

California Fish and Game Commission
Marine Resources Committee
Meeting Binder



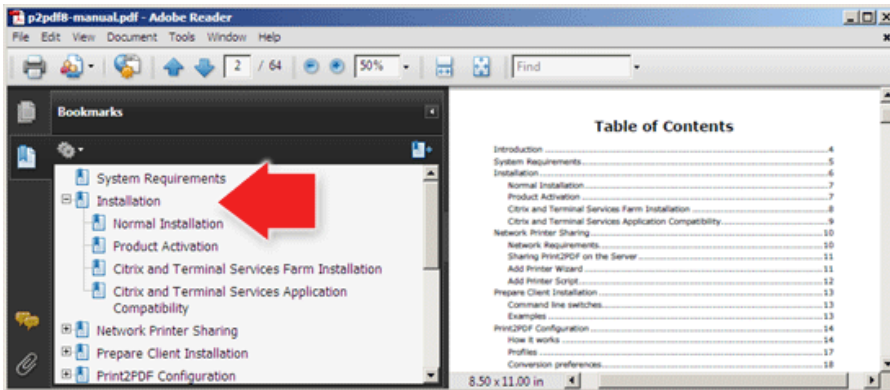
July 29, 2020
Webinar/Teleconference


EASY GUIDE TO USING THE BINDER

1. Download and open the binder document using your Adobe Acrobat program/app.
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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.
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7. Upon locating a staff summary for an agenda item, notice that you can obtain more information by clicking/tapping on any item underlined in blue.
8. Return to the staff summary by simply clicking/tapping on the item in the bookmark panel.
9. Do not hesitate to contact staff if you have any questions or would like assistance.

OVERVIEW OF FISH AND GAME COMMISSION COMMITTEE MEETING

- Welcome to this meeting of the Marine Resources Committee. The Committee is comprised of up to two Commissioners who co-chair each meeting; members are assigned annually by the Commission.
- Our goal today is informed discussion to guide future decision making, and, we need your cooperation to ensure a lively and comprehensive dialogue.
- We are operating under Bagley-Keene Open Meeting Act, but it is important to note that the Committee chairs cannot take action independent of the full Commission; instead, the chairs make recommendations to the full Commission at regularly scheduled meetings.
- These proceedings may be recorded and posted to our website for reference and archival purposes.
- Items may be heard in any order pursuant to the determination of the Committee co-chairs.
- In the unlikely event of an emergency, please locate the nearest emergency exits.
- As a general rule, requests for regulatory change need to be redirected to the full Commission and submitted on the required petition form, FGC 1, titled “Petition to the California Fish and Game Commission for Regulation Change” (Section 662, Title 14, CCR). However, at the Committee’s discretion, the Committee may request that staff follow up on items of potential interest to the Committee and possible recommendation to the Commission.
- Committee meetings operate informally and provide opportunity for everyone to provide comment on agenda items. If you wish to speak on an agenda item, please follow these guidelines:
 1. Raise your hand and wait to be recognized by the Committee.
 2. Provide your name, affiliation (if any), and the number of people you represent.
 3. Time is limited; please keep your comments precise to give others time to speak.
 4. If several speakers have the same concerns, please appoint a group spokesperson.
 5. If speaking during general public comment, 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).

Commissioners
Eric Sklar, President
Saint Helena

Samantha Murray, Vice President
Del Mar

Jacque Hostler-Carmesin, Member
McKinleyville

Russell E. Burns, Member
Napa

Peter S. Silva, Member
Jamul

STATE OF CALIFORNIA
Gavin Newsom, Governor

Fish and Game Commission



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Wildlife Heritage and Conservation!*

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MARINE RESOURCES COMMITTEE

Committee co-chairs: Commissioner Silva and Commissioner Murray

Meeting Agenda

July 29, 2020; 9:00 a.m.

Webinar / Teleconference

The California Fish and Game Commission is conducting this committee meeting by webinar and teleconference to avoid a public gathering and protect public health during the COVID-19 pandemic, consistent with Executive Order N-33-20.

Pursuant to Executive Order N-29-20, members may participate in meetings remotely. The public may provide public comment during the public comment periods, and otherwise observe remotely consistent with the Bagley-Keene Open Meeting Act.

To participate in the meeting, please join via Zoom or by telephone.

Please [click here](http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=180646) or go to <http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=180646> for instructions on how to join the meeting.

Note: See important meeting deadlines and procedures, including written public comment deadlines, starting on page 4. Unless otherwise indicated, the California Department of Fish and Wildlife is identified as Department. All agenda items are informational and/or discussion only; the Committee develops recommendations to the Commission but does not have authority to make policy or regulatory decisions on behalf of the Commission.

Call to order

1. Approve agenda and order of items

2. General public comment for items not on agenda

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

3. Recreational red abalone fishery

Receive updates and develop potential committee recommendations related to developing a fishery management plan and potