bay, California***

October 31, 2024

The attached document is a revised project description for an aquaculture lease application submitted by San Andreas Shellfish Company on October 7, 2024. The application is in the early stages of the Commission's leasing process. The proposed project will be presented and discussed at the Marine Resources Committee meeting on November 7, 2024, consistent with the Commission's enhanced state water bottom leasing process.

San Andreas Shellfish Farm Project Description

DRAFT
October 7, 2024

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Introduction

The San Andreas Shellfish Company (SASC) is currently designing and proposing the San Andreas Shellfish Farm (SASF). Approval of the SASF will require documentation under the California Environmental Quality Act as well as approvals from local, state and federal agencies. The purpose of this draft project description is to present the SASF as currently envisioned to inform discussions with stakeholders and agencies, prior to beginning CEQA documentation or submitting regulatory permit applications. During the CEQA documentation and permitting process it is expected that the project may be modified.

Surrounding Land Uses and Setting

Tomales Bay is approximately 24 km long and 1.6 km wide. The Project is on the east side of Tomales Bay, near the bay’s entrance and in between Sand Point and Tom’s Point. The upland area adjacent to the Project is primarily grazed and natural open space. The area within the bay near the Project is primarily used for recreational clamming, fishing, hunting and boating. (Figure 1). Tomales Bay is a complex ecosystem and valuable resource for California and the nation because of its natural resources, aesthetic appeal, recreational opportunities, ecological value and economic activity. Visitors and Marin County residents value Tomales Bay for its natural and anthropogenic attributes. The bay itself is primarily used for recreational boating, swimming, clamming, fishing, hunting and shellfish culture. Small towns are on the shores of Tomales Bay but the area surrounding the bay is predominantly natural and agricultural open space.



Figure 1: San Andreas Shellfish Farm Project vicinity.

Project Description

The following sections provide an overview of the Project, including:

1. Project Scope and Objectives
2. Project Area
3. Species and Culture Methods
4. Draft Best Management Practices and Mitigation Measures

Project Scope and Objectives

The Project objectives are as follows:

- Produce premium seafood for public consumption.
- Create additional job opportunities and sustainable economic development for Marin County and local jurisdictions.
- Culture shellfish and seaweed in a manner that contributes to the value of Tomales Bay's natural ecosystem.

Project Area

SASC proposes to lease from the California Fish and Game Commission an approximately 34.3 acre intertidal area and 4.6 acre subtidal area near the entrance of Tomales Bay (Figures 1 and 2).



Figure 2: San Andreas Shellfish Farm Project culture areas.

Species and Culture Methods

SASC proposes to culture the following species:

- 1) Manila clams, *Venerupis philippinarum*
- 2) Atlantic oysters, *Crassostrea virginica*
- 3) Pacific oysters, *Crassostrea gigas*
- 4) Kumamoto oysters, *Crassostrea sikamea*
- 5) Purple hinged scallops, *Crassadoma gigant*
- 6) European oyster, *Ostrea edulis*
- 7) Olympia oyster, *Ostrea lurida*

- 8) Mediterranean mussel, *Mytilus galloprovincialis*
- 9) Native algae species (for example: red algae, *Gracilaria* spp.)

Table 1 lists the location of the culture methods that will be used and the species that will be cultured with each method.

Table 1. San Andreas Shellfish Farm culture locations, methods and species.

Location	Method	Species
Intertidal	Suspended Long-line / Adjustable Long Line	All oyster species
	Bag on Ground (Clam)	Manila clams
	Bag on Ground (Oyster)	All oyster species
	Rack and Bag / Basket / Tray	All oyster species and Manila clams
Subtidal	Growout Rafts	All oyster species and purple hinged scallops
	Longline Suspended Culture	All oyster species and purple hinged scallop
	Longline Floating Culture	All oyster species
	FLUPSY	All species

Note: algae that colonizes on culture equipment will be harvested.

Table 2 summarizes the anticipated coverage and densities of each of the culture methods.

Table 2. San Andreas Shellfish Farm culture equipment densities.

Method	Estimated Acres	Unit	Units per Acre	% Gear Coverage per Acre	% Area Uncovered
Intertidal Suspended Long-line	16.31	lines	26	18%	82%
Intertidal Bag on Ground (Clam)	4.5	bags	2,475	34%	66%
Intertidal Bag on Ground (Oyster)	4.5	bags	1,238	17%	83%
Intertidal Rack and Bag / Basket	9.0	racks	353	29%	71%
Subtidal Growout Rafts / Wet Storage Rafts	2.11	rafts	15	10%	90%
Subtidal Longline Suspended Culture	0.5	lines	10	5%	95%
Subtidal Longline Floating Culture	1.62	lines	10	5%	95%
Subtidal FLUPSY Rafts	0.34	rafts	12	16%	84%

Equipment Common to Multiple Methods

Following is a description of shellfish enclosure equipment common among multiple culture methods.

Bags – Bag enclosures will be composed of polyethylene mesh pre-fabricated into bags or fabricated to form a semi-flat bag to contain shell stock. Mesh size of the bags will be dependent based on the size-class of the shell stock at any one time. The dimensions of the bags will also vary based on culture method and stage of shell stock growth but will not exceed 2 feet by 3 feet.

Baskets – Basket enclosures are recognized to be manufactured, or similarly fabricated, enclosures similar to the type; SEAPA®, Hexcyl®, Fusion Marine or Zapco. The dimensions of baskets varies but they are typically approximately 30 inches (in) x 12 in x 12 in.

Trays – Trays will consist of manufactured plastic or wire mesh, shallow, open topped baskets. Individual trays will be no larger than 4 ft by 4 ft by 6 inches.

Intertidal Suspended Longline / Adjustable Longline

A primary culture method for the grow-out of oyster species in all intertidal areas will be longline based placement of both baskets and bags (Figures 3, 4 and 5). Long line systems will consist of polyethylene rope, vinyl coated galvanized cable, or large gauge monofilament line with polyethylene sleeve, suspended off the bottom using 2-inch schedule 80 PVC pipe. The pipes will be spaced approximately 10 feet apart. The ends of each longline will be anchored by a helical anchor or galvanized steel post driven into the ground to provide tension and support to the lines.

Individual longlines will be no more than 150 feet long with no more than 50 baskets or bags attached to each longline. Longlines will be arranged in groups of three parallel lines with 5 foot spacing between each line. Each longline group will have at least 20 foot spacing on all sides from other longlines or culture gear. Culture baskets and bags will be held on the lines with plastic or stainless-steel clips. Baskets and bags may or may not have floats attached to assist in the mobility of the culture gear during tidal swings and wave activity that can promote shell growth.



Figure 3: Example of Intertidal Suspended Longline Culture with Bags during a low tide. (Source: <https://www.pangeashellfish.com/blog/the-different-methods-of-growing-oysters>)

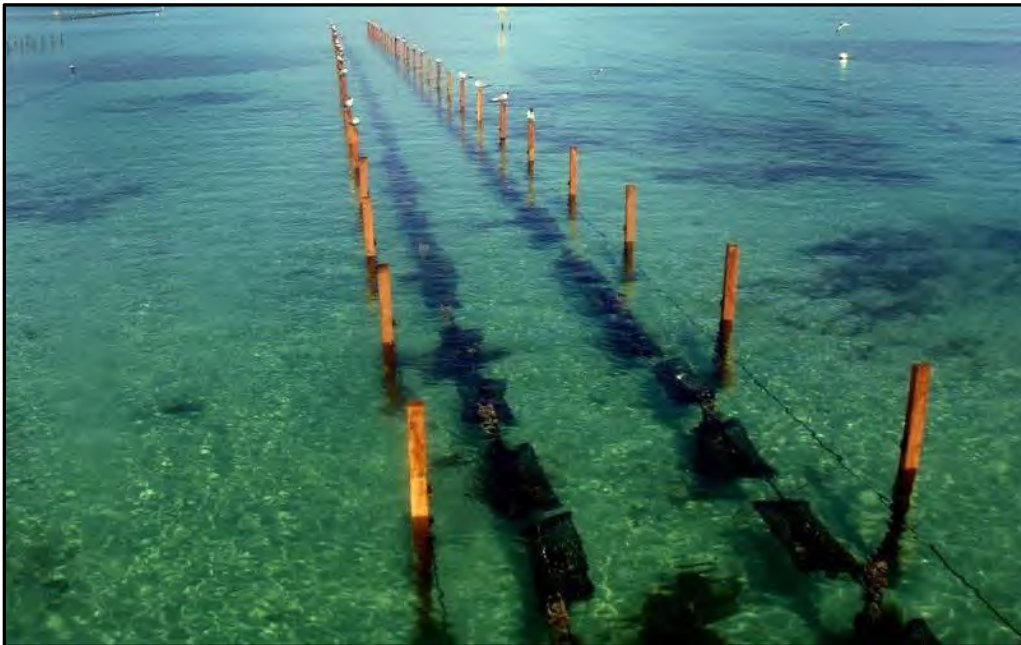


Figure 4. Example of Intertidal Suspended Adjustable Longline Culture with Bags. (Source: <http://www.bstoysters.com>)



Figure 5. Example of Intertidal Suspended Adjustable Longline Culture with Bags during a high tide. (Source: <http://www.bstoysters.com>)

Intertidal Bag on Ground

Bag-on-Ground culture (Figure 6) will be utilized in instances where occupying the ground surface is necessary to ensure adequate duration to maintain culture gear submergence. This method is not a preferred method based on the concerns of predation, siltation, and ease of operation. Culture gear utilized for this method will consist of ground lines, polypropylene rope, vinyl coated cable, or monofilament strung between ground anchors. Helical anchors, concrete blocks or stakes will be used for anchoring. Each ground line will be no longer than 200 feet long. Culture bags will be tethered to the ground lines every 3-4 feet. Ground lines will be spaced at least eight feet apart from each other. All bottom bags will be affixed to lines secured to the mudflats within the bottom bag cultivation areas.

For oyster culture, up to 65 grow out bags may be attached to each 200 foot line at any time. During operation bags may be flipped back and forth over the ground line to reduce siltation and fouling and maintain preferable conditions for oyster growth.

For clam culture, up to 130 grow out bags may be attached to groundlines limited to 30 feet in length.



Figure 6. Example of Intertidal Bag-on-Ground Culture. (Source: <https://smea.uw.edu>)

Intertidal Rack and Bag / Basket / Tray

The proposed Rack and Bag / Basket / Tray culture method (Figure 7) consists of fabricated 5/8-inch rebar frames with bag culture gear secured flat on top or basket culture gear suspended between the two longest top bars. Each rack will be 3 feet wide by 12 feet long. The height of the racks will vary depending on ground elevation but will not be constructed with heights more than 2.5 feet above the ground surface. The racks will be placed in groups of 12 arranged in two rows of six racks, with at least three foot spacing between each rack. Ten foot spacing will be maintained in all directions between multiple plots, and 20 foot spacing will be maintained between rack culture gear and other culture gear.

Each rack will have up to six 2-foot by 3-foot bags secured flat to the top of the racks by clips, industrial rubber bands, stainless steel or plastic clips, or polyethylene line. Alternatively, basket culture gear will be suspended off of the racks. Up to 4 baskets may be secured to each rack. Baskets will be secured in a similar manner to bags.



Figure 7. Example of Intertidal Rack and Bag Culture. (Source: <http://njseagrant.org>)

Subtidal Growout Rafts

Subtidal grow out rafts (Figure 8) will consist of aluminum and/or timber framed floating structures with dimensions no greater than 25 feet by 12 feet. The rafts are anticipated to maintain approximately 1.5 feet of freeboard above the water surface, and 1 foot of draft unencumbered. Raft framing will mount on to plastic floats on either end of the raft. Area above floats will be covered with plywood. The edge of the plywood will be enclosed with either plywood or chain-link with a minimum 3' height from the water to serve as a bird and seal deterrent. Between the two floats, metal cross bars will span the width of the rafts for securing grow out gear. Grow out gear secured and utilized in the rafts will include baskets, bags, and trays. Suspended gear under the rafts may reach 4 feet below the watersurface.

Raft pairs will be spaced at least 40 feet apart with at least a 20 feet buffer from lease boundaries. The raft pairs will be anchored with helical anchors on opposing ends, and weighted lines tethering them together with 20 foot spacing in between.

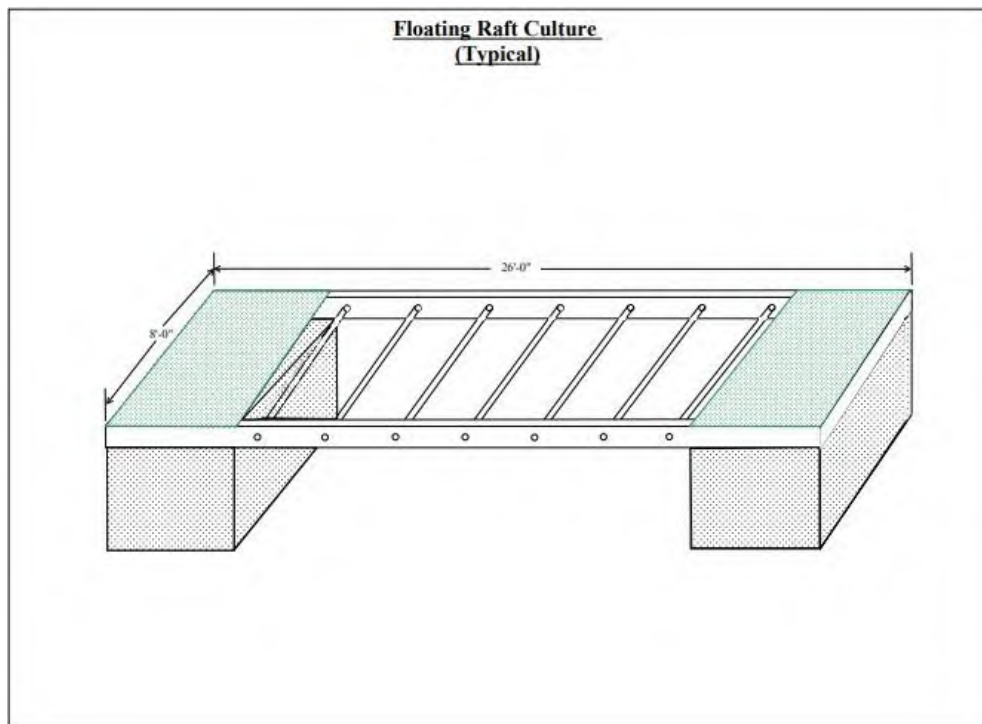


Figure 8. Floating raft culture schematic.

Subtidal Longline Suspended Culture

Subtidal longlines (Figure 9) are also proposed for using suspended baskets and bags. Subtidal longlines will consist of polyethylene rope or polyester cord anchored using helical anchors at

both ends. Floats spaced every 20 feet will suspend the line on the surface. Tethered to the longline between floats will be baskets or bags secured to the long line using metal or plastic clips, or polyethylene line. Baskets and bags may be suspended in the water column using weights to keep them submerged. Submerged baskets/bags will be arranged clusters of no more than 4 stacked units affixed to each other and then secured to the long line by two dropper lines, 2-4 feet in length. Spacing along the longline will be no less than 4 feet. Line lengths will be no longer than 200 feet



Figure 9. Example of Subtidal Suspended Longline Culture with Baskets.
(<https://seapa.com.au>)

Subtidal Longline Floating Culture

Subtidal longlines (Figures 10 and 11) are also proposed for using floating baskets and bags. Longline systems will consist of the same gear deployment as for longline suspended culture. However, baskets and bags will be attached in pairs to the longline with floats secured to each basket/bag to keep the culture gear floating at the surface. Floating baskets/basket pairs will be attached to the longline with no less than 4 foot spacing between each pair. Line lengths will be no longer than 200 feet.



Figure 10. Example of Subtidal Floating Culture. (Source: <https://www.zapcoaquaculture.com>)



Figure 11: Example of Subtidal Floating Culture. (Source: <https://www.zapcoaquaculture.com>)

Subtidal FLUPSY

Floating Upwelling Systems (FLUPSYs) will be used in the initial maturing of seed stock. A FLUPSY is a floating raft structure designed to create an increased flow rate of seawater through screened bins holding seed stock. The system uses a paddle wheel or propeller to move water through the system to create an upwelling current of water through each of the seed containing bins. The seed containing bins are constructed with less than 2 millimeter size screen. The proposed FLUPSY structure will be constructed of aluminum and composite material with poly-encapsulated floats. Each FLUPSY will be no larger than 25 feet by 45 feet with a 6-foot draft and 1 to 3 feet of free board above the waterline. The Project proposes up to 2 FLUPSYs for use in culturing all proposed species. FLUPSYs will be either solar or tidal powered. Each FLUPSY will be moored to at least two helical anchors, one at each end, to maintain the rafts position. Seed stock sorting will be done using a series of hand-held screens, and the largest oysters and clams will be brought to other lease areas for further grow-out.

Algae Cultivation

Commercial use of algae for consumption, personal care products, laboratory use, as well as decorative use, is a growing industry. While specific algae cultivation is not a current focus of operations, San Andreas does propose to commercially use algae species, in particular *Gracilaria* spp. which has been observed in the proposed areas and naturally seed and grow on shellfish culture gear. There are potential ecological benefits of maintaining diverse structure in the culture area.

Facilities and Equipment

Marine Vessels

Up to 4 vessels will be used as part of the SASF operations. Vessels utilized for operations are anticipated to be of the Carolina Skiff type with wide beam, shallow draft and large open working decks. Vessels will be used for transferring culture gear and shell stock to and from the various lease areas and conducting limited shell stock handling when sorting and preparing shell stock for sale. Vessels will also be used for transferring market ready shell stock to land for transfer to vehicles for transport. Vessels will be no larger than 30 feet in length and propelled with standard outboard engines. All vessels (including rafts) will adhere to state regulations regarding the identification of commercial vessels. Bird netting and shade canopies will be installed in working areas of vessels to provide sun protection and prevent bird roosting. Vessel routes are designed to avoid eelgrass habitat and marine mammal haul out areas and are shown in Figure 12.



Figure 12. Vessel routes that will be used to access culture area.

Operation Platforms

Operation platforms will have two small, shed structures with solid wooden walls and corrugated roofs – one for a restroom area and one for equipment storage. These structures and shade canopies will extend approximately nine feet above the decking. Floatation will be provided by air filled polyethylene barrels and expanded polystyrene foam filled dock floats. The floating work platforms will be anchored in place in depths of roughly 10 to 25 feet with two to three helical anchors or weighted mooring blocks. Power on the platforms will be provided by a gasoline generator. Sorting will be assisted by an electric tube sorter/tumbling machine and two large tables used to wash and sort oysters by size. Cultivation bags will be brought to the raft and opened to remove the oysters. They will be placed directly into the tube sorter or sorting table for processing. Shell stock will be sorted by size, those that require additional grow-out will be placed back in their cultivation areas. Those that are mature, will be packaged for sale and transported to shore. Packaging of oysters will be carried out on a platform through the use of an automatic bagger machine powered by electricity and compressed air. Once packaged, the shell stock will be brought directly to shore or placed within a submerged wet storage enclosure on the work platform. The work platform will also be used to store commonly used equipment such as bottom bags, PVC posts, tools, and storage containers and as a break area for personnel.

Wet Storage Rafts

Wet storage rafts will be of similar design and dimension as grow out rafts described in Section 3.8. Operation of the rafts will function for the temporary storage of market mesh bags, grow out bags, and grow out baskets, containing cultured shellfish prior to the transport to market. The wet storage rafts will be anchored in the subtidal lease areas. Bags and baskets of market ready shellfish will be temporarily secured to the rafts to maintain submergence and ensure fresh condition.

Floating Operations Raft / Vessels

In addition to the transportation vessels described above, up to two semi-stationary vessels will be used as centers for processing operations, sorting, washing, and packaging shell stock during the various stages of culture operations and to assist in the deployment and retrieval of culture gear. These raft/vessels will be fabricated using an aluminum style pontoon boat structure, or in a similar design to FLUPSYs with the option of maneuverability by attaching a motor, or towing. As such the rafts will be mobile, with outboard engines, to position the rafts in operationally convenient locations throughout the lease area to support particular activities. At least one raft will be designed to maneuver over the floating rafts to lift culture cages or other gear with a crane/winch onboard. Both are anticipated to have sorting and washing facilities on board. Sorting facilities will consist of a series of table surfaces with grates and screens to facilitate sorting shell stock. In addition to these facilities, a prefabricated motor driven sorting machine may be utilized on the deck of the rafts. Integral with the sorting facilities, a washing system will be set up to use seawater to wash shell stock prior to market to remove any sediment, algae growth, or other natural debris from the shell stock. Power to equipment will be supplied by generator, batteries, or both. The rafts will be no larger than 40 feet long with a 20 foot beam. The rafts may also have a roof covering all or a portion of the deck, to provide cover and temporary storage space. Rafts will have permanent helical

moorings, but will also utilize Danforth anchors to temporarily anchor the rafts in positions throughout the subtidal culture areas.

Navigational Marking

SASC limited the extent of the subtidal lease area to approximately ½ the width of the deep water channels in the region; occupying the eastern halves. This leaves an approximate 75-foot minimum channel width for boater navigation, with much of the remaining channel width greater than 100 feet. The placement of floating culture gear in the eastern half of the channels will provide additional delineation of the channel assisting in safe navigation by recreational and other boaters. Improving channel navigation for other users could also help limit accidental impacts to eelgrass beds and other resources caused by errant boaters.

All markings of the lease gear and facilities will conform with the US Coast Guard (USCG) requirements for marking of aquaculture lease area corners, gear and vessels. All buoys will be of adequate size and clearly marked. All vessels will maintain marking and identification lighting to conform with USCG requirements.

Operations

Operations will generally follow the stages and activities listed in this section during regular operations after facilities have been established. Operation stages include:

- 1) Seed sourcing
- 2) Initial shell stock grow out in FLUPSY or Floats (as necessary)
- 3) Shell stock sorting
- 4) Transfer of suitable size class shell stock to grow out locations
- 5) Shell stock sorting and harvest
- 6) Shell stock transfer to market, transfer to floating temporary wet storage for subsequent transfer to market, or transfer back to grow out areas

Seed Sourcing

San Andreas Shellfish will secure shellfish seed by purchasing it from licensed seed supply vendors or through natural seeding from native / naturalized populations in the marine environment. For example, natural seeding of mussels and algae species on the culture gear is expected to occur.

FLUPSY Initial Grow-out

Seedstock that requires further growth prior to placement in grow-out areas will be placed in FLUPSY bins for initial grow-out. Operation of the FLUPSY rafts will consist of daily visits to ensure proper operation, conduct maintenance and check the size of seed stock. FLUPSY bins will be regularly cleared of any fouling organisms and material. Regular maintenance of the seed stock will consist of screening and grading to maintain consistent size classes. All washing and sorting of seed stock and FLUPSY equipment will use water from the lease area. Following use, bins and screens will be washed to remove fouling materials. Equipment may be moved to locations off the bay to ensure desiccation and remove fouling organisms.

Grow Out to Market size

After sorting of seed, shell stock that has reached adequate size for grow-out, will be transferred to grow-out equipment in the intertidal or subtidal areas. Once placed, the grow-out equipment will be visited at least quarterly, with more frequent inspection occurring as shell stock reaches maturity to check growth rates and condition for sorting and harvesting. The full period of grow-out will be dependent on species, location in the lease area and water conditions.

Sorting

Periodic sorting will be required of all cultivated species to maintain consistent size classes in relation to expected harvesting cycles. During sorting, grow-out bags and baskets will be emptied and individual shell stock will be re-allocated to appropriate size class grow-out equipment. Shell stock deemed undesirable will be removed offsite, recycled when possible or disposed.

Harvesting

Once shell stock reaches a harvestable size, the culture equipment will be transferred to the operations raft. Once on the raft the shell stock will be removed from the culture equipment and sorted. Marketable shell stock will be cleaned and packaged for market, or placed on the wet storage raft. Shell stock that has not reached market size may be transferred back to grow-out equipment or may be disposed.

Draft Best Management Practices and Mitigation Measures

SASC has identified the following potential best management practices and mitigation measures to implement as part of culture operations. It is expected that these may be modified, reduced and/or expanded on during the Project's environmental documentation and permitting process.

Pollution Control

Waste Management and Litter/Debris Removal Plans

San Andreas Shellfish Company will develop both a Waste Management Plan which encompasses how waste materials will be disposed of during operations and a Litter and Debris Removal Plan, which will describe periodic cleanup efforts within the region. Implementation practices of the plans will be part of regular employee training. The Waste Management Plan will give particular attention to management of gear not in use so as to avoid the generation of "legacy" waste gear.

Culture Gear & Materials

San Andreas Shellfish Company will strive to utilize gear types designed for longevity and avoid gear prone to degradation (e.g., foam floats and certain plastics). Single use materials which constitute potential marine debris nuisance will also be avoided when possible. Documentation will be made to gears expected life span so that replacement of gear will be possible before it can become marine debris.

Culture gear will be tagged or otherwise marked to distinguish it as originating from and belonging to SASC, as feasible. Marked gear will include: all shell stock containing equipment, buoys,

harvesting and sorting gear, and other operational support gear. Examples of gear which is not feasible for marking include clips, ropes and lines, anchors, posts and hand tools.

Equipment Design and Maintenance

Maintenance of operational equipment where there is a potential for the release of hazardous materials (oils and fuels) will be conducted at a site off the water where control and containment of hazardous materials can be ensured to prevent release to water bodies. Disposal of all hazardous materials will conform to state disposal requirements.

Biofouling Maintenance

San Andreas Shellfish Company will attempt to maintain the culture gear and area to be free of known non-native and/or biological nuisance organisms. This process will be conducted as part of regular maintenance operations. Personnel will be trained to recognize undesired organisms and the proper methods to remove, contain, and dispose of these organisms to limit the potential for spread.

Waste Shell Stock

Waste shell stock that is removed from the lease area will be desiccated to eliminate potential for the transfer of undesirable biological organisms. Following desiccation, waste shell stock will be transferred to other entities for use, transported to a landfill, or used for on-land agriculture practices. Waste shell stock will not be returned to Tomales Bay.

Environmental Protection

Environmental Education Program

San Andreas Shellfish Company will implement an internal education program to ensure employees recognize and address environmental concerns and implement best management practices to ensure environmental and public resources are protected. This program will follow the format of a health and safety plan, and will include new employee environmental orientation, weekly tailgate meetings, and maintaining weekly environmental checklists.

Eelgrass Habitat Protection

The following potential impact types to eelgrass habitat could result due to the Project:

- Siting of culture gear/practices on existing eelgrass habitat.
- Shading of eelgrass habitat through the placement of culture gear in adjacent areas.
- Direct impacts to eelgrass habitats inside and outside the lease area through Project activities such as impacts from boat propellers.

The following measures will avoid eelgrass impacts.

Eelgrass Protection Measure 1. Leases are located such that they avoid existing eelgrass beds. Where there is eelgrass within a lease, it will be avoided through Eelgrass Protection Measure 2.

Eelgrass Protection Measure 2. Prior to placement of culture equipment, eelgrass mapping will be conducted consistent with methods described in the California Eelgrass Mitigation Plan (NMFS 2014). Culture equipment will not be located within 30-feet of mapped eelgrass.

Eelgrass Protection Measure 3. All boat traffic will be confined to recognized channels where eelgrass is not present.

Seal Haul Out Protection

In development of the Project the lease areas have been established to provide a minimum 300 foot distance from recognized seal haul outs. During operations, boat transit will maintain this 300 foot distance from occupied seal haul outs.

Marine Debris Reduction and Management

San Andreas Shellfish shall carry out operations consistent with the following marine debris reduction and management practices:

Storm Damage and Debris. As soon as safely and reasonably possible following storm or severe wind or weather events, SASC shall patrol all of its active cultivation areas for escaped or damaged aquaculture equipment. All equipment that cannot be repaired and placed back into service shall be properly recycled or disposed of at an appropriate onshore facility. In addition, SASC shall retrieve or repair any escaped or damaged aquaculture equipment that it encounters while conducting routine daily and/or monthly maintenance activities associated with shellfish culture (e.g. bed inspections, shellfish harvest and planting). If the escaped equipment cannot be repaired and replaced on the shellfish bed, it shall be properly recycled or disposed of on land.

Gear Marking. SASC shall mark shellfish culture bags (bottom bags, floating bags and hanging bags), baskets, and floats in an easily identifiable manner with identification information including its company name. Markings shall be securely attached and robust enough to remain attached and legible after an extended period in the marine environment (e.g. heat transfer, hot stamp, etching, etc.). SASC shall use crab floats (or similarly robust and durable buoys/floats) for culture activities.

Marine Debris Reduction Training. SASC shall implement an employee training regarding marine debris issues, including how to identify culture equipment or associated materials (marking stakes, support posts, longlines, label tags, clasps, etc.) that are loose or at risk of becoming loose, proper gear repair methods, and how to completely remove gear from out-of-production areas. Particular focus shall be placed on management and maintenance practices to reduce the loss of any gear type that is frequently lost or consistently found during bay cleanup and inspection activities. This training shall be repeated on an annual basis. During trainings, SASC's employees shall be encouraged to consider and implement field and management practices that reduce the amount of small plastic gear (such as zip-ties, tags and fasteners) and non-biodegradable material (such as PVC stakes and nylon or polypropylene rope) used in its operations.

Cleanup Events. SASC shall carry out quarterly cleanup events in Tomales Bay in coordination with other interested parties or organizations. Cleanup events shall include walking different portions of

the bay and shorelines to pick up escaped shellfish gear and other trash, regardless of whether it was generated by the Project. The volume and type of shellfish gear collected and the cleanup location (marked on a map) and duration of cleanup activity shall be recorded and documented in an annual report. If persistent discoveries of certain gear types are made, SASC shall evaluate (and if feasible, implement use of) alternative gear types or practices that will reduce these consistent sources of debris.

Ongoing Operations. SASC shall not leave or temporarily store tools, loose gear, or construction materials on its leased tidelands or surrounding areas. All aquaculture gear installed on and in use in active cultivation sites shall be kept neat and secure and maintained in functional condition. SASC shall carry out regular bed inspections and maintenance activities to help ensure that broken, collapsed, fallen, or buried gear is fixed or removed in a timely manner.

Bed Cleaning at Harvest. At the time of harvest of each cultivation area, SASC will carry out a thorough inspection to locate and remove loose, abandoned or out of use equipment, tools, and accumulations of shellfish from the surrounding substrate. Shells shall not be intentionally placed or deposited within the lease outside of cultivation gear, and shellfish and shells accidentally spilled during cultivation or harvest will be immediately collected and removed.

Wildlife Disturbance

During vessel transit, harvest, maintenance, inspection, and planting operations, SASC will avoid approaching, chasing, flushing, or directly disturbing shorebirds, waterfowl, seabirds, or marine mammals.

Water Intake System Design

All water intake systems used by SASC to supply water from Tomales Bay for maintenance or shellfish cleaning, sorting or washing shall be designed with intake screens designed consistent with California Department of Fish and Wildlife and National Marine Fisheries Service guidelines for protection of juvenile salmonids by having: (a) mesh openings of no more than 3/32 inches; and (b) a maximum intake water velocity of 0.33 feet per second.

Discharge of Materials

SASC shall not intentionally dispose of or release any equipment or waste, including lines, buoys, cultivation bags, baskets, fasteners and other equipment, or living or dead shellfish, shells, or non-native fouling organisms into the marine environment. All biofouling organisms and biological materials removed during oyster cleaning, sorting, and packing operations shall be collected and disposed of at an appropriate upland facility.

Hazardous Material Spill Prevention and Response Plan

SASC shall develop a Project specific Spill Prevention and Response Plan (SPRP) for work vessels, barges, and gasoline powered machinery that will be used during Project installation and operational activities. SASC and its personnel shall be trained in, and adhere to, the emergency procedures and spill prevention and response measures specified in the SPRP during all Project

installation and operations. The SPRP shall provide for emergency response and spill control procedures to be taken to stop or control the source of spills and to contain and clean-up spills. The SPRP shall include, at a minimum: (a) identification of potential spill sources and quantity estimates of a Project specific reasonable worst-case spill; (b) identification of prevention and response equipment and measures/procedures that will be taken to prevent potential spills and to protect marine and shoreline resources in the event of a spill; (c) a prohibition on vessel fueling/refueling activities outside of designated fueling stations and limitation on equipment refueling to no more than five gallons, carried out with spill prevention and response protocols in place; and (d) emergency response and notification procedures, including a list of contacts to call in the event of a spill.

References

NMFS (National Marine Fisheries Service). 2014. California Eelgrass Mitigation Policy and Implementing Guidelines [online report]. NMFS, West Coast Region. Available at: https://www.cakex.org/sites/default/files/documents/cemp_oct_2014_final.pdf (accessed on October 4, 2024).

**California Fish and Game Commission and
California Department of Fish and Wildlife**
**Criteria and Framework for Evaluating if a
New State Water Bottom Lease is in the Public Interest**

**as approved by the Commission on August 23, 2023
September 29, 2023¹**

This document provides evaluation criteria to support a California Fish and Game Commission (Commission) public interest determination, as required by California Fish and Game Code (FGC) Section 15400, prior to issuing a state water bottom lease for aquaculture purposes. The criteria and evaluation framework were approved by the Commission following several workshops and conversations with agency partners, industry members, environmental non-governmental organizations and the Marine Resources Committee (MRC).

At the March 2023 MRC meeting, MRC requested that Commission staff work with the Department to revise the second draft public interest determination criteria, presented at the November 2022 MRC meeting, into a third and proposed final draft. MRC directed staff to restructure the draft criteria as a framework for evaluating if a lease is in the public interest as recommended by staff, develop options for the Commission public interest determination process, and bring a final proposal to the July 2023 MRC meeting for potential MRC recommendation.

At the July 2023 MRC meeting, the MRC directed Commission staff to work with various stakeholders to refine the public interest criteria for potential approval at the August Commission meeting based on input during the meeting. This document provides the final proposed draft of criteria and a high-level overview of their use within the leasing process. A process diagram is provided in a separate document.

Overview of Public Interest Evaluation Criteria

An analysis to support a determination by the Commission of whether a state water bottom lease is in the public interest is structured around a series of criteria, divided into two categories: “Requirements”, which limit or constrain lease locations or activities by statute, regulation, or other lease entitlements, and “Considerations”, which include a suite of potential impacts or concerns, and potential benefits for the Commission to weigh in making a determination of public interest.

Requirements Criterion

Evaluation of requirements is based on a single criterion:

¹ Note: Document updated following approval to: (a) correct wording in Considerations Criteria 2 from “impingement on” to “impeding of” for consistency with statute; (b) add additional references to footnote 8 under Consideration Criteria 3 inquiries for clarity; (c) add missing word “mitigate” in footnote 8 consistent with CEQA; and (d) clarified references to the state aquaculture action plan under 1.a. and Commission coastal fishing communities policy under footnote 10 as being “once adopted.”

1. Legality under existing laws, regulations or entitlements related to aquaculture.

Evaluation of the requirements criterion is structured around a series of related inquiries that are binary in nature and, therefore, can be objectively assessed by staff.

Considerations Criteria:

The considerations criteria consist of a broader list of environmental, social, economic and cultural factors that may be reasonably anticipated for consideration during the planning, evaluation, and decision-making process. The factors are divided into six criteria:

1. Compatibility with state aquaculture policy standards.
2. Social, cultural, and/or economic impeding of access for public uses or other interests, or tribal uses.
3. Degree of threat to environmental protection, ecosystem sustainability goals, and public trust values
4. Best management practices measures.
5. Potential environmental benefits.
6. Potential social, cultural, or economic benefits.

Evaluating the considerations criteria is structured around a series of related inquiries to explore the potential impacts or benefits of each unique lease application. The answers to inquiries associated with these criteria are not proposed to be used in a prescriptive way, but rather are intended to inform staff review of any lease application's specific facts and staff's associated recommendations, and the Commission's eventual discretionary determination.

Evaluating the considerations criteria requires in-depth analyses, including those conducted pursuant to CEQA review; thus, the evaluation cannot be completed prior to CEQA. Consequently, evaluating these criteria is proposed to occur after CEQA environmental and cultural analysis and supplemental social and economic analyses. However, the criteria are expected to serve as a guide in pre-application lease design and siting, and during the application process to inform public discussion and CEQA review.

Initial Review: Requirements Criteria

Following Commission receipt of a new lease application, an initial review and confirmation of lease requirements will be completed by staff to determine if lease requirements are met under a single criterion with seven corresponding inquiries.

Legality under Existing Laws and Regulations Related to Aquaculture

This criterion verifies that any location or proposed culture species or method would not be illegal under any relevant state or federal law, regulation, or legal entitlement or existing lease agreement. Information sources for evaluating this criterion include California State Lands Commission (CSLC), the Department, the Native American Heritage Commission, and the California Department of Public Health (CDPH).

Inquiries:

1. Lease is located in an area that is certified by the California State Lands Commission as unencumbered and available for aquaculture use².
2. Lease area avoids areas used by the public for digging clams, as designated by CDFW³.
3. Lease is not located within designated areas or jurisdictions that prohibit aquaculture.
4. Lease is not located in an area where it will adversely impact previously identified Native American cultural resources, as identified by the Native American Heritage Commission.
5. Lease does not propose finfish aquaculture in state waters.⁴
6. Lease area is compatible with activities occurring within administrative kelp bed designations.⁵
7. *For products cultivated for human consumption only:* Lease is not sited in areas with *unresolvable* risks to public health as defined by the California Department of Public Health in compliance with the National Shellfish Sanitation Program.⁶

Recommended actions:

- If all requirements are met, the Commission will direct staff to advance the application to MRC and Tribal Committee (TC) for review and commence CEQA an in-depth analysis, which will contribute information to support evaluation of the considerations criteria.
- If any requirements are not met, consideration of the application is concluded. An applicant may reapply if deficiencies in the requirements are addressed.
- Staff will report the outcome of the requirements evaluation at the next regularly scheduled Commission meeting. Note that if the requirements are met, advancement to MRC and TC can precede the outcome report at the next Commission meeting.

² T14, CCR, Section 237(b)(3).

³ FGC Section 15401.

⁴ FGC Section 15400(b).

⁵ T14, CCR, Section 165.5.

⁶ This is independent from any required certificates, licenses, permits, and registrations issued by CDPH that must be pursued by an aquaculturist subsequent to lease approval.

Final Review and Evaluation: Considerations Criteria

A final evaluation of lease public interest is supported by analyses conducted pursuant to CEQA and supplemental evaluation by Department staff based on six criteria and corresponding inquiries.

1. **Compatibility with State Aquaculture Policy Standards**

This criterion considers any activities or methods that conflict with state aquaculture policy. Information sources for evaluating this criterion include the Department and other partner agencies.

Inquiries:

- a. Are proposed lease activities, culture methods, and species compatible with the State aquaculture action plan (once adopted)?

2. **Social, Cultural, and/or Economic Impeding of Access for Public Uses or Other Interests, or Tribal Uses**

This criterion considers locations that would interfere with public access to state waters or commercial or recreational uses. Information sources for evaluating this criterion include the Department, CSLC, California Coastal Commission, United States Coast Guard, industry members, and stakeholders.

Inquiries:

- a. Would the lease unreasonably impede public access to state waters, waterfronts, or fishing grounds for purposes of commercial and/or recreational fishing and harvesting, commerce, or coastal recreation, including documented high-use vessel routes, shipping lanes, or navigation channels?⁷
- b. Would the lease unreasonably impede tribal access to state waters for the purpose of exercising customary hunting, gathering, and fishing rights (e.g., as afforded by exemptions to marine protected area restrictions)?

⁷ FGC Section 15411.

3. Degree of Threat to Environmental Protection, Ecosystem Sustainability Goals, and Public Trust Values

This criterion considers the degree of impact of the lease (including the location, culture species, or methods) on the environment and/or the ecosystem and explores whether the lease would impede the ability of the ecosystem to function properly. Information sources for evaluating this criterion include CEQA⁸, the Department, and National Marine Fisheries Service Office of Protected Resources consultation.

Inquiries:

- a. Does the lease propose use of culture methods, chemicals, feeds, or materials known to cause significant environmental degradation?
- b. Do lease activities include culture of any species at any location where it has been determined, based on best available science, it would be detrimental to adjacent native wildlife?⁹
- c. What is the risk that the lease would unreasonably interfere with, or significantly impact the ability of the site and surrounding areas to support ecologically significant flora and fauna and the ecosystem services they provide, including blue carbon sequestration and wetland migration as sea levels rise, or to achieve ecological goals of overlapping or adjacent marine protected areas?⁸
- d. Is the lease sited to avoid impacts to areas within recognized sensitive habitats (including biogenic habitat such as eelgrass)?^{8,10}
- e. Is the lease sited to avoid impacts to special-status species, including species with a threatened or endangered designation-or species protected under Marine Mammal Protection Act, or Migratory Bird Treaty Act?⁸
- f. Does the lease propose culture of any non-native species not currently cultured in California waters? If so:
 - i. Are any of the non-native species documented to be invasive?

⁸ Note: CEQA measures to avoid, minimize, or mitigate significant impacts would be relevant to this evaluation and other inquiries reliant on CEQA review.

⁹ FGC Section 15102 is a provision for potential Department action (generally applies after lease issuance and can be applied as an adaptive management tool at any time within a lease area). The Department currently does not have a list of pre-determined locations where an aquaculture operation or cultured species would be detrimental to adjacent native wildlife; however, if the Department formally determines these designations, this consideration inquiry should be added to the Requirement criterion. In addition, information sources for this inquiry may include determinations by other agencies.

¹⁰ Note: This inquiry can be adaptively managed as more information is released from emerging science, such as studies that indicate specific measures that avoid impacts to or support eelgrass (e.g., compatibility of specific gear types, harvesting methods, or culture depths). In the interim, the Commission generally takes a precautionary approach.

- ii. Does the proposal demonstrate the culture practices will not be detrimental to native fish and wildlife consistent with the Commission's Introduction of Non-Native Species Policy?¹¹

4. Best Management Practices Measures

This criterion considers methods and measures that would reduce the leases environmental impact on local species and the surrounding habitat. Information sources for evaluating this criterion include CEQA and the Department.

Inquiries:

- a. Does the proposed lease include measures to:
 - i. Avoid and/or minimize the risk of marine life entanglements?
 - ii. Prevent introduction, transmission, and/or spread of invasive species, pathogens, disease, and pests?
 - iii. Prevent, minimize, clean up, and monitor marine debris?
 - iv. Maintain regular inspections of infrastructure and culture activities, keep infrastructure in good repair, address any damaged or lost cultivation materials within specified time frames, and report on gear and infrastructure conditions?
 - v. Meet minimum planting and harvesting requirements per acre?¹²
 - vi. Account for any potential environmental or logistical challenges associated with the lease location (e.g., depth and trampling or vessel scouring of eelgrass, proximity to seabird and shorebird rookeries and avoidance of rookery habitat loss or bird disturbance, proximity to marine mammal haul-outs, proximity to river run-off or seasonal siltation events, vessel transit routes, etc.)?

5. Potential Environmental Benefits

This criterion includes any potential benefits or adaptation strategies to the local environment. Information sources for evaluating this criterion include CEQA and the Department.

Inquiries:

- a. Would lease activities contribute environmental benefits, such as habitat creation, nutrient uptake or filtration, species recovery, supporting ecologically significant flora, or other ecosystem services?
- b. Would lease activities advance mitigation, adaptation strategies, and/or climate resilience such as blue carbon sequestration or reducing carbon footprint ("food miles")?

¹¹ Commission Policy on the Introduction of Non-native Species

¹² T14, CCR, Section 237.

- c. Would lease activities contribute to collaborative monitoring and/or academic research efforts that enhance scientific knowledge and/or inform adaptive management?

6. Potential Social, Cultural, or Economic Benefits

This criterion includes any potential benefits that would positively affect local, regional and/or statewide communities. The information source for evaluating this criterion is the Department.

Inquiries:

- a. What employment and other economic opportunity would lease activities provide to the state and surrounding community?
- b. Would lease activities provide fresh, locally-sourced product, benefiting California food security, and/or supplement wild-harvested supplies?
- c. Would lease activities help increase native fish stocks or enhance commercial and recreational fishing?
- d. Would approval of the proposed lease align with Commission goals for equitable access to leasing?¹³
- e. Would lease activities help to educate the public about aquaculture practices and/or the local environment through activities such as public tours or informational boards?
- f. Does the lease application:
 - i. Have cross-interest community support?
 - ii. Seek to align with coastal fishing community goals reflected in the Commission's policy¹⁴, including enhancing availability and stability of shoreside infrastructure?

Recommended actions:

- Request the Department evaluate the inquiries in consultation with other state, federal and tribal agencies, where relevant; highlight areas of uncertainty or unmitigated impacts; and develop a public interest recommendation.
- Deliver recommendations to MRC and TC for potential committee recommendations for Commission consideration.
- Commission consider evaluations and recommendations, along with public input, in making its public interest determination.

¹³ Includes the [Commission's Policy on Justice, Equity, Diversity, and Inclusion](#)

¹⁴ As defined in the Commission's Policy on Coastal Fishing Communities, once adopted

- If the Commission determines that the lease is in the public interest, then the application may be considered for approval.
- If the Commission does not determine that the lease is in the public interest, consideration of the application is concluded.

California Fish and Game Commission and California Department of Fish and Wildlife

**Application for State Water Bottom Lease:
Staff Evaluation of Aquaculture Lease Requirements in Support of
Public Interest Determination**

***Proposed Project: San Andreas Shellfish Company Application for
State Water Bottom Lease in Tomales Bay, California***

October 28, 2024

The California Fish and Game Commission (Commission) has the authority to lease state water bottoms to any person for the purpose of conducting aquaculture in marine waters of the State, under terms agreed upon between the Commission and the lessee (California Fish and Game Code sections 15400 and 15405). Prior to approving any lease, the Commission must determine the lease is in the public interest (Fish and Game Code subdivision 15400(a)).

At its August 2023 meeting, the Commission approved an evaluation framework, "Criteria and Framework for Evaluating if a New State Water Bottom Lease is in the Public Interest." The evaluation framework is comprised of inquiries to help consistently evaluate lease applications to support a determination by the Commission if a state water bottom lease for aquaculture purposes is in the public interest. The framework is structured around a series of criteria divided into two categories: "Requirements" and "Considerations." Requirements include items that limit or constrain aquaculture lease locations or activities by statute, regulation, or other lease entitlements. Considerations include a suite of potential impacts or concerns, and potential benefits for the Commission to weigh in making a determination of public interest.

Requirements Review

Any application for a new aquaculture lease must undergo an initial review and confirmation of the lease requirements criterion before advancing to further environmental, public, and Commission review. Commission and California Department of Fish and Wildlife (CDFW) staffs jointly evaluate a proposed project relative to the requirements category to confirm a lease application meets the requirements by answering a series of seven inquiries.

Commission and CDFW staffs have completed the requirements review of the state water bottom lease application submitted by San Andreas Shellfish Company (version dated October 7, 2024) and determined that the requirements criterion has been met. This document presents the Commission and CDFW staff's findings for the set of seven inquiries.

Requirements Criterion

The evaluation of requirements is based on a single criterion:

- *Legality under existing laws, regulation or entitlements related to aquaculture.*

Evaluation of the requirements criterion is structured around a series of seven related inquiries that are binary in nature and, therefore, can be objectively assessed by staff.

Inquiries and Findings

1. ***Lease is located in an area that is certified by the California State Lands Commission as unencumbered and available for aquaculture use¹.***

Finding: Confirmed. The California State Lands Commission notified CDFW and Commission staffs that the proposed lease area is unencumbered (via letter received September 9, 2024).

2. ***Lease area avoids areas used by the public for digging clams, as designated by CDFW².***

Finding: Confirmed. CDFW assessed the location and notified staff that the proposed lease area avoids designated clamming areas (via email received October 25, 2024).

3. ***Lease is not located within designated areas or jurisdictions that prohibit aquaculture.***

Finding: Confirmed. Commission staff reviewed spatial management data and confirmed that the area is not located within state marine protected areas, other state marine managed areas, protected areas that prohibit aquaculture, or within state or federal submerged lands that prohibit aquaculture.³

4. ***Lease is not located in an area where it will adversely impact previously identified Native American cultural resources, as identified by the Native American Heritage Commission.***

Finding: Confirmed. The Native American Heritage Commission completed a sacred lands file search for the proposed project and the results were negative (letter received September 11, 2024).

5. ***Lease does not propose finfish aquaculture in state waters.⁴***

Finding: Confirmed. The project description does not propose finfish aquaculture.

6. ***Lease area is compatible with activities occurring within administrative kelp bed designations.⁵***

Finding: Confirmed. The proposed lease is compatible with activities within administrative kelp bed designations, as determined by CDFW (via email received October 25, 2024).

¹ California Code of Regulations, Title 14, subsection [237\(b\)\(3\)](#).

² California Fish and Game Code, Section [15401](#).

³ [MarineBIOS](#) (accessed 10/01/2024) and California Code of Regulations, Title 14, Section 632.

⁴ California Fish and Game Code, subdivision [15400\(b\)](#).

⁵ California Code of Regulations, Title 14, Section [165.5](#).

7. Lease is not sited in areas with unresolvable risks to public health as defined by the California Department of Public Health in compliance with the National Shellfish Sanitation Program⁶ (products cultivated for human consumption only).

- *Finding:* Confirmed. California Department of Public Health confirmed to CDFW the proposed area is not sited in an area with unresolvable risks to public health (October 8, 2024).

Conclusion

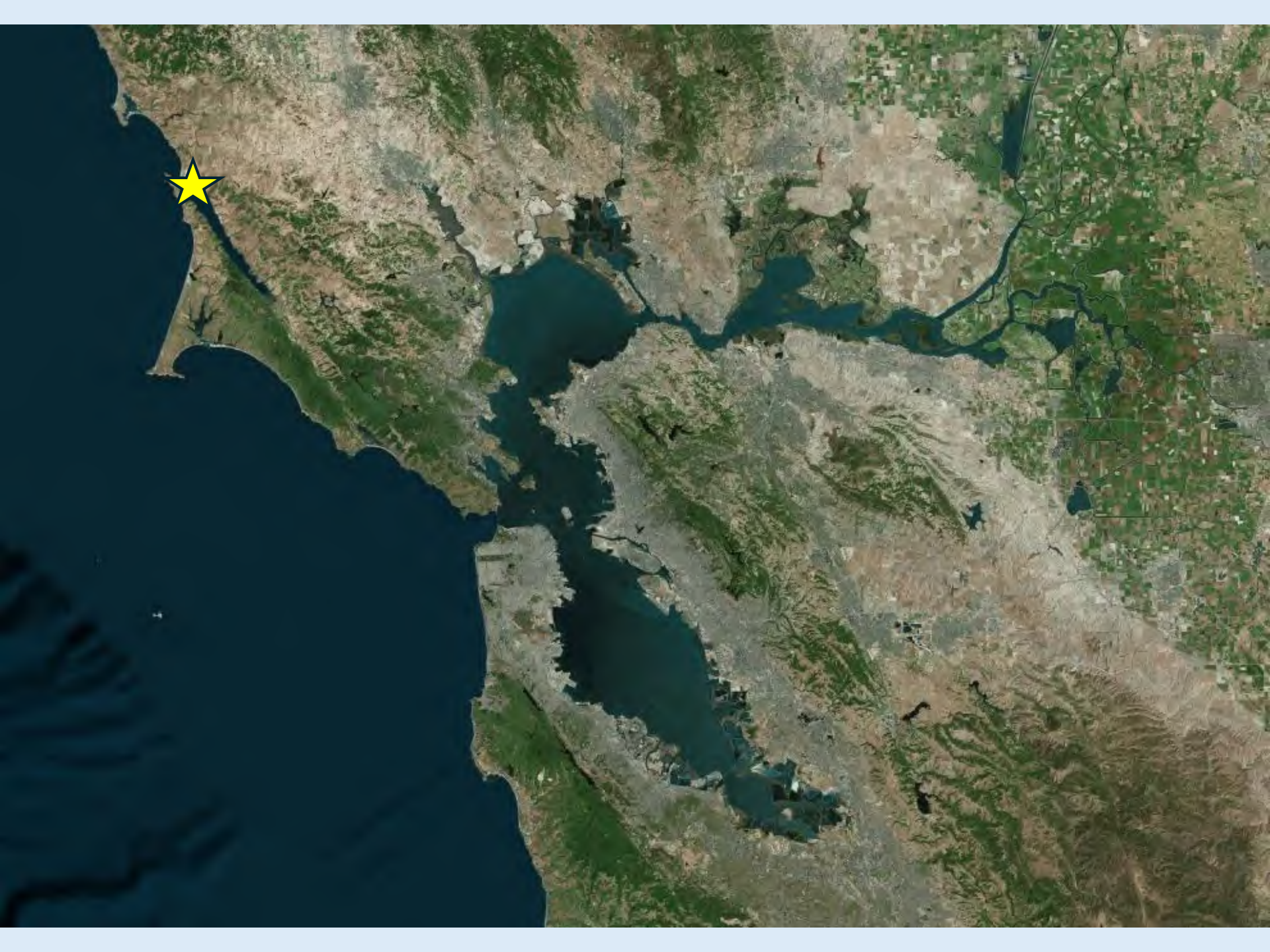
The evaluation confirms that all requirement inquiries have been met and, thus, the lease application from San Andreas Shellfish Company is being advanced to the next steps in the Commission’s leasing process.

⁶ This inquiry and finding is independent from any required certificates, licenses, permits, and registrations issued by the California Department of Public Health that must be pursued by an aquaculturist subsequent to lease approval.

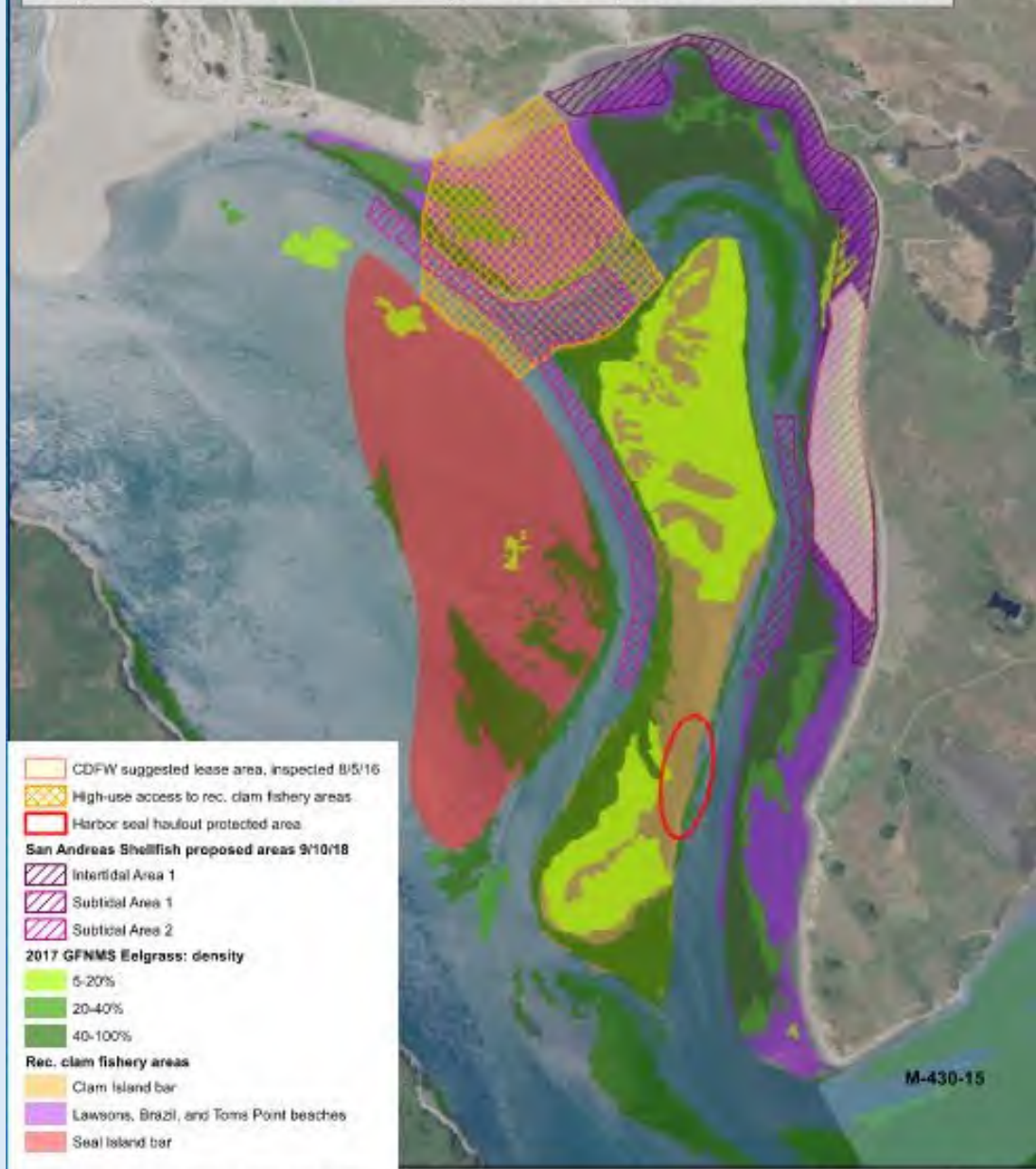
San Andreas Shellfish Farm

California Fish and Game Commission
Marine Resources Committee

November 7, 2024



Proposed San Andreas Shellfish lease:
Eelgrass, recreational clamming, and other potential spatial conflicts



- CDFW suggested lease area, inspected 8/5/16
- High-use access to rec. clam fishery areas
- Harbor seal haulout protected area
- San Andreas Shellfish proposed areas 9/10/18**
- Intertidal Area 1
- Subtidal Area 1
- Subtidal Area 2
- 2017 GFNMS Eelgrass: density**
- 5-20%
- 20-40%
- 40-100%
- Rec. clam fishery areas**
- Clam Island bar
- Lawsons, Brazil, and Toms Point beaches
- Seal Island bar

M-430-15





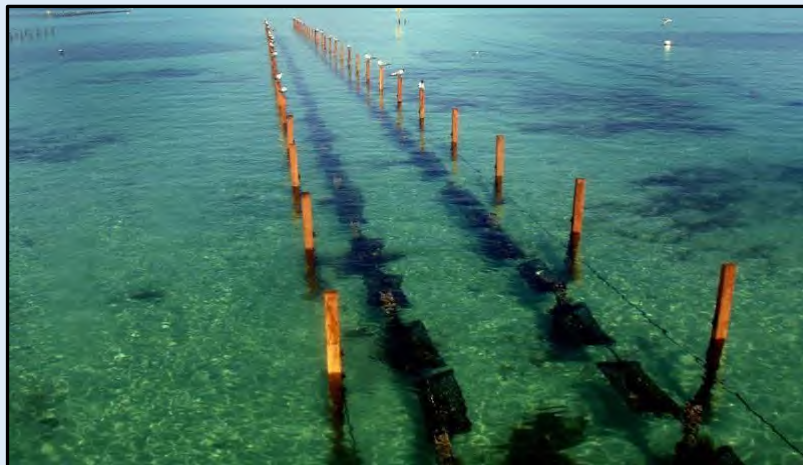
Proposed Species

- Manila clams, *Venerupis philippinarum*
- Atlantic oysters, *Crassostrea virginica*
- Pacific oysters, *Crassostrea gigas*
- Kumamoto oysters, *Crassostrea sikamea*
- Purple Hinged Scallops, *Crassadoma gigantea*
- Mediterranean mussels, *Mytilus galloprovincialis*
- European Oysters, *Ostrea edulis*
- Olympia Oysters, *Ostrea lurida*
- Native Algae Species (e.g., red algae (*Grasilaria spp.*))

Culture Methods

- Intertidal Suspended Long-line / Adjustable Long Line
- Intertidal Bag on Ground
- Intertidal Rack and Bag / Basket
- Subtidal Grow Out Rafts
- Subtidal Longline Suspended Culture
- Subtidal Longline Floating Culture
- Subtidal Floating Upwelling System (FLUPSY)
- Algae Cultivation

Intertidal Suspended Long-line / Adjustable Long Line



Intertidal Bag-on-Ground



Intertidal Rack and Bag / Basket



Subtidal Longline Suspended Culture



Subtidal Longline Floating Culture



Subtidal Grow Out and Wet Storage Rafts

- Aluminum or timber framed structures.
- 25' x 12' maximum.
- Baskets, bags or trays suspended below rafts.

Subtidal Floating Upwelling System (FLUPSY)

- Nursery rafts with a paddle wheel or propeller that actively moves water through system.

Algae

- Harvested from culture equipment where it naturally grows.

Requirements Criterion

- Based on “Legality under existing laws, regulations or entitlements related to aquaculture”.
 - Prior to implementation, the Project will require numerous local, state and federal approvals. Consistency with this criterion will be shown based on the Project’s ability to obtain these approvals.

Considerations Criteria

- “...evaluation cannot be completed prior to CEQA...However, the criteria are expected to serve as a guide for pre-application lease design and siting, and during the application process to inform public discussion and CEQA review”.

Discussion of Criteria for Evaluating New Bottom Leases

1. Compatibility with state aquaculture policy standards.
2. Social, cultural, and/or economic impeding of access for public uses or other interests, or tribal uses.
3. Degree of threat to environmental protection, ecosystem sustainability goals, and public trust values
4. Best management practices measures.
5. Potential environmental benefits.
6. Potential social, cultural, or economic benefits.

Compatibility with state aquaculture policy standards

- Compliance with standards to be ensured by securing approvals under state laws and regulations including:
 - California Department of Health Growing Area Certification.
 - Coastal Development Permit.
 - CA Fish and Game Commission Lease.
 - Regional Water Quality Control Board Clean Water Act Section 401 Certification.
 - California Environmental Quality Act and related consultations.

Social, Cultural, and/or Economic Impeding of Access for Public Uses or other Interests, or Tribal Uses

- Project sited to minimize impacts to public access and other uses including boating, clamming, fishing and hunting.
- Further public and tribal engagement during the CEQA and permitting process may further inform siting and other pertinent project details.

Degree of Threat to Environmental Protection, Ecosystem Sustainability Goals, and Public Trust Values

- Project sited to avoid sensitive habitats (i.e., eelgrass) and marine mammal haul-outs.
- Numerous best management practices built into project to avoid environmental impacts.
- Additional avoidance, minimization and mitigation measures may be identified during CEQA and permitting process.

Best Management Practices

- Current BMPs incorporated for:
 - Pollution control
 - Environmental / habitat protection
 - Marine debris reduction and management
 - Wildlife disturbance
 - Water intake system design
 - Material discharge
 - Hazardous spill prevention
- Based on recent precedent from aquaculture projects in Humboldt Bay and Morro Bay.
- Additional avoidance, minimization and mitigation measures may be identified during CEQA and permitting process.

Potential environmental benefits

- Shellfish/seaweed culture is a sustainable form of food production that does not involve addition of feed, fertilizer, pesticides/herbicides, etc.
- Culture systems documented to provide habitat for numerous aquatic species.
- Culture can have water quality benefits.
- Carbon sequestration.
- Shoreline protection from waves and sea level rise.
- Debris cleanup program.

Potential Social, Cultural, or Economic Benefits

- Job creation.
- Tax base.
- Sustainable food production with low carbon footprint.

Committee Staff Summary for July 17-18, 2024 MRC
For background purposes only

5. Market Squid Fishery Management and Fishery Management Plan (FMP) Review

Today's Item

Information

Action

Receive and discuss Department's Squid Fishery Advisory Committee (SFAC) and proposed recommendations.

Summary of Previous/Future Actions

- Commission adopted *Market Squid Fishery Management Plan* (FMP) and implementing regulations August 2004
- Commission referred market squid fishery management review to its Marine Resources Committee (MRC) April 2021
- Department presented proposed approach to squid fishery management review, including forming a SFAC July 2021; MRC
- Department written update on squid management review planning July 2022; MRC
- Department written updates on SFAC process July and November 2023; MRC
- Commission received update and discussed SFAC meetings to date and next steps March 19, 2024; MRC
- **Today receive and discuss SFAC report and proposed recommendations** **July 17-18, 2024; MRC**
- Discuss SFAC report and proposed recommendations, and potential MRC recommendation November 7, 2024; MRC

Background

The market squid fishery is one of the largest commercial fisheries in California, in both landings volume and value. Managed under the Commission's authority since 2001, the fishery operates within the framework of the market squid FMP adopted by the Commission in 2004. The FMP defines harvest control rules, a restricted access program, environmental protections against seabird interactions, and fishery administration.

While regulations have been periodically adopted to adaptively manage various aspects of the fishery, 2021 marked the initiation of the first comprehensive review of market squid fishery management since the FMP's adoption. The Department-developed, multi-phase, management review, supported by the Commission, has been anchored in a SFAC. Established by the Department's director according to Section 53.02, the SFAC has played a crucial role in assisting with developing and reviewing fishery assessments, management options and proposals, and FMP amendments (see Exhibit 1 for background details on the SFAC).

Committee Staff Summary for July 17-18, 2024 MRC*For background purposes only*

At the March 19, 2024 MRC meeting, the Department presented its overview of SFAC meetings to date and discussed next steps with the MRC. The Department relayed that, following the final SFAC meeting in May 2024, it would prepare a summary report and recommendations for adaptive management of the California market squid fishery.

Update

With the SFAC process complete, the Department prepared and has submitted a report, *Squid Fishery Advisory Committee Review of California Market Squid Fishery Management and Proposed Recommendations* (Exhibit 2), to MRC for discussion. The report reviews SFAC discussions over the course of 10 meetings, options explored, and Department recommendations developed through that process in six categories:

- *Monitoring*
- *Fishing dynamics and empirical dynamic modelling*
- *Fishing effort and temporal closures*
- *Nets and squid spawning habitat*
- *Lighting and seabird habitat*
- *Small-scale fishery access*

In addition to proposed FMP amendments and/or regulatory changes, the Department is continuing to explore small-scale opportunities outside of current major fishing areas through an experimental fishing permit (EFP) (e.g., development of local markets and low volume gear (hand jig and hand brail)). The Department is continuing research using empirical dynamic modelling and evaluating potential wildlife interactions with squid fishery log data.

For today's meeting, the Department will give a presentation recapping California market squid fishery dynamics and management, summarize SFAC deliberations and emerging themes, provide an overview of the options considered, and present Department-proposed recommendations (Exhibit 3). The recommendations encompass: (1) Potential FMP amendments and/or regulatory changes, (2) outreach goals focused on fishery "best practices," and (3) areas of continued research for potential future action.

The purpose of today's discussion is to review the process and outcomes detailed in the Department report and discuss Department-proposed recommendations. Today also represents an opportunity for MRC to ask questions or request further follow-up on any of the topics for review prior to the discussion and potential MRC recommendation scheduled for the November 2024 MRC meeting.

Significant Public Comments

Two fish processors from Noyo Harbor, Mendocino County, request that the Commission support developing a small-scale, open-access market squid fishery north of Point Arena to the California-Oregon border (outside current major fishing areas) to support local coastal fishing community access, recognizing geographic and weather constraints in the area. Specific requests include non-transferrable permits, maximum catch of five tons per day; and an annual

Committee Staff Summary for July 17-18, 2024 MRC
For background purposes only

cap of 3,000 tons (exhibits 4 and 5).

Recommendation

Commission staff: Hear from SFAC members and stakeholders, clarify Department-proposed recommendations where needed, and identify any areas for further follow-up in advance of the final discussion scheduled for the November 2024 MRC meeting.

Department: See exhibits 2 and 3 for Department recommendations and rationale related to monitoring, fishing dynamics/fishing effort, fishery access, and gear and habitat. ^[RK1]

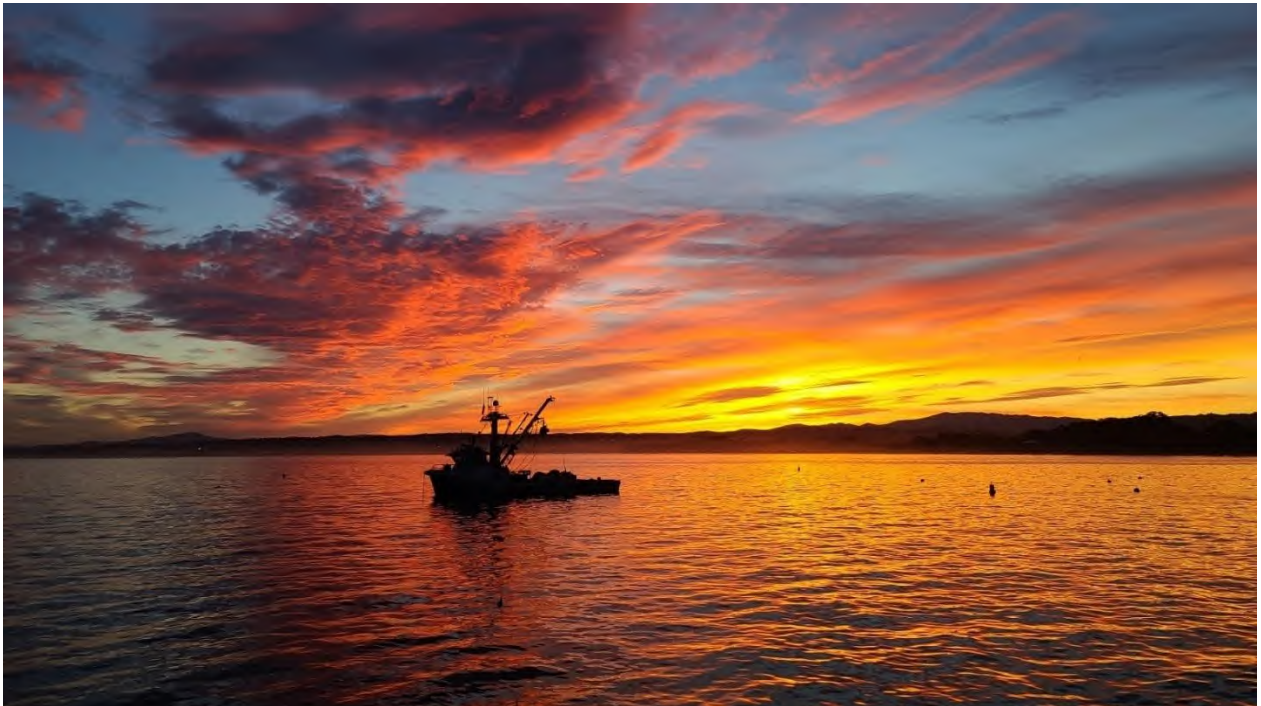
Exhibits

1. Staff summary from March 19, 2024 MRC meeting, Agenda Item 5 (*for background purposes only*)
2. Department report, *Squid Fishery Advisory Committee Review of California Market Squid Fishery Management and Proposed Recommendations*
3. Department presentation
4. Letter from Robert Juntz, Jr., Ocean Fresh LLC, received July 1, 2024
5. Letter from Scott Hockett, owner, Noyo Fish Company, received July 1, 2024

Committee Direction/Recommendation (N/A)

Squid Fishery Advisory Committee Review of California Market Squid Fishery Management and Proposed Recommendations

California Department of Fish and Wildlife



**Marine Resources Committee Meeting
of the California Fish and Game Commission.
July 18, 2024**

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EXECUTIVE SUMMARY

BACKGROUND

In 2023, the California Department of Fish and Wildlife (Department) convened a Squid Fishery Advisory Committee (SFAC) charged with reviewing and advising the Department on potential changes to California market squid (*Doryteuthis opalescens*) fishery management. This document reviews the final recommendations developed in that process, including the background, rationale, and other options considered. Recommendations are included in each of the following categories:

MONITORING

The recommendation is to develop an electronic logbook (e-log) for the California market squid commercial fishery. Paper logs are cumbersome and real-time data collection is essential to modernize long-term monitoring efforts and build fishery climate resilience.

EMPIRICAL DYNAMIC MODELING

The Department will continue to develop forecasts with Empirical Dynamic Modeling (EDM; 2024 onward). EDM shows promise in (1) informing the development of an e-log, (2) forecasting for industry and management planning in response to climate change, and (3) exploring potential future management options.

FISHING EFFORT AND TEMPORAL CLOSURES

The recommendation is to extend the existing weekend closure (noon Friday to noon Sunday) to start at 7am Friday Statewide. An additional extension to end Sunday at midnight in the Monterey Bay Area (to be defined) is also recommended. These changes provide added conservation in squid fishery management and a buffer for climate change at little expense or potentially improvement to fishery yields and performance. The extensions provide for additional uninterrupted spawning, which should benefit squid reproduction and spawning success.

SMALL-SCALE FISHERY ACCESS

The recommendation is that individuals interested in pursuing small-scale opportunities should utilize the newly established experimental fishery permit (EFP) program. The Department will work with potential EFP applicants to develop EFPs that would allow for limited small-scale fishery opportunities outside the primary commercial fishing areas and not to compete with the existing limited entry program. This allows for testing for the viability and enforceability of small-scale commercial fishing outside the restricted access program.

NETS AND SQUID SPAWNING HABITAT

The recommendation is to establish regulations that require the use of a ribline and rope purse line for all squid round haul fishing vessels. This change mitigates potential impacts to sandy bottom habitat and enhances sustainability by protecting squid egg beds and other benthic species.

LIGHTING AND SEABIRD HABITAT

The Department, with support from the SFAC, has developed a draft Fishery “Best Practices” document that will be distributed to all commercial squid fishery participants. The Department will continue to collaborate with researchers to evaluate potential wildlife interactions (primarily nocturnal seabirds at the Channel Islands National Park) using squid fishery log data. The Best Practices document includes precautionary conservation measures that squid fishing vessels should implement near shorelines and in sensitive bird nesting regions. Evaluations of interactions will use long-term monitoring to inform potential wildlife interactions.

INTRODUCTION

MARKET SQUID FISHERY MANAGEMENT PLAN

The Market Squid Fishery Management Plan (MSFMP) was drafted over the course of five years between 1998 and 2003, with input from two advisory groups - the original Squid Fishery Advisory Committee and a Squid Research Scientific Committee - appointed by the California Department of Fish and Wildlife (Department). The MSFMP was reviewed through an extensive California Fish and Game Commission (Commission) process and adopted in December 2004, with the final version officially published in March 2005 (CDFW, 2005). The MSFMP was developed under the provisions set forth by California's Marine Life Management Act (MLMA), which established state policies, goals, and objectives to govern the conservation, sustainable use, and restoration of California's living marine resources, including the market squid resource.

The MSFMP established a management program for California's market squid resource and procedures by which the State manages the market squid fishery. The goals of the MSFMP are to manage the market squid resource to ensure long term conservation and sustainability, reduce the potential for overfishing, and institute a framework for management that is responsive to environmental and socioeconomic changes. The tools implemented to accomplish the MSFMP goals were:

- Fishery control rules, including:
 - A seasonal catch limitation to prevent the fishery from over-expanding;
 - Weekend closures, which provide for periods of uninterrupted spawning;
 - Gear regulations regarding light shields and wattage used to attract squid and;
 - Monitoring programs designed to evaluate the impact of the fishery.
- A restricted access program, including provisions for initial entry into the fleet, types of permits, permit fees, and permit transferability that produced a moderately productive and specialized fleet.
- A seabird protection measure restricting the use of attracting lights for commercial purposes in any waters of the Greater Farallones National Marine Sanctuary.

ENHANCED STATUS REPORT

In 2020, the Department developed an Enhanced Status Report (ESR) for California's Market Squid Fishery in accordance with the MLMA's Master Plan. In general, ESRs systematically address objectives and requirements of the MLMA similar to but more succinctly than FMPs, and include topics such as landings,

fishing effort and location, and emerging needs. As an FMP was already in place for the Market Squid fishery, the ESR provided updated and more focused information pertaining to market squid life history information, the fishery, and management (CDFW, 2024). Additionally, the ESR included potential revisions to the FMP or management framework that have materialized since the 2005 implementation.

2023 MSFMP REVIEW – SQUID FISHERY ADVISORY COMMITTEE

Background

Between 2014 and 2017, fishing communities from northern California developed a petition that was submitted to the Commission for a community-based squid fishery with its own quota for the ports of Noyo, Eureka, and Crescent City. The inquiry for a community quota outside of the already established restricted access program led to consideration and discussion of potential squid fishery management changes. In August 2021, Monterey area fishermen submitted a petition seeking additional time restrictions for the fishery. In 2022, the State of Oregon also established commercial squid fishery management measures and regulations requiring the use of purse seine riblines, which provided additional basis for revisiting gear and potential habitat impacts in California. With increasing interest in evaluating existing management, new information identified in the ESR, and uncertainty involving climate change impacts on sustainable fisheries, the Department determined a need to revisit market squid regulations and initiated the process to form an advisory committee.

In 2023, the Department, with support from the California Ocean Protection Council and Resources Legacy Fund, initiated a review process for the market squid fishery and MSFMP. The Department convened a new Squid Fishery Advisory Committee (SFAC) charged with reviewing the fishery and advising the Department on potential changes to California market squid fishery management. The goals of the SFAC process were to:

- Review changes in fishery dynamics
- Respond to past stakeholder input and management change proposals
- Consider potential new management measures as guided by the MSFMP, Enhanced Status Report (ESR), and MLMA Master Plan
- Work with a postdoctoral scholar (post-doc) to forecast future landings and catch per unit effort (CPUE) and evaluate harvest control measures in the context of climate change using Empirical Dynamic Modelling (EDM)
- Explore opportunities for small-scale fisheries and the ability for coastal communities and local economies to adapt to climate change
- Modernize data collection and fishery monitoring efforts, including the use of electronic reporting

2022 SFAC Establishment

In spring of 2022, one-on-one interviews with interested stakeholders were conducted by the professional facilitation team, Concur Inc., to capture the broad range of perspectives on potential changes for squid fishery management and to test the willingness of interviewees to engage in an advisory deliberative process. In the fall of 2022, a call for nominations was released by the Department to squid fishery stakeholders and California Native American Tribes. SFAC members were selected in winter 2022 to participate as representatives for specific stakeholder groups, and an SFAC listserv was developed to keep the public and interested Tribes informed of the SFAC's progress. Concur assisted in developing a biography portfolio that included each of the SFAC members, meeting ground rules, and a committee charge to help the SFAC prepare for a series of meetings that would occur over the next 18 months. The SFAC consisted of a broad group of stakeholders, including representatives from the fishing industry, non-governmental organizations, government scientists, and the public.

Squid Fishery Advisory Committee Roster - 2023-2024

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

* These members resigned from the SFAC prior to conclusion of the deliberative process and development of final recommendations

Meetings

The SFAC process included a series of in-person and remote meetings each discussing a specific set of topics for consideration. The meetings were designed to elicit detailed expressions of individual interests and commentary from members and directly respond to the SFAC goals. The SFAC process was supported by facilitation from Concur Inc. and subject matter experts with the Department, including insight from law enforcement. SFAC Members contributed a significant amount of their time to these meetings and their commitment to constructive engagement was invaluable. The meetings resulted in the set of recommendations found in this document. While not a consensus process, each recommendation had broad support from the majority of SFAC members. Summaries of each meeting's key outcomes are available on the Department's [squid fishery management web page](#).

- Meeting 1 – February 2023, Virtual – Introductions
- Meeting 2 – April 2023, Santa Cruz – Effort and EDM
- Meeting 3 – May 2023, Virtual – Effort and EDM
- Meeting 4 – July 2023, Virtual – Monitoring
- Meeting 5 – August 2023, Seal Beach – Monitoring
- Meeting 6 – October 2023, Virtual – Gear/ Habitat
- Meeting 7 – November 2023, Virtual – Gear/ Habitat and Access
- Meeting 8 – January 2024, Oakland – Access
- Meeting 9 – March 2024, Santa Barbara – Initial Proposals
- Meeting 10 – May 2024, Long Beach – Finalize Department Recommendations

SFAC Outcomes and Department Recommendations

For each meeting, the Department provided a presentation to frame a specific topic, presented interim data and results, and asked the SFAC for feedback based on the information provided. Members were able to hear differing perspectives of observed phenomena from other members. The dialogue provided SFAC members with an understanding of the fishery from different standpoints and engaged the committee in problem solving.

Recommendations were developed for the following topics: monitoring; empirical dynamic modeling; fishing effort and temporal closures; small-scale fishery access; nets and squid spawning habitat; and lighting and seabird habitat. At the final SFAC meeting, the Department reflected on SFAC discussions using MLMA guidance and provided a list of “narrowed options” which were selected based on the following criteria: specificity and clarity of the proposal, feasibility and enforceability, and presence of some demonstrated level of support. Using the criteria listed above, the Department provided a preferred option and the SFAC provided input and refinement to

work toward a more complete recommendation with as broad support as possible among SFAC members.

The SFACs' review of market squid fishery management was guided by the MLMA goals described in and key to the development of the MSFMP:

- 1) Ensure long-term resource conservation and sustainability.
- 2) Employ science-based decision-making.
- 3) Increase constituent involvement in management.
- 4) Balance and enhance socioeconomic benefits.
- 5) Identify implementation costs and sources of funding.

The five goals were referenced at the onset of each major topic reviewed by the SFAC and used to help guide meeting objectives. Throughout the SFAC process, committee members were asked to provide input on the following:

- Level of support for existing market squid fishery management (i.e., status quo).
- Potential and/or preferable modifications, if any.
- Confidence with whether the squid fishery management framework will keep the fishery sustainable in the face of climate change.

MARKET SQUID FISHERY AND MANAGEMENT BACKGROUND

Market squid (*Doryteuthis opalescens*) are short-lived (6 to 10 months) and die after spawning (Butler et al., 2001). Once sexually mature, market squid invest all metabolic energy into reproducing and die naturally within a few days to weeks. Market squid aggregate to lay eggs in the nearshore sandy bottom, which can happen throughout the year (Cheng et al., 2020). While spawning aggregations are found and fished primarily off central and southern California, market squid are found from Baja to Southeastern Alaska (Jereb and Roper, 2010). The population, which functions as cohorts of aggregations, is responsive to oceanographic changes resulting in large fluctuations in abundance and regional distribution (Suca et al., 2022; Van Noord and Dorval, 2017; Zeidberg et al., 2006).

Market squid landings in California are highly variable in time and space with a large market demand, primarily from international markets. The market squid commercial fishing industry is routinely the largest in California in volume (amount of fish landed) and value (ex-vessel revenue). The fishery has averaged approximately 70 thousand tons landed each calendar year since the MSFMP was implemented. The fishery is valued at an average of \$48 million in ex-vessel revenue each calendar year since 2005 (CDFW, 2024). In addition to commercial fishing, many recreational anglers use squid as dead or live bait to catch finfish species. (CDFW, 2023)

Implementation of the MSFMP followed an especially productive six-year period, followed by another productive period from 2010 to 2015 when the fishery approached or surpassed the 118,000-ton seasonal cap for five consecutive fishing seasons (Figure 1). The market squid fishing season runs from April 1 to March 31 of the following year. Since the implementation of the MSFMP, the Department observed the lowest statewide landings in 2019 at 13.6 thousand tons (Figure 1). Importantly, the relative value of market squid has increased substantially in recent decades. The ex-vessel value doubled from 2015 to 2023, increasing from an average of \$0.30 per pound to \$0.60 per pound (CDFW, 2023). In 2022, the value for time spent fishing market squid was noticeably larger than it was 10 years ago and is an important indicator for how fishery dynamics can change over time.

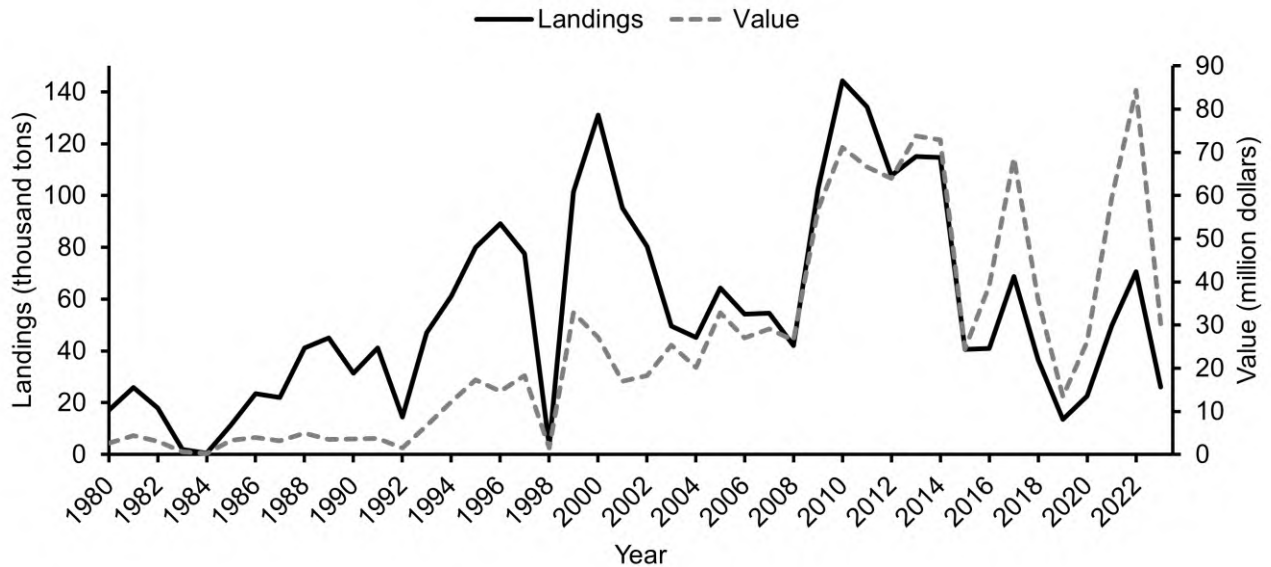


Figure 1. Market squid fishery landings (thousand tons) and value (million dollars) by calendar year from 1980 to 2022.

The major squid fishing areas are located on the central coast of California and the Southern California Bight with a hub of fish businesses in Monterey Bay, Ventura, and San Pedro. Notable fishing hotspots can be found off the Monterey Peninsula, the Northern Channel Islands, and Santa Catalina Island (Figure 2). Market squid spawning and fishing activity in California are typically considered asynchronous and seasonal, occurring between the area north of Point Conception (“northern region” or “north”) and the area south of Point Conception (“southern region” or “south”). In fall and winter, fishing takes place almost exclusively in the southern region while the northern region typically makes up more of the landings during the spring and summer.

The commercial fishery was historically concentrated in the southern part of California. However, landings and the number of vessels fishing have increased around the Monterey Bay region since the 2014-2016 El Niño and correspond with changing fishery dynamics and oceanographic warming events in the California Current Ecosystem (CCE; Chasco et al., 2022). While a large body of scientific literature that explores squid dynamics and biology in response to abiotic influences (i.e., temperature, dissolved oxygen, and upwelling) exists, little is known regarding predictive fisheries models that explore long-term market squid fishery-dependent information in relation to climate drivers (Suca et al., 2022; Munch et al., 2018; Navarro et al., 2018; Ralston et al., 2018).

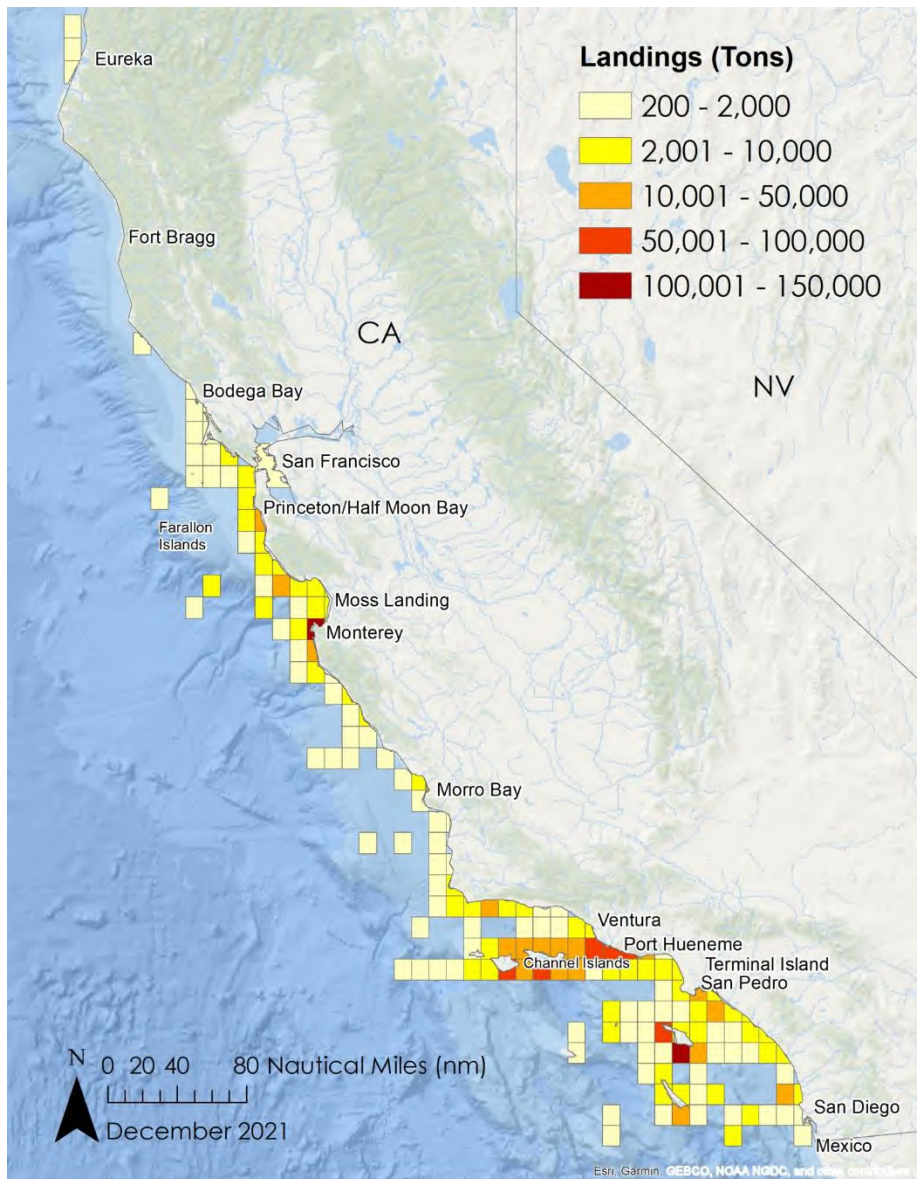


Figure 2. Market squid fishery landings (tons) summarized as a heat map by CDFW fishing block from 2005 to 2021.

Although market squid are included in the federal Coastal Pelagic Species (CPS) Fishery Management Plan (FMP), the California fishery is primarily managed at the State-level through the MSFMP. In addition to the MSFMP fishery control measures (see Fishery Management Plan), the CPS FMP and Magnuson-Stevens Act required that Maximum Sustainable Yield (MSY) be determined for all species in the federal plan. Without an accurate biomass estimate, determining MSY for market squid was problematic, hence the Pacific Fishery Management Council (PFMC) approved the use of egg escapement as a proxy for MSY for the market squid fishery. The estimates of egg escapement are evaluated in the context of a threshold (proxy set at 30%) that allows for

sustainable reproduction year after year (PFMC, 2024). With support from the National Oceanic and Atmospheric Administration (NOAA), the Department evaluates the 30% target escapement statewide by fishing season (CDFW, 2024). Additional conservation is provided by California's Marine Protected Area (MPA) network, which was designed with consideration for market squid spawning grounds and provides for additional escapement.

SFAC DISCUSSIONS AND DEPARTMENT RECOMMENDATIONS

MONITORING

Fishery monitoring efforts, from data collection to fisheries modelling, were a fundamental component during SFAC meetings and the market squid fishery management review. Long-term monitoring and time series data supported science-based discussions during the management review process. Three core market squid fishery monitoring tools and fishery dependent datasets managed by the Department were discussed:

- Landings – Marine Landings Data System
- Logbook – Marine Logs System
- Biological – Market squid fishery dockside sampling

Marine landings data, collected since 1969, are now submitted by fish dealers and businesses through electronic fish tickets (E-tix). The logbook program includes on-the-water effort and location information submitted on paper logs by vessel operators. The dockside sampling time series began in 1998. Department staff monitor offloads at the docks and subsample squid for processing in a laboratory. Importantly, the dockside sampling program supports bycatch monitoring and provides inputs for the egg escapement modelling as a measure of relative spawning potential over time.

The market squid fishery logbook program began in 1999 shortly after the Legislature passed Senate Bill (SB) 364 (Sher), deeming it necessary to adopt and implement squid fishery management measures. The logbooks (Appendix I) are a requirement under Fish and Game Code (FGC) §8026, and California Code of Regulations (CCR) Title 14 §149. The logbook program enables the Department to monitor daily fishing activity, fishing trends, and provide more precise location and catch data than the landings dataset. Logbook data are useful in marine spatial planning, particularly during discussions of MPA locations and scoping for offshore wind and marine aquaculture (Morris Jr. et al., 2021). The logs were designed to learn about fishery and resource dynamics, and was originally intended to aid in the development of population models (CDFW, 2005).

While the Department's collection of marine landings data transitioned from paper receipts to electronic fish tickets in 2019, the market squid fishery logbook data are still collected through paper logbooks, post mail, and manual entry by Department staff (Appendix I). The objectives in working with the SFAC to review the market squid fishery logbook program were to:

- Better understand the current use of logbooks,

- Qualify and quantify the validity and accuracy of the information provided on paper logs,
- Evaluate the relative importance/usefulness of existing logbook data fields,
- Gauge interest in electronic logs, and
- Discuss areas for data collection improvement and/or techniques to collect data electronically.

The market squid fishery logbook data are currently used:

- To observe fishery dynamics over a finer spatial and temporal resolution,
- To explore novel population modelling techniques with EDM,
- In marine spatial planning such as fishery impact analyses during offshore wind and aquaculture scoping,
- For fishery business operations and record keeping, and
- For enforcement.

After reviewing current and potential future uses for market squid logbook data, the SFAC confirmed broad-based support to move away from paper logbooks and transition towards electronic data collection. Multiple vessel operators volunteered to participate in a pilot program, if available, to help the transition. Additional interest in logbook data improvements included capturing information about lightboats through E-fix. Currently, the only documentation lightboat operators have of their lighting activity is through paper logs, which can be cumbersome for operators, permit holders, and the Department to source as proof of fishing activity.

As part of SFAC meeting 4, Kate Wing, a contractor with the Department, shared a mock-up of a potential electronic log (e-log). The mock-up entailed an account set up form, a function to record the start and end of trips, buttons with GPS locations for different types of fishing events such as lighting, and other important details (Figure 3). In the effort of modernizing and advancing the market squid logbook, the Department, EDM team, and SFAC described and discussed specific examples of modifications to data fields and the information collected. Though not a comprehensive list, below are some examples and suggested modifications:

- Add fields for seine vessels to report time spent searching and lighting – Time spent searching and lighting should be reported by all vessels, not just lightboats, and are important metrics for calculating fishery CPUE.
- Add more detailed information about market orders and economic influences on effort or catch.

- Add more detailed monitoring of marine mammal interactions during fishing activity.
- Monitor the use of marine mammal deterrents.
- Improve reporting on vessel and net specifications.
- Make it easy for the permit holder and vessel operator (if different) to access vessel or trip reporting.
- Minimize the amount of time that operators need to interact with reporting forms while actively fishing (i.e., consider Bluetooth sensors on hydraulics).

Figure 3. Example of a potential electronic log form with start and stop buttons for various fishing events. Mock-up designed by Kate Wing.

Electronic data collection in the form of an e-log could generate more timely and reliable information as well as reduce time and effort for vessel operators and Department staff. By minimizing manual entry and written records of detailed information such as GPS coordinates, the validity and accuracy of data collected can improve. An e-log also enables more real-time monitoring, better quality assurance and quality control, and improved compliance.

Additional topics discussed that were deemed outside the scope of the Department's active monitoring programs included interest in utilizing observers on vessels, primarily to document wildlife interactions and bycatch during fishing and lighting. Vessel operators and crew explained that seining operations are not conducive to and can be unsafe for on-board observers. Due to the existing investment in dockside observations of bycatch and the logistical constraints of getting observers on vessels, equivalent observations could be made from a nearby Department vessel. Continued outreach with the fleet and upfront

investment in well-planned monitoring tools could provide more detailed documentation of fishery interactions with other wildlife.

Narrowed Options:

- Develop an e-log for the California market squid commercial fishery

Department Recommendation:

- Develop an e-log for the California market squid commercial fishery

EMPIRICAL DYNAMIC MODELLING

While market squid is currently considered a sustainable fishery, a need exists to modernize management and planning in the context of climate change. In the primary fishing grounds, located in the southern region of California, market squid landings, larval abundance, and size at maturity declined during major El Niño events. As noted above, cumulative landings have increased in central and northern California since the 2014-2016 El Niño. Climate drivers can alter the seasonal and spatial cycles in spawning activity, which in turn can impact fishing behavior, fleet dynamics, and socioeconomics of fishing communities (CDFW, 2024; Chasco et al., 2022). Given that El Niño Southern Oscillation (ENSO) variability is likely to increase in the future, a better understanding of how market squid respond to environmental forces is needed as conditions shift (Ohman et al., 2020). Sea surface temperature (SST) is one of the primary sources of information on ENSO patterns.

Empirical dynamic models (EDMs) capture nonlinear dynamics and system drivers that haven't been measured by including lags (i.e. previous measurements of the same data stream at different time steps). EDMs can be used to make predictions based on patterns in long-term data such as environmental drivers and are unbiased by predetermined model equations. EDMs can work particularly well for short-lived species (Giron Nava et al., 2017; Munch et al., 2018). California market squid fishery data and data sets include landings and logbook data on vessel-specific effort and dockside sampling, larval abundance surveys conducted by both California Cooperative Oceanic Fisheries Investigations and industry researchers with the California Wetfish Producers Association (CWPA), and juvenile abundance information resulting from NOAA surveys of juvenile rockfish. Preliminary work conducted by Dr. Stephan Munch and Bethany Johnson using EDM indicated excellent capability to forecast market squid landings, tease out complex spatial and temporal dynamics, and highlight survey information of greatest value.

2022-2024 EDM Post-Doc Objectives:

- Forecast future squid landings and CPUE (i.e., proxy for market squid abundance) over relevant temporal and regional geographic scales.
- Incorporate environmental drivers (i.e., SST) into EDM.
- Seek stakeholder input on calculating CPUE, management options, and desired fishery performance metrics.
- Set up a harvest control analysis to evaluate CPUE under different fishing effort and climate scenarios (See Fishing Effort and Temporal Closures).

The EDM post-doc investigator, Dr. Lucas Medeiros, was onboarded in July 2022 to tackle the objectives listed above. Initial SFAC meetings focused on introducing EDM and the various sources of time series data from 2000 to 2023. Early data exploration at quarterly resolution indicated apparent differences between SST and fishery dynamics in the regions of California north and south of Point Conception. Given the differences, the modelling team constructed separate models of the northern and southern regions of the fishery, delineated at Point Conception, with quarterly forecasts.

Both quarterly time series exhibited seasonality in SST with more variability in SST in the South than in the North. Landings and logbook catch were highly correlated, and initial comparisons of catch and effort were tightly coupled and not independent (i.e., landings/catch scaled with time spent fishing). Once the modelling team incorporated search time into the effort metric, landings became more decoupled from effort, which is necessary to effectively use CPUE as a proxy for abundance. Hindcasts were performed to predict CPUE as an estimate of squid abundance based on lags in CPUE, effort (i.e., hours fishing and searching), and SST. The northern model more accurately predicted past CPUE than the southern model, while both were far more accurate in their predictions than an average seasonal trend. Additionally, positive correlations were found between estimates of fishery CPUE and paralarval CPUE informed by CWPA surveys, particularly at biologically relevant lags. Positive correlations at biologically relevant lags help to validate the use of CPUE as an abundance indicator and provides support for the continued monitoring of paralarvae.

The SFAC was well-positioned to build on collaborative data gathering and accountability. Modelling efforts were informed by commercial squid vessel operator experience and knowledge, particularly when attempting to accurately calculate effort. Importantly, EDM work helped to prioritize the types and frequency of data collected in a transition to electronic, real-time monitoring.

The harvest control analysis was constructed by imposing varying degrees of fishing effort and forecasting landings and CPUE under three different SST scenarios. While SST states had only modest impacts on forecasts, larger impacts were observed when changes in fishing effort were imposed in the northern and southern regions. The results supported discussions about fishing pressure and time spent fishing (see Fishing Effort and Temporal Closures). EDM struggled to capture extreme highs and lows of landings and SST in either region. EDM is an area for further exploration given that expansions, shifts, or dramatic changes in

market squid landings or proxies for abundance at various life stages are most likely to occur under environmental extremes.

Narrowed Options:

- Continue forecasts with EDM (2024 onward)

Department Recommendation:

- Continue forecasts with EDM (2024 onward)
 - Test forecasting for industry and management planning.
 - After testing period and the development of real-time monitoring for fishing effort (e-log), explore the potential use of EDM to help inform harvest control rules as management procedures.

FISHING EFFORT AND TEMPORAL CLOSURES

At the onset of the SFAC meetings, stakeholders were interested in pursuing additional temporal and spatial closures in the Monterey Bay Area, as well as exploring lighting dynamics (See Lighting and Seabirds, below). Data summaries were initially reviewed to aid discussions about fishery dynamics and potential changes since the development of the MSFMP.

An iterative approach was used between the modelling team and the SFAC to quantify fishing effort in EDM, resulting in significant discussion about some of the drivers that impact fishing effort. Economic and market factors discussed include trade wars, processing capacity, freight costs, availability of cold storage, and market demand. Overall reliance on squid fishing has increased with fishery closures such as Pacific sardine (*Sardinops sagax*), incidental catch restraints, or limited markets in other fisheries such as northern anchovy (*Engraulis mordax*). Fishing also becomes more competitive, particularly when concentrated in easily accessible fishing locations such as Monterey Bay.

SFAC members confirmed that in their experience, effort and dynamics are distinct between the north and south regions, and the regions should be discussed and modeled separately. While the Department manages the fishery statewide by fishing season (April 1 to March 31), the SFAC determined a need to consider the biogeographic and fishery differences between the two regions. The southern region made up the bulk of the landings historically, but in 2014 the northern region exceeded the south for the first time since the MSFMP (Figure 4). In 2020, the Department documented more squid seiners offloading in the Monterey port area than any season prior.

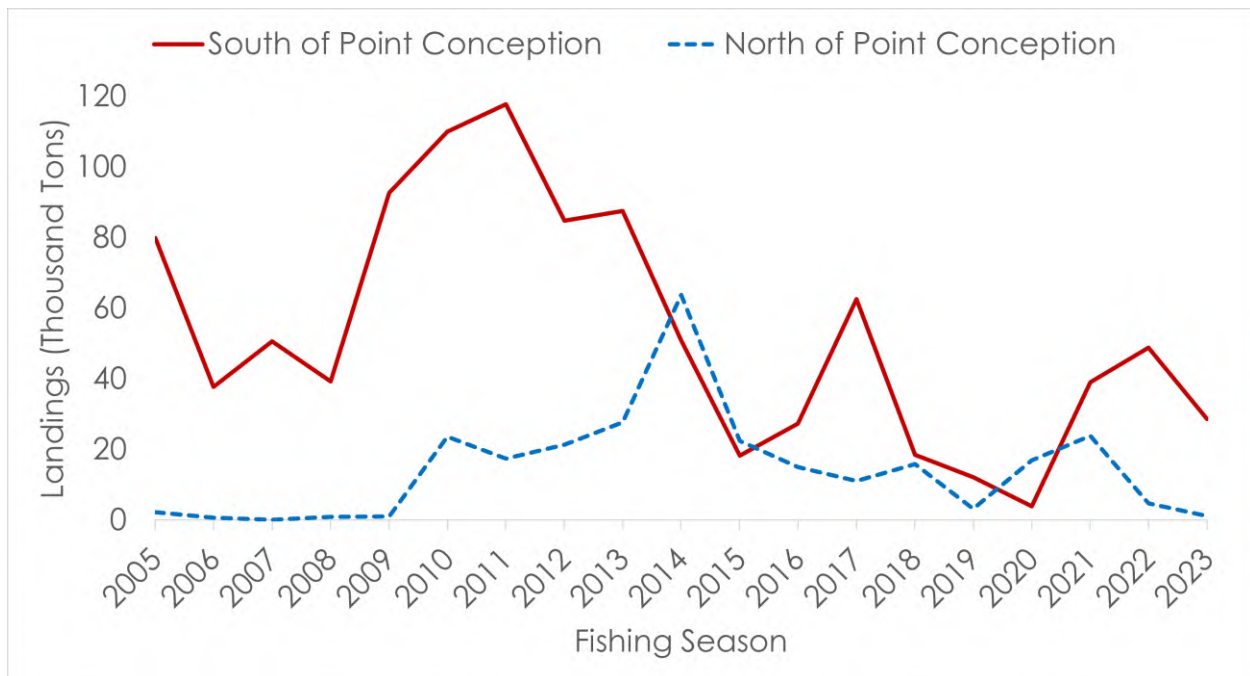


Figure 4. Market squid fishery landings (thousand tons) by regions south and north of Point Conception and fishing season (April 1 to March 31 of the following year).

In 2021, a petition was submitted to the Commission requesting a weekend closure extension and incorporation of half-day closures on weekdays in the Monterey Bay Area. The original request was to extend the weekend closure by 12 hours from noon Friday to midnight on Sunday, and to close commercial market squid fishing from noon to midnight Monday through Thursday. The rationale for the proposed change was the concern that increased fishing pressure in the Monterey Bay Area was not allowing enough time for squid to spawn. The petition was not considered at the Commission and was referred to the SFAC process.

While the weekend closure was the primary topic discussed under fishing effort, additional feedback included interest in re-visiting the seasonal catch limit of 118,000 tons, exploring a daily catch limit on the number of sets or trips to slow down the rate of fishing, and a seasonal closure that varies by region to allow squid “scouts” more time to build spawning aggregations. The underlying goals behind these interests were to boost localized spawning potential, provide for long-term sustainability and added conservation, and improve fishery yields.

SFAC members voiced strong support to keep a seasonal catch limit (SCL) in place, particularly to provide market stability. The SCL was historically only utilized during prolific periods of squid abundance (i.e., 2010 to 2014). Some

SFAC members were interested in exploring alternative, forecast-driven, or in-season ways to manage catch. Though EDM forecasting of CPUE could be an avenue to estimate future abundance, managing catch has more uncertainty and less assurance compared to managing effort or focusing on proportional egg escapement (PFMC, 2024). The challenges of managing catch or quotas in a changing climate stem from rapid squid population turnover (on average 6 months) and responsiveness to environment, and high natural mortality (CDFW, 2024). Daily catch or trip limits are also difficult to enforce.

Without the ability to establish a biomass estimate for squid and the fact that landings scale with effort (see Empirical Dynamic Modelling), temporal closures that allow uninterrupted spawning (i.e., the weekend closure) as opposed to catch controls (i.e., SCL or daily catch limits) are considered more effective when squid abundance is low. Based on dockside sampling data, squid landed immediately following the weekend closure have spawned more than squid landed later in the week (Leos, 1998). The increase in spawned squid early in the week provides evidence for the value of the weekend closure to facilitate uninterrupted squid spawning and greater proportional egg escapement. While a longer-term closure may allow squid aggregations to build at popular fishing sites, concern and uncertainty exists about the timing of such a closure given that the early part of the spawning window can vary seasonally and regionally.

The EDM harvest control analysis was used in an attempt to help understand how changes in fishing effort might impact fishery yields. Results from this analysis suggest that a reduction in fishing effort in the northern region of the fishery could provide improved yields and fishing efficiency. In the southern region, yields increased with increasing fishing effort and declined with a reduction in time spent fishing, though the greatest yields occurred earlier in the fishing week. Egg escapement monitoring shows a similar result. On quarterly and regional scales, relative escapement is lower and therefore relative fishing pressure is higher in the northern-most region on the central coast around the Monterey Bay area (Dorval et al., 2013).

Given the EDM results, monitoring findings, and feedback from the SFAC, an extension to the front end of the weekend closure Statewide provides an added buffer for sustainability, is unlikely to negatively impact overall yields, and is enforceable. In addition to a statewide extension, key differences between the northern and southern regions of the fishery drove the Department's recommendation to extend the closure longer at the back end for the Monterey Bay Area (using a reference line of latitude to be defined). Differences between the regions that guided the Department's rationale

include transit distance to spawning grounds, business operations, lighting dynamics, biogeography, relative egg escapement estimates, and forecasted landings and CPUE from the EDM harvest control analysis.

Current Regulation:

Statewide weekend closure from noon on Friday to noon on Sunday

Narrowed Options:

- Start time of weekend closure: Begin closure earlier on Friday at 7am
- End time of weekend closure: Extend closure to Sunday sunset or 7pm or Monday 12am or 7am
- Location of weekend closure:
 - Statewide
 - North of Point Conception (northern region)
 - District 16 and/or District 17
 - Monterey Bay Area – (using reference line of latitude)

Department Recommendation:

- Extend the weekend closure
 - Statewide – start time of weekend closure will begin 7am Friday
 - Monterey Bay Area (to be defined) – end time of weekend closure extended to Sunday at midnight

SMALL-SCALE FISHERY ACCESS

Since 1990, most commercial squid landings were made by seine vessels with upwards of 4,000 unique landings per year (CDFW, 2023). With support from a tender, seine vessels use purse or drum seine, also known as round-haul gear to encircle squid. Brail vessels use mechanical or handheld scooping, which leads to a smaller-scale operation. On average, very few landings are from brail-permitted vessels, though brail landings spiked in the 2010-2011 and 2011-2012 fishing seasons due to an unintentional 2-ton allowance loophole that allowed commercial brail operations to keep fishing after the seasonal catch limit was reached and the fishery was closed. The desire to land more squid using brail led to a two-fold increase in the number of brail permits through upgrades from lightboat permits (Figure 5). Inversely, lightboat permits have declined by half. Seine permits have steadily declined from 92 permits in 2005 to 69 permits in 2023, likely due to attrition, two-for-one permit transfers to increase overall tonnage on the vessel, latent permits, and lack of fishing opportunities.

While the MSFMP lays out capacity goals for the market squid commercial restricted access fleet (Figure 5), the goals are operational in nature. Results from the EDM harvest control analysis suggest that historical levels of fishing effort statewide, which scales with number of vessels, have not exceeded sustainable harvests. It is unlikely that exceeding the capacity goals, especially brailing activity, will negatively impact sustainability. Of the 69 vessel permits issued, only 59 reported squid landings, and of the 47 brail permits issued, only 10 reported commercial landings sold as dead squid in 2023.

SFAC members asked that the market squid fishery restricted access permit ownership and transfer process be more transparent. The Department generated summaries of permit transfers and use over time, which can be incorporated into the ESR for more routine updates (Figure 5). For confidentiality reasons, permit information must be summarized and the Department cannot provide specifics on individual permit ownership or use.

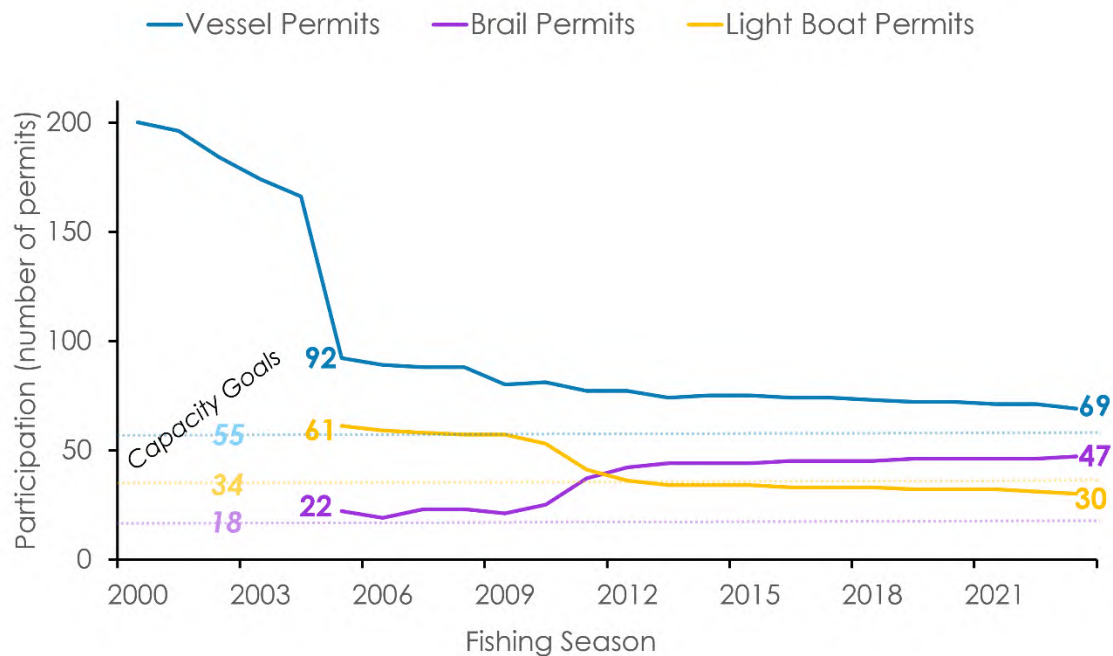


Figure 5. Participation (number of permits) in the commercial market squid restricted access fishery from 2000 to 2023. Capacity goals described in the MSFMP are delineated as dotted lines.

Discussion continued around underutilization of the brail permits, and an effort to understand and define the term “small-scale” for the California market squid fishery, which included reference to the Commission’s recently developed Coastal Communities Policy.

Small-scale access was also a topic identified early in the SFAC process with a request to initiate discussions around fishery access sooner than the final topic meeting. Small-scale access was therefore incorporated as a topic over the course of multiple meetings through the SFAC process.

In terms of interest in improved small-scale access, various proposals were discussed:

- Experimental fishing permits (EFPs),
- Small-scale/low volume fishing,
- Developing local markets in smaller ports,
- Providing dead bait for other commercial fisheries,
- Selling local catch at farmers’ markets or local restaurants,
- Use of low volume gear (i.e., hand jig and hand brail),

- Special allocations of up to 10 tons per day and 10,000 tons per season for specific port areas, and
- Establishing an open access small-scale allowance.

A primary concern raised was that if market squid aggregate near more remote fishing harbors (i.e., Fort Bragg), the fishable biomass is inaccessible to commercial boats in those harbors under the current restricted access policy. The market squid fishery is focused on a high-volume export market and the restricted access fleet has shown a propensity to develop infrastructure in response to squid presence. There is uncertainty in whether a different, economically viable, and small-scale avenue exists in regions where squid aggregate and are less accessible to the active fleet.

As an alternative to acquire a more expensive seine permit, multiple SFAC members pointed to the potential to purchase a brail permit as an existing opportunity to gain access to the commercial market squid fishery. Existing permit holders noted that the restricted access permit program was enacted to create a moderately productive and specialized fleet. Allowing others to create an open access portion of the fishery, particularly at high volume, is seen as unfair to those who have made substantial investments to follow the regulatory framework put in place by the MSFMP. Such a change would also call the entire Commission limited access policy into question and could have broad implications in other limited access fisheries.

The SFAC also discussed the possibility of commercial vessel operators interested in fishing squid using existing permits – purse seine or brail. There are ways to allow another captain to fish an existing limited entry permit, as the operator and the permit holder/vessel owner do not need to be the same individual or entity. Exploratory jigging and modifying regulations to allow for intermittent jigging was also discussed. Additionally, a suggestion to explore a fishery “pop-up” on the more isolated northern coast of California was mentioned.

Many of the proposed quota allocations and harbor-based options would be difficult to manage, challenging to enforce, and could create conflicts with existing commercial operations. The SFAC discussed that options for improved small-scale access should be explored as a new sector that is unique or outside of the business operations built under the restricted access program. The EFP would allow the Department a testing and evaluation period to determine feasibility, enforceability, and unforeseen negative impacts of a truly unique small-scale sector prior to moving forward with a new policy. The Commission

recently approved a new EFP process in which participants can apply for opportunities to fish.

Narrowed Options:

- Experimental Fishing Permit (EFP) –
 - Small-scale/low volume
 - Develop local markets
 - Dead bait, farmer markets, local restaurants
 - Low volume gear (i.e., hand jig and hand brail)
 - Outside current major fishing areas
- Open-Access Small-Scale – This would bypass the EFP described above and go straight into a policy for an open-access sector

Department Recommendation:

- Experimental Fishing Permit (EFP)

NETS AND SQUID SPAWNING HABITAT

In the California market squid fishery, bycatch is minimal and marine mammal interactions that lead to mortality or serious injury are rare (Marine Mammal Protection Act Category III). The low bycatch, in large part, is because seiners are specifically targeting squid aggregations and the action of pursing a seine net allows for mammals or large predators to jump in and out of nets or for the active release of an animal by dipping the side of the net as it gets closer to the vessel. Most of the bycatch observed are other incidentally caught CPS such as Pacific sardine, Pacific mackerel (*Scomber japonicus*), and northern anchovy because CPS will occasionally school with market squid.

Benthic species are, however, observed in small amounts during dockside sampling and fishery offloads, which indicate that nets contact spawning habitat (i.e., nearshore sandy bottom). Squid eggs are also present in offloads about 30% of the time though eggs can be laid in the net during transit or come from the egg bed. Squid eggs serve no benefit to the fishery and the presence of squid eggs can be cumbersome to processing.

The Department has heard interest expressed from various stakeholders and SFAC members to consider net restrictions as a method to mitigate impacts to spawning habitat and egg beds. No requirements or specifications currently exist for seine net use while fishing market squid in California. The market squid logbooks were designed to gather information about fishing gear including nets. However, the Department does not have a strong understanding of net metrics and changes over time due to extremely low compliance rates for vessel profile page submittals (only four seiners reported this information in 2022). The data collected from interviews with vessel operators during the Department's dockside sampling are more robust and provide a more accurate understanding of net specifications and changes over time. Since 2019, net depth is, on average, longer in the northern region of the fishery compared to the southern region. Conversely, the average fishing depth is routinely deeper in the south and shallower in the north. As a result, fishing grounds are shallower, but nets are deeper in the northern region.

While not common, Department data show nets are interacting with bottom habitats, egg beds, benthic species, and prohibited species. As a result, the Department determined it prudent to consider additional measures to minimize adverse effects on habitat caused by fishing as guided by the MLMA. Some ideas proposed included prohibiting the use of chains or heavy cable lines, requiring the use of a ribline to modify how the seine purses, prohibiting submerged lights, and establishing a maximum net depth or minimum fishing

depth. Some members of the seine fleet voiced a strong reluctance to pursue net depth or fishing depth restrictions given logistical and financial constraints.

As an alternative measure, many vessel operators have employed the use of a ribline, which creates a “ribbing” or additional webbing between the lead line and the purse line. SFAC members and members of the public explained that this causes the net to flutter or bounce when it does contact the bottom as opposed to dragging. The ribline is intended to reduce the likelihood of pursuing benthic bycatch, including squid eggs, and to reduce the impact on the sandy bottom habitat, while simultaneously strengthening the integrity of and preventing damages to the net. The Department conducted a survey in 2020 and discovered that roughly 40% of the 56 vessel operators interviewed had switched to a ribline, which was up from an estimated 15% in 2016 (Figure 6). Since the 2020 interviews, more operators/owners have switched to a ribline including members of the SFAC. The Department estimates that more than 50% of the fleet is now using a ribline.

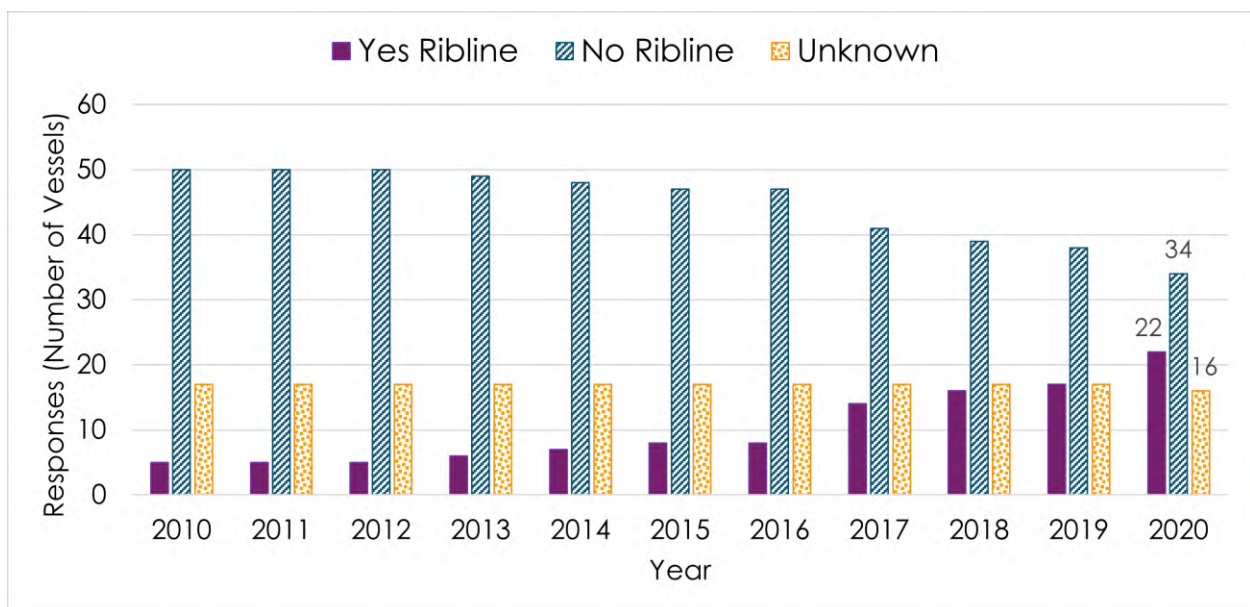


Figure 6. The results of a survey conducted by the Department in 2020. Responses from vessel operators, described by year as yes to using a ribline, no ribline, or unknown if the operator could not be reached.

Dockside sampling data were used to evaluate the extent that nets disturb egg beds in relation to proposed net modifications. Observations of squid eggs in the offloads were roughly half as likely when vessels had a ribline. The Department used the following two conditions as indicators of seine nets touching the bottom: (1) the presence of eggs aged past 24 hours and (2) the presence of benthic bycatch. In the northern region, a 10% decrease in benthic habitat

interactions was observed when the vessel had a ribline. While a positive impact with riblines was not detected in the southern region during this timeframe, discerning these effects was difficult as dockside sampling efforts were minimal at southern region ports due to challenges posed by the COVID-19 pandemic, staffing shortages, and a lack of fishing activity. Statewide, the likelihood of observing a specific benthic species declined when a ribline was employed for almost all documented benthic species.

As guided by the MLMA, mitigating habitat impacts and minimizing bycatch remains a high priority for the Department. In addition to pursuing gear modifications, improved data quality and monitoring through the use of e-logs should clarify the interactions between net depth, fishing depth, bycatch, and habitat. A better understanding of these interactions could inform future management actions and additional regulatory changes, if needed.

Narrowed Options:

- Require a ribline.
- Require a ribline when fishing shallower than a specified depth boundary.
- Require rope purse lines, no cable or chains (i.e., no metal lines).

Department recommendation:

- Require a ribline and rope purse line.

LIGHTING AND SEABIRD HABITAT

In addition to evaluating direct potential impacts to spawning habitat, discussions occurred around the use of lights over time and the potential impacts to land-based wildlife and the public. Current lighting regulations include:

- Permit required to light for squid for the purpose of commercial take
- Logbook required
- No more than 30,000 watts of lights to attract squid per vessel
- Entire filament of each light shielded
- Lower edges of shields parallel to the deck of the vessel

The SFAC was interested in improving our understanding of the dynamics between daytime and nighttime fishing and looking at the use of lights and lightboats over time. Stakeholder interest in spatial closures was primarily focused on restricting lighting activity around nocturnal seabirds during particularly sensitive life stages and to improve visitor experience at the Channel Islands National Park (Park), with an initial suggestion to close the Park to all squid lighting year-round. Some SFAC members also expressed interest in additional lighting restrictions, specifically that the light bulb (not only the filament) be shielded. Using logbook data, the Department provided various maps and summaries to give context to historical fishing and lighting activity, as well as MPA development over time and space.

According to set times reported on fishing logs, the proportion of fishing sets made at night is greater in the southern region (75%) relative to the northern region (59%). Furthermore, smaller sets are more common in the daytime in the North. SFAC members expressed that they are more likely to encounter squid during the day in the North and suggested that this is due to differences in spawning behavior between the regions. The seiners are more reliant on nighttime fishing and lightboats in the South.

The MPAs on the northern Channel Islands were implemented in 2003 and considered seabird activity as well as market squid spawning during the designation process. The SFAC discussed relative fishing activity in the northern Channel Islands MPA areas leading up to the development of the MSFMP. From 1999 to early 2003, approximately 25% of overall squid catch for this region came from fishing sets made in areas that subsequently were closed to commercial market squid fishing and lighting. Members of the fishing fleet referenced the closure of the north side of Anacapa Island as a substantial loss of fishing grounds at the time. The current lighting regulations were also

implemented, in large part, using results from lighting research on impacts to nocturnal seabirds conducted during the 1999 to 2005 timeframe (CDFW, 2005).

Most vessels and lightboats continue to use metal halide as the predominant attracting light type, which is listed on approximately 75% of logbook profile pages since 2005. In order of most prevalent to least, the other attracting light types used include high pressure sodium, incandescent, and halogen. To support SFAC discussions around lighting, Department staff took photos of light configurations and summarized compliance in the three major port areas (Monterey, Ventura, and San Pedro) in 2023. Almost all vessels in Monterey and San Pedro had 95% to 100% of their bulbs fully shielded, while shielding compliance was more ambiguous for a subset of Ventura-based vessels. Some vessels also had unshielded forward-facing lights, which are illegal to use during squid fishing because they can attract and aggregate squid. The SFAC and members of the public explained that current shielding requirements are set up to provide some light spread on the water to improve the capacity to aggregate squid. SFAC members also mentioned that forward-facing lights are useful for safety and navigation.

Because the historical research that went into the existing lighting regulations is still relevant today and most commercial squid fishing lights are compliant with those regulations, the SFAC suggested that a “Best Practices” for the fishery could be a useful management tool and more appropriate than a regulation change. A Best Practices could inform the fleet of how to employ precautionary conservation measures near shorelines and be used to mitigate less desirable or unenforceable lighting behaviors. Using scientific literature provided by SFAC members and mitigation strategies summarized by Dr. Travis Longcore out of the University of California, Los Angeles, the Department expanded on the body of research used to develop the MSFMP, and with advice from the SFAC, drafted a Best Practices throughout the course of the SFAC meetings (Appendix II).

At the final SFAC meeting, a proposal was made to close Anacapa, San Miguel, and Santa Barbara Islands to night-time squid fishing from February to October, which is considered a key nesting and breeding period for the California listed (Threatened) Scripp’s murrelet (*Synthliboramphus scrippsi*). Most of the commercial squid fishing and lighting activity takes place in the fall and winter at these islands and does not overlap with known nesting and breeding seasons, though there are occasionally landings from February to October that add considerable ex-vessel value to the fishery. A strong opposition was voiced from many SFAC members, who explained that lighting in the areas of concern has already been reduced over the last 25 years, and that the status of the Scripp’s

murrelet has improved, which is largely attributed to the eradication of land-based predators on the Channel Islands. SFAC members that opposed the proposal stated a lack of evidence for lighting impacts. Given the considerations, the SFAC voiced broad-based support for research to improve the understanding of potential interactions between lighting operations and nocturnal seabird activity at the Park.

Narrowed Options:

- Develop a Best Practices for the commercial squid fishery
- Close Anacapa, San Miguel, and Santa Barbara Islands to squid fishing from February to October (key nesting and breeding period for the Scripp's Murrelet)
- Evaluate potential wildlife interactions (primarily nocturnal seabirds at the Park) using squid fishery log data

Department Recommendation:

- Develop a Best Practices for the commercial squid fishery – draft included (Appendix II)
- Evaluate potential wildlife interactions (primarily nocturnal seabirds at the Park) using squid fishery log data

CLIMATE CONSIDERATIONS

The California market squid fishery still faces many unknowns. Continued research into climate drivers using long-term monitoring in conjunction with physiological studies is fundamental to improving our understanding of how market squid will continue to respond to environmental change. Squids and other cephalopods have high adaptive capacity and the propensity to modify their own physiology through protein-altering ribonucleic acid editing, which could help with acclimating to variable ocean conditions and temperature changes (Voss and Rosenthal, 2023). These physiological advantages paired with a changing ocean environment may result in shifts in suitable habitats for market squid, including an expansion or shift of fishable biomass to more northern latitudes north of Point Conception (Suca et al., 2022).

A few questions arise if the market squid population is expected to acclimate and adapt to climate changes that impact the CCE. How will the fishing industry and coastal communities adapt along with the market squid resource? How can fisheries managers effectively plan, prepare, and sustainably manage the market squid resource with such a high level of climate uncertainty?

The SFAC explored some of the above questions in the context of the MSFMP and the prevailing topics described in this report. Representatives of the fishing industry expressed a common understanding that market squid landings have always fluctuated, but also that more opportunities existed in the past to redirect fishing effort to other species, such as Pacific sardine, when squid abundance was low. Now, with a greater reliance on and higher value for squid, fishing can be more concentrated, and operators are investing more effort into finding squid when squid is available. It also seems that while the various sectors within the commercial squid fleet are facing different challenges, vessel operators and commercial businesses agree that having flexibility in fishing operations such as easily switching targets is of the utmost importance.

Given the questions around small-scale access, a need exists to understand how local economies may respond to shifts in timing, location, and frequency of squid aggregations under climate change. An EFP could provide valuable insight as to the viability of commercial squid fishing outside the restricted access policy (i.e., low volume or local markets) in the future.

The Department sought support from the EDM team to better understand how climate drivers might directly impact fishery and management performance. EDM efforts were informed by the market squid fishery logbook data and insight from members of the commercial fleet as an iterative process. The long-term goal for continuing work with EDM is to advance climate resiliency for the fishery as forecasting may provide an avenue to buffer uncertainty for fishing

operations and management. The SFAC and the modelling team agreed that forecasting by quarter with max of one year is appropriate, and any forecasts beyond that timeframe are less reliable and not as useful. Real-time monitoring through electronic logs will be essential to forecast at biologically relevant scales and to assess management strategies in the future.

SUMMARY AND DEPARTMENT RECOMMENDATIONS

During the final meeting, the Department presented draft recommendations to the SFAC and adjusted the recommendations to reflect discussion points and expression of support from members. Given the broad topics the SFAC covered and the various potential regulatory changes, the Department is also proposing that an amendment to the FMP be initiated, which would allow for incorporation of new information regarding climate change, revisions to pertinent chapters of Section 1, and removal of regulatory text in Section 2 that is redundant with the California Code of Regulations Title 14. Proposed Department recommendations are listed below with the necessity for associated rulemakings noted:

MONITORING

Department Recommendation: Develop an electronic logbook (e-log) for the California market squid commercial fishery.

Far-term Rulemaking: This would eventually lead to a regulatory change to section 149(e) to revise text pertinent to logbook requirements.

EMPIRICAL DYNAMIC MODELING

Department Recommendation: Continue forecasts with EDM (2024 onward):

- Test forecasting for industry and management planning
- After testing period and development of electronic log, explore the potential use of EDM for management procedures and further evaluation under climate change

FISHING EFFORT AND TEMPORAL CLOSURES

Department Recommendation: Extend the weekend closure

- Statewide – start time of weekend closure will begin 7am Friday
- Monterey Bay Area – end time of weekend closure extended to Sunday midnight

Near-term Rulemaking: Revise hours in 149(c)(1); add times for specific locations.

SMALL-SCALE FISHERY ACCESS

Department Recommendation: Those interested in pursuing small-scale opportunities should utilize the newly established EFP program.

NETS AND SQUID SPAWNING HABITAT

Department Recommendation: Require commercial purse seiners to use ribline and rope purse line.

Near-term Rulemaking: Add a regulatory paragraph to section 149 specific to nets.

LIGHTING AND SEABIRD HABITAT

Department Recommendation:

- Provide a fishery “Best Practices” in 2024
- Evaluate potential wildlife interactions (primarily nocturnal seabirds at the Channel Islands National Park) with squid fishery log data

PROPOSED FMP AMENDMENT

The 2005 MSFMP contains four sections, which are listed below. Preliminary Department proposed revisions for an amendment are noted for each section:

- **Section 1** presents background on the California market squid fishery. It also provides a range of alternatives for management of California's market squid fishery and the Department's Proposed Project.

Proposed revision:

Chapter 1 – minimal changes, Department can revise as needed

Chapters 2 and 4 – could point to ESR

Chapter 3 – Pertinent sections would be revised

Chapter 5 – Update costs

- **Section 2** includes the environmental analysis (see California Code of Regulations Title 14 15250-15253), including a review of alternatives and options, some of which were recommended by constituents in the review of the preliminary draft MSFMP.

Proposed revision: Analysis pertinent to weekend closures and gear (nets) would be revised/ incorporated, and logbook text would refer to modernization.

- **Section 3** includes regulations that would implement the MSFMP Project's management strategy.

Proposed revision: Do not include this section in the amendment as the text is redundant with regulatory text that should only appear in the California Code of Regulations.

- **Section 4** includes public comments and Department responses to both the Preliminary Draft Market Squid Fishery Management Plan (released May 2002) and the Draft Market Squid Fishery Management Plan (released July 2003).

Proposed revision: Replace with new public comment on amendment.

FUTURE REVISIONS

Five years after an amendment is complete and subsequent rulemakings have been approved, a future review is recommended. The review would serve as a check-in with stakeholders and include an evaluation of monitoring data, any new changes to the fishery, and any emerging issues either specific to climate change or other unforeseen variables. The ESR is the primary document to find

up-to-date information on California market squid fishery and fishery management.

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APPENDIX I



State of California - Department of Fish and Wildlife
MARKET SQUID VESSEL LOGBOOK
 DFW 149a (Rev. 05/01/15) Previously DFG 149a

LOG # _____

Market Squid Vessel Profile

Vessel Name _____

Attracting Lights Used:

Vessel ID Number _____

Type: _____ Light Generated: _____ Number: _____

Vessel Characteristics:

Vessel Permit Number _____

_____ W L (circle one) _____

Boat Length (ft) _____

Captain's Name _____

_____ W L (circle one) _____

Hold Capacity (st) _____

Captain's ID Number _____

_____ W L (circle one) _____

Gross Tonnage _____

Purse Seine / Drum Seine / Lampara / Brail Net (circle one)

Electronics Used:

Horsepower:

Net Depth (fm) _____

Side-scan Sonar: Yes No (circle one)

Main Engine _____

Net Length (fm) _____

Fathometer: Yes No (circle one)

Generator _____

Mesh Size (in) _____

Other: _____

If Brail, scoop capacity (ft): Circumference _____ Depth _____ Average lbs per scoop _____

Fish Hold's Water System (circle one): Brine RSW Dry CSW (live) Other (please specify) _____

Crew members:

Name	ID Number	Name	ID Number

Captain's Signature _____ Date _____

Certified under penalty of perjury as true and correct



Market Squid Light/Braile Boat Profile

Vessel Name: _____

Vessel ID Number: _____

Light or Braile Boat Permit Number: _____

Captain's Name: _____

Captain's ID Number: _____

Attracting Lights Used:

Type:	Light Generated:	Number:
_____	_____ W L (circle one)	_____
_____	_____ W L (circle one)	_____
_____	_____ W L (circle one)	_____

Vessel Characteristics:

Boat Length (ft): _____

Gross Tonnage: _____

Hold capacity (st): _____

Electronics:

Side-scan Sonar: Yes No (circle one)

Fathometer: Yes No (circle one)

Other: _____

Horsepower:

Main Engine _____

Generator _____

Scoop capacity: Circumference (ft) _____ Depth (ft) _____ Average lbs per scoop _____

Fish Hold's Water System (circle one): Brine RSW Dry CSW (live) Other (please specify) _____

Crew Members:

Name	ID Number

Captain's Signature: _____ Date _____

Certified under penalty of perjury as true and correct



State of California - Department of Fish and Wildlife
MARKET SQUID VESSEL LOGBOOK
 DFW 149a (Rev. 05/01/15) Previously DFG 149a

LOG # _____

Vessel Name: _____

Vessel Permit Number: _____

Captain's Name: _____

Vessel ID Number: _____

Captain's ID Number: _____

Alpha Code	Date	Set Number (or 8 if using trailbeer)	Set Time: hr:min AM or PM (circle one)		Set Position: decimal minutes to hundredths place				SST (°F)	Bottom Depth (fm)	Name of light boat set upon	Catch Estimate (Short Tons)	Was catch limited by market order? Y/N	Bycatch:		Landing Receipt(s)	
			Start	End	Latitude		Longitude							Species	Amount (lbs)		
			Degree Ex. 34°	Minutes Ex. 05.15'	Degree Ex. 120°	Minutes Ex. 04.85'											
A			AM / PM	AM / PM													
B			AM / PM	AM / PM													
C			AM / PM	AM / PM													
D			AM / PM	AM / PM													
E			AM / PM	AM / PM													
F			AM / PM	AM / PM													
G			AM / PM	AM / PM													
H			AM / PM	AM / PM													

Comments: List by date any anecdotal information such as additional bycatch information, equipment problems, interference from other boats, weather-related problems, day set activity, etc.

Captain's Signature _____ Date _____
 Certified under penalty of perjury as true and correct



Vessel Name: _____

Light or Brail Boat Permit Number: _____

Captain's Name: _____

Vessel ID Number: _____

Captain's ID Number: _____

Date	Location:		Hours spent:		Name of Seiner that set squid	Total tons (st) of squid caught by seiner	Estimated tonnage (st) remaining after fishing is completed	Were birds present? Y/N	Were mammals present? Y/N	Your vessel's estimated BRAIL catch							
	For brail activity enter latitude and longitude using decimal minutes to hundredths place. Ex. 34° 06.15', 120° 04.85'		Searching (includes day sets)	Lighting						Leave blank if you are a light boat permittee or a brail boat permittee operating solely as a light boat							
	For light boat activity enter block code or lat/long if block code unknown.									Time of trawling: hr:min AM or PM (circle one)		Bottom depth (fm)	Amount sold to Market (short tons)	Landing receipt #	Amount for Live Bait (lbs)	Brail Bycatch:	
				Start	End			Species	Amount (lbs)								
										AMPM	AMPM						
										AMPM	AMPM						
										AMPM	AMPM						
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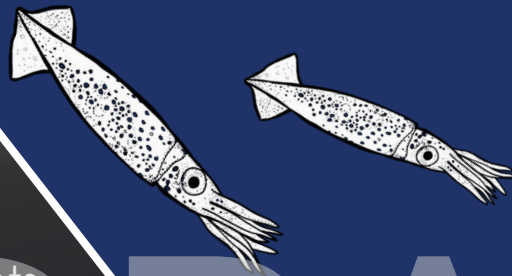
Comments: List by date any anecdotal information such as additional bycatch information, equipment problems, interference from other boats, weather-related problems, day set activity, etc.

Captain's Signature: _____
 Certified under penalty of perjury as true and correct

Date: _____

APPENDIX II

Best Practices for Market Squid Fishing



ILLUMINATE only downward facing lights

INSPECT lights and shields for compliance annually

MINIMIZE deck lights when at anchor or close inshore overnight

CONFIRM that squid lights illuminate downward and do not illuminate the shoreline

TURN OFF unnecessary lights

TURN OFF squid lights when fishing not permitted

DO NOT illuminate shoreline

DO NOT use forward facing lights (ie. crab lights) when lighting for squid

MINIMIZE the amount of weight used to sink nets and don't add additional weight in shallow water

DRAFT



Sea Bird Avoidance Tips

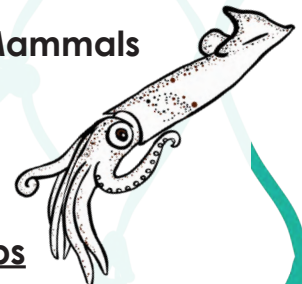
<https://www.fisheries.noaa.gov/national/resources-fishing/seabird-protection-and-avoidance-tips>



Proposed guidelines for safely deterring marine mammals : <https://www.regulations.gov/document/NOAA-NMFS-2020-0109-0001>

Additional Information

- CCR T14 § 149 (h) Light Shields - Each vessel fishing for squid or lighting for squid will reduce the light scatter of its fishing operations by shielding the entire filament of each light used to attract squid and orienting the illumination directly downward, or providing for the illumination to be completely below the surface of the water. The lower edges of the shields shall be parallel to the deck of the vessel.
- Reducing lights when not in use will help limit wildlife interactions at night.
- Vessels using any light (Ex. squid lights, deck lights, or forward facing crab lights) that may attract/aggregate market squid while fishing is not permitted are in violation of FGC § 86 and CCR T14 §149.
- Keeping lights at a minimum when near the shoreline will reduce impacts to wildlife especially seabirds which can be negatively impacted by artificial lights.
- If near the shoreline, make sure that all extraneous lights are reduced so that seabirds and other wildlife are not affected.
- It is **ILLEGAL** to use forward facing lights (ie. crab lights) when attracting squid because squid lights **MUST** have entire filament shielded and the squid light must be illuminating directly downward. CCR T14 § 149 (h).
- Using additional weights in shallow water may increase the interactions of the net and seafloor. CCR T14 § 149 (j) - Citations for violations of this Section [CCR T14 § 149] may be issued to the vessel operator, crewmembers, and/or the holder of a market squid permit issued pursuant to Section 149.1 of these regulations
- National Marine Fisheries Service has a proposed rule on Guidelines for Safely Detering Marine Mammals and has specific guidance on proper use of Seal Bombs. More information can be found here: <https://www.regulations.gov/document/NOAA-NMFS-2020-0109-0001>
- If sea birds need to be released please visit this site for more information on proper release: <https://www.fisheries.noaa.gov/national/resources-fishing/seabird-protection-and-avoidance-tips>
- For more information on the market squid fishery, please visit <https://marinespecies.wildlife.ca.gov/market-squid/>



Squid Fishery Best Practices References

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Squid Fishery Advisory Committee

Review of California Market Squid Fishery Management and Proposed Recommendations

07 November 2024

Presented to:

**Marine Resources Committee
Fish and Game Commission**

Presented by:

**Trung Nguyen
Environmental Scientist
Marine Region**



Objectives

1. Review Squid Fishery Advisory Committee (SFAC) process and resulting Department recommendations
2. Address questions and discussion topics from July 2024 MRC Meeting
3. FMP Amendment/Rulemaking proposed timeline



Squid Fishery Advisory Committee (SFAC)

SFAC Charge

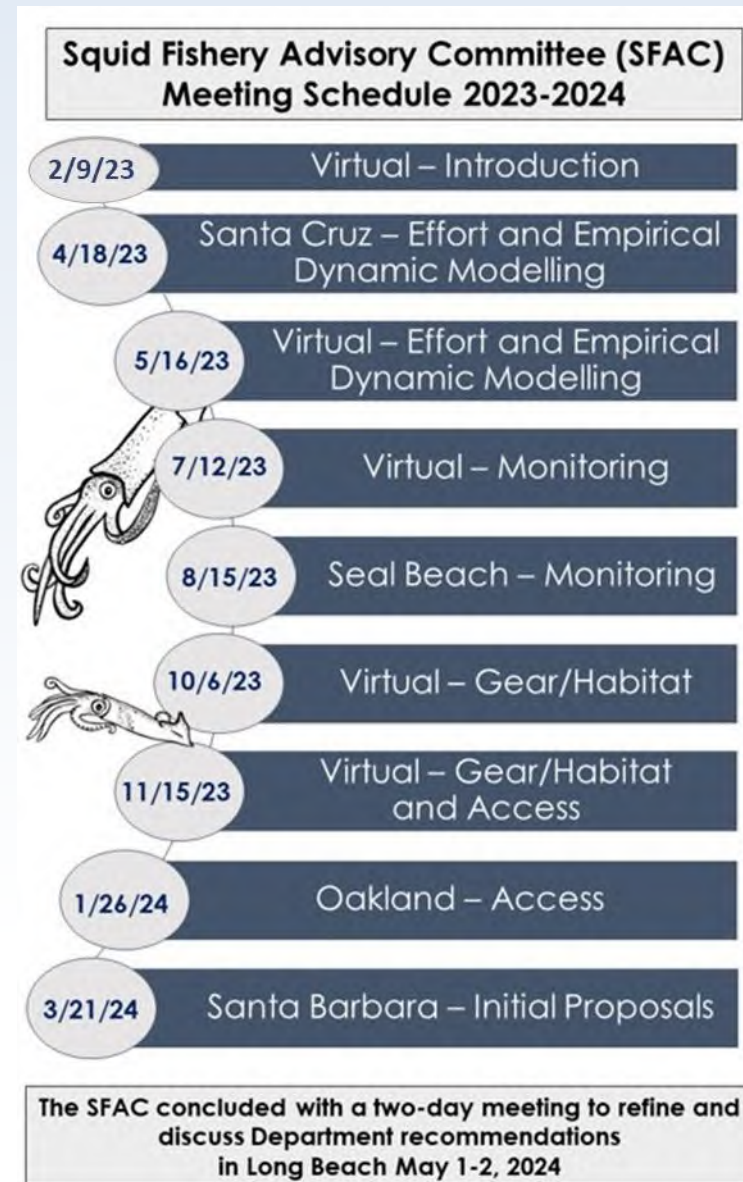
Review and advise the California Department of Fish and Wildlife (CDFW or Department) on potential changes to California market squid fishery management

SFAC Members

Fishing Community, Conservation, Non-Consumptive, Research

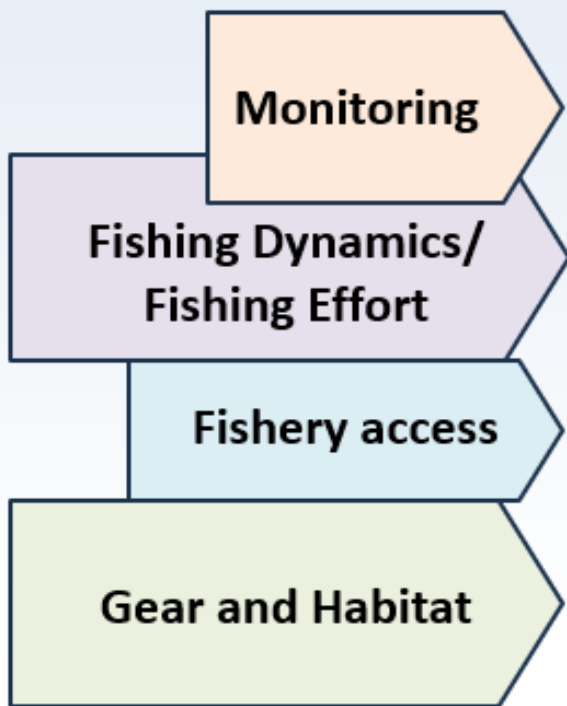
Squid Fishery Management Web Page

<https://wildlife.ca.gov/Conservation/Marine/MSFMP>





Recommendation Topics



- Monitoring
- Empirical Dynamic Modelling (EDM)
- Fishing effort and temporal closures
- Small-scale fishery access
- Nets and squid spawning habitat
- Lighting and seabird habitat



Monitoring

Department Recommendation:

- Electronic logbook
 - Market squid e-logs as pilot for Department-wide effort
 - Once funded, ideally start pilot in 2025

Sample E-log Interface

RECORD A FISHING EVENT

SEARCHING	Start	Stop
LIGHTING	Start	Stop
BRAILING	Start	Stop
SEINING	Start	Stop

Additional event questions ...

The START and STOP buttons would automatically generate timestamps and record GPS locations

The mockup shows a form titled "RECORD A FISHING EVENT" with a dashed orange line underneath. It contains four rows of buttons. Each row has a white button with a grey border on the left, and two colored buttons (purple for "Start" and orange for "Stop") on the right. A large orange bracket on the right side of the "Start" and "Stop" buttons points to a text box that says "The START and STOP buttons would automatically generate timestamps and record GPS locations". At the bottom of the form is a dark grey button with the text "Additional event questions ...".

Mockup by Kate Wing



How Existing Monitoring Data Are Used?

Scientific Basis for Squid Fishery Management, 2005:

- Egg Escapement Method
 - Department dockside biological sampling (1998 – present)
 - Proportional eggs escaped with proxy for Maximum Sustainable Yield (MSY) set at 30% escapement (Dorval et al. 2024)



New Use for Monitoring Data

Exploring Predictive Modelling, 2022:

- Empirical Dynamic Modelling (EDM)
 - Fishery logbook and Sea Surface Temperature (SST) data (1999 – present)
 - Informed extension to weekend closure



EDM and Future Planning

Department Recommendation:

- Continue forecasts with EDM (2024 onward):
 - Test forecasting for industry and management planning
 - After testing period and development of electronic log explore the potential use of EDM for management procedures and further evaluation under climate change

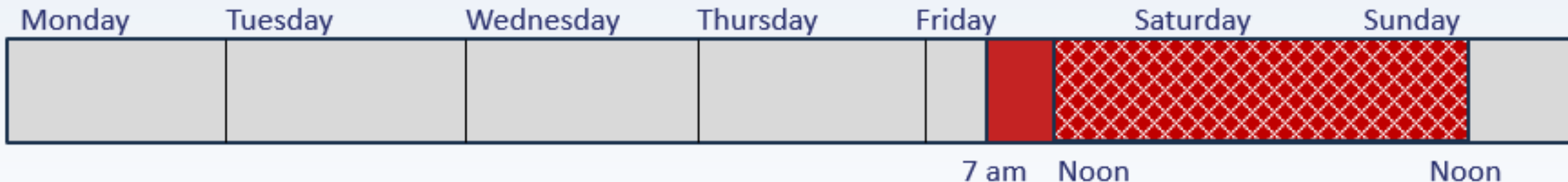




Fishing Effort Recommendation

Department Recommendation:

- Extend weekend closure
 - 7am Friday to noon Sunday, Statewide



- Monterey Bay Area extends to Sunday at midnight

- Alternative Areas: (A) Include Half Moon Bay (B) North of Point Conception





Northern Weekend Closure – Potential Areas

Department Proposed:

“Monterey Bay Area”

Point Lobos to Pigeon Point



Alternative A:

Point Lobos to Point Arena



Alternative B:

North of Point Conception





Gears Currently Allowed/Used

Restricted Access Program Permit Types:

- Seine
 - Can seine, light, and brail
- Brail (hand or power)
 - Can brail and light
- Light
 - Can only light
 - No landings

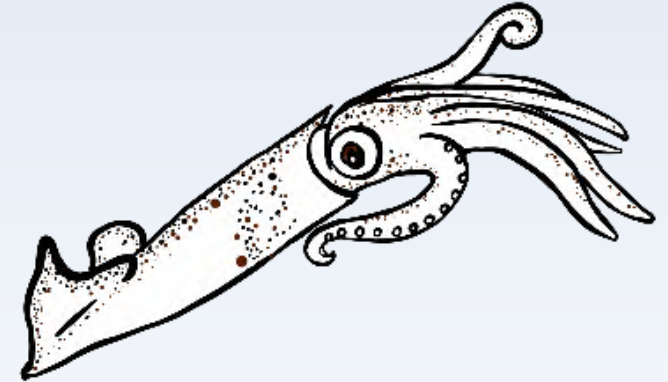




Small-Scale Fishery Access

Department Recommendation:

- Experimental Fishing Permit (EFP)
 - Small scale/low volume
 - Develop local markets
 - Dead bait, farmers markets, local restaurants
 - Outside current major fishing areas

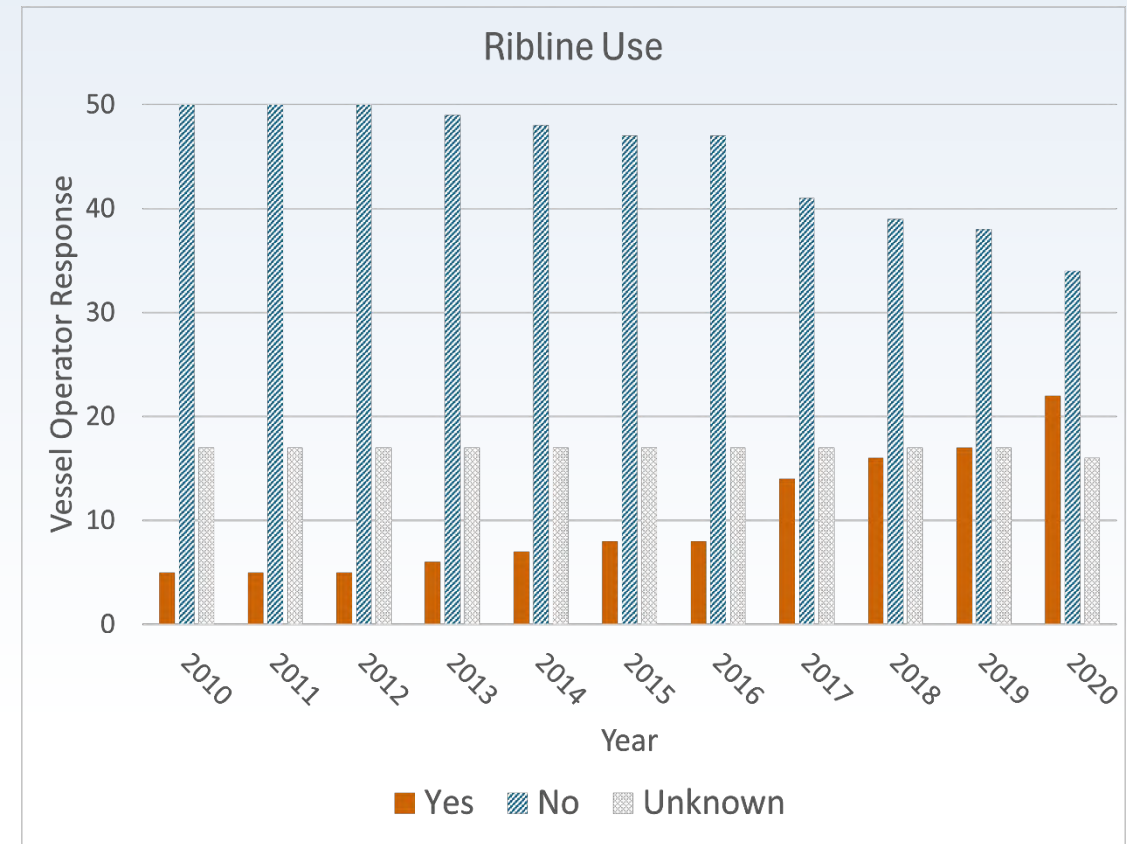




Nets and Squid Spawning Habitat

Department Recommendation:

- Require a ribline AND rope purse line.
 - Ribline use continues to increase in the fleet
 - Department dockside sampling indicates that riblines reduce the incidence of bycatch for most benthic species



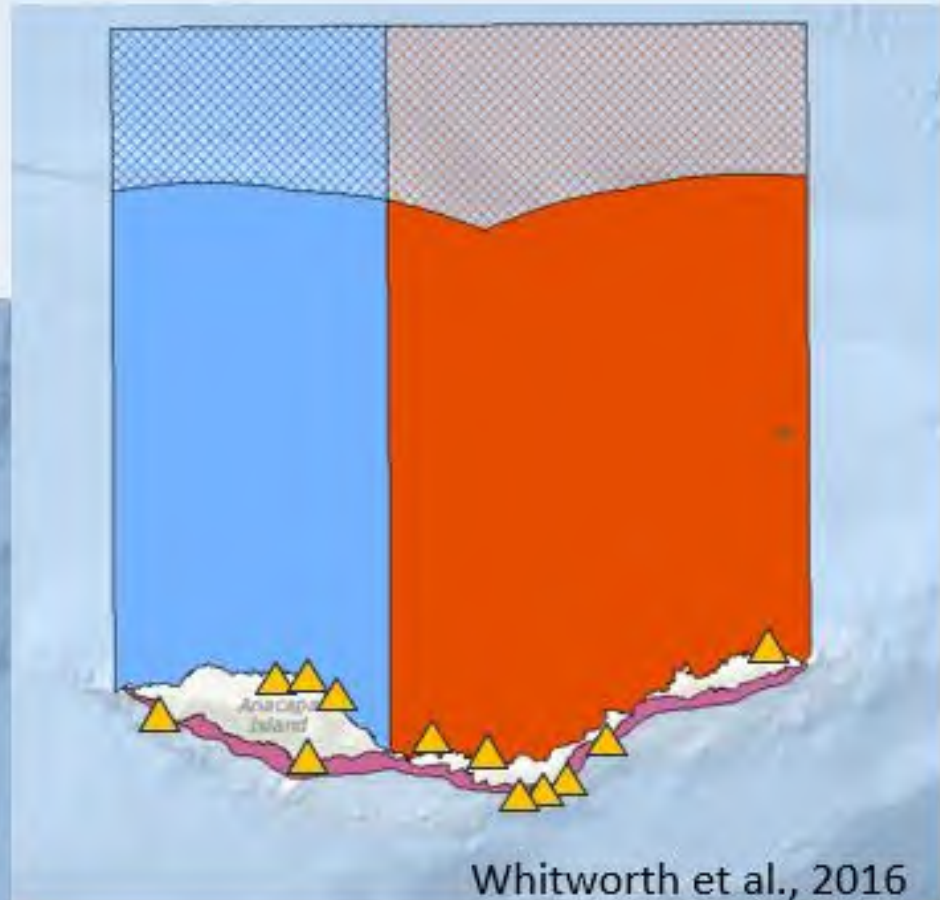
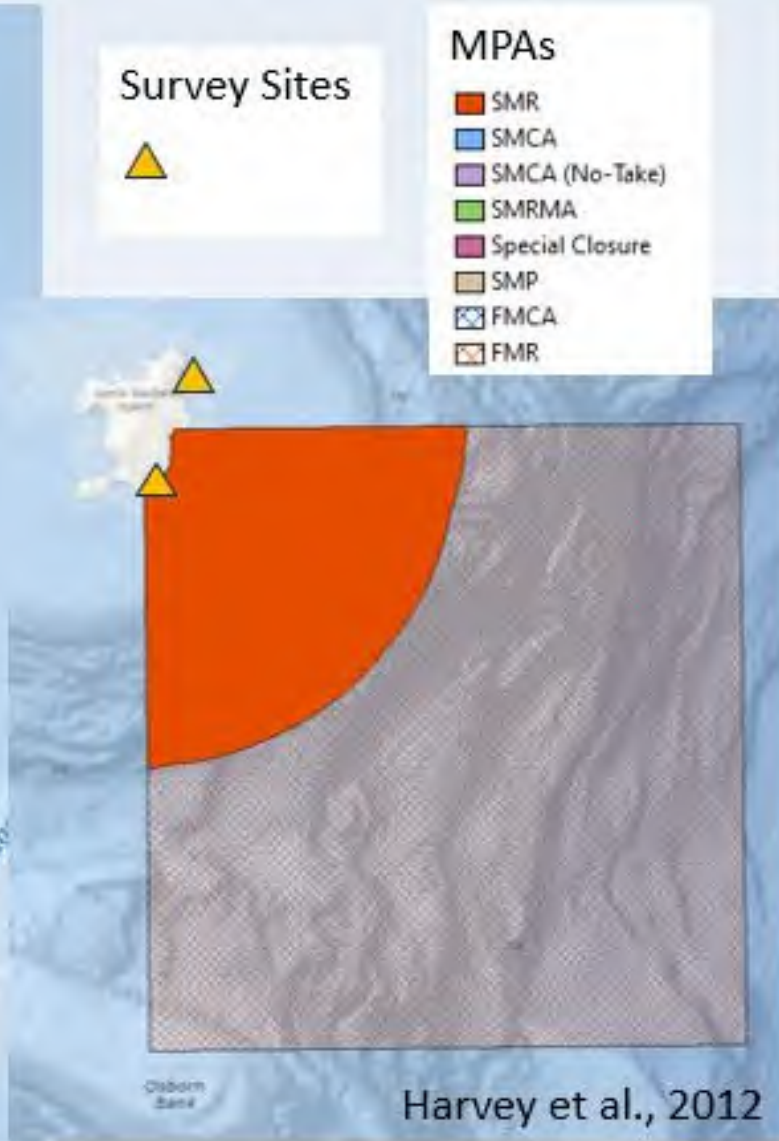
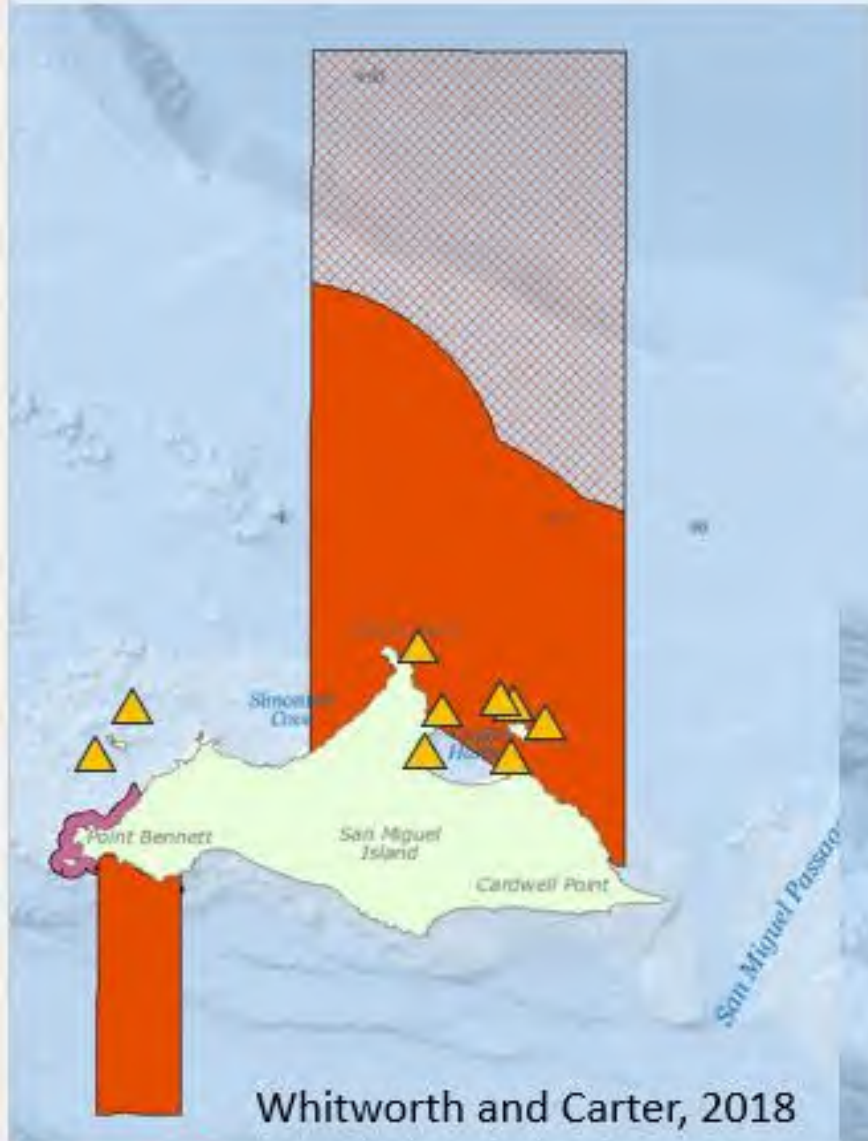


Lighting and Seabird Impacts

- Lighting regulations (wattage and shielding requirements) established during market squid FMP development late 1990's to 2005
- 2024 proposal to close night-time fishing on Anacapa, San Miguel, and Santa Barbara islands from February through October to provide additional protection for the breeding State-listed (Threatened) Scripps's murrelet.
- Scripps's murrelet population counts increased 150% and occupied nests increased over 5-fold on Anacapa from surveys in 2001 and 2014.



Scripp's Murrelet Cont.





Lighting and Seabird Habitat Recommendation

Department Recommendation:

- Fishery “Best Practices”
- Evaluate potential wildlife interactions (primarily nocturnal seabirds at the Channel Islands National Park) with fishery logbook data

Best Practices for Market Squid Fishing

ILLUMINATE only downward facing lights

INSPECT lights and shields for compliance annually

MINIMIZE deck lights when at anchor or close inshore overnight

CONFIRM that squid lights illuminate downward and do not illuminate the shoreline

TURN OFF unnecessary lights

TURN OFF squid lights when fishing not permitted

DO NOT illuminate shoreline

DO NOT use forward facing lights (ie. crab lights) when lighting for squid

MINIMIZE the amount of weight used to sink nets and don't add additional weight in shallow water

Sea Bird Avoidance Tips
<https://www.fisheries.noaa.gov/national/resources-fishing/seabird-protection-and-avoidance-tips>

Proposed guidelines for safely deterring marine mammals ; <https://www.regulations.gov/document/NOAA-NMFS-2020-0109-0001>



Marine Mammal Deterrents

- Marine Mammals managed by the federal government
 - NOAA allows the use of pyrotechnics to deter marine mammals
 - NOAA has proposed regulations that further restrict that use
- Fish and Game code 5500 prohibits explosives except under terms and conditions set by the Commission
- Title 14 Section 225.1 allows the use of agricultural and wildlife fireworks
 - Health and Safety Code, Sections 12503 – 12678 describe and define the use of agricultural and wildlife fireworks



Summary – Department Recommendations

**Proposed
FMP
Amendment and/
or Regulatory
Changes**

- Electronic logbook
- Extend weekend closure Statewide to begin at 7am on Friday / Monterey Bay Area to Sunday midnight
- Require rib line and rope purse line

Outreach

- Provide a fishery “Best Practices” in 2024

**Continued
Research**

- Small-scale opportunities through EFP
- Continue forecasts with EDM (2024 onward)
- Evaluate potential wildlife interactions (primarily nocturnal seabirds) with squid fishery log data



FMP Amendment/Rulemaking

First Ever Commission FMP Amendment

Proposed Timeline:

**FGC Meeting
April 16-17, 2025**

- Notice Hearing
 - FMP Amendment/Rulemaking goes to notice

**FGC Meeting
June 18-19, 2025**

- Discussion Hearing

**FGC Meeting
August 13-14, 2025**

- Adoption Hearing

Thank You



For questions please contact:
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From: Shester, Geoff <GShester@oceana.org>
Sent: Wednesday, October 23, 2024 11:31 PM
To: FGC <FGC@fgc.ca.gov>; [REDACTED]
Cc: Birch, Caitlynn <cbirch@oceana.org>
Subject: submission for MRC briefing materials - agenda item 4 - market squid fishery review

Good evening Commission staff,

We would like to submit the two attached reports for the MRC briefing materials under Agenda Item 4: Market squid fishery management and fishery management plan review.

These reports provide **two independent analyses of the use of seal bombs in California fisheries with a focus on the market squid fishery**. One is by [former Oceana research intern Leah Davis](#) and the other is by [Aimee Kerr and Jason Scorse from the Center for the Blue Economy](#). While these reports were written in 2018 and there have been some developments since then, their findings remain relevant as this issue has not been meaningfully addressed to date. Given the Commissioners' interest in this topic and request for additional information at the July 2024 MRC meeting, we hope the MRC finds these reports helpful in understanding the background of this important issue. We look forward to further discussions with the MRC regarding potential management improvements to address ongoing concerns over the use of explosives in the market squid fishery.

Thank you,

Geoff Shester

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The Use of Seal Bombs in California Fisheries

Unknown Impacts Point to an Urgent Need for More Research

By Aimee Kerr and Jason Scorse*
Center for the Blue Economy, 2018

Abstract

Commercial fishing in California is a significant source of jobs and incomes. The industry can also produce detrimental environmental impacts, including injuries to threatened and endangered marine mammals and damage to marine ecosystems. There are a host of state and federal legal and regulatory mechanisms in place to protect marine mammals and their habitat. Some of these are more effective than others, and all exist within a continually evolving political and economic landscape. Seal bombs are incendiary devices used by some fishers to deter sea lions, seals, and other mammals from fish nets and fishing grounds. Measures to allow the use of seal bombs were adopted in part to protect fishermen from mammal depredation, but there is increasing evidence that the devices are being used off the coast of California at higher levels than previously realized. The available evidence indicates that seal bombs may pose a significant risk to marine life, both due to risk of direct injury from the blasts and the large number of intense noise impulses being introduced into marine ecosystems filled with animals that depend on the natural soundscape to live and thrive. The current regulation of these devices is weak, informed by outdated and incomplete research. Further, the monitoring and enforcement of their use is minimal, and their direct consideration by seafood certification organizations is practically nonexistent. Therefore, the authors recommend that the state and federal agencies tasked with monitoring and enforcing the use of seal bombs in California immediately review their policies, and consider significant investments in seal bomb research and monitoring to ensure that they are being used according to the law and not producing significant harm to marine mammals.

I. California's Fishing Industry & the Use of Explosive Deterrents

The fishing and harvesting of marine resources has played an important role in California's history and economy. In 2016, the value of commercial fish landed in California totaled almost \$200 million,¹ and in 2015, the industry supported over 122,000 jobs.² California's coasts host an incredibly rich assortment of marine mammals; over 34 species of pinnipeds, whales, otters, and other marine mammals can be found in Monterey Bay National Marine Sanctuary (MBNMS) alone.³ As marine mammals such as whales, dolphins, and sea lions subsist on fish, commercial fishing activities off the coast sometimes lead to conflicts between humans and marine mammals.⁴

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In order to deter and chase pinnipeds away from fishing activity—which can damage gear, scare fish and diminish fish catch—fishermen in multiple fisheries in California use explosives such as “seal bombs” or “cracker shells”.⁴ Seal bombs used in California waters are firecrackers that contain approximately of 2-2.5g of explosive charge and sink and explode 1-4 meters⁵ under the water’s surface, producing a loud noise that can travel for kilometers underwater.⁶ “Cracker shells are 12 gauge shotgun shells containing a sound and flash explosive charge that is designed to explode in the air or on the surface of the water at a distance of 75 to 100 yards from the point of discharge.”⁷

Image 1: An example of a “seal bomb”



Photo credit: Anna Krumpel (formerly Meyer-Loebbecke)

These types of explosives are used in large numbers during times of intense fishing activity off the coast of California, with hydrophones recording a maximum of “37,500 [explosions] per month and 3,740 per day” near Catalina Island between 2005 and 2014.⁸ As many as 500 blasts have been recorded in one hour during peak fishing season.⁸ The blasts were found to occur primarily at night, strongly correlating with fishing activity targeting squid.⁸ The hydrophone operated by the Monterey Bay Aquarium Research Institute (MBARI) in the Monterey Bay recorded over 3,000 explosions in the span of about a year, from mid-2015 to mid-2016,⁹ with a maximum of almost 1,000 in a single month.¹⁰ The hydrophone can pick up some sounds up to 500 kilometers away depending on intensity, frequency, seafloor topography, and other factors, though it is likely that these blasts are occurring within the Monterey Bay.¹⁰

Seal crackers are considered “high explosives” by the U.S. Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF) because they contain flash powder;¹¹ they can be compared to M-80s or cherry bombs.¹² As a result of misuse of these devices, in 2011 ATF began to more heavily enforce the Safe Explosives Act of 2002, mandating that those wishing to purchase seal bombs obtain a permit and clear a background check.¹¹ These devices have the potential to harm humans, marine mammals, other species, and the marine environment.¹² They have been shown to shatter bones of marine mammals⁵ and to kill fish within the blast vicinity.¹³

Experiments done in California indicated that the use of cracker shells only deterred pinnipeds from boat activity for roughly 4 minutes, a timespan that increased to 6 minutes when combined

with acoustic harassment devices. The inadequate number of controlled scientific experiments on the use of seal bombs has made it difficult to determine their true effectiveness as a type of deterrent.⁴ More data is needed on the effect of seal bombs on various marine mammals as well as on their exposure and risk.

II. Impacts on Marine Life

The impacts of seal bombs on the area's various marine mammals have yet to be clearly determined, but initial evidence points to the potential for significant risk of harm for many species. A 1989 study done by the National Oceanic and Atmospheric Administration (NOAA) Southwest Fisheries Science Center indicated that one of the many types of seal bombs (albeit larger than the majority of bombs currently used in California) detonated within half a meter of a dolphin carcass can shatter its bones and is likely to cause moderate to severe injury within that distance.⁵ This is concerning given that these devices are only effective as seal deterrents when detonated near the offending pinnipeds.⁴ Scientific research on seal bombs has been lacking in recent years, but studies examining the effects of seal bombs on marine mammals are currently underway.⁹

According to Shawn Johnson, Director of Veterinary Services at the Marine Mammal Center, whether or not a seal has been killed by the immediate or delayed effects of a seal bomb would be difficult to determine once a carcass is found. However, over the past decade the Marine Mammal Center has recovered two sea lion carcasses displaying “evidence of intra-oral explosion, including traumatic injury to bone of maxilla and mandibles, soft tissue burns and prolapsed eye balls” (see Image 2 & 3 below), injuries that the Center believes were likely caused by seal bombs. It is important to note that it is likely that a seal that was severely injured by a seal bomb at sea would die and decompose offshore, and never be observed by Marine Mammal staff or other enforcement agencies.

Images 2 & 3: Dead sea lions recovered by Marine Mammal Center, whose deaths were likely caused by seal bombs





Credit: Shawn Johson, Marine Mammal Center

Other marine animals such as fish can also be injured or killed by seal bombs; dead fish have been immediately observed in the vicinity of seal bomb blasts.¹² A single accidental human death has also been recorded and retrospectively studied; a swimmer was killed when a bomb—containing 3.0g of explosive charge—exploded within 0.3 meters of his body. The explosion “ruptured both eardrums, herniated brain tissue through ruptured areas in the cribriform plates, fractured cranial bones including the wings of the sphenoid and the left petrosal, and caused a 1.5-cm-deep wound above the scapula”.⁵

Exploding seal bombs produce intense impulsive and broadband noise with energy at a wide range of frequencies, some of which can carry for tens of kilometers across the ocean. Researchers at the Scripps Acoustic Ecology Laboratory estimate that the bombs can be heard by whales and dolphins from up to 80 kilometers away.⁶ The sound pressure levels of explosions from these devices can be detected from kilometers away; unpublished preliminary results from analyses of experiments conducted by researchers at MBARI and Scripps show that they can be higher than the 160 dB re 1 uPa received sound levels needed to initiate an avoidance response in gray whales in California’s waters within a kilometer or more from the blast area.¹⁴ As these devices are used typically in large quantities concentrated in short time periods, and across different locations, the aggregate potential for noise disturbance is an issue that warrants further research. There have been several reports of explosives driving whales away from whale-watching sites, and SCUBA divers too, have felt the impacts of seal bombs; divers in Monterey have described being driven out of the water by the noise and pressure waves from the blasts.⁶

Toothed whales are extremely sound-sensitive, and they are consequently likely to suffer adverse effects from underwater noise¹⁴ Many types of toothed whales, including the sperm whale, killer whale, beaked whales, Pacific White-Sided dolphin, Risso’s dolphin and Dall’s porpoise, are found off the coast of California.¹⁵ All species of whales are protected under the 1972 Marine Mammal Protection Act (MMPA) and many, including the gray whale, blue whale, and fin whale, are also protected under the 1973 Endangered Species Act (ESA). Whales in marine sanctuaries are also covered by the 1972 Marine Protection, Research, and Sanctuaries Act (MPRSA). Many

marine mammal species, notably large whales, rely on sound for communication, navigation, and food location and acquisition.⁴ With up to tens of thousands of underwater explosions occurring during some months on California’s coast, it is very possible that a number of these marine mammals are being adversely affected by the noise alone.

Over the past few years, acoustic pollution in the marine environment has become a topic of widespread concern within the marine conservation community. For example, the Natural Resources Defense Council (NRDC) has a [program focused on acoustic pollution](#) in the ocean and helped produce the Emmy Award-winning documentary, [Sonic Sea](#), which brought the issue to the attention of the public in 2016. National and international bodies including the National Research Council of the National Academies, the International Maritime Organization, and the United Nations have also recently given extensive consideration to this issue.[†] Commercial shipping traffic represents the greatest contribution to acoustic ocean pollution,¹⁶ but anthropogenic sources of noise in the marine environment also include fishing activities, recreational and commercial boats, aerial activity,¹⁷ sonar systems for military purposes, fishing, and research, and seismic surveys for oil and gas exploration.¹⁸

The background noise intensity in some areas of California’s marine environment that have been systematically measured has increased drastically since the mid-1960’s.¹⁶ Marine mammals use sound for feeding, “communication, individual recognition, predator avoidance, prey capture, orientation, navigation, mate selection, and mother-offspring bonding”.¹⁸ Anthropogenic noise can lead to behavior changes in marine mammals; responses vary depending on the species, sound, and source.¹⁷ Potential effects of noise pollution on marine mammals include physical injury, temporary and permanent noise-induced hearing loss, behavioral changes such as altered migration and foraging patterns, and inability to detect important sounds like those that assist with communication, food sourcing, and navigation.¹⁹ Acoustic pollution such as sonar testing has been linked to acute decompression sickness in marine mammals, which may lead to death through beaching.¹⁶ Long-term, cumulative impacts are not well-known, but given the noise produced by tens of thousands of seal bombs over many months, it is likely a significant source of additional acoustic pollution in California waters.

III. Existing Regulation of Seal Bombs

Regulation of the use of seal bombs in California’s commercial fishing industry is complicated. On a federal level, sale of the devices is regulated by ATF. National Marine Fisheries Service (NMFS) collaborates with the State of California and the Pacific Fishery Management Council (PFMC),²⁰ “one of eight regional fishery management councils established by the Magnuson Fishery Conservation and Management Act of 1976”²¹ to regulate fishing activities in California’s

† Some of the recent efforts to understand the effects of ocean noise on marine mammals are presented in the following documents: National Academies of Sciences, E., and Medicine (2017). *Approaches to Understanding the Cumulative Effects of Stressors on Marine Mammals*. Washington DC: The National Academies Press. National Research Council (NRC) (2005). *Marine mammal populations and ocean noise: determining when noise causes biologically significant effects*. National Academies Press.
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waters. Federally, the 1972 MPRSA, the 1972 National Marine Sanctuaries Act (NMSA), the 1972 MMPA and the 1973 ESA are applicable to the use of seal bombs off the coast of California. On a state level, the California Department of Fish and Wildlife (CDFW) manages fishing in California's state waters, and the 1970 California Endangered Species Act applies to all endangered species which may be harmed by the use of seal bombs in California.

Federal Regulation

As seal bombs are explosives, their sale is federally regulated by ATF.²² ATF conducts “inspections of applicants for licenses or permits as explosive material manufacturers, importers, dealers, and users, as well as periodic inspections” once every three years.²³ According to Ronald J. Borg, Senior Industry Operations Investigator at ATF's San Francisco Field Division, “We do not monitor the actual usage of the materials, only its accountability.”²³ ATF does not approach vessels on the water; inspections are conducted once ships are docked. Borg adds, “We can, however, conduct inspections if we had reason to suspect or reasonable cause to believe that criminal activity was or is ongoing.”²³

Following the point of sale of seal bombs, information on their use and impacts is lacking. As of November 2017, “officials with both the California and the US federal governments say they do not know how many fishermen are using explosive deterrents, or whether they're being used appropriately.”²⁴ Impacts on marine mammals and on the marine environment are also generally unknown.²⁴ Fisheries monitoring on the California coast has been performed with attention to other issues, and the issue of seal bombs has been largely overlooked. In a telephone conversation with the author on Feb 23, 2018, Kristy Long at NMFS stated that there are very few fisheries observers in relation to the number of fishing vessels. According to Robert Anderson, a pinniped expert with NMFS, “It would be impossible to watch every fisherman using an explosive device. It falls on you as a fisherman to make sure you're in compliance with the law.”²⁶

On the guidance document issued by NMFS, potential methods fishers can use to deter Pacific harbor seals, California sea lions, and eastern U.S. stock Steller sea lions from damaging their gear and catch include “pyrotechnics (e.g., bird screamers, bangers, underwater firecrackers, cracker shells)”, yet exclude methods that have “an increased likelihood of causing injury or death”.²⁵ Due to the lack of information on the deleterious effects of seal bombs on marine mammals, it is entirely possible that they may, in fact, cause such effects. The NMFS guidance document on distinguishing serious from non-serious injury of marine mammals does not provide guidance on noise-related injuries “because NMFS scientists making injury determinations are unlikely to detect noise related injuries in live animals and because the state of science on identifying noise-related injuries in live marine mammals is still developing.”²⁶ The document only addresses the obvious physical impacts that might be immediately visible as a result of explosives, such as “body cavity exposure” or “visible blood loss”.²⁶

Fishing activities in California's national marine sanctuaries are managed by the State of California, NMFS, and PFMC. Fishing in California state waters is managed by CDFW, and fishing in federal waters is managed by NMFS and PFMC.²⁷ The national marine sanctuaries are mandated to “protect all sanctuary resources on an ecosystem wide basis” under the MPRSA. However, in MBNMS, commercial fishing activity is “not being regulated as part of the sanctuary regime and is not included [...] as an activity subject to future regulation.” In fact, Sanctuary prohibitions that

may indirectly affect fishing activities have been written to explicitly exempt [...] traditional fishing activities”,²⁰ although it is questionable whether the use of potentially harmful explosives should be considered part of this category. The NMSA (National Maritime Safety Administration) prohibits the destruction, loss of, or injury of sanctuary resources, but also excludes fishing activity.²⁸

The MMPA is a federal law protecting California sea lions, pacific harbor seals, and other marine mammals, such as cetaceans.²⁹ Under the MMPA, NMFS is responsible for regulating activities that could seriously injure or kill marine mammals, and the taking of a marine mammal by a member of the public is punishable by a large fine.²⁰ The term “taking” in this case refers to all forms of harassment, including moving, injuring, or causing the loss of a marine mammal,²⁰ and “harassment” refers to “any act of pursuit, torment, or annoyance” which could lead to a marine mammal being injured, disturbed or having its behavioral patterns disrupted.²⁹ It is allowed under the MMPA, however, for commercial fishers to deter pinnipeds from damaging their gear or catch as long as this activity does not cause marine mammal mortality or serious injury.²⁹ However, the injurious effects of seal bombs have not been closely studied nor monitored, despite evidence that they have the potential to cause serious injury.

In the case that marine mammals are killed or injured as a result of commercial fishing activity, the MMPA also allows their “incidental take” as long as a permit has been issued.²⁹ The MMPA “mandates that all commercial fisheries be classified by the level of incidental marine mammal death and serious injury”³⁰ Fisheries are divided into three categories based on their record of incidental death or serious injury of marine mammals.²⁹ These figures are reported in the annual Marine Mammal Stock Assessment Reports.³⁰

Many species that are found along the California coast—including the gray whale, killer whale, sperm whale, blue whale, Guadalupe fur seal, western Steller sea lion and sea otter—are also listed under the ESA. The Pacific harbor seal, the eastern U.S. stock of Steller sea lions, and the California sea lion were removed from the list of threatened species under the ESA in 2013.³¹ Responsibility for implementing the ESA is shared by NMFS and the U.S. Fish and Wildlife Service (FWS). NMFS is responsible for endangered and threatened marine mammal species with the exception of a few, including sea otters, which are managed by FWS.³² Under the ESA, a species listed as endangered cannot be legally harassed, injured, or killed.³² However, the ESA, like the MMPA, allows owners of commercial fishing vessels the “incidental take” of endangered or threatened species, but requires the issuance of an incidental take permit and accompanying Habitat Conservation Plan.³³

State Regulation

On a state level, fishing in California waters is managed by CDFW. According to CDFW, the department “does not track or record use of seal bombs”²² as they are not a type of gear.³⁴ According to John Urgoetz, Environmental Program Manager for the CDFW:

“The California Fish and Game Commission regulations implementing State statutes regarding the use of explosives in State Waters specifically exempt explosives designated by the State Fire Marshall as agricultural and wildlife fireworks (Title 14, California Code

of Regulations, Section 225.1). The State Fire Marshall considers Seal Bombs as this type of device and they are therefore allowed as a deterrent device for use in fisheries.”

From what we can gather from state officials, there is no state program in place for monitoring the use of seal bombs or assessing their frequency or impacts, nor are any efforts currently underway to bring them under greater scrutiny and/or management.

IV. Connection between Seal Bombs and Seafood Certification

Consumers who seek out seafood that has been assessed by one of the many organizations that rate seafood sustainability do so for many reasons, including ethical and health concerns and to promote local fisheries. Currently, seafood caught using seal bombs is not automatically disqualified from being certified by any of the leading certification bodies, and it difficult to determine the extent to which these bodies are assessing potential seal bomb impacts on marine ecosystems. The result is that it is possible that seal bombs are used in some of the fisheries that receive positive sustainability ratings, and that consumers who do not want to purchase seafood from fisheries where seal bombs are used cannot rely on these rating bodies.

One of the most well-known and widely utilized sustainable seafood advisory tools, the Monterey Bay Aquarium’s Seafood Watch Program, assigns a color-coded sustainability score for each fishery analyzed. Organizations and companies such as Fishwise and Real Good Fish base their sustainable seafood recommendations on this standard. According to Seafood Watch Program representative Peter Adame, there are currently no reports that specifically mention the use of seal bombs, as they are “not a common method for commercial fishing.”³⁵ Adame says that the Seafood Watch Program would consider the impact of the explosives “under two criteria: Impacts on Other Species and Habitat Impacts.”³⁵ These impacts, however, are currently unknown.

The Marine Stewardship Council (MSC), a sustainable seafood certification organization, does not specifically mention seal bombs in its guidance document on fisheries certification. MSC bars fisheries from certification that use explosives as a method of fishing.³⁶ However, there is no such ban for fisheries that use the explosives as a deterrent. According to Matt Gummery, fisheries certification manager for MSC, “There are several areas where fishery impacts on marine mammals would be addressed by a third-party scientist assessment team, even if there was a lack of data. The assessment team would be required to use data-limited assessment methods (a semi-quantitative approach that uses any available data and stakeholder input to determine precautionary scores) to assess the risk of a negative impact.”³⁷ Fisheries are also scored by MSC on how frequently they review and implement alternative measures to minimize fishery-related mortality of endangered, threatened, or protected species.³⁷

Ultimately, sustainable seafood listings and certifications are only as good as the information received by the organizations that produce them, and information on seal bomb impacts on marine mammals is practically nonexistent. MSC will not certify a fishery that specifically targets marine mammals,³⁷ but if the mammals are taken as a by-product of fishing activity, certification is possible.

Currently, Seafood Watch and MSC sustainability determinations do not preclude fisheries from using seal bombs as deterrents. It is hard to know how many fisheries positively rated by Seafood Watch or MSC use seal bombs, but Seafood Watch assigns a yellow rating to squid caught by the California squid fishery, which is one of the fisheries that likely uses the greatest number of seal bombs in its operations.⁸

V. The Need for More Research, Monitoring, and Dialogue on Seal Bomb Use in California Waters

The use of seal bombs in California fisheries presents a system almost completely lacking in data, monitoring, and enforcement. The regulatory system for seal bombs is broken if it requires the users of the devices to self-regulate without having any system in place to objectively assess the impacts of seal bombs, nor a data collection and monitoring program in place to correlate the use of seal bombs with marine mammal injury and death. Fishers who use seal bombs have no incentive to self-regulate, and there are no government or third-party entities directly monitoring their use of these devices.

The serious injury or death of a marine mammal, if caused by seal bombs, would have to be witnessed and proven before any action would be taken against those responsible, which is entirely backwards from a precautionary or incentive-based management standpoint. In addition, there is a paucity of fisheries observers in California waters who could collect the appropriate data and alert regulatory personnel of violations.

The issue of seal bomb use, however, has recently made its way into the California policy spotlight. The sanctuary's management plan is currently being updated, and there is public and Sanctuary Advisory Council interest in addressing seal bombs issues. According to the MBNMS program's Andrew DeVogelaere, the Sanctuary is "concerned about the potential incidental impacts of specific fishery technique on all sanctuary resources including benthic habitats or marine mammals".²⁰ If it is found that seal bombs "have a significant adverse effect on marine mammals, the Secretary of Commerce may prohibit such deterrent methods, after notice and opportunity for public comment, through regulation under this Act."²⁹ The responsibility for analyzing fishing activities for negative impacts falls to NOAA, who can make changes under the NMSA.³⁸ If seal bombs present issues, "NOAA would consult with the State, PFMC and NMFS as well as the industry to determine an appropriate course of action."²⁰

Many California fishermen claim that the use of seal bombs is economically necessary, as without them, they would lose a lot of fish and gear to pinnipeds. Larry Collins, the president of the San Francisco Crab Boat Owner's Association, however, explained that when seal bombs are used, the seals "swim away, and they swim right back. It's probably more effective to throw raw potatoes at them."¹¹ Other than the California squid fishery, most other Californian fisheries do not use seal bombs. Due to the known adverse effects and the difficulties in effectually modifying or regulating their use, seal bombs were prohibited from use in the eastern tropical Pacific yellowfin tuna purse seine fishery (although these bombs were larger than the ones currently used in California).³⁹

As with the overall uncertainty regarding the marine impacts of seal bombs in California, there is no way to objectively examine the overall economic impacts of seal bombs, since there is

insufficient supporting evidence on the potential losses to fishermen. An argument could be made that even if seal bombs provide a net economic benefit to fishermen, the damage inflicted on the marine environment does not justify their use; there is simply a lack of robust and consistent data with which to make any meaningful economic assessment at all.

Given the weak and uncertain regulatory environment, the authors recommend that the state and federal agencies tasked with monitoring and enforcing the use of seal bombs in California immediately review their policies and invest more resources in researching and creating dialogue around this issue. There is the potential that seal bombs pose a significant threat to marine life in California, both due to risk of direct injury from the blasts and the high level of acoustic pollution they generate.

Due to the potential unintended consequences of such a policy change, it is important that the state and federal agencies also review any likely changes in fishery practices that might accompany limits or a ban on the use of seal bombs. It is possible that fishers might resort to other practices that also have negative environmental impacts, or that they have ideas for improvements that could diminish environmental impacts. Fishers should be brought into the conversation from the beginning so that any regulatory changes produce sustainable outcomes.

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- ¹⁸ “Marine Mammals and Noise: A Sound Approach to Research and Management.” Marine Mammal Commission. March 2007. Accessed March 4, 2018. <https://www.mmc.gov/wp-content/uploads/fullsoundreport.pdf>.
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- ²⁰ National Oceanic and Atmospheric Administration, Department of Commerce. Final Rule. “Monterey Bay National Marine Sanctuary Regulations, Part III: 15 CFR Chapter IX, Subchapters A and B and Part 944.” Federal Register 57, no.182 (September 18, 1992): RIN 0648-AC63. https://nmssanctuaries.blob.core.windows.net/sanctuaries-prod/media/archive/management/fr/57_fr_43309.pdf.
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- ²² Grady, Katherine. ‘Seal Bombs Information’. Email, 2018.
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- ²⁴ Anna Krumpel (formerly Meyer-Loebbecke) (Visiting PhD student at Scripps Acoustic Ecology Laboratory), interviewed by Aimee Kerr in Monterey, February 23, 2018.
- ²⁵ “Potential Deterrence Methods for Pacific Harbor Seals, California Sea Lions & Eastern U.S. Stock Steller Sea Lions.” NOAA Fisheries West Coast Region. November 2015. Accessed February 18, 2018. http://www.westcoast.fisheries.noaa.gov/publications/protected_species/marine_mammals/pinnipeds/sea_lion_removals/112515_potential_deterrence_methods.pdf.
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- ³⁴ Melanie Parker (California Department of Fish and Wildlife), interviewed by Aimee Kerr at the CDFW Marine Region Main Office in Monterey, March 2, 2018.
- ³⁵ Adame, Peter. ‘Seal Bombs and Seafood Watch’. Email, 2018.
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Marine Stewardship Council. Accessed February 22, 2018. <https://www.msc.org/documents/scheme-documents/fisheries-certification-scheme-documents/fisheries-certification-requirements-version-2.0>.

³⁷ Gummery, Matt. 'Information on Seal Bombs'. Email, 2018.

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³⁹ National Marine Fisheries Service, National Oceanic and Atmospheric Administration, Department of Commerce. Proposed Rule. "Taking and Importing of Marine Mammals; Deterrence Regulations and Guidelines, Part 216: 50 CFR." Federal Register 60, no.87 (May 5, 1995): RIN 0648-AH19. <http://www.westcoast.fisheries.noaa.gov/publications/frn/1995/60fr22345.pdf>.

Fishing with Explosives: The Impact and Legality of Seal Bombs in California's Coastal Pelagic Species Fisheries

White Paper by Leah Davis, Oceana Research Intern

August 2018

Executive Summary

This report provides an analysis of the scientific and legal background of the use of seal bombs in California's Coastal Pelagic Species (CPS) fisheries.¹ A seal bomb is a small explosive device deployed as an acoustic deterrent against pinnipeds (seals, sea lions and walruses).¹ These devices are used in CPS fisheries to prevent sea lion entanglement and depredation of catch, particularly in the market squid, northern anchovy, and pacific sardine fisheries.

While seal bombs assist fishermen in these efforts, they also add anthropogenic noise to the ocean's soundscape. Marine mammals rely on sound for a variety of essential behaviors from reproduction to foraging.² Anthropogenic noise can affect an animal's ability to execute these behaviors effectively, resulting in harmful implications for an individual and potentially entire populations.³ Despite the potential adverse effects of anthropogenic noise, various acoustic deterrents, including seal bombs, are commonly used off the U.S. west coast to deter pinnipeds from fishing operations.

In California, seal bombs are particularly common within the northern anchovy, pacific sardine and market squid fisheries in Monterey Bay and surrounding the Channel Islands in Southern California.⁴ Seal bombs are highly prevalent in these fisheries and are often used as an integral part of the fishing method both to prevent bycatch mortality of sea lions and to prevent losses in catch. For example, data recorded by sixteen High-Frequency Recording Packages (HARPs) shows up to 37,500 seal bomb explosions occurring in just one month off Southern California.⁵

Seal bombs, often compared to cherry bombs and M80s,⁶ produce a source level explosion of 205 (dB re 1 μ Pa @ 1 m).⁷ This noise level is loud enough to cause permanent hearing loss to high-frequency cetaceans at the detonation site,⁸ and temporary hearing loss and behavior changes, including changes in feeding and migration patterns, from those farther away. While the devices are targeted toward pinnipeds, seal bomb explosions may additionally affect feeding and migration patterns of protected cetaceans along California's coast, potentially causing population level effects. Cetaceans of particular concern include humpback whales, harbor porpoises, and Risso's dolphins,

¹ Bland, A. (2017). California Fishermen are Throwing Explosives at Sea Lions. *Hakai Magazine*.

² Forney, K. A., Southall, B. L., Slooten, E., Dawson, S., Read, A. J., Baird, R. W., & Jr., R. L. B. (2017). Nowhere to go: noise impact assessments for marine mammal populations with high site fidelity *Endangered Species Research*, 32, 391-413. at 392.

³ Forney, K. A., Southall, B. L., Slooten, E., Dawson, S., Read, A. J., Baird, R. W., & Jr., R. L. B. (2017). Nowhere to go: noise impact assessments for marine mammal populations with high site fidelity *Endangered Species Research*, 32, 391-413.

⁴ Meyer-Loebbecke, A., Debich, A. J., Širović, A., Trickey, J. S., Roch, M. A., Carretta, J. V., . . . Baumann-Pickering, S. (2016). Noise from explosive deterrents used by California fisheries and possible effects on marine life. In Scripps Institution of Oceanography (Ed.).

⁵ Meyer-Loebbecke, A., Debich, A. J., Širović, A., Trickey, J. S., Roch, M. A., Carretta, J. V., . . . Baumann-Pickering, S. (2016). Noise from explosive deterrents used by California fisheries and possible effects on marine life. In Scripps Institution of Oceanography (Ed.).

⁶ Jefferson, T. A., & Curry, B. E. (1996). Acoustic methods of reducing or eliminating marine mammal-fishery interactions: do they work? *Ocean and Coastal Management*, 31(1), 41-70. at 52.

⁷ Hildebrand, J. A. (2009). Anthropogenic and natural sources of ambient noise in the ocean. *Marine Ecology Progress Series*, 395, 5-20. doi:10.3354/meps08353

⁸ Finneran, J. (2016). *Auditory Weighting Functions and TTS/PTS Exposure Functions for Marine Mammals Exposed to Underwater Noise. Technical Report 3026*. Retrieved from San Deigo, CA: <http://www.dtic.mil/dtic/tr/fulltext/u2/1026445.pdf> at 46.

Management entities including the Monterey Bay National Marine Sanctuary and National Marine Fisheries Service (NMFS) Protected Resources have acknowledged these potential impacts and recommended further research focused on the seal bomb issue. This report summarizes the available evidence of potential impacts of seal bombs on target and non-target marine mammals.

The seal bomb issue is a complex problem with potential solutions at a variety of scales and differing timelines. This report evaluates and assesses the following potential management solutions:

1. Implement restrictions on seal bomb use.
2. Increase monitoring of seal bomb use for California's Coastal Pelagic Species Fisheries with onboard observers or electronic monitoring (i.e., video).
3. Increase seal bomb enforcement efforts under existing laws.
4. Establish federal regulations for the use of marine mammal deterrents.
5. Reduce the knowledge gap surrounding the use and impacts of seal bombs.

The findings in this report are limited by the availability of information regarding physiological and behavioral impacts of seal bombs on protected species off California. The recommendations are accordingly based on a precautionary approach to potential impacts to marine mammals. Much of the research that would further inform a course of action is underway and expected to be available within the next year.

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October 24, 2024

Commissioners Sklar and Murray
California Fish and Game Commission
Marine Resource Committee
P.O. Box 944209
Sacramento, CA 94244-2090

[via Electronic Mail to FGC@fgc.ca.gov]

RE: Market Squid Fishery Management and Fishery Management Plan (FMP) Review, MRC November 2024 meeting agenda item #4

Dear Co-Chairs Sklar and Murray:

Ocean Conservancy¹ offers the following comments regarding recommendations provided to the Marine Resources Committee (MRC) at its meeting in July 2024 by the Department of Fish and Wildlife (CDFW, or Department).²

Ocean Conservancy served as an appointed conservation representative on the Squid Fishery Advisory Committee (SFAC) with a particular interest in improved management of this most economically and ecologically important species. California market squid support a top California fishery by volume and value,³ serve as important forage for an array of marine wildlife,⁴ and are highly susceptible to changes in ocean conditions which are expected to increase.⁵

¹ Ocean Conservancy is working with you to protect the ocean from today's greatest global challenges. Together, we create evidence-based solutions for a healthy ocean and the wildlife and communities that depend on it.

² Staff Summary for July 17-18, 2024, Marine Resources Committee - Item 5
<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=224074&inline>

³ Enhanced Status Report, Market Squid. California Department of Fish & Wildlife 2024.
<https://marinespecies.wildlife.ca.gov/market-squid/the-fishery/>

⁴ Justin J Suca, Jarrod A Santora, John C Field, K Alexandra Curtis, Barbara A Muhling, Megan A Cimino, Elliott L Hazen, Steven J Bograd, Temperature and upwelling dynamics drive market squid (*Doryteuthis opalescens*) distribution and abundance in the California Current, *ICES Journal of Marine Science*, Volume 79, Issue 9, November 2022, Pages 2489–2509, <https://doi.org/10.1093/icesjms/fsac186>

⁵ IPCC Special Report on the Ocean and Cryosphere in a Changing Climate, Chapter 5.2.2.2, available at <https://www.ipcc.ch/srocc/chapter/chapter-5/> Accessed October 8, 2024.

1. Sustainable Squid Catches: Extend Weekend Closures and Prioritize Real-time Management

Managers do not know the abundance of the squid population and cannot confirm that fishing rates are sustainable.⁶ Squid catch levels are currently managed under the existing Fishery Management Plan (FMP) adopted in 2005 in two primary ways: (1) a total allowable catch of 118,000 tons, and (2) a time-closure prohibiting squid fishing during specified weekend hours. These basic controls were meant to serve as a proxy for achieving maximum sustained yield,⁷ but they do not support timely management decisions based on data about stock health and relevant ocean conditions.

The 118,000-ton harvest cap itself no longer appears applicable to current trends in the fishery discussed by the SFAC including recent catch history and available processing capacity. SFAC discussions indicated weekend time closures established with the 2005 FMP represent the only truly operational mechanism promoting sustainability of squid harvest. We therefore urge the MRC to recommend extended weekend closures at least as long as recommended by CDFW to provide additional uninterrupted squid spawning. Time closures show benefits to squid reproductivity according to data shared with the SFAC but should be viewed as interim measures contributing some protection pending more precise and updated means of linking squid management with observed stock health indicators.

Harvest control rules that link monitoring of stock health and ocean condition data to management measures are an important feature in recently adopted management plans for the California spiny lobster⁸ and pink shrimp⁹ fisheries, and an important element of fulfilling the active management vision of the Marine Life Management Act Master Plan.¹⁰ They also offer special value in managing a highly conditions-dependent stock undergoing visible climate-driven changes and expected to experience more change. Current monitoring of the squid fishery to estimate egg escapement as a measure of whether sufficient squid spawning biomass escapes harvest can help evaluate management performance and detect problems after the fact. But it falls short of the real-time data needed to support responsive, timely management. As indicated by the 2003 Marine Stewardship Council Fishery Assessment Report that led to the fishery's conditional certification, this monitoring protocol "is not intended as a real-time

⁶ NOAA Fisheries Species Directory, California Market Squid, available at <https://www.fisheries.noaa.gov/species/california-market-squid>

⁷ Current and Past Management: Enhanced Status Report, Market Squid. California Department of Fish & Wildlife 2024. <https://marinespecies.wildlife.ca.gov/market-squid/the-fishery/>

⁸ Overview of Rationale for Current Management, California Spiny Lobster Enhanced Status Report, CDFW 2019. <https://marinespecies.wildlife.ca.gov/california-spiny-lobster/management/>

⁹ Past and Current Management, California Pink Shrimp Enhanced Status Report, CDFW 2023. [https://marinespecies.wildlife.ca.gov/pink-\(ocean\)-shrimp/management/](https://marinespecies.wildlife.ca.gov/pink-(ocean)-shrimp/management/)

¹⁰ The MLMA envisions demonstrating sustainability of fisheries on an ongoing basis rather than assuming management success absent visible declines. See <https://wildlife.ca.gov/Conservation/Marine/MLMA/Master-Plan/Harvest-Control-Rules>

management tool to regulate annual harvest...” and “is not appropriate and effective in achieving the exploitation levels required by the [fishery’s control measures].”¹¹

Notably, the Department has actively and successfully begun exploring techniques to assess fishery and ocean condition indicators able to inform management action for “data-limited” stocks where formal stock assessments are infeasible or unattainable. In the case of squid, CDFW is working successfully with modelling and assessment experts to supply harvest planning and management information by analyzing available data sources—including collaborative data produced by fishery participants and interests. We urge the MRC to recommend CDFW prioritize the rapid implementation of these techniques once finalized to modernize squid fishery management and secure sustainable squid management into the future.

2. Habitat and Gear: Require Use of Riblines and Rope Purse Lines

The SFAC was presented compelling CDFW data indicating that contact by squid nets on seabed habitat and squid egg beds occurs during shallow squid fishing. Consistent with the need to minimize a fishery’s impact on habitat—and in this case a potentially significant impact on spawning success—CDFW recommends requiring use of gear modifications innovated by and currently used by many California squid fishermen: a ribline to control the extent of bottom habitat impact when fishing gear contacts the seafloor, and ropes—rather than metal cables—to serve as purse lines.

Ocean Conservancy strongly supports this recommendation, and urges requiring use of this gear as soon as practical. The recommendation received substantial support from the squid fleet and is consistent with requirements established by the State of Oregon in establishing a squid fishery there. We recognize that acquiring, maintaining and repairing squid nets is an ongoing part of participation in the squid fishery and poses a significant cost. Nevertheless, to ensure timely and effective reduction in habitat impacts from squid fishing, we urge the Commission to establish a near-term requirement to employ rib lines and rope purse lines in California’s squid fishery.

3. Squid Lights and Sensitive Wildlife Protection: Enforce Regulations and Enact Time-Area Measures

The effects of powerful lights used by the squid fishery to attract and aggregate squid have been discussed before the Commission in several proceedings over the years. A requirement to utilize shields to direct illumination toward the sea surface currently exists. CDFW has reported uneven compliance with this requirement concentrated in 1-2 ports, which we request be addressed by the Law Enforcement Division as soon as possible. There is also uncertainty

¹¹ SCS Global Services, inc. *California Market Squid MSC Fishery Assessment, Public Certification Report*, August 2023. P 295.

among enforcement and fishing participants as to which lamp configurations meet the requirements due to imprecise language and interpretations of whether light shields must extend to the lamp filament itself versus the outer edge of the lamp bulb. We urge this uncertainty be addressed in amended regulations and/or FMP amendments to increase compliance and improve negative interactions between squid fishing and wildlife.

We also urge the Commission to recognize the limitations of existing light-shielding regulations in controlling light impacts. The fact remains that these lights can affect the natural patterns of light and darkness that, for sensitive species such as nocturnal seabirds, serve as habitat required for successful feeding and breeding. Rough seas routinely cause light to spread from its intended path; incomplete compliance likewise may reduce the effectiveness of light shields on sensitive wildlife and habitats. State and Federal agencies continue work to recover and protect sensitive nocturnal seabirds and their habitat¹² at protected public land areas bordering State waters and within active squid fishing grounds, and fishery measures should align with the important investments.

During and subsequent to SFAC meetings, seabird experts proposed measures to set aside key areas and times at Channel Islands National Park critical to threatened seabird recovery from lighted, nighttime squid fishing, refined to minimize overlap with periods of high value squid harvest. Ocean Conservancy urges the Commission to consider the input of these experts and enact reasonable time-area closures to aid public investment in recovery of imperiled wildlife affected by night lighting in the squid fishery.

4. Consideration of Small-Scale Fishery Access

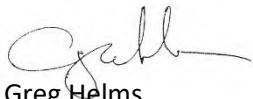
Access to the market squid resource beyond traditional fishing grounds and by fishers outside the squid restricted access program is another topic discussed by the Commission over the years. Ocean Conservancy is supportive of a means of affording community-based harvest of periodically available squid to serve fresh, local markets in a way and of an amount that does not confound existing management or fleet dynamics. We unfortunately do not believe a proposal meeting these goals emerged during intensive discussions of the topic at the SFAC. We support the Experimental Fishing Permit (EFP) pathway recommended by the Department for exploring small-scale squid fishery opportunities. This option recognizes that existing squid restricted access permittees have historically and currently do harvest commercial quantities of market squid that appear outside focal areas of historic squid fishing, and that proposals offered by small-scale squid fishery advocates would target unduly large squid volumes for export to the same global markets served by the existing fishery. Ultimately, we hope the EFP option recommended by the Department can help identify a fresh market, community-based option for small-scale squid harvest that does not compete with existing harvesters or add to management complexity and risk.

¹² https://pacificseabirdgroup.org/wp-content/uploads/2023/04/SCMUGUMU_2022_tech_report_03Feb23.pdf

Conclusion

SFAC completed a thorough and broad-based review of the valuable and ecologically important market squid fishery, producing important recommendations for improved fishery performance. We recommend timely adoption of ribline and purse rope recommendations to protect seabed habitat and squid egg beds and extended weekend closures to aid precaution while more refined management procedures are made available. We urge the Commission adopt time-area restrictions on nighttime squid fishing to advance recovery of sensitive bird nesting sites. Finally, we support the use of EFP proposals to explore the goal of small-scale community fishers serving fresh, local seafood markets.

Sincerely,



Greg Helms
Manager, Fish Conservation Program
Ocean Conservancy
(805) 886-8645

Cc:

Katie Grady, CDFW
John Ugoretz, CDFW

From: Dennis Arguelles <[REDACTED]>
Sent: Monday, September 30, 2024 08:33 AM
To: FGC <FGC@fgc.ca.gov>
Subject: Support for Increased Protections for Scripps's Murrelet

Dear Fish and Game Commission,

Attached please find our letter supporting increased protections for the threatened Scripps's Murrelet in and around the waters of Channel Islands National Park.

Thank you.



Dennis G. Arguelles

Southern California Director | National Parks Conservation Association

[REDACTED] | [REDACTED] | npca.org

Your parks. Your turn.



September 25, 2024

Melissa Miller-Henson, Executive Director
California Fish and Game Commission
715 P Street, 16th Floor
Sacramento, CA 95814

Dear Director Bonham,

Since 1919, the National Parks Conservation Association (“NPCA”) has been the leading voice of the American people in protecting and enhancing our National Park System. On behalf of our more than 1.3 million members and supporters nationwide, I would like to express our support for proposed actions *presented during the Squid Fishing Advisory Committee meetings* **to protect the breeding/nesting/fledging grounds of the Scripps’s Murrelet, a State-threatened species.**

Specifically, **we support the closure of night-time fishing and the use of artificial lights around Santa Barbara, Anacapa, and San Miguel Islands for a distance 6 nautical miles seaward (within the boundaries of Channel Islands National Marine Sanctuary) during the months of February thru October annually to provide habitat protection for the breeding State-listed (Threatened) Scripps’s murrelet.**

We understand the impact to the commercial fishery to be negligible, as these closures coincide with the least active period for the fishery.

The Scripps’s murrelet only breeds on islands off California and Mexico. **Channel Islands National Park contains 80% of the U.S. breeding population** and primary nesting locations include Santa Barbara, Anacapa, and San Miguel Islands. Santa Barbara Island has the largest Scripps's murrelet colony in the United States, and possibly the world. **The Scripps’s murrelet breeding grounds within the park represent the only protected colonies on the West Coast of the U.S.**

Ample research supports the impacts of human disturbances on the mortality of the species, including a 2000 study that categorized “attraction to bright lights from vessels and platforms at sea” as among the greatest threats¹. The study found that “extremely bright sources of light, especially on offshore oil platforms and squid fishing boats, undoubtedly attract murrelets and may result in mortality.”

¹ Carter, Harry R., Darrell L. Whitworth , John Y. Takekawa , Thomas W. Keeney , and Paul R. Kelly 2002. At-sea threats to Xantus’ murrelets (*Synthliboramphus hypoleucus*) in the Southern California Bight.

Our national parks help to conserve some of our country's most prized marine and island natural resources. These parks protect key habitat for thousands of species, preserve our nation's maritime and cultural heritage, provide countless educational and scientific research opportunities and are critically important to the health of ocean ecosystems throughout the country. In particular, Channel Islands National Park's isolation over thousands of years has created a unique ecosystem found nowhere else on Earth and helps preserve a place where visitors can experience coastal southern California as it once was.

We urge you to adopt these proposed protections to ensure the protection of a critical species and the preservation of the greater Channel Islands National Park ecosystem.

Thank you for your consideration of these comments.

Sincerely,

A handwritten signature in black ink, appearing to read "Dennis G. Arguelles", with a long horizontal flourish extending to the right.

Dennis G. Arguelles
Southern California Director

CC:

From: Lindsay Adrean <[REDACTED]>

Sent: Monday, September 30, 2024 02:26 PM

To: FGC <FGC@fgc.ca.gov>

Cc: Ugoretz, John@Wildlife <[REDACTED]>; Grady,
Katherine(Katie)@Wildlife <[REDACTED]>

Subject: Squid Fishery Management comments

Hello California Fish and Game Commission,

Attached you will find comments from the Pacific Seabird Group regarding the Squid Fishery Management Review.

Thank you for your consideration,

--

Lindsay Adrean

Vice-Chair for Conservation

Pacific Seabird Group



Juliet Lamb

PSG 2024 Meeting Chair
Chair@pacificseabirdgroup.org

Dan Barton

PSG 2024 Meeting Chair-Elect and Scientific Program Chair
Programchair@pacificseabirdgroup.org

Richard Veit

PSG 2024 Meeting Past Chair and Awards Committee Chair
Pastchair@pacificseabirds.org

September 30, 2024

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

To: California Fish and Game Commission and the Marine Resources Committee

Subject: Market Squid Fishery Management Review: Seabird Protection within Channel Islands National Park and Channel Islands National Marine Sanctuary.

The Pacific Seabird Group supports the option developed during the Squid Fishery Management Review process to enact a seasonal prohibition of night-time fishing around Santa Barbara, Anacapa, and San Miguel Islands to protect the breeding grounds of the Scripps's Murrelet. As detailed below, the use of high intensity lighting during night squid fishing poses a distinct threat to this threatened nocturnal bird which relies on natural patterns of light and dark for essential breeding and rearing functions. California Fish and Game Commission has this rare opportunity to both maintain an economically sustainable squid fishery while protecting the natural diversity and abundance of marine life, and the structure, function and integrity of marine ecosystems.

The Pacific Seabird Group (PSG) is a society of professional seabird researchers and managers dedicated to the study and conservation of seabirds. PSG was formed in 1972 out of a need for increased communication among academic and government seabird researchers.

The principal goals of PSG are (1) to increase the quality and quantity of seabird research through facilitating exchange of information and (2) to identify and assess the importance of threats to seabird populations and provide government agencies and others with expert advice on managing the threats and populations.

Over the past year members of PSG have been in consultation with one of the members of the Squid Fishery Advisory Committee (SFAC). It is our understanding that a proposal was presented to the SFAC that called for the closure of night-time fishing within the Channel Islands National Park and Sanctuary.

We support this proposal for the following reasons:

1. The Scripps's murrelet is a State-listed threatened species. Eighty percent (80%) of the United States population nests within Channel Islands National Park. The primary nesting locations are Santa Barbara, Anacapa, and San Miguel Islands. Santa Barbara Island has the largest Scripps's murrelet colony in the United States, and possibly the world.
2. The National Park Service continues to invest significantly in protecting the Scripps's murrelet by eradicating invasive predators like the black rat, restoring nesting habitat on Santa Barbara and Anacapa islands, conducting seabird monitoring and reducing island-based lighting during nesting season. Partner agencies must contribute protections of their own also.
3. The Scripps's murrelet is a nocturnal seabird. Artificial lights at night cause high mortality of nocturnal seabirds, one of the most endangered groups of birds globally. There are two primary causes of mortality: 1) Fledglings of burrow-nesting seabirds, and to a lesser extent adults, are attracted to and then grounded (i.e., forced to land) by lights when they fly at night. 2) Increased predation by predatory birds (including barn owls and gulls) (Rodríguez et al. 2019). The Commission has taken action to require shielding around the high-powered lights used in the fishery, however these actions do not prevent the scattering of artificial lights, especially during periods of fog and varied sea-state. Shielding, even when the shields extend beyond the tip of the bulb, doesn't prevent the reflection and scattering of horizontally.
4. The proposed closure would have little to no effect on the squid fishery. The vast majority of commercial fishing occurs in California, traditionally in shallow waters, less than 70 m, and focuses on spawning adults (Zeidberg et al., 2006). The locations that have yielded the largest tonnage are near the islands of Santa Cruz, Santa Rosa, and Santa Catalina, and just offshore of Port Hueneme and Monterey. A significant amount of catch occurs within the boundaries of Channel Islands National Park and Channel Islands National Marine Sanctuary. Vessel participation is greatest during the late fall and early winter for southern California (Zeidberg et al. 2006). The southern portion of the fishery encompasses most of the Southern California Bight including the northern and southern Channel Islands southward along the coast to La Jolla and is most active from October to February. During this time there is less stratification of the water column and more mixing due to winter storms and colder air temperatures (Zeidberg et al. 2006). Current harvest information provided by the Department continues to reinforce the height of the season around the Channel Islands. The closure as called for:
 - a. Only prohibits night-time fishing and the use of artificial lights around Santa Barbara, Anacapa, and San Miguel Islands. The critical period necessary to protect the breeding/nesting/fledgling period of the State-listed threatened Scripps's Murrelet is February through October.
 - i. The prohibition would be in place (February through October) outside of the highest season of market squid harvest (late fall through early winter).

- b. It does not prohibit daytime fishing around Santa Barbara, Anacapa, and San Miguel Islands.
- c. The proposal does not call for prohibiting or restricting the fishery around Santa Cruz and Santa Rosa Islands where landings are the greatest.

Additionally, we have reviewed a draft version of a management plan for Synthliboramphus Murrelets currently in the final stages of preparation for publication by the Channel Islands National Park, California Institute of Environmental Studies, and other partners. This plan is the most comprehensive existing review of the threats to Scripps Murrelets and contains the same recommendations that we are supporting above.

In closing, we want to thank the Commission for actions they have taken to protect and manage California's marine ecosystems with the creation of marine protected areas and special closures. However, when it comes to protecting the Scripps's murrelet not enough has been done to protect this State-listed threatened species. In 2004, the Commission prohibited the take of market squid for commercial purposes using attracting lights in all waters of the Gulf of the Farallones National Marine Sanctuary. This regulation also applies to vessels pursuing squid for live bait purposes. It's time to do the same on a more limited basis to protect the State-listed threatened Scripps's murrelet within an area that we as American's set aside for future generations – Channel Islands National Park and Channel Islands National Marine Sanctuary.

Sincerely,

Lindsay Adrean
PSG 2024 Vice Chair for Conservation
conservation@pacificseabirdgroup.org



Update: Regulation Change Considerations for Barred Sand Bass

7 November 2024

Presented to:

Marine Resources Committee
CA Fish and Game Commission

Presented by:

Armand Barilotti
Environmental Scientist
CDFW Marine Region



Life History

- Barred sand bass (*Paralabrax nebulifer*, referred as BSB hereon).
- Range: southern Baja California, Mexico to Santa Cruz, California; rare north of Pt. Conception.
- Habitat: coastal rocky reef, soft bottom, and bays.
 - Preference for ecotone where reef meets soft bottom.
- Size: up to 67 cm (26.4 in) and 6 kg (13 lb).
- Mature by 27 cm (10.6 in) and 5 years old.
- Life span: up to 25 years.
- Small home range:
 - 2,682–240,000 m² (0.66 – 59 ac).
- Migrate to form spawning aggregations in summer months over soft bottom habitat.

Photo Credit M. Haggerty, CDFW

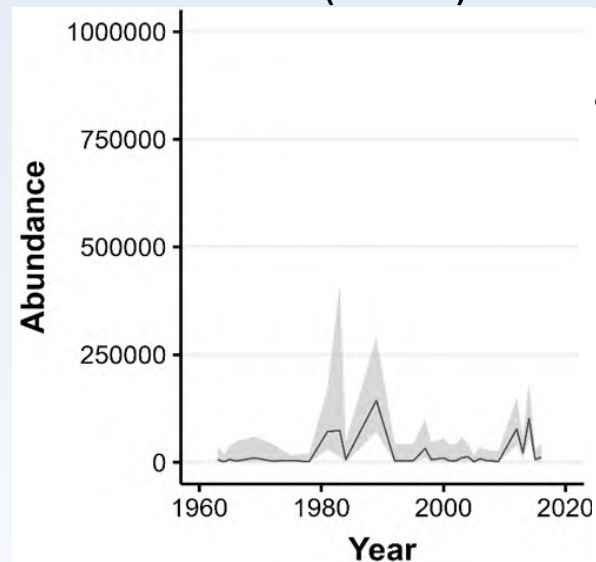




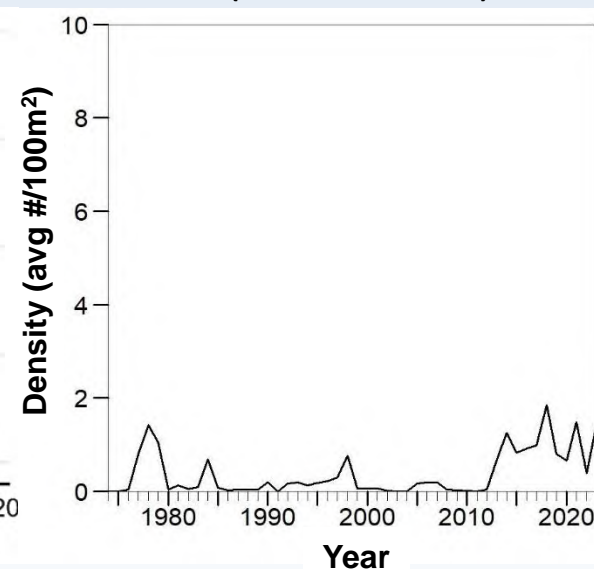
BSB Spawning and Recruitment

- Spawning peaks June through August.
- BSB show minimal annual recruitment.
- Sporadic recruitment from Mexico.
 - 4 major recruitment events in last 60 years .
 - Can occur when upwelling in northern Baja CA is interrupted during warm water years.
- Kelp Bass have higher (~6x) annual baseline recruitment.

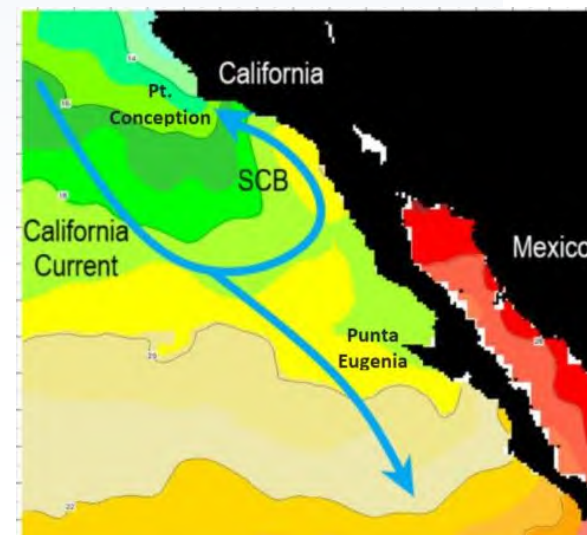
CalCOFI
(larvae)



VRG King Harbor
(BSB < 20 cm)



Jarvis Mason et al. 2024



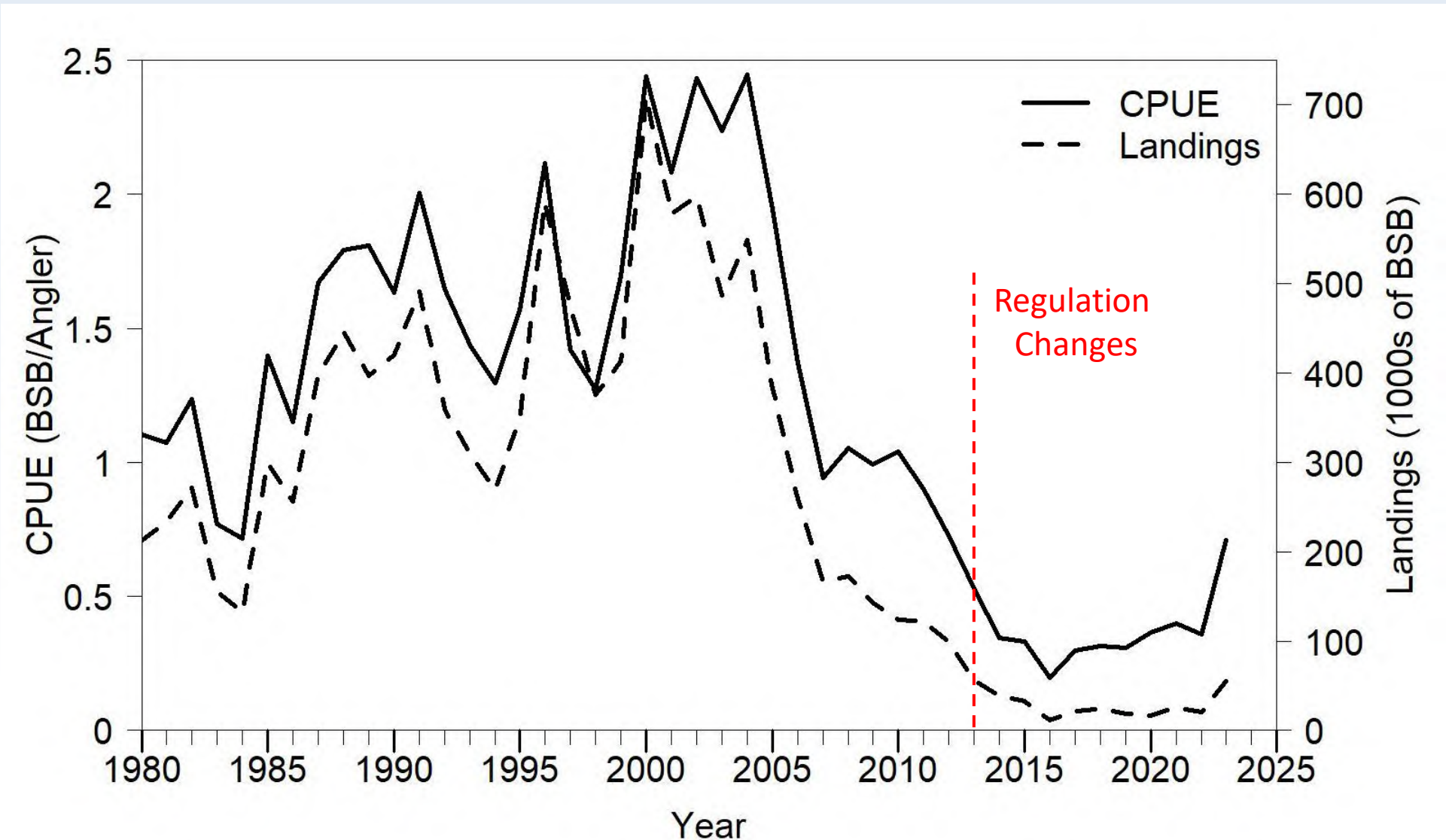


Current Bass (*Paralabrax sp.*) Regulations

- CCR, Title 14, Section 28.30. Kelp Bass, Barred Sand Bass (BSB) and Spotted Sand Bass
 - a. Minimum size: Fourteen inches total length or 10 inches alternate length.
 - b. Limit: Five in any combination of species.
- Effective March 1, 2013
 - Enacted to help protect and recover BSB & kelp bass.
 - Seasonal closure for BSB was recommended by CDFW but rejected by the Fish and Game Commission.

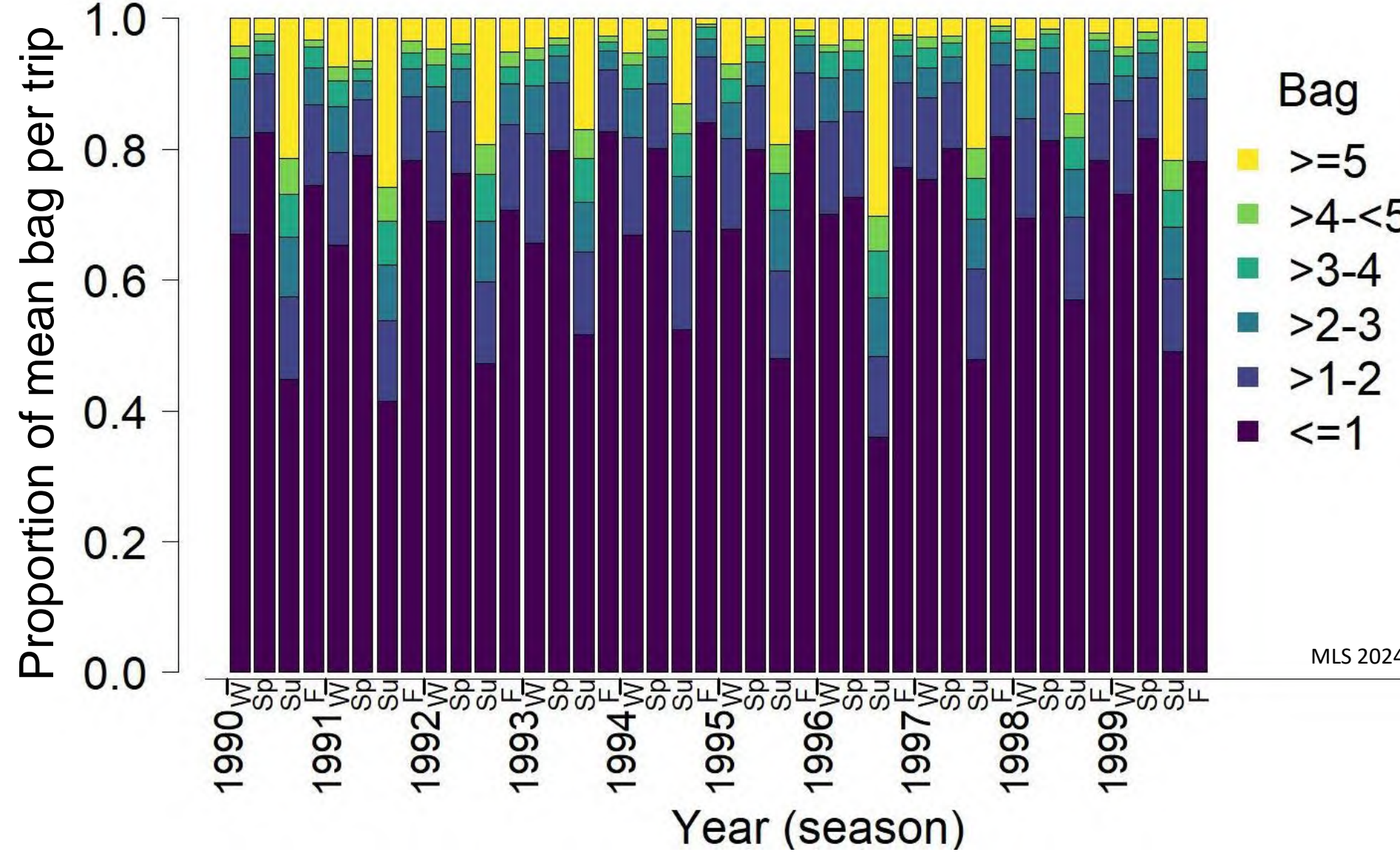


BSB CPFV Landings 1980 - 2023





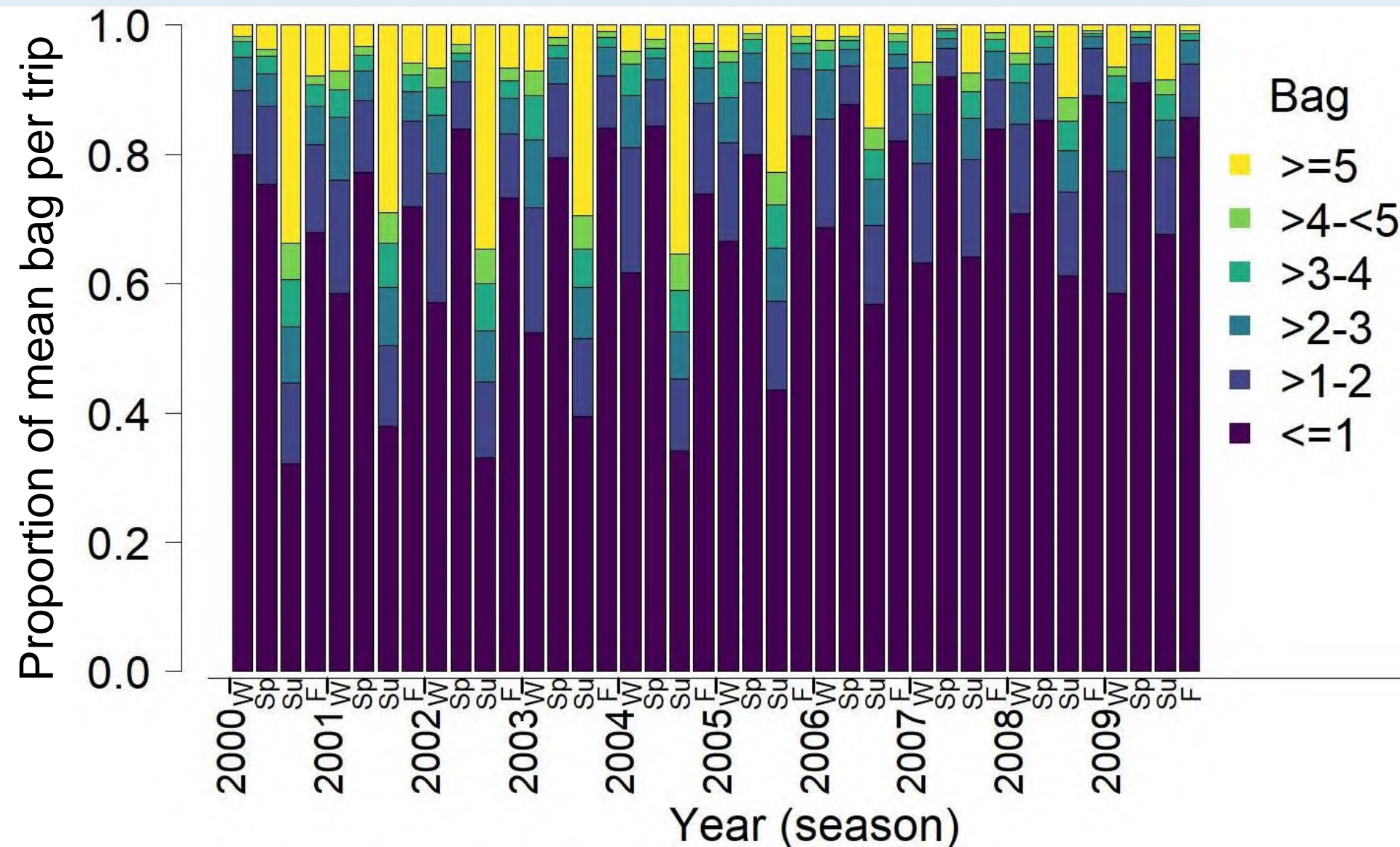
1990s Mean BSB Bag per Trip



- Bag = # BSB / # anglers
- W = Dec – Feb
- Sp = Mar – May
- Su = June – Aug
- F = Sept - Nov



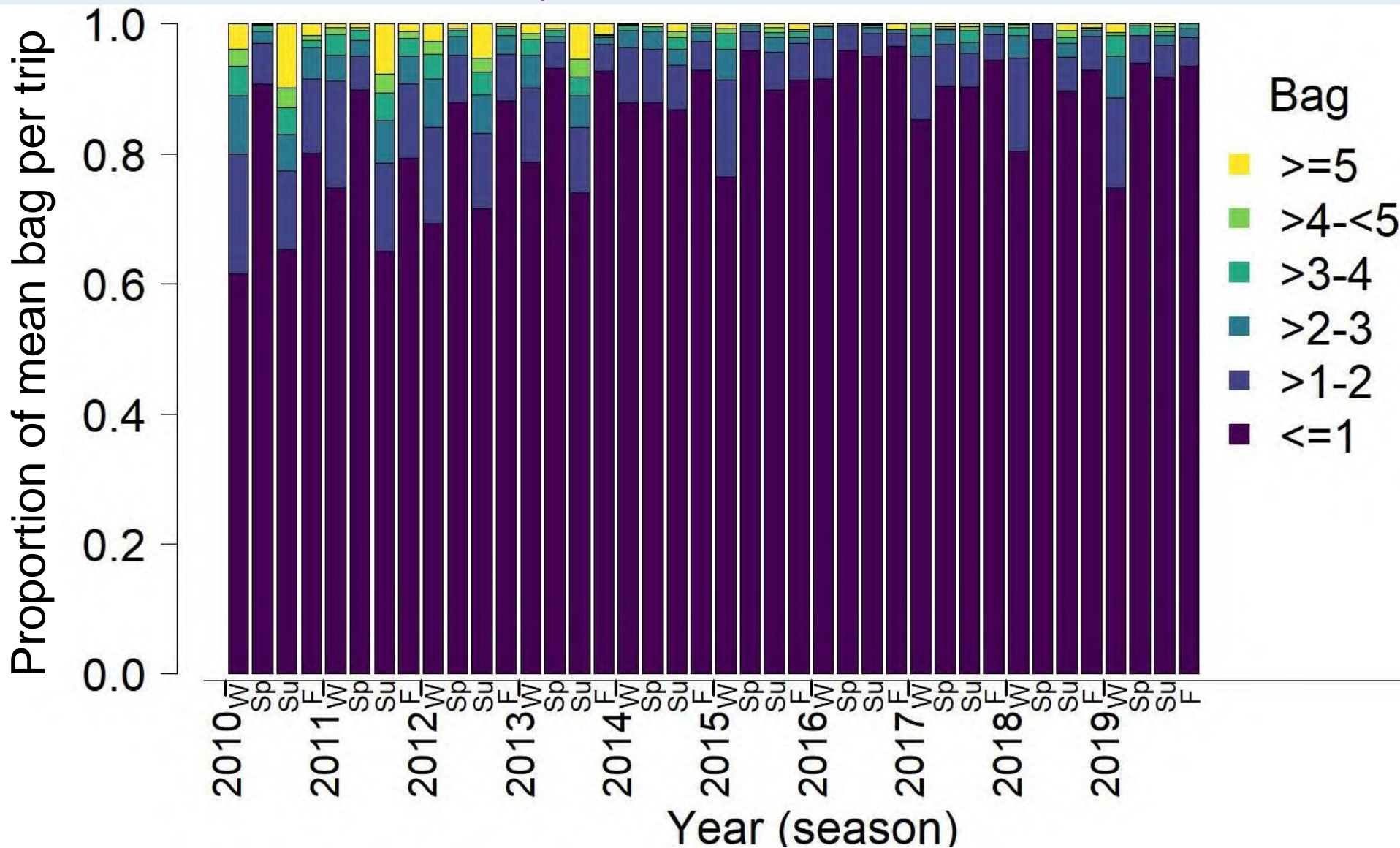
2000s Mean BSB Bag per Trip





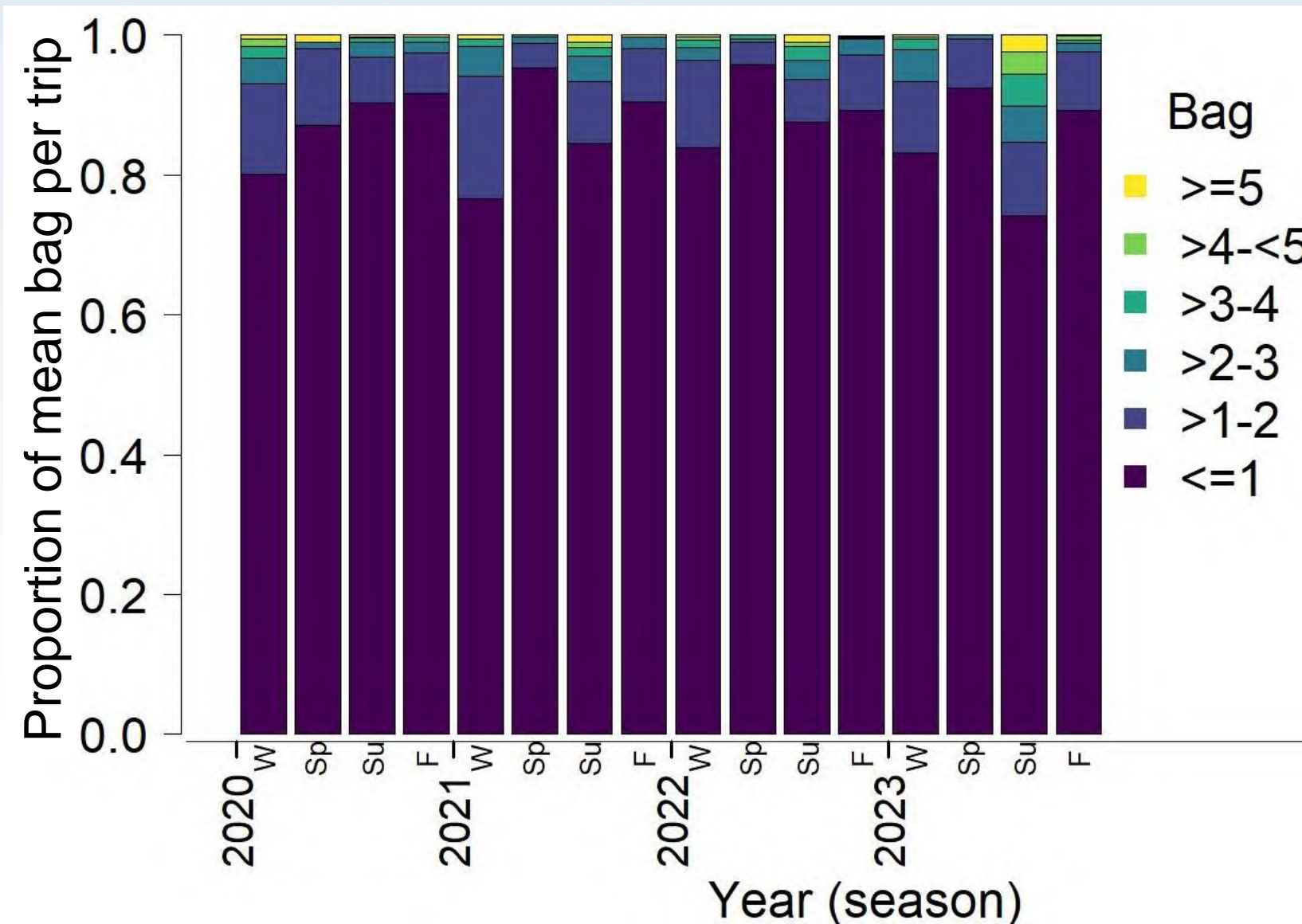
2010s Mean BSB Bag per Trip

Regulation change





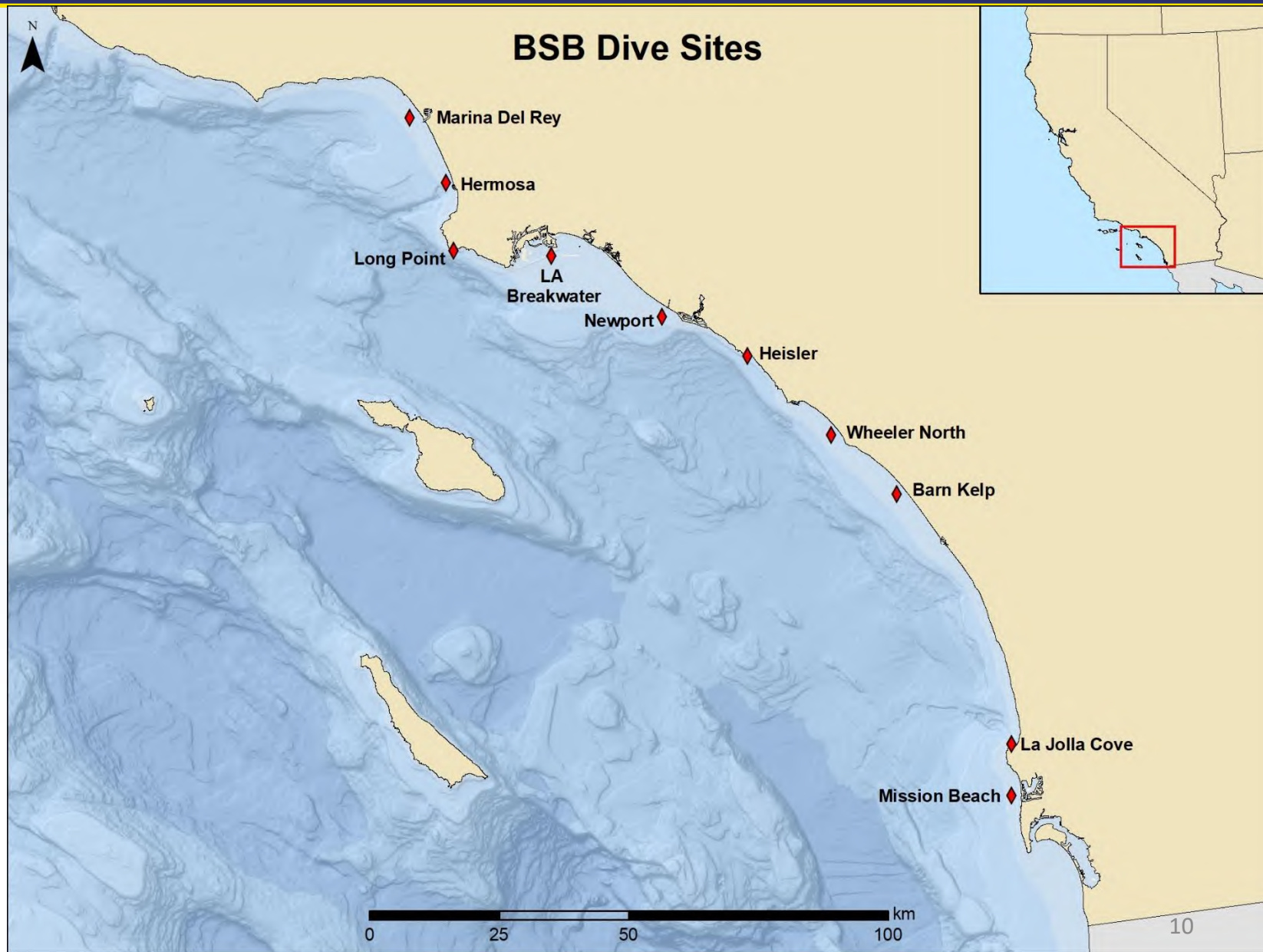
2020s Mean BSB Bag per Trip





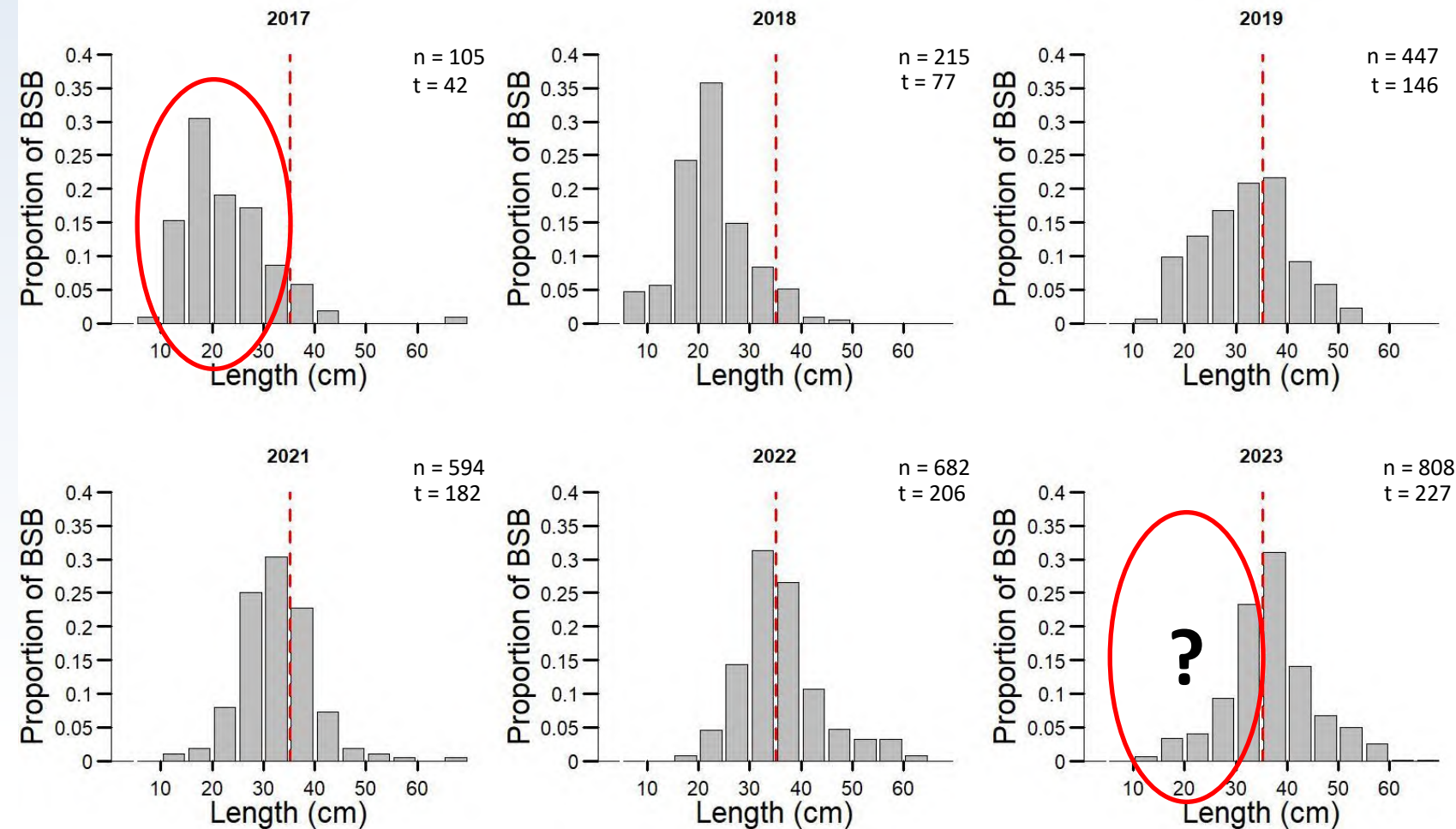
CDFW BSB Dive Surveys 2017 - 2023

- 10 sand/reef ecotone sites from San Diego to Santa Monica Bay.
 - 6 artificial reefs.
 - 4 natural reefs.
 - 3 MPAs.
- Survey Sept – Nov.
 - Sample each site monthly.
 - Minimum of 3 transects per site visit.





CDFW BSB Dive Surveys 2017 – 2023 (cont.)



- No sizeable recruitment pulse behind these legal fish as seen in previous years.
- With less recruitment, increased fishing success on these spawning aggregations is potentially unsustainable.

CDFW unpublished data 2024



Outreach

Engagement category	Stakeholder Group	Format	Date
Presentation & discussion	Fishing industry (SAC, CCA CA)	Remote	Feb. 20, 2024
Presentation & discussion	BSB Researchers	Remote	Feb. 21, 2024
Presentation & discussion	Fishing industry	Remote	Apr. 30, 2024
Tribal notification	Tribal leaders and representatives	Letter	Jul. 8, 2024
Working group meeting	Fishing industry, BSB researchers, CDFW	Hybrid	Sept. 4, 2024
Working group meeting update	Fishing industry, BSB researchers, CDFW	Remote	Oct. 7, 2024



BSB Working Group

- Goals:
 - Improve understanding of the current status of the BSB population and fishery.
 - Develop a shared understanding of the current need for a conservation measure.
 - Identify information gaps and strategies to collaborate on future data collection.
 - Support an open collaborative process (now and in the future) to share information on the species and fishery.



Potential Regulation Options

- Adopt an interim regulation for the next three years to explore more management procedures with MSE.
- Table shows potential regulation options and how they would have changed the 2023 BSB CPFV landings (55,409 BSB landed in 2023).

BSB bag limit options	% BSB saved	# BSB saved
5 year-round (no change)	0%	0
4 year-round	3.5%	1,990
3 year-round	11.2%	6,227
3 June-Aug, 5 Sept-May	10.5%	5,836
0 June-Aug, 2 Sept-May (original proposal)	76.1%	42,151



Recommendation and Next Steps

- Year-round bag limit of 4 BSB, with no more than 5 bass in combination, with a sunset of 3 years
- Notice = December 10-11, 2024
- Discussion = February 2025
- Adoption = April 2025, effective by June 1, 2025
- Continue to work with stakeholders to fill priority research gaps and develop a long-term conservation strategy that is based on best available science to protect BSB spawning aggregations.

Thank You

Armand Barilotti

Environmental Scientist

Southern California Fisheries Research
and Management Project

Department of Fish and Wildlife

Marine Region

Email: AskMarine@Wildlife.ca.gov

Enhanced Status Report:

<https://marinespecies.wildlife.ca.gov/barred-sand-bass/true/>

From: Merit McCrea <[REDACTED]>

Sent: Thursday, October 24, 2024 04:53 PM

To: FGC <FGC@fgc.ca.gov>

Cc: Ken Franke <[REDACTED]>

Subject: Fw: Written Public Comment for upcoming MRC meeting 11/6 & 7 Agenda item 5

This written public comment is intended as written comment only. I do not intend to present it on the floor at the MRC meeting (way too much).

Hopefully people will have the opportunity to take a look in the coming days.

Merit McCrea

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[REDACTED]

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[REDACTED] (UCSB, MSI)

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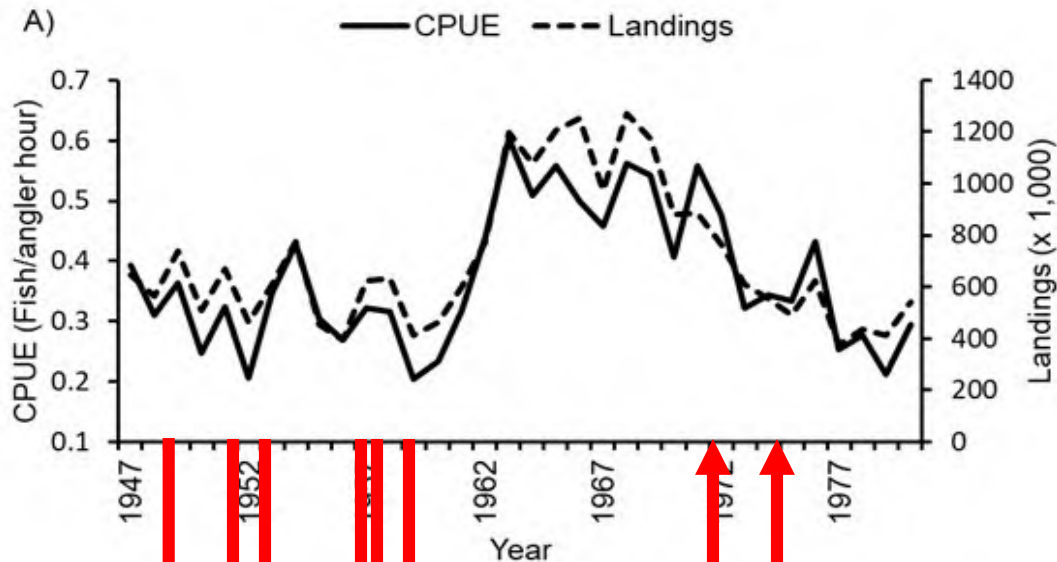
SAC supports:

- Sandbass sub-bag limit reduction to 4 sandbass within the 5-fish combined Paralabrax bass limit.
- We support a 3-year window for this interim conservation measure.
- SAC desires to support efforts to fill any gaps in scientific knowledge/data, such as trans-boundary tagging studies, life history data collection, age/size composition data and young-of-year/recruitment data)

The following slides represent our current observations

- With many skippers having experience fishing sand bass during high catch seasons in the 1980s and 1990s our common hypothesis has been Southern California is at the northern extreme of sand bass range.
- High catch seasons were predominantly a result of large masses of adult fish following foraging opportunities and immigrating concurrently with other semi-migratory species (bonito, barracuda) from farther south during warm water events.
- It seemed some portion of these immigrating sand bass would remain to populate inshore reefs following such events.
- However, we recognize this pattern has not been nearly as evident during more recent warm water events.

Catch rate and regulations



5 bass in aggregate
14-inch minimum length

CDFW data show the average released fish is 12.3 inches with the mode at 13

15 in ag

10 in ag

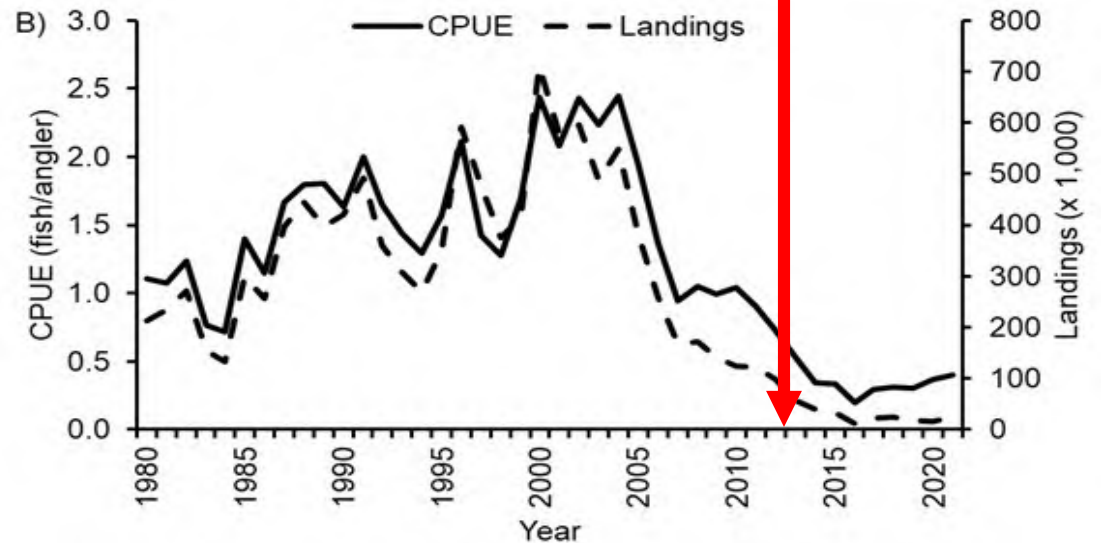
15 in ag

Rec only, 10.5in

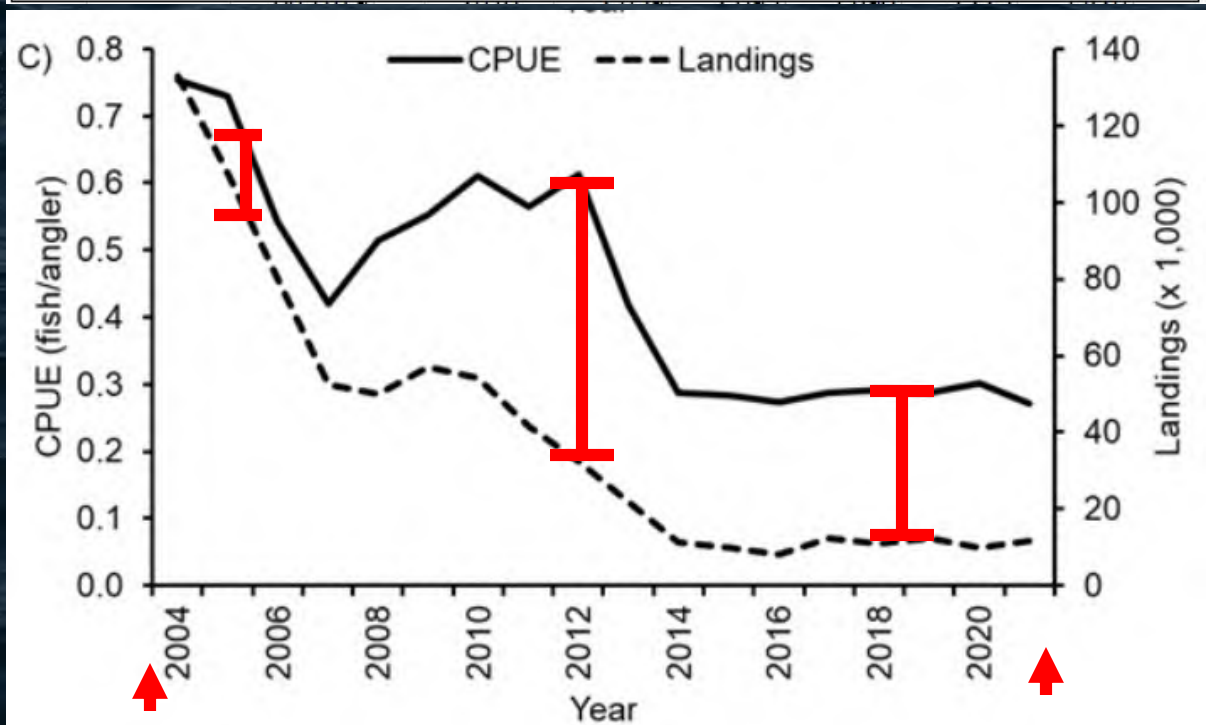
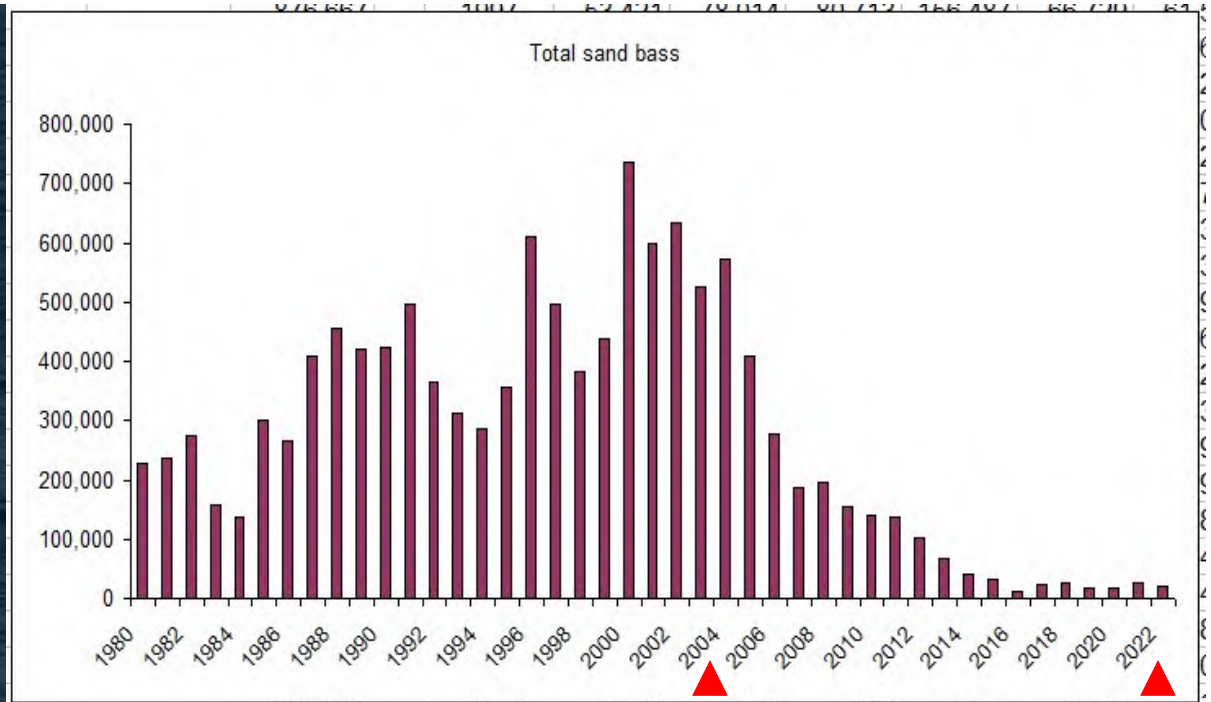
15 in ag, 12-inch min

10 of 20 fish 12-inch min

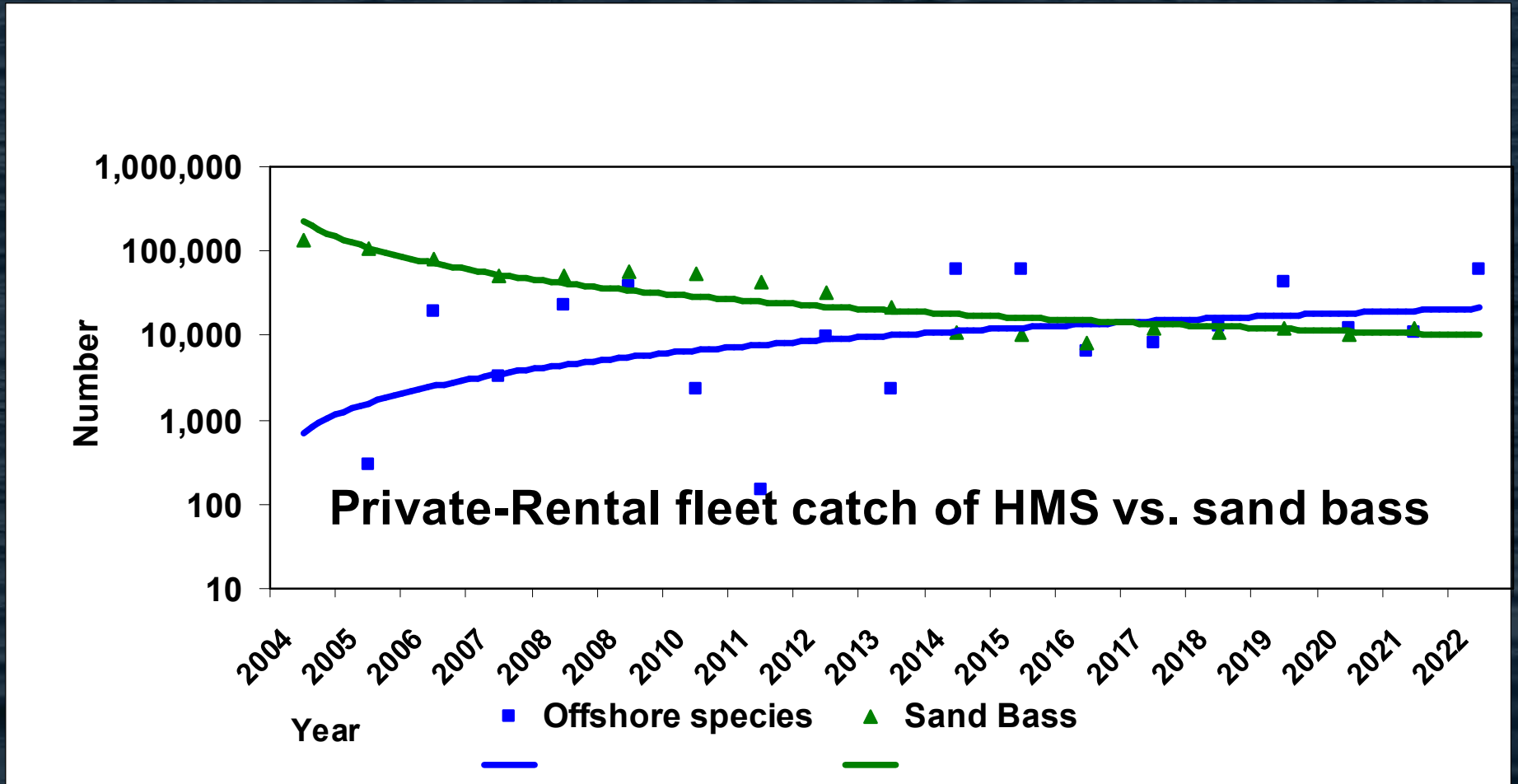
10 bass in combination, 12 inch min.
40 years – 10 fish, 12 inches !



- In recent years there has been less effort for sand bass and a greater spread between catch rates and total landings
- Some of this may be due to declining participation as well as effort shift

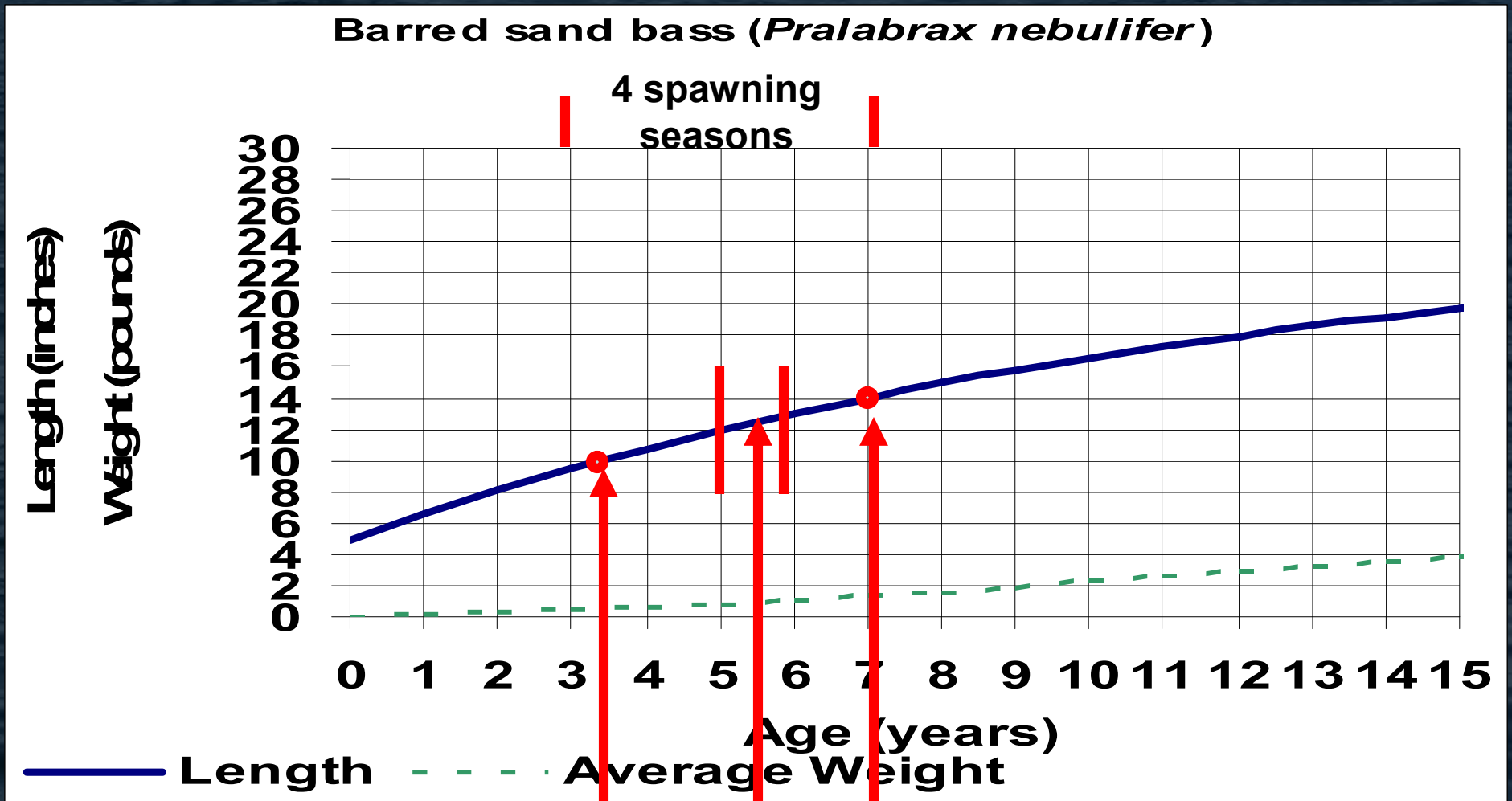


Effort shift to large pelagics within range



Large pelagic species include bluefin, yellowfin and skipjack tunas and dorado
Data from RecFIN and DFW sand bass (marinespecies.wildlife.ca.gov)

Barred sand bass length, weight and maturity at age



mature at 10"

Current 14" minimum size limit

Size limit range for
MSY/OY (CDFW 2013)

PISCO and Vantuna PNEB data

- 30 survey sites from Gaviota to La Jolla
- 3,560 total sandbass records
- 2001 – 2023
- Over the entire 23-year period just 77 fish less than 20cm were seen by the UCSB PISCO research dive team at the northern sites while 497 were seen by the Vantuna Research Group at the southern sites -- mostly along the PV coast.

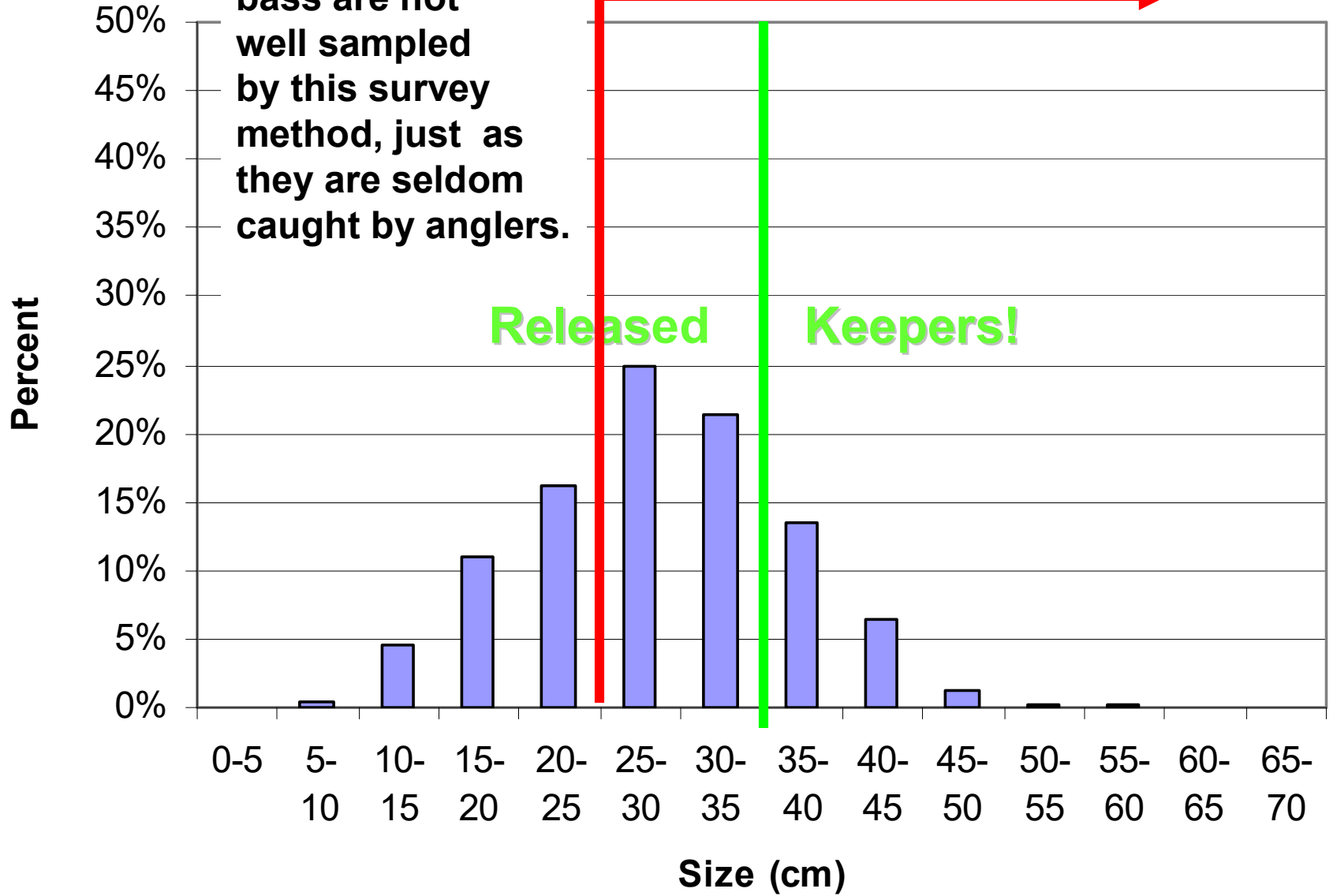
All Years

Very young sand bass are not well sampled by this survey method, just as they are seldom caught by anglers.

Mature

Released

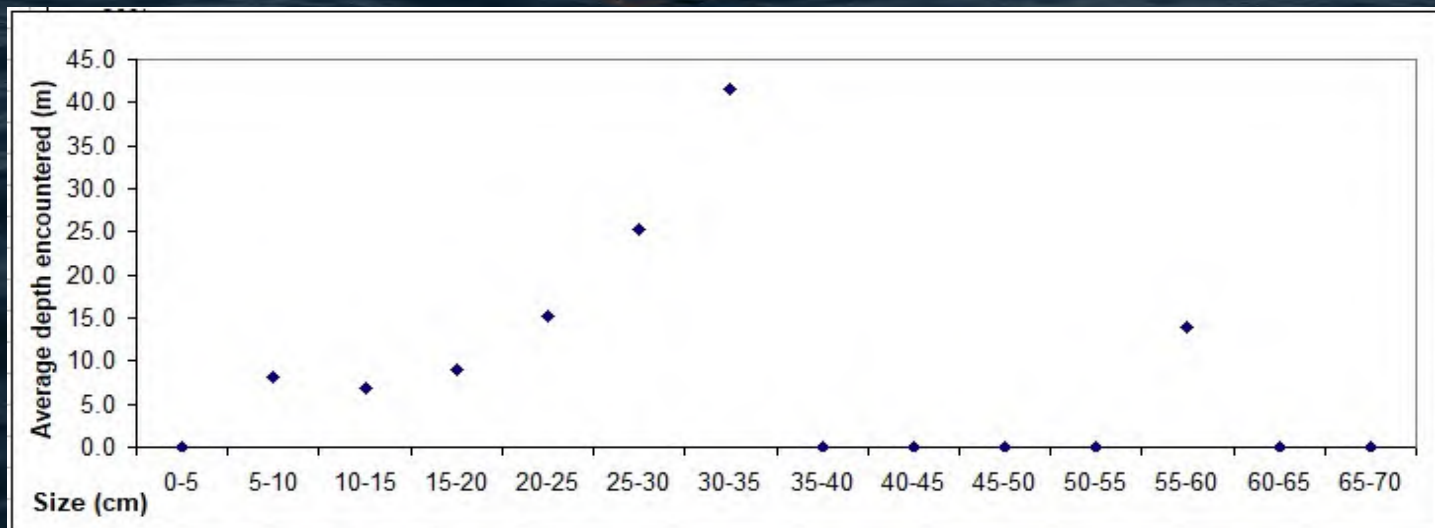
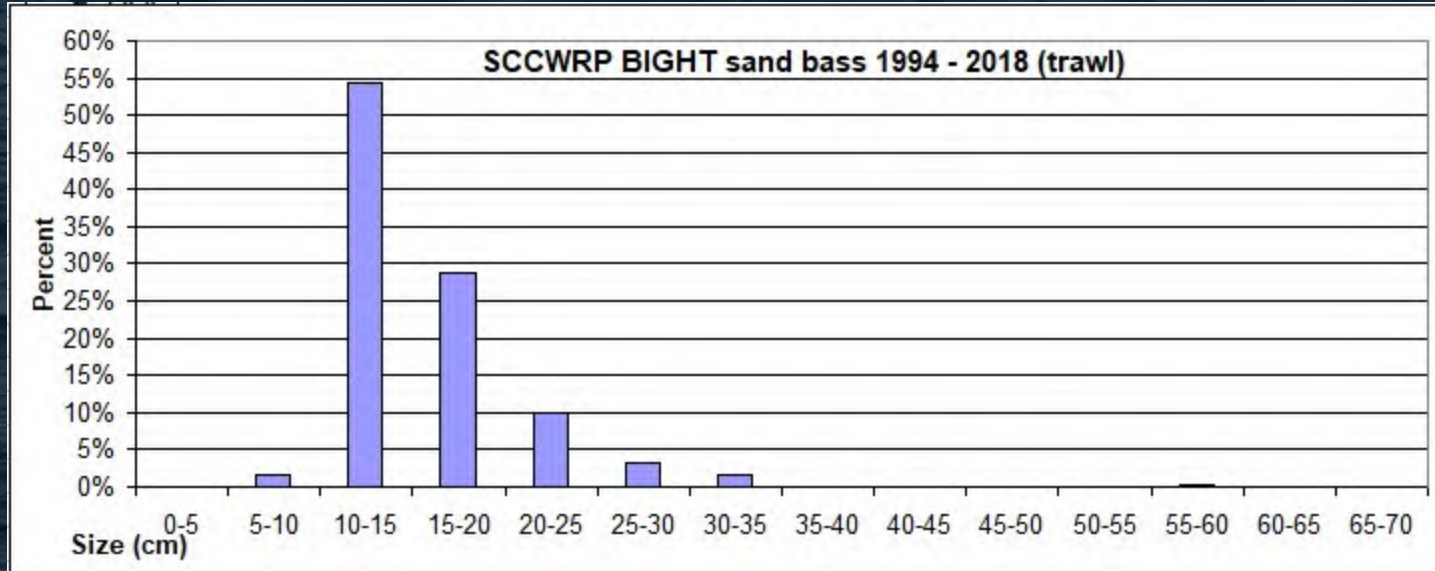
Keepers!



Potential for existing data sources on younger sand bass year-class strength

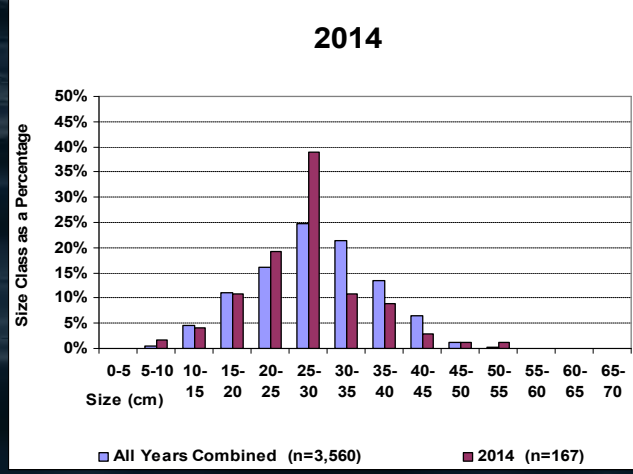
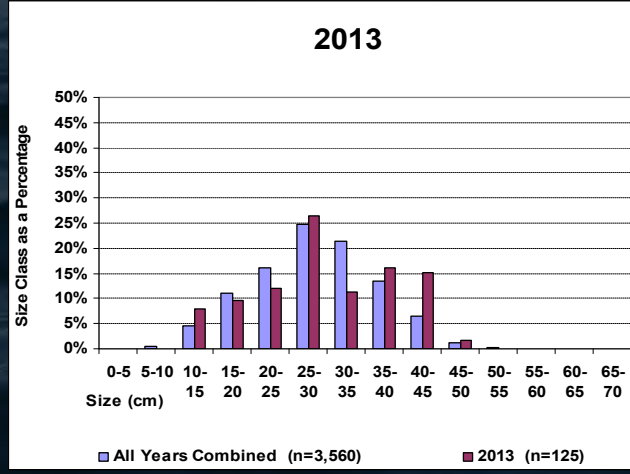
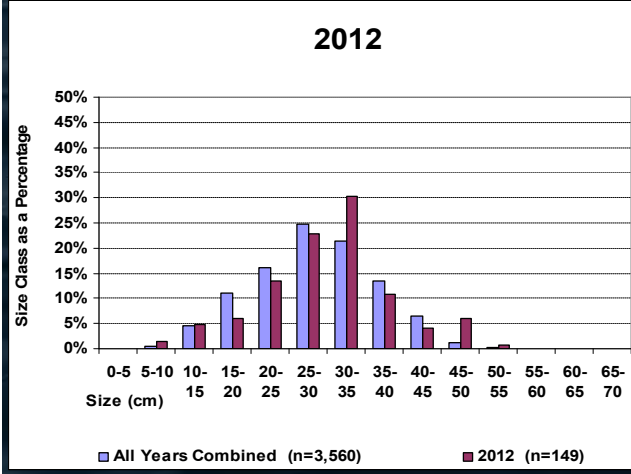
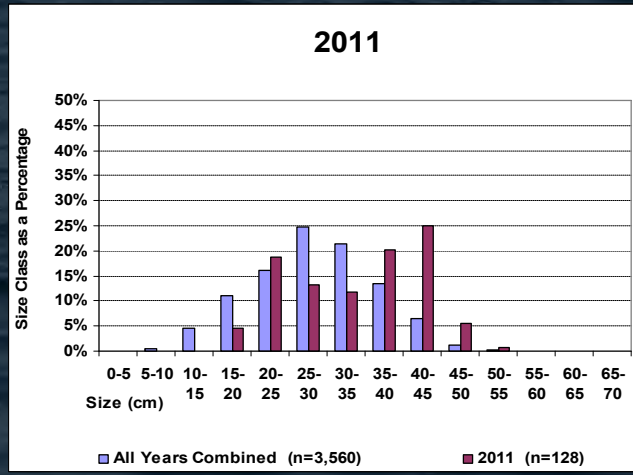
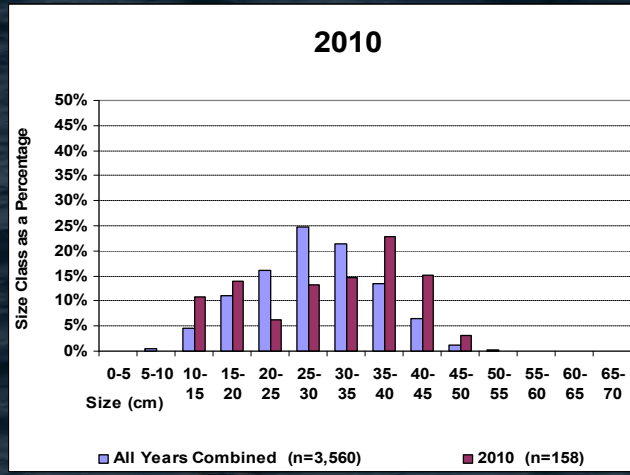
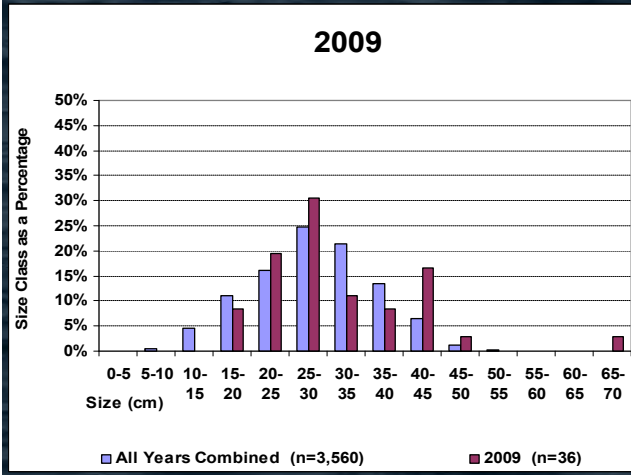
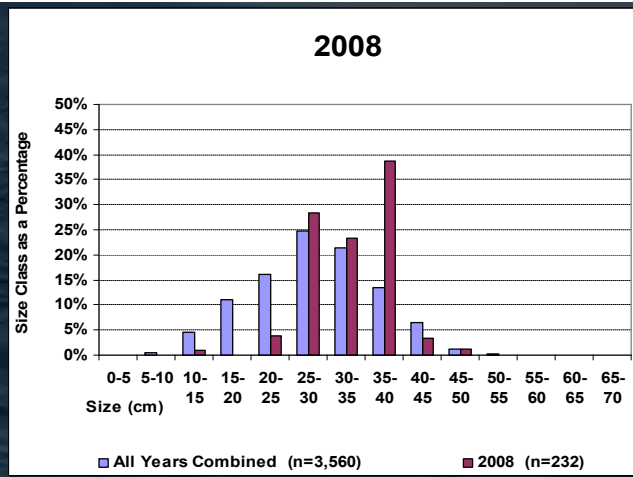
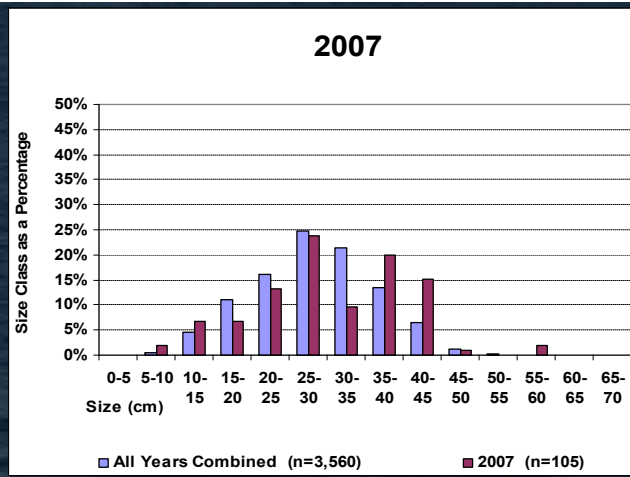
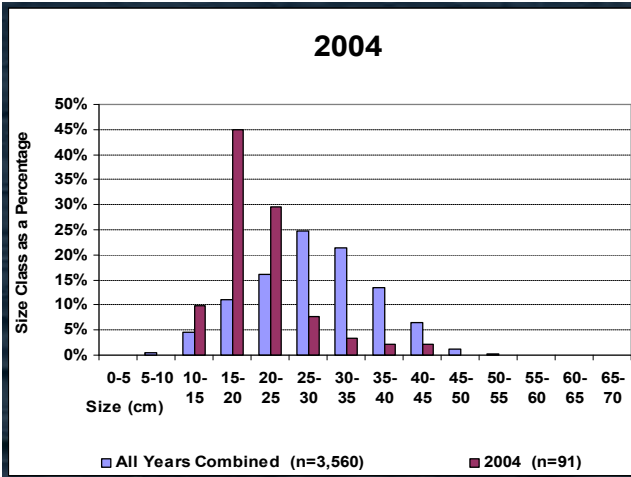
- Further research into NPDS and other near-shore, turbid waters sampling efforts might shed additional light on local (California) recruitment strength.
- New methodologies might be possible to develop that could capture data on incoming sand bass year class strength.

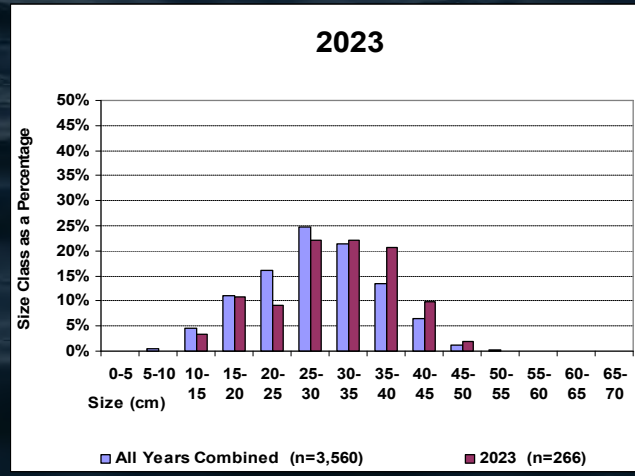
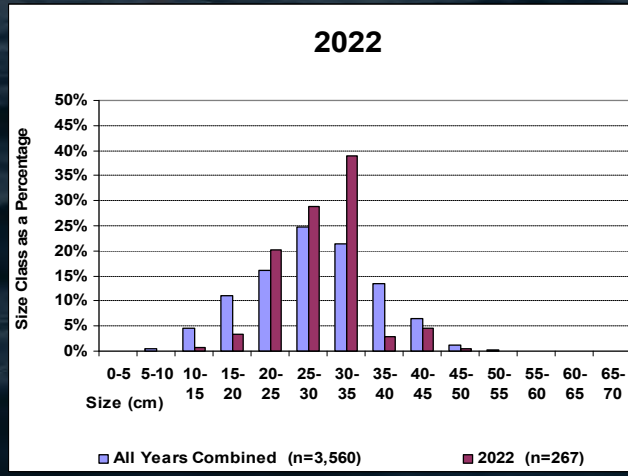
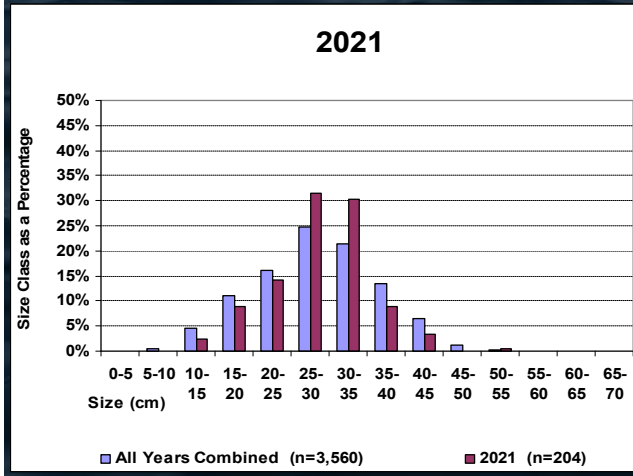
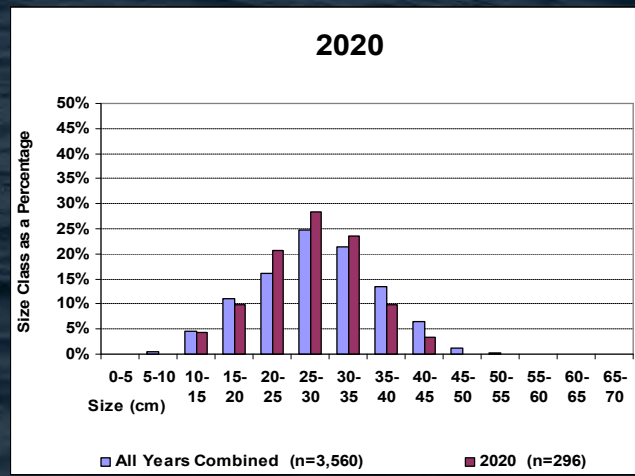
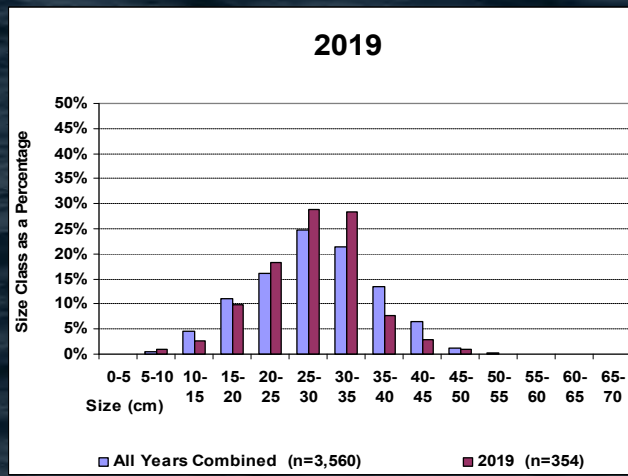
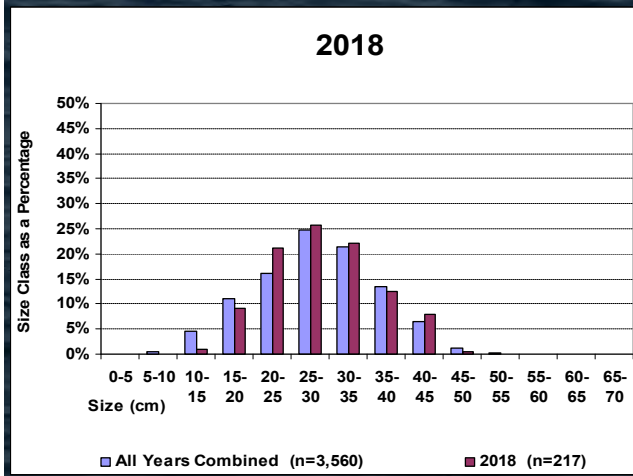
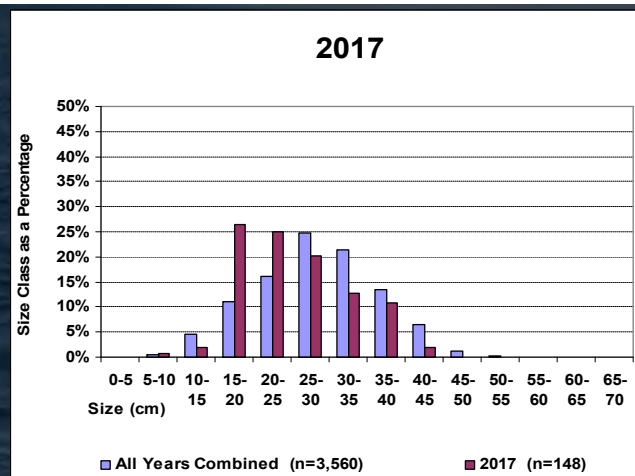
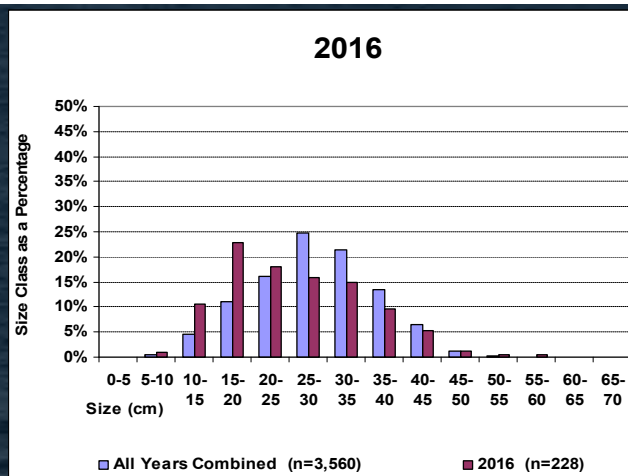
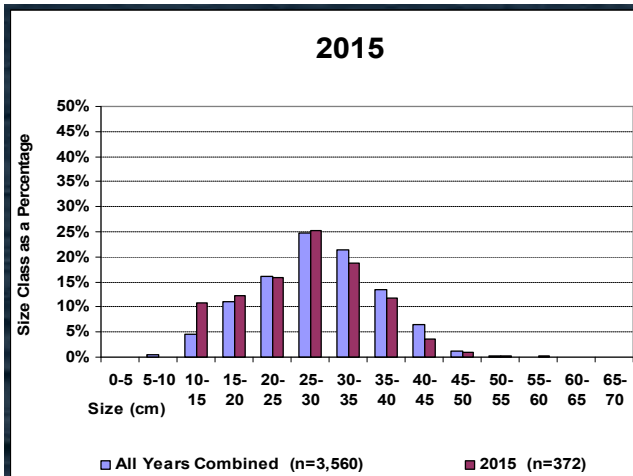
SCCWRP BIGHT trawl sand bass data
Average depth encountered 10.5m
Mostly inside harbors
Total number of fish = 529



PISCO/Vantuna sand bass dive data by year against the all-years composit

- These data are similar in form to those gathered in the past six years by CDFW divers.
- A primary difference is CDFW divers targeted edge habitats along the interface between hard and soft substrate while PISCO/Vantuna divers targeted hard bottom habitat in general.





On sand bass spawning:

- 1. There is evidence for site fidelity between seasons.**
- 2. Sand bass appear to spawn at a wide variety of locations, opportunistically .**
- 3. The primary assumption sand bass aggregate to a just a handful of specific sites expressly for spawning appears to remain anecdotal.**

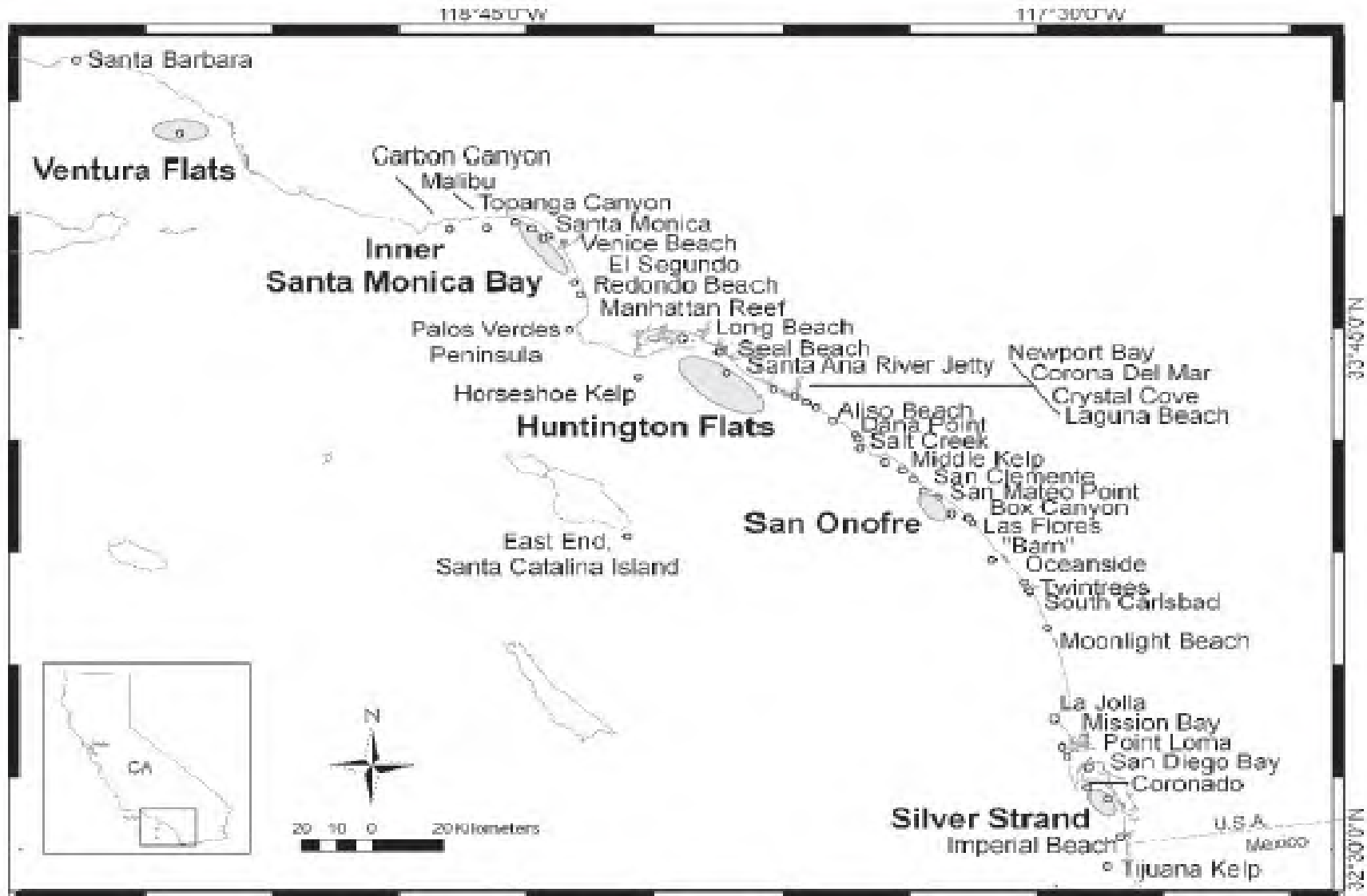


Fig. 1. Map of barred sand bass tagging locations in southern California, historical California Department of Fish and Game tagging project (1960s and 1990s). Shaded ellipses and bolded text identify historical barred sand bass spawning aggregation locations.

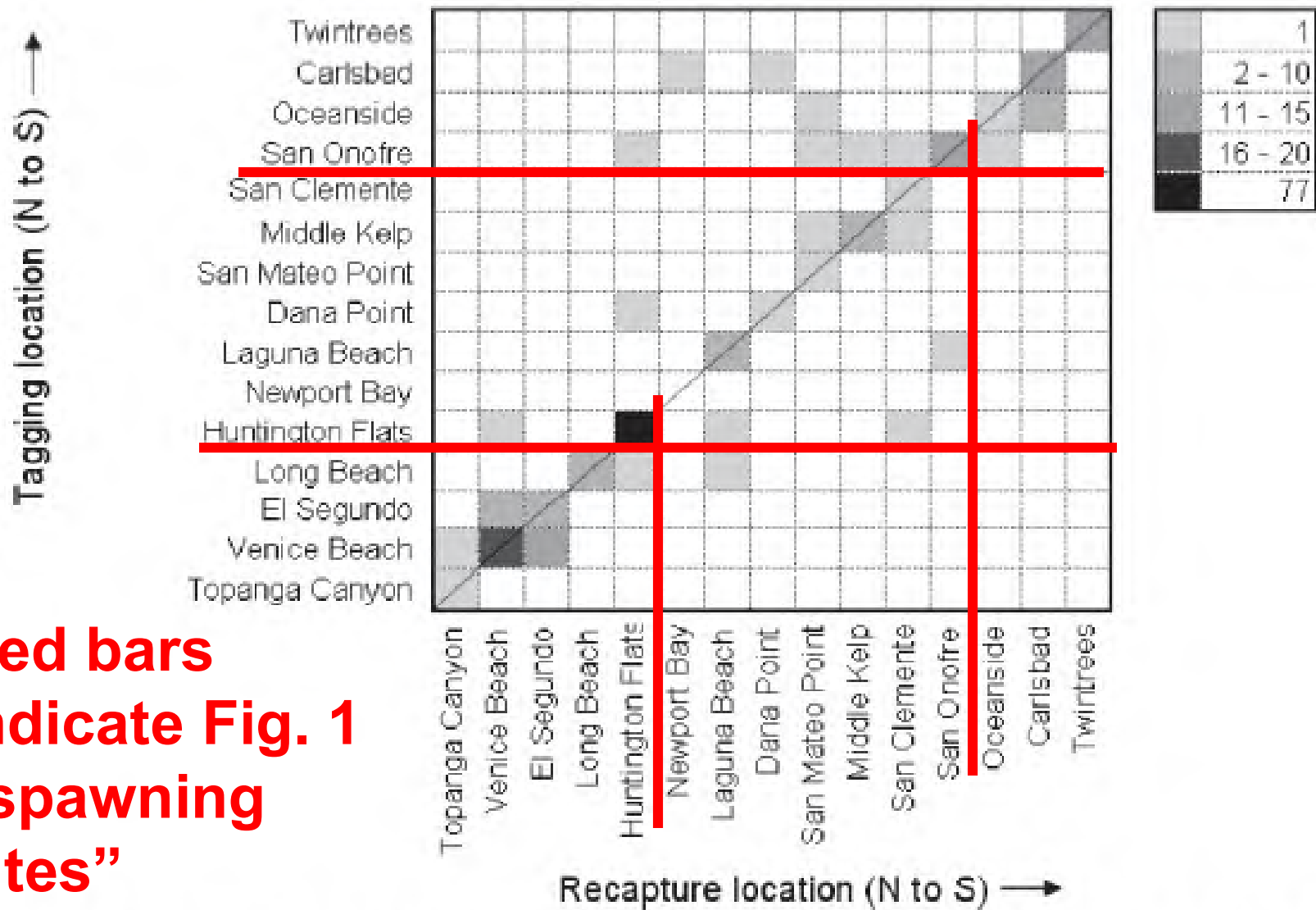


Fig. 7. Recapture matrix plot of barred sand bass tagged during peak spawning season and recaptured in subsequent peak spawning seasons, historical California Department of Fish and Game tagging project (1960s and 1990s). Shaded, darker boxes along the diagonal line indicate a higher degree of breeding site fidelity.

•No strong vertical bars indicating fish aggregated to historical barred sand bass spawning aggregation locations identified in figure 1 (Jarvis et al. 2010) .

•Strong tendency to be encountered in subsequent seasons where first encountered, irrespective of habitat type or classification (Strong evidence for Site Fidelity instead).

•Only 2 of the 5 areas identified as historical spawning aggregation locations appeared to have subsequent-season recaptures for inclusion within Figure 7.

It's clear that sand bass bite much better during the summer months.

- Warmer waters and longer days spur growth and spawning.
- With that, foraging activity reaches a peak.
- Reducing the bag limit to 4 fish acts as a cap to the harvest when sand bass are most susceptible to being caught.
- Should the sand bass bite continue to improve the precautionary reduction to a 4-fish sand bass bag limit will restrain the catch level while additional scientific data are gathered and analyzed.

From: Matthew Bond <[REDACTED]>

Sent: Thursday, October 24, 2024 08:37 AM

To: FGC <FGC@fgc.ca.gov>

Cc: Christopher Killen <[REDACTED]>

Subject: Nov. 7th 2024 MRC Meeting Agenda Item 5

Dear President Murray and Commissioner Sklar,

We are writing to express that we share the Department's concern about the health of the Barred Sand Bass (BSB) population and urge the commission to take reasonable steps aimed at allowing its abundance to recover in order to ensure the health of the species, the marine ecosystems they inhabit, and to allow for future sustainable fishing once stocks are deemed recovered.

This stance is based on the facts that recent landings are severely down, surveys show low abundance, and spawning aggregations appear smaller and less frequent.

Around this last point is where we feel regulatory action for the Commission may be best focused. BSB all come together to spawn at specific places and during certain seasons. When landings data and surveys are done at these times and in these areas, the majority of BSB in a given region are aggregated, abundance estimate data may be overstated. Simply stated, the fishing vessels whose passengers' bags are being surveyed know where ALL the BSB aggregate and go fish there. The resulting biomass counts most likely aren't representative of reality.

We hate to see a loss in fishing opportunity. But it seems BSB need help to recover in the short term to allow for possible continued sustainable fishing in the future. Simply applying a seasonal or spawning ground protection program; closing or limiting effort where and when they aggregate, still leaves good fishing opportunity outside those times and places.

Given the obvious need for BSB recovery measures, the worst case scenario is a half measure where some fishing opportunity is lost to limited overall effect on the fishing community's future ability to enjoy Southern California marine fishing. We anticipate a result similar to what we saw when the commission cut bag limits in half and raised the size limit in 2013; no dramatic benefit to offset loss in total allowable species bag limits according to CDFW figures.

Sadly, it doesn't seem that the past bag reduction and size limit increase had the protective impact on the BSB's biomass we needed. We propose a different mechanism for the Commission to consider now. A focus on regulations around when and where BSB spawn should be explored. We believe this is what will drive better health in this fishery. We ask that the Commission consider the following:

- Closing two or three of the five known spawning aggregation sites in Southern California to BSB fishing for a handful of years to support fishing after a period of time sufficient enough for stocks to recover. BSB caught incidentally while fishing for other species would need to be immediately released. The department would continue to do annual stock assessments and reopen the closed areas once a healthy spawning biomass is observed.
- Another option is to close BSB fishing in the months they spawn — June to September. Or a fraction of that timespan in combination with size and bag limit adjustments. These months in Southern California offer some of the most bountiful fishing opportunities because of the influx of warmer water species, like white seabass, bonito, mackerel, yellowtail, and California barracuda. The minimal impact of not being able to take BSB will be muted even more during these months.

We are committed to a thriving subsistence and recreational fishery in California. And we are committed to healthy and abundant oceans. We again urge the Commission to take a hard look at what the Department's biologists are telling us about the current status of the BSB fishery and take necessary steps to protect it.

Respectfully,

Matt Bond
Allwaters PAC



Proposed Changes to Recreational Crab Regulations

7 November 2024

Presented to:

Marine Resources Committee
CA Fish and Game Commission

Presented by:

Christy Juhasz
Senior ES Specialist, Invertebrate Program
Marine Region

Overview

- Purpose
- Summary of proposed changes
- Outreach
- Timeline
- Next steps



Photo Credit: CDFW

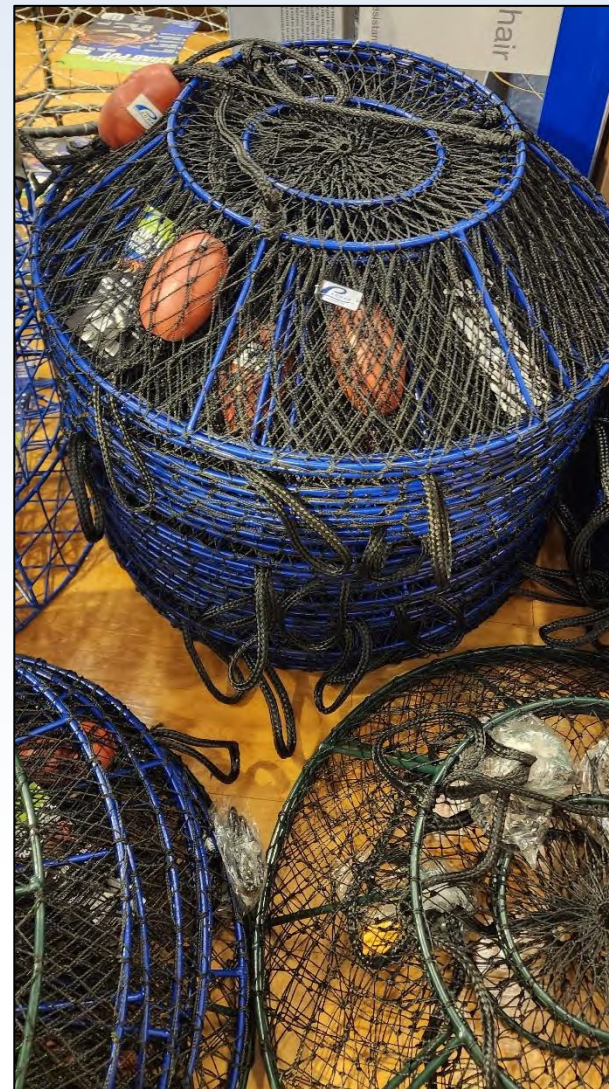


Photo Credit: Ryan Bartling/CDFW



Purpose

- Address 2022 FGC Petition
- Update hoop net operations based on increased usage
- Increase available tools to address entanglement risk of recreational crab gear
- Prevent the use of unique line marking that is required in other fisheries for entanglement identification



Summary of Proposed Changes

	Current Regulations	Proposed Change
Validation Stamp	Individual Validation Stamp	Individual Validation CPFV-specific Validation
Tampering Prohibition	Crab Traps	Crab Traps Hoop Nets
Surface Gear for Northern Hoop Nets	Shall be marked with a buoy	Specify only one main buoy may be used



Summary of Proposed Changes (Cont. 1)

	Current Regulations	Proposed Change
Entanglement Evaluation (Management Trigger)	Marine Life Concentrations	Marine Life Concentration Entanglement Numbers
Entanglement Evaluation (Management Actions)	Trap Gear Prohibition	Trap Gear Prohibition Depth Restriction



Summary of Proposed Changes (Cont. 2)

Prohibition of Unique Line Marks Used in Other Fisheries

Current Regulation: No line restriction.

Proposed Regulation: Prohibit use of line required in other fisheries.



Photo Credit: CDFW



Photo Credit: CDFW



Photo Credit: CDFW



Outreach

- Public Meeting Webinar – September 20, 2024
- Presented to Industry – October 2024
 - Dungeness Crab Fishing Gear Working Group
 - Dungeness Crab Task Force
- Tribal Notifications



Timeline

Milestone	Date
MRC Final Recommendation	November 7, 2024
Proposed Rulemaking Timeline	
FGC Notice Meeting	April 2025
FGC Discussion Meeting	June 2025
FGC Adoption Meeting	Aug 2025



Next Steps

- MRC Recommendation
- Initiate rulemaking in 2025



Photo Credit: Christy Juhasz/CDFW

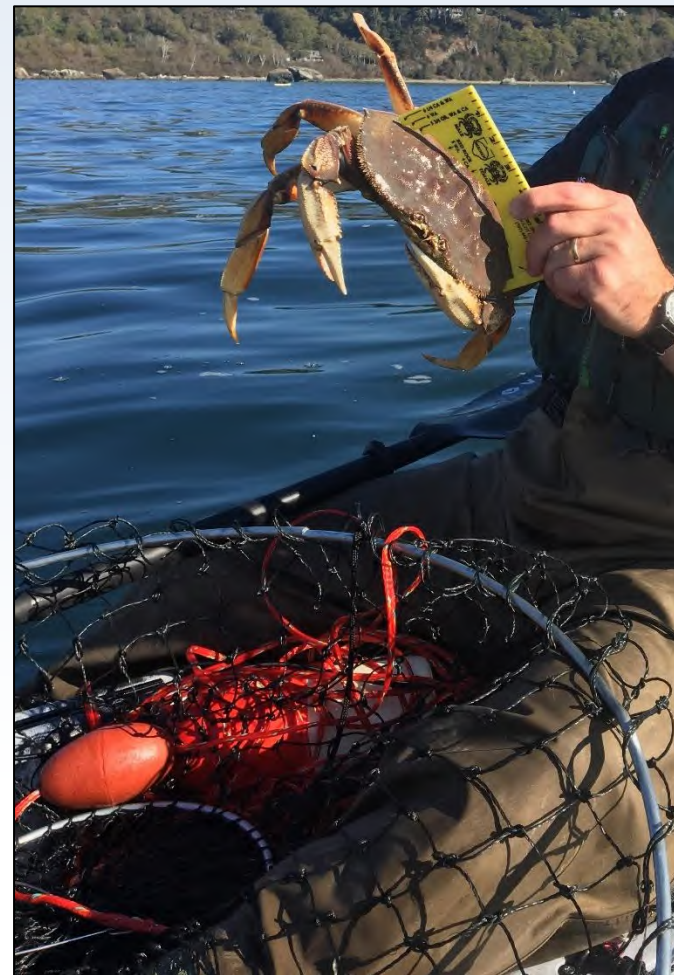


Photo Credit: Ed Roberts/CDFW

Thank You



Questions:

WhaleSafeFisheries@wildlife.ca.gov



Proposed Changes to Recreational Crab Regulations

18 July 2024

Presented to:

Marine Resources Committee
CA Fish and Game Commission

Presented by:

Christy Juhasz
Senior ES Specialist, Invertebrate Program
Marine Region



Overview

- Crab Validation Survey
- Proposed changes to northern hoop net and recreational crab trap regulations
- Next Steps



Photo Credit: Christy Juhasz/CDFW



Crab Validation Survey

- Nov 2021 – Individuals Require Crab validation to use traps
 - Goal is to collect and assess EFI
- March 2024 – Survey 2023 Purchasers
 - Emailed to random subset
 - Received ~20% response rate
- Analysis and Summary Report

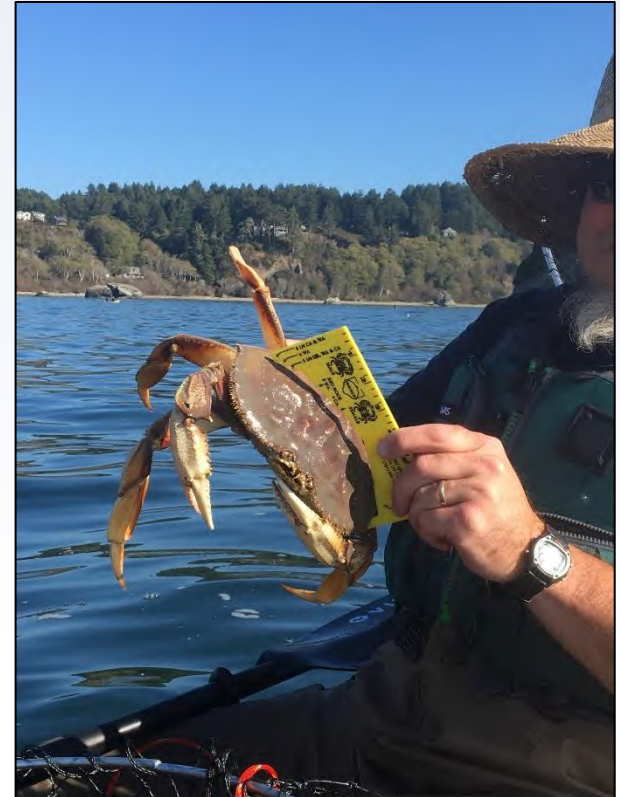
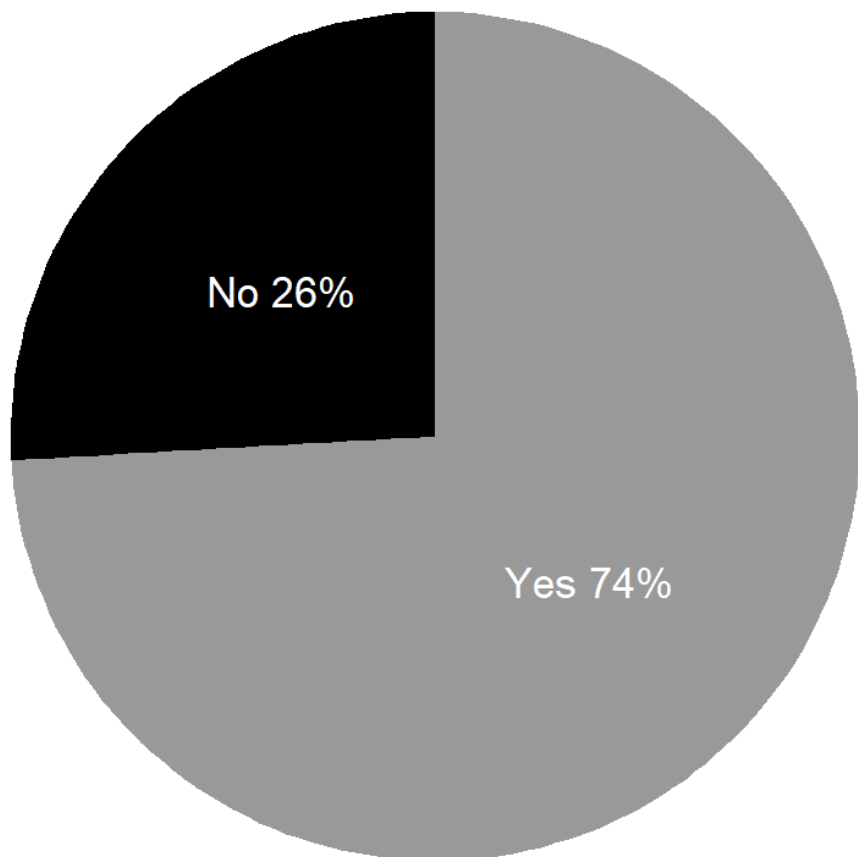


Photo Credit: Ed Roberts/CDFW

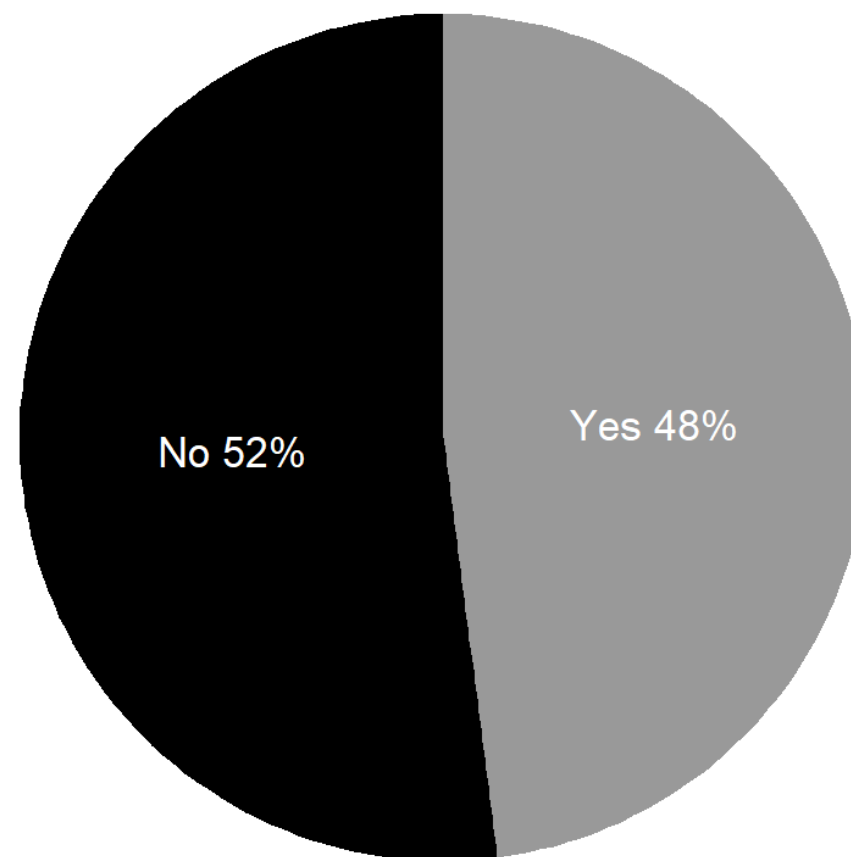


Crab Validation Survey Results – Fishing Activity

Did you go crabbing in 2023?



If you went crabbing, did you use a crab trap?





Proposed Changes (Title 14, CCR § 29.80 & § 29.85)

1. Allow for specific Commercial Passenger Fishing Vessel (CPFV) stamp - Petition
2. Prohibit tampering of hoop nets without permission of operator - CDFW
3. Clarification of northern hoop net surface gear - CDFW
4. Update recreational entanglement evaluation: triggers, management actions, northern hoop nets - CDFW
5. Prohibit use of line marks from other fisheries - CDFW



1) Allow for Specific CPFV Stamp

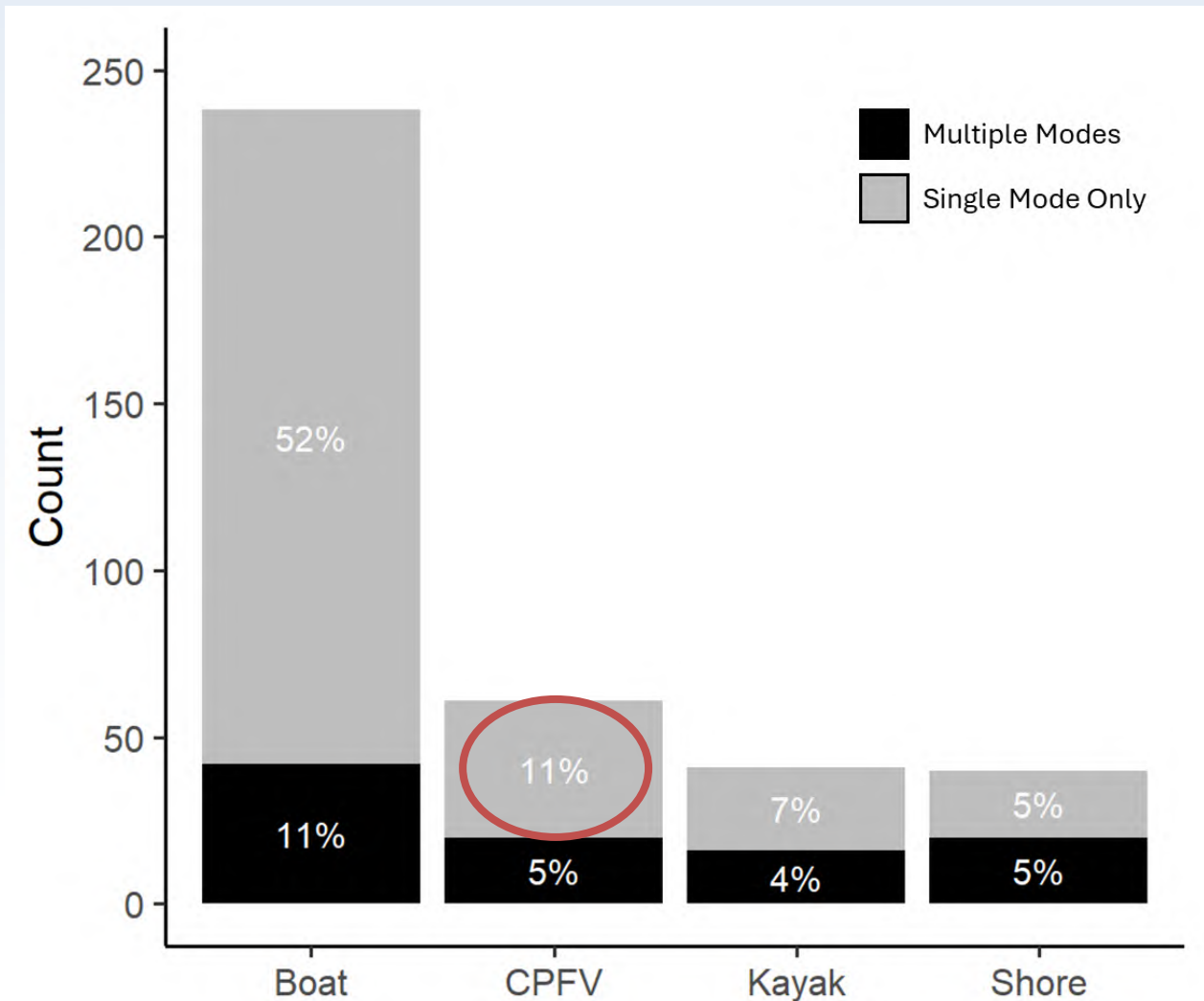
Current Regulation: Any individual who fishes for crab using crab traps must possess a recreational crab trap validation.

Proposed Changes: Add a separate validation stamp specific for CPFVs; update electronic & paper logs; add new fee

Rationale: CPFVs should be required to submit data on fishery effort through logbooks since anglers would not know this information.



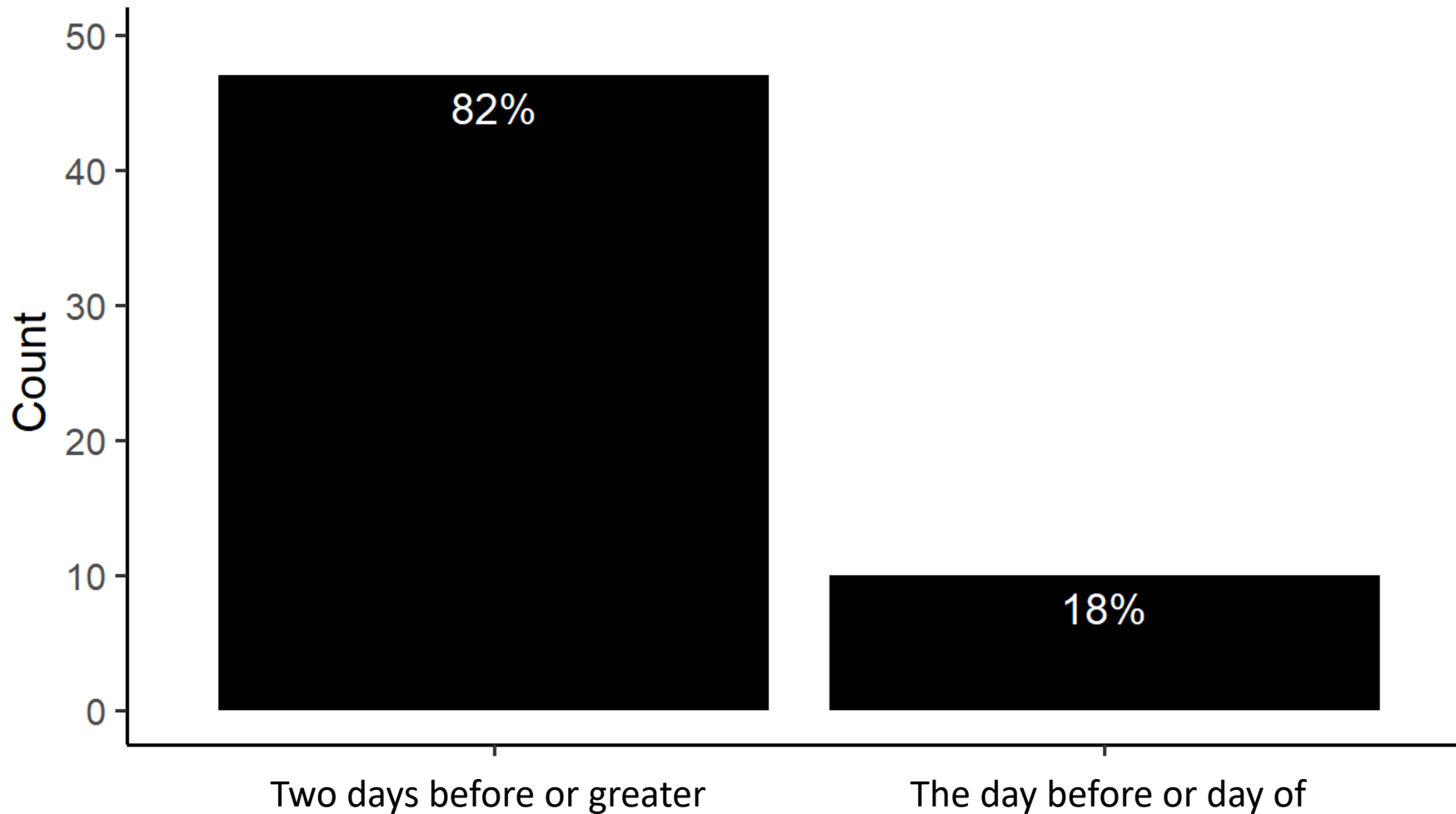
Crab Validation Survey Results – Fishing Modes





Crab Validation Survey Results – CPFV Users

When did you purchase your validation stamp in relation to your first fishing trip?





2) Prohibit Tampering of Hoop Nets

Current Regulation: Unlawful to disturb, move, or damage any trap; or remove any saltwater crustacean from a trap that belongs to another person without written permission.

Proposed Change: Unlawful to disturb, move, or damage any trap or hoop net; or remove any saltwater crustacean from a trap or hoop net that belongs to another without written permission.

Rationale: Align all gear used to take saltwater crustaceans under this requirement.



3) Clarify Northern Hoop Net Surface Gear

Current Regulation: All hoop nets shall be marked with a surface buoy (except for those deployed on shore).

Proposed Regulation: Specify one main buoy for hoop nets used north of Point Arguello, Santa Barbara County.

Rationale: Clarify surface gear requirement.



Photo Credit: Ryan Bartling/CDFW



4) Recreational Entanglement Evaluation - Triggers

Current Regulation: Entanglement risk evaluation limited to one trigger of marine life concentrations.

Proposed Regulation: Add number of entanglements as another trigger to evaluate risk.

Rationale: Align triggers with commercial sector.



4) Recreational Entanglement Evaluation - Management Actions

Current Regulation: Prohibiting the use of crab traps is the only management action that can be implemented in response to elevated entanglement risk during Dungeness crab season.

Proposed Regulation: Include gear reduction and depth restriction under management actions.

Rationale: Align management actions with commercial sector; increase fishing opportunities in response to elevated risk.



4) Recreational Entanglement Evaluation – Northern Hoop Nets

Current Regulation: Hoop net gear **not** evaluated for entanglement risk.

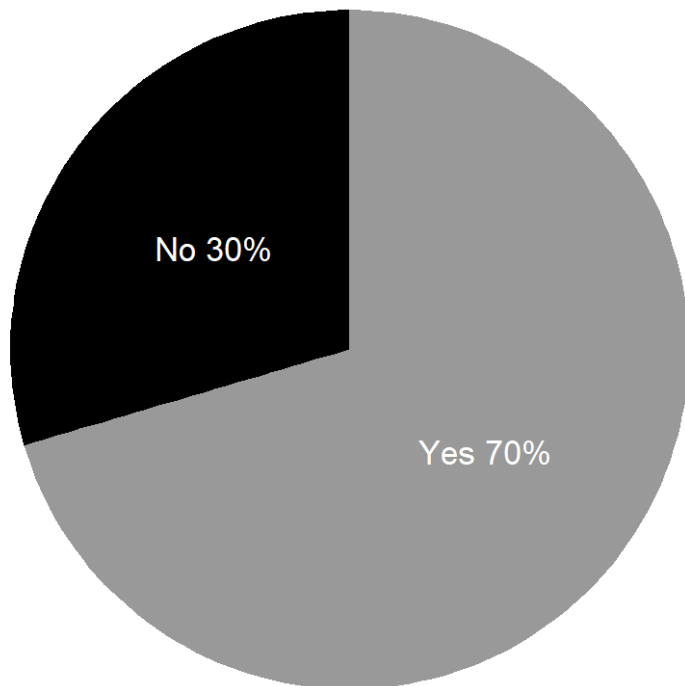
Proposed Regulation: Add hoop net gear (north of Point Arguello) as part of evaluation for entanglement risk.

Rationale: Evaluate all vertical-lined gear types for entanglement risk.



Crab Validation Survey Results – Hoop Nets

If you went crabbing, did you use a hoop net?



If you used a hoop net, did you also use a crab trap?

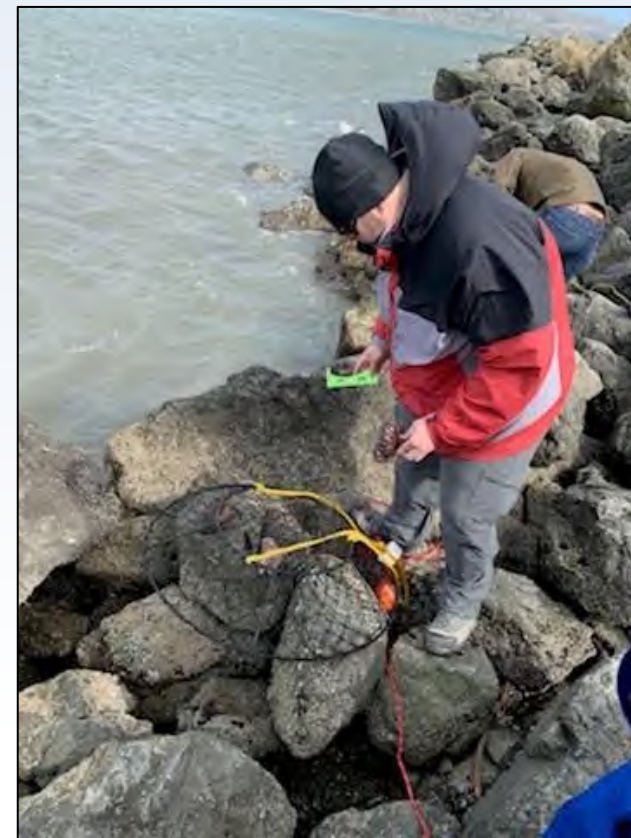
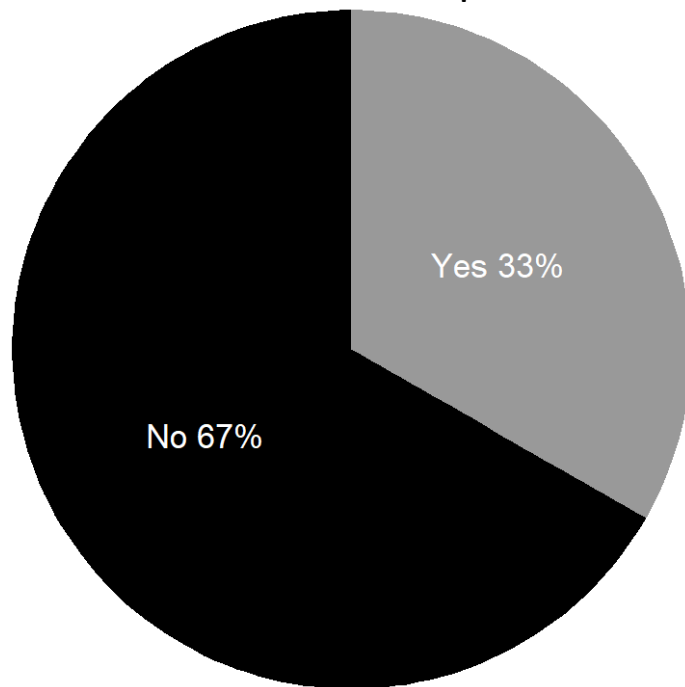


Photo Credit: James Phillips/CDFW



5) Prohibit Line Marks Used in Other Fisheries

Current Regulation: No line restriction.

Proposed Regulation: Prohibit use of line required in other fisheries.

Rationale: Better identify entanglements to source fishery.



Photo Credit: CDFW



Photo Credit: CDFW



Photo Credit: CDFW



Timeline

Milestone	Date
MRC Introduction	July 18, 2024
MRC Discussion/Final Recommendation	November 7, 2024
MRC Final Recommendation (if needed)	March 13, 2025
FGC Notice Meeting	April 16-17, 2025
FGC Discussion Meeting	June 18-19, 2025
FGC Adoption Meeting	Aug 13-14, 2025



Summary & Next Steps

- MRC Guidance
- Continue to conduct outreach
- Present findings for potential recommendation either in November 2024 or March 2025 MRC meeting
- Continue crab validation survey analyses and draft summary report

Thank You



Questions:

WhaleSafeFisheries@wildlife.ca.gov



Kelp and Algae Commercial Harvest – Sea Palm (*Postelsia*)

07 November 2024

Presented to:

Marine Resources Committee
California Fish and Game Commission

Presented by:

Rebecca Flores Miller
Environmental Scientist
Marine Region



Overview

- Sea palm and harvest regulation overview
- Recent stakeholder outreach
- Commercial harvest data
- MARINe monitoring
- Species concerns
- Proposed amendments
- Proposed timeline



Photo Credit: R. Flores Miller



Sea Palm (*Postelsia palmaeformis*) Overview

- Annual species, upper intertidal
- Limited dispersal (1-5 meters)
- Recreational take is prohibited
- Commercial harvest is allowed
 - No license, harvest, or seasonal limits or closures
 - Allowable methods include cutting, picking, and collection of drift or loose individuals
- Concerns due to existing regulations and potential range contraction



Photo Credit: R. Flores Miller



Recent Outreach and Engagement

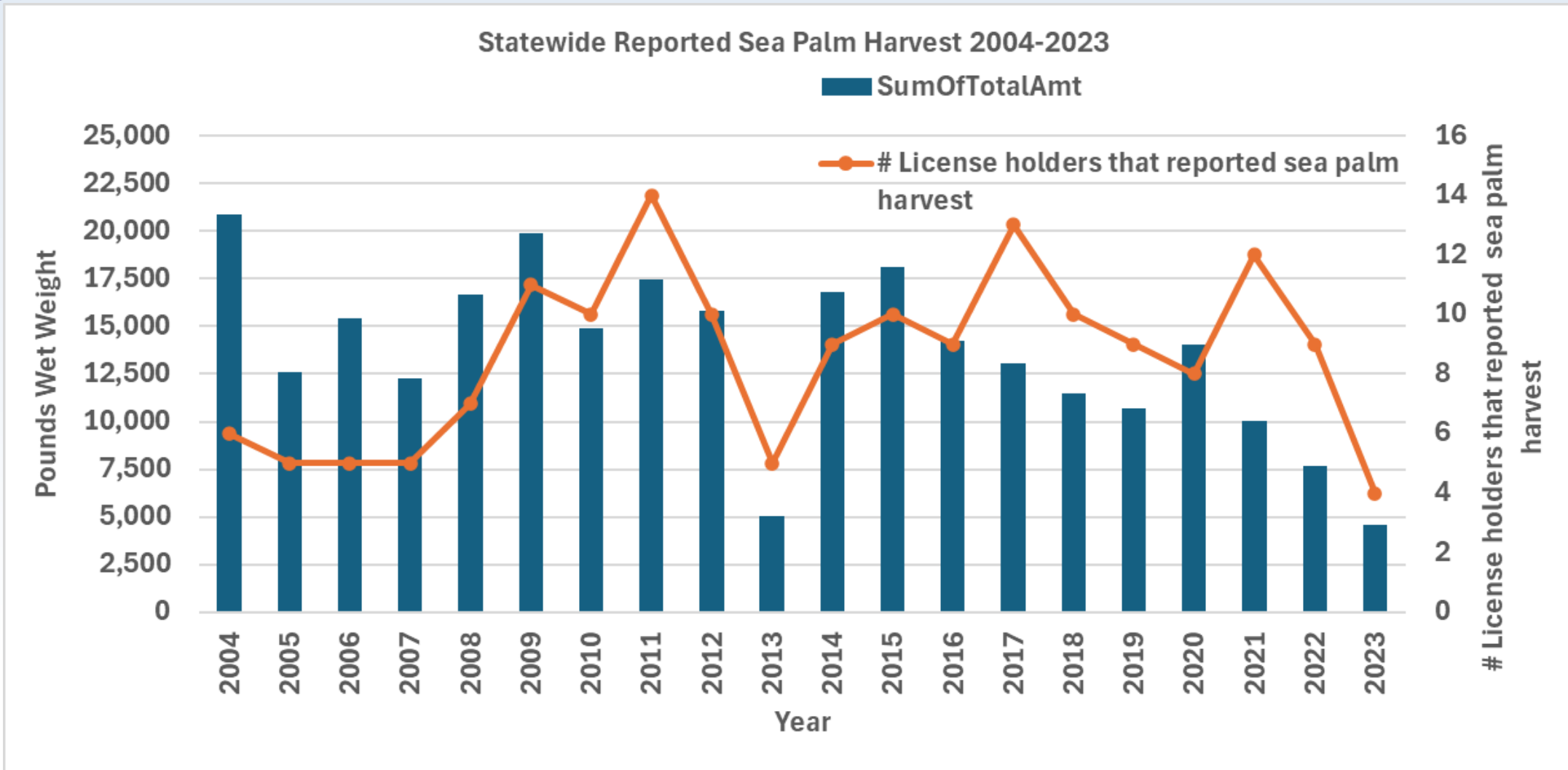


- Recent outreach and engagement (2022-present):
 - Site visits observing sea palm harvest
 - Sea palm harvester focused discussion meeting
 - Researcher discussions
 - Commission, Marine Resources Committee, and Tribal Committee meetings
 - Tribal notification

Photo Credit: R. Flores Miller



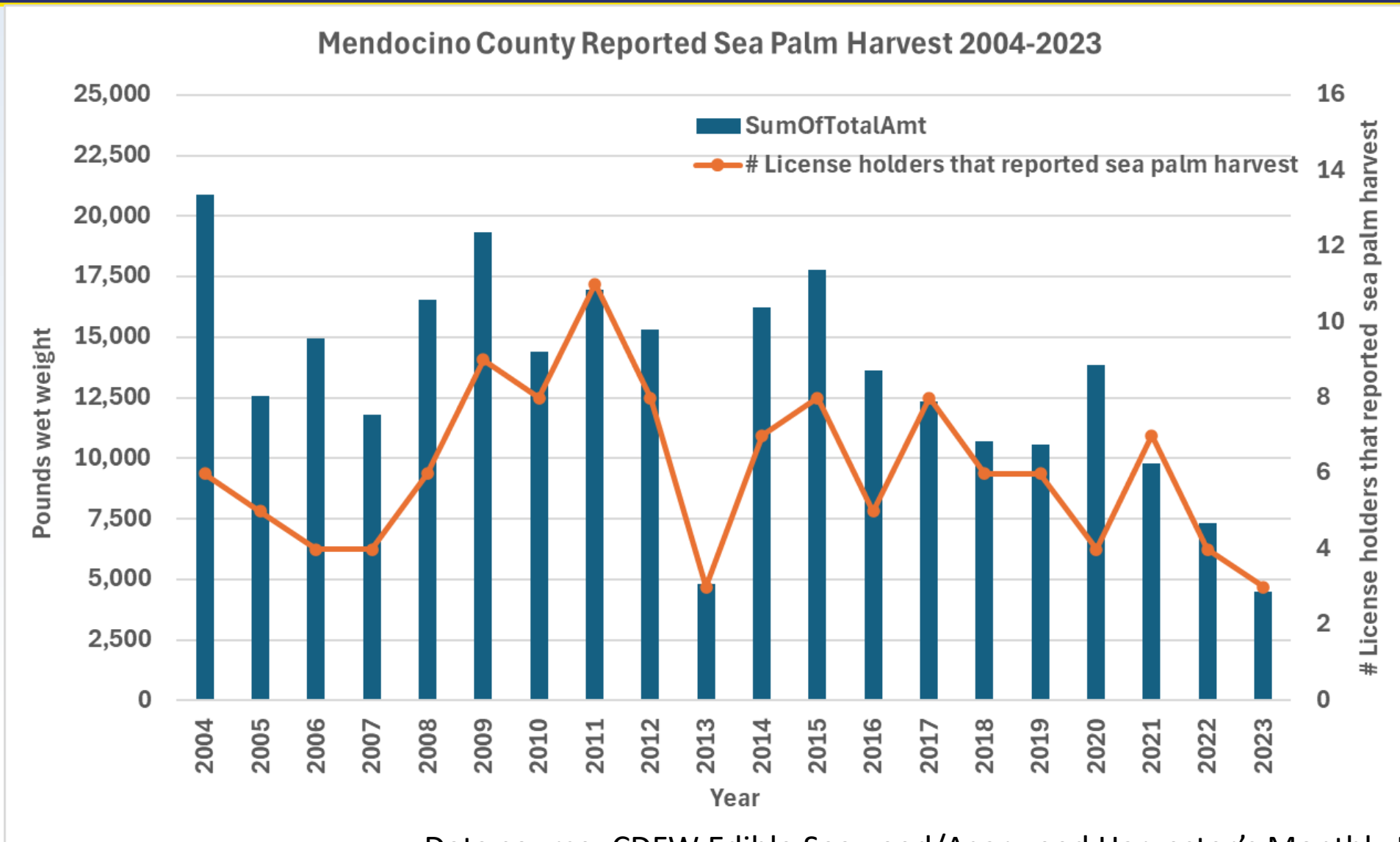
Sea Palm Harvest - Statewide



Data source: CDFW Edible Seaweed/Agarweed Harvester's Monthly Reports



Sea Palm Harvest – Mendocino County



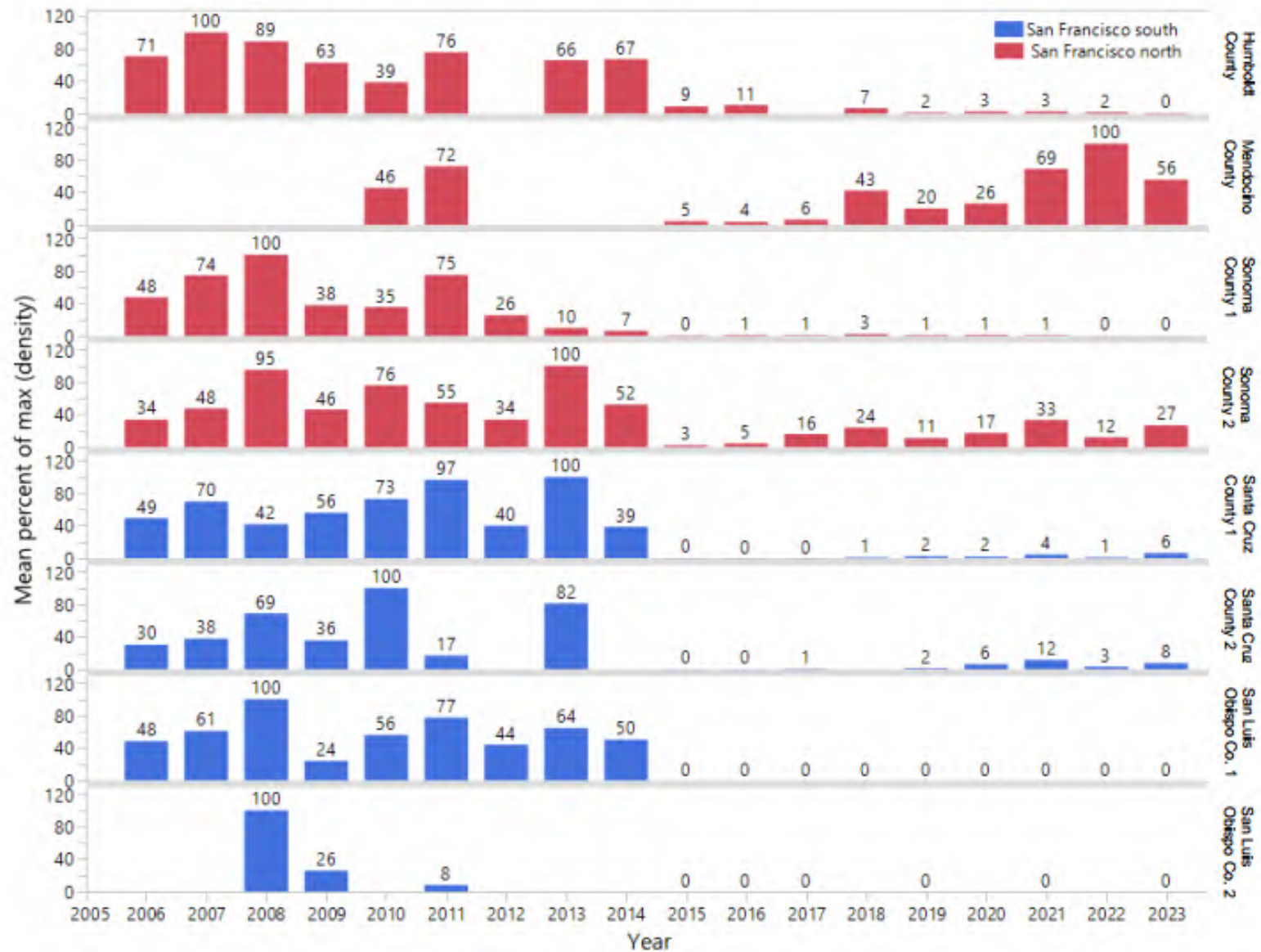
Data source: CDFW Edible Seaweed/Agarweed Harvester's Monthly Reports



Sea Palm Density Monitoring

- Drop in density after 2014
- Most loss in southern sites
- Slow recovery at most sites, esp. in southern range
- Lack of recovery at some sites

Figure source: Multi-Agency Ror Intertidal Network (MARINE)





Proposed Amendments to Sea Palm

- Sea palm
 - Define allowable harvest methods
 - Require central latitude/longitude coordinates of harvest location
 - Prohibit harvest in the southern portion of its range (Pigeon Point, San Mateo County to the south)



Photo Credit: R. Flores Miller



Proposed Amendments to Marine Algae

- All marine algae
 - Harvest reporting to include the day of harvest
 - Specify if take is “drift” or “beached”
 - Additional information on harvest effort



Photo Credit: R. Flores Miller



Proposed Amendments Continued

- Clarify language/update outdated references
 - Direct those interested in broodstock collecting permits for aquaculture to the appropriate regulations
 - Replace outdated reference on contact to purchase a commercial kelp harvesting license
 - Update the location of informational maps depicting administrative kelp beds and fishing blocks
 - Update the location of monthly harvest reports



Proposed Timeline

- Marine Resources Committee (MRC) Recommendation – Today
- Notice – February 2025
- Discussion/Adoption – April 2025
- Regulation Effective – Jan 2026



Photo Credit: R. Flores Miller

Thank You

kelp@wildlife.ca.gov





Update on Box Crab Experimental Fishery

7 November 2024

Presented to:

Marine Resources Committee
California Fish and Game Commission

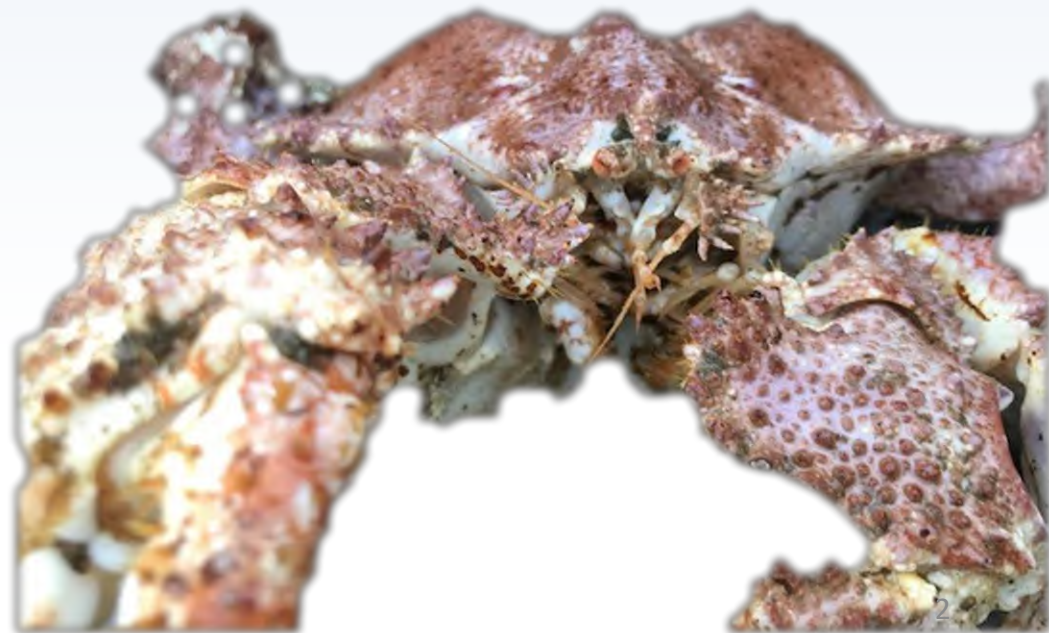
Presented by:

Lindsay Marks Orsini, Ph.D.
Environmental Scientist
Marine Region



Outline

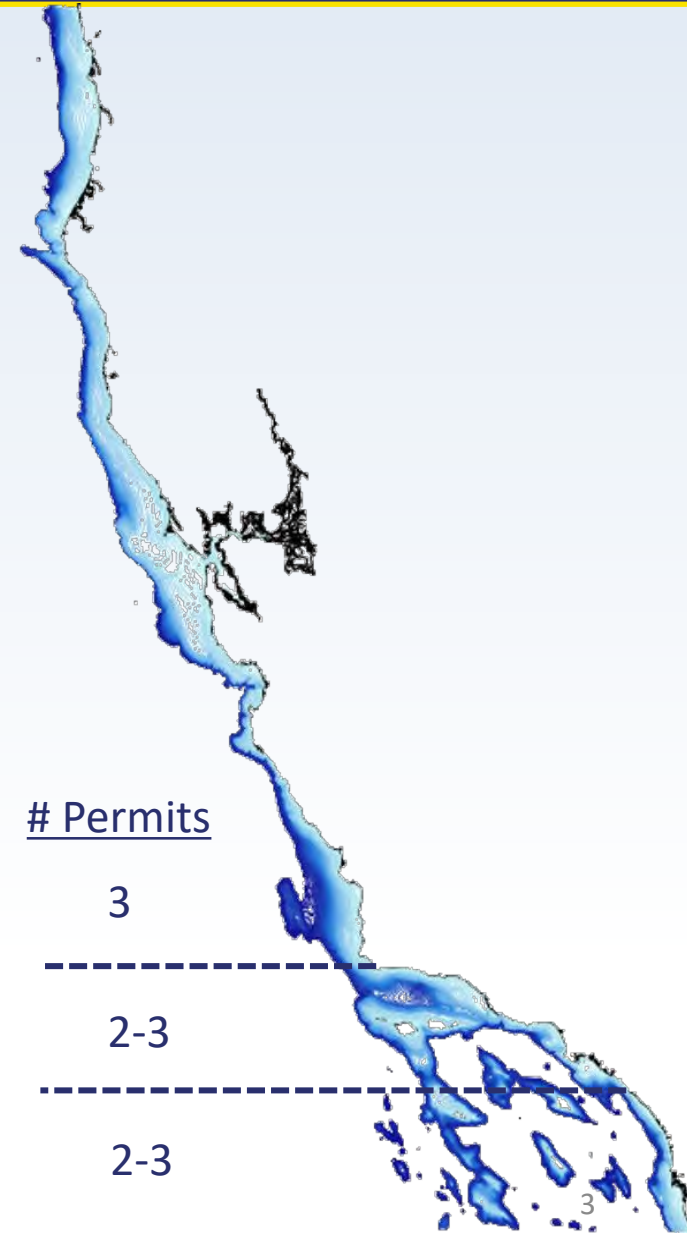
- Prior box crab Experimental Fishing Permit (EFP)
- Current Sustainable Seas Technology EFP (#2023-01)
- Preliminary results
- Next steps





Prior box crab EFP

- Exploratory fishing for brown box crab using traditional trap gear
- April 2019 – March 2023
- Up to 8 permits at a time across California
 - Fished only in Southern California
- Primary Objectives
 - Gather Essential Fishery Information for brown box crab and California king crab
 - Evaluate potential and design of a commercial box crab fishery





Sustainable Seas Technology EFP (#2023-01)

- Exploratory fishing for box crab and king crab using on-demand fishing systems
- Approved in June 2023
- Authorizes up to 5 vessels (10 agents) in Southern California
- Primary Objectives
 - Fill gaps in Essential Fishery Information
 - Test on-demand fishing system functionality in this experimental fishery (i.e., strings of traps in deep-water habitat)



Data collection and reporting requirements

1) Exploratory fishing: Essential Fishery Information

- Department-led data collection
- EFP participants provided with training and supplies for electronic monitoring, documenting fishing effort and catch
- Department is responsible for managing and analyzing data

2) Gear testing: On-demand fishing systems

- EFP Holder-led data collection, analysis, and reporting (annual)



Phased gear-testing approach

- Phases 1 & 2: On-demand gear training, configuration and trials
- Phase 3: Exploratory fishing for box and king crab using on-demand fishing systems
 - Fishing authorized from depths of 60 to 200 fathoms
 - Traps fished in strings up to 7 traps/string



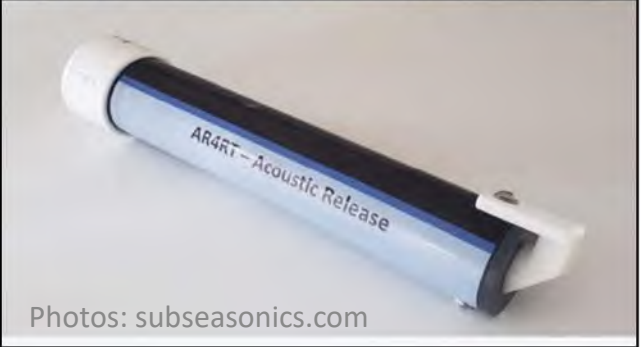
On-demand fishing systems

Ropeless Systems RISER



Photos: ropeless.us

Subsea Sonics AR4RT/DAR4RT



Photos: subseasonics.com

Fiomarine Fiobuoy AC200



Photo: Fiomarine.com

Desert Star ARC1-XD



Photo: desertstar.com



Current status of the EFP

- EFP issued in January 2024
- High turnover in authorized agents and vessels
 - 12 agents/8 vessels added
 - 8 agents/5 vessels removed
- Participation has been limited with only two authorized agents conducting exploratory fishing



Preliminary results

Data sources

- Essential Fishery Information
 - Catch sampling
 - Electronic monitoring
 - Fishing logs and landings
 - Tag-recapture study
- Gear Performance
 - On-demand fishing systems testing



Photo: CDFW

Size limits

- Males attain a larger size than females
- Essentially male-only fishery
 - Few females reach legal size of $5\frac{3}{4}$ " carapace width (CW)
- Size at maturity (females) and fecundity





Essential Fishery Information (Cont. 1)

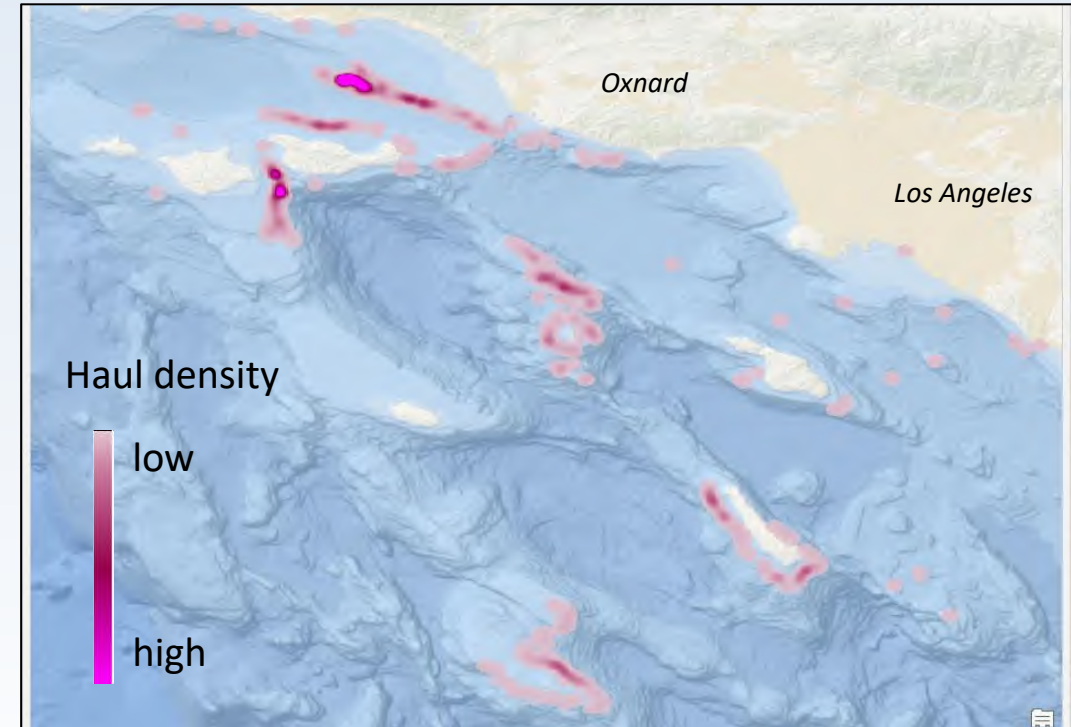
Fishing Seasons

- 18-month biennial reproductive cycle
- Seasonality of mating and molting: late summer/fall
- Catch-per-unit-effort decreases during mating/molting season



Fishing activity

- High-resolution fishing location and catch
- Primary areas explored around offshore islands and banks
- 325 – 900 feet



Bycatch

- Primarily box and king crab in traps
- Relatively minimal catch of other invertebrate and finfish
- 1 humpback whale entangled in 2021



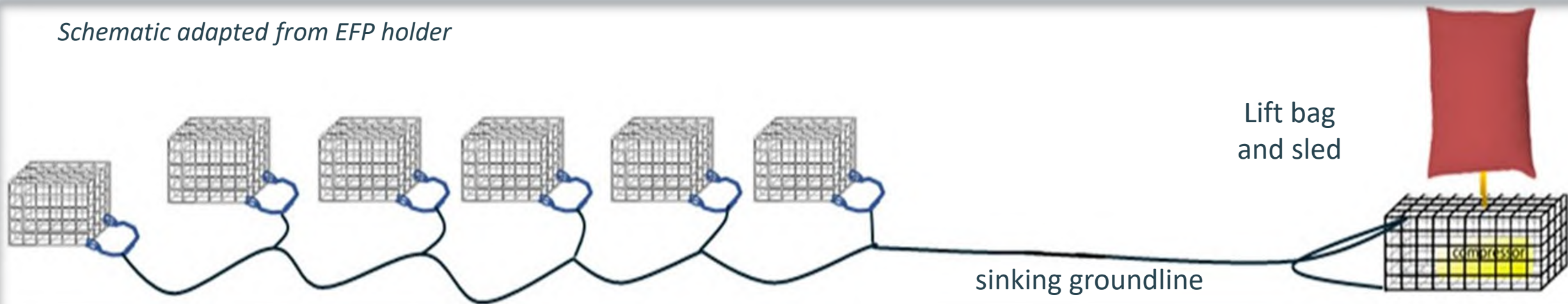
EFP Landings (2019-2024)

- Pounds
 - box: 236,184 lbs
 - king: 32,616 lbs
- Ex-vessel value
 - box: \$1,072,835
 - king: \$106,305
- Price per pound
 - box: \$4.71 (avg)/\$14 (max)
 - king: \$5.97 (avg)/\$20 (max)



Ropeless RISER

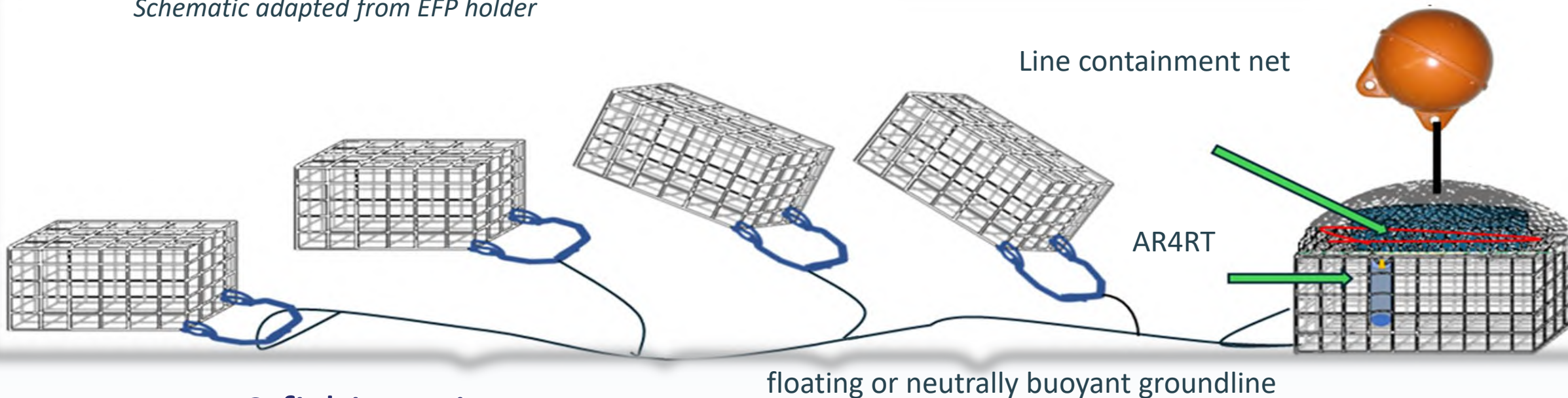
Schematic adapted from EFP holder



- 33 fishing trips
- Depths - up to ~ 100 fathoms (600 feet)
- 227 strings pulled
- 2 unrecovered strings

Sub Sea Sonics

Schematic adapted from EFP holder



- 9 fishing trips
- Depth - up to 96 fathoms (579 feet)
- 133 strings pulled
- 100% gear recovery



Information gaps

- Abundance, growth and mortality
 - Data collection and analyses ongoing
- Habitat
 - More potential fishing grounds to be explored
- Whale entanglement risk
 - Efficacy of on-demand fishing systems and gear making applications



Next steps

- Continued collection of Essential Fishery Information data
 - Multi-year timeline to address data and analysis needs to evaluate feasibility of new commercial fishery
- Continued testing of on-demand fishing systems and gear marking applications
 - If on-demand fishing in Southern California proves successful, could consider expansion to northern California
- First annual report due March 2025

Thank You

Lindsay Marks Orsini, Environmental Scientist

Email: EFP@wildlife.ca.gov





Experimental Fishing Permit (EFP) Program Update

November 7, 2024

Presented to:

Marine Resources Committee

CA Fish and Game Commission

Presented by:

Morgan Ivens-Duran

Senior Environmental Scientist Supervisor

Marine Region



EFP Program Overview

- Adopted pursuant to AB 1573 (Bloom, 2018) and Fish & G. Code section 1022
- Purpose: foster innovation and experimentation to inform the conservation and sustainable use of the state's marine resources
- Pathway: limited, short-term exemptions from state laws and regulations
- Partnership between CDFW and FGC
- Dedicated CDFW staff within new Marine Permitting Project
 - Coordinate with Marine Region programs, Marine Enforcement District, Office of General Counsel, License and Revenue Branch, applicants, and EFP holders



EFP Program To Date

- Phase II EFP regulations: effective as of April 1, 2022
 - 23 requests for Pre-Application Consultation and 9 submitted applications
 - Commission has approved 7 EFPs and CDFW has issued 5 EFPs

EFP Action	2022	2023	2024	Total
Pre-application Consultation Request	18	4	1	23
Submitted Applications	4	6	0	10
Approved Applications	2	4	1	7
Issued Permits	1	3	1	5
Renewed Permits	0	1	3	4
Minor Amendments	1	7	3	11
Major Amendments	1	2	3	6
CDFW Initiated Amendments	0	0	1	1



Summary of Approved EFPs

Tracking ID	FGC Approval	Target Species	Gear Tested	Tier
2022-01	Aug 2022	Swordfish and other highly migratory species	Deep-set buoy gear	3
2022-02	<i>Oct 2022</i>	<i>King and other deepwater crabs</i>	<i>Traditional traps</i>	<i>3</i>
2022-03	Feb 2023	Dungeness crab and hagfish	Pop up gear + trawls	2
2022-04	<i>April 2023</i>	<i>Dungeness crab</i>	<i>Pop up gear</i>	<i>1</i>
2023-02	June 2023	Dungeness crab and rock crab	Pop-up gear + trawls; NOAA-approved weak rope	2
2023-01	June 2023	Brown box and California king crab	Pop-up gear + trawls	4
2023-03	Feb 2024	Dungeness crab	Hoopnets	2



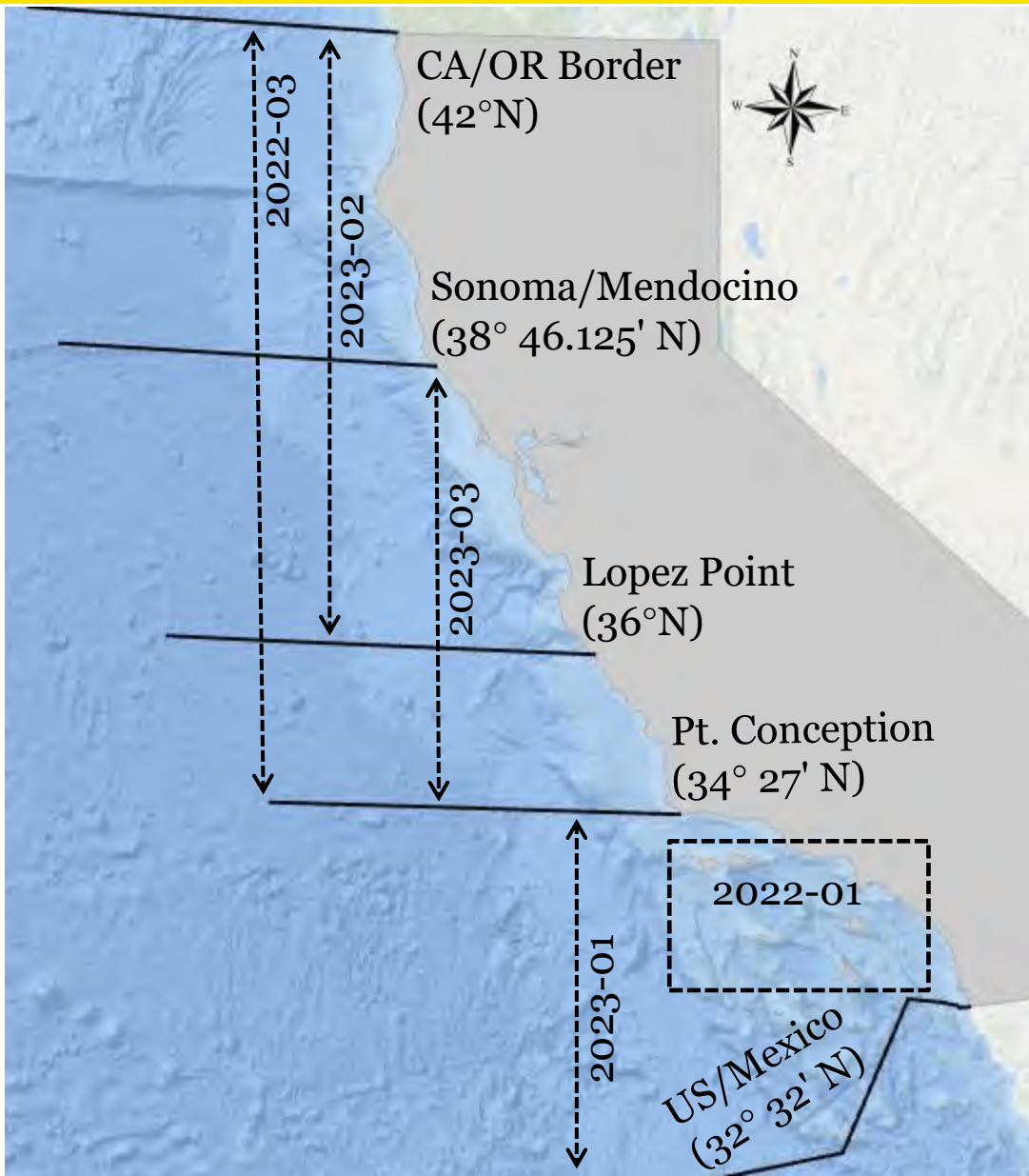
Pop-Up Gear EFPs

- Three issued EFPs are testing different types of pop-up releases

Pop-Up Release	Type	2022-03	2023-02	2023-01	Total EFPs
Sub Sea Sonics TR4RT	Timed	Y	Y	N	2
Sub Sea Sonics AR4RT	Acoustic	Y	Y	N	2
Sub Sea Sonics DAR4RT	Acoustic	N	N	Y	1
Desert Star ARC-1XD	Acoustic	N	Y	Y	2
Guardian Ropeless GTR	Timed	N	Y	N	1
EdgeTech 5112	Acoustic	N	Y	N	1
Fiomarine Fiobuoy	Acoustic	N	Y	Y	2
Ashored Innovations MOBI	Acoustic	N	Y	N	1
Ropeless Systems Ropeless RISER	Acoustic	N	N	Y	1



EFP Testing Areas



Dungeness crab

- 2022-03: within 100 fa
- 2023-02: within 100 fa
- 2023-03: within 30 fa

Box and King crab

- 2023-01: outside 60 fa

Highly Migratory Species

- 2022-01: state waters surrounding the islands & specified mainland areas



Fiscal Considerations

- Current EFP fees (*50% fee reduction*)
 - Application: \$180.77
 - Initial issuance: \$1,015.50 (*\$507.75*)
 - Annual
 - Tier 1: \$523.25 (*\$265.25*)
 - Tier 2: \$1,225.00 (*\$616.00*)
 - Tier 3: \$4,896.25 (*\$2,452.00*)
 - Tier 4: \$11,210.00 (*\$5,608.75*)
 - Minor amendment: \$225.83
 - Major amendment: \$529.25



Preliminary Findings and Forecast

- Meeting legislative mandates: bycatch reduction and sustainability
 - Area of growth: EFPs focused on fishing effort efficiency
- Program challenges
 - Number and frequency of amendments
 - Incomplete lists of authorized agents and vessels
 - Enforcement of permit conditions
- Looking ahead
 - Legislative report
 - Programmatic improvements
 - Prioritizing future applications

Thank You

Morgan Ivens-Duran, Senior Environmental
Scientist Supervisor

Marine Permitting Project

Email: EFP@wildlife.ca.gov

From: Rossi, Devon-Contractor [REDACTED]

Sent: Friday, August 9, 2024 02:23 PM

To: FGC <FGC@fgc.ca.gov>

Cc: [REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

Subject: Coastal Fishing Communities Policy adopted by the Commission and next steps

Dear coastal fishing communities members, California fisheries stakeholders, and partners,

Thank you for your continued support and commitment to the California Fish and Game Commission (Commission) Coastal Fishing Communities Project. It is with delight we share that, at its February 14-15, 2024 meeting, the Commission adopted the [Coastal Fishing Communities Policy](#). We are incredibly grateful for the significant effort you have dedicated to this project over time; your feedback has been invaluable in shaping the policy, and your perspectives and engagement will be crucial as we seek to advance the policy's goals.

We are committed to exploring implementation of the policy's goals, spearheaded by Devon Rossi, our new 2024-2025 California Sea Grant State Fellow. While there is no specific timeline for the implementation phase yet, we would love to hear from you if you are interested in participating. We encourage you to reach out to Devon Rossi (devon.rossi@fgc.ca.gov) with any input. Your continued engagement is integral to the policy's success.

Additional fishing communities informational resource:

We also want to bring to your attention a recently-released website – [FishingCommunities.net](#) – developed by partners in response to informational needs your communities previously identified and highlighted through the Commission's project. [FishingCommunities.net](#) is “...an informational resource for stakeholders, managers, and the public. The website presents profiles of the history, economics, and culture of California's fishing communities with information, data, and interactive charts for thirteen of the state's principal fishing ports.”

The website includes text and data from port profile reports written by Lauren Drakopoulos (Cornell University) and Carrie Pomeroy (California Sea Grant) for Resources Legacy Fund based on analysis of data provided by California Department of Fish and Wildlife (CDFW).

The website is currently a “Public Review Version”, and authors are inviting input from community members (via email at contact@fishingcommunities.net) in recognition that input from community members helps to shape and improve this site.

We look forward to continuing our work together to better support California’s coastal fishing communities by implementing the goals of the Commission’s new Coastal Fishing Communities Policy.

Best,

Kimi Rogers and Devon Rossi

Devon Rossi (she/her) | California Sea Grant State Fellow

California Fish and Game Commission

715 P Street, 16th Floor, Sacramento, CA 95814

(916) 210-1412 | devon.rossi@fgc.ca.gov

California Fish and Game Commission Marine Resources Committee (MRC) Work Plan

Updated October 31, 2024

Note: Proposed changes to topics/timing are shown in blue underline or ~~strike-out~~ font.

Topics	Category	Jul 2024	Nov 2024	Mar 2025
Planning Documents, Fishery Management Plans (FMPs)				
MLMA Master Plan for Fisheries – Implementation Updates	Plan Implementation			
Red Abalone Recovery Plan (statewide)	Recovery Plan	*		
- Risk Tolerance for Reopening Fishery Harvest	Recovery		<u>X</u>	<u>X</u>
California Halibut Fishery Management Review (CHal Review) – CHal Trawl Grounds Review	Management Review	*		
CHal Review – Bycatch Evaluation for Set Gill Net (Lessons Learned)	Management Review	X		
CHal Review – Bycatch Evaluation for Trawl Gear	Management Review			
Market Squid Fishery Management and FMP Review	Management/ FMP Review	X	X/R	
Kelp Recovery and Management Plan (KRMP) Development	Recovery/ Management Plan		*	
Marine Protected Area (MPA) Network 2022 Decadal Management Review Implementation: <i>MPA Petitions</i>	Management Review	X/R	X/R	<u>X</u>
Regulations				
Kelp and Algae Commercial Harvest – Sea Palm (<i>Postelsia</i>)	Commercial Take	*	X/R	
Commercial Sea Urchin Fishing (Including Review of Petition 2023-04 for Northern Fishery)	Commercial Take	X/R		
Recreational Crab Trap Gear Options and Trap Validation for Commercial Passenger Fishing Vessels	Recreational Take	X	X/R	
Commercial Fisheries Logbook Forms & Fishing Block Charts	Commercial Take			
Electronic Recreational Fishing Report Cards Rulemaking	Recreational Take	X/R		
Recreational Barred Sand Bass Fishery	Recreational Take	X	X/R	
Marine Aquaculture and State Water Bottom Leases				
Statewide Aquaculture Action Plan	Planning Document			
Status of Existing Leaseholder Requests	Current Leases			<u>X</u>
Applications for New Leases	Lease Applications	*	X	<u>X</u>
Lease Best Management Practices Plans (Hold, TBD)	Leases–Regulatory			

Topics	Category	Jul 2024	Nov 2024	Mar 2025
Special Projects, Informational Topics, and Emerging Management Issues				
Coastal Fishing Communities Project	MRC Project	*	*	X
Kelp Restoration and Recovery Tracking	Kelp			
Experimental Fishing Permit (EFP) Program				
Box Crab Exploratory Fishing	EFP		X	
Pop-Up Gear in State-Managed Fisheries	EFP		X	
EFP Program Review	EFP			X

Key: X = Discussion X/R = Recommendation and may move to Commission * = Written or oral agency update

From: Phoebe Lenhart <[REDACTED]>

Sent: Wednesday, October 23, 2024 03:24 PM

To: FGC <FGC@fgc.ca.gov>

Subject: November 6, 2024 meeting. #12: General public comment for items not on the agenda. Please, NO Salmon fishing in CA. Status of all salmon species? Status of coastal mammals? Consideration of the Southern Resident Pacific orca whales.

Dear FGC,

This email is sent to your attention regarding numerous concerns.

First, the status of the salmon species (ALL) is not on the agenda for this meeting. I protest the omission of the consideration on the state of the salmon on the agenda. I believe, until all 7 species of Pacific salmon are no longer considered “endangered” or “threatened”, all the species of Pacific salmon are of urgency to be listed on the agenda at every meeting. In addition, please protect all the Chinook salmon in order to feed the Southern Resident Pacific (SRP) orca whales, in particular. The survival of the SRP is dependent upon the supply of Chinook salmon. Please include all the species of Pacific salmon on the agenda for consideration. Thank you.

Second, how can multiple agencies involved with the survival of the Chinook salmon fail? What kind of “management” do you call this? How can 830,000 Chinook fry die swimming to the Klamath River? How can multiple agencies “fail” by not testing the condition of the Klamath River before releasing ALL the Chinook fry to their subsequent death? This matters immensely as other marine mammals in the Pacific Ocean dependent upon the salmon to eat!! Particularly the Southern Resident Pacific (SRP) orcas. What are these agencies going to do to prevent future disasters and to supply the Pacific Ocean with abundant Chinook salmon for all marine life dependent on them?

Third, of great importance is the wellbeing of small coastal mammals in CA. I would like the DFW/FGC to investigate the status of the CA mink, the CA fisher, the River otters, the Humboldt marten and etc. It is very rare when any of these small coastal mammals are accounted for at all in your meetings. With the development of off shore wind turbines, pollution, habitat loss, among many other factors, these are issues that impact small marine mammal survival.

Fourth, the Southern Resident Pacific (SRP) orca whale pod has 73 members. According to

research, there was only 1 birth in the pod this year. The population of the SRP has been in decline for 20 years and has been considered as “starving” for many years due to low Chinook salmon stocks. What are your agencies doing to correct this failure?

Sincerely,
Phoebe Lenhart



Sent from my iPad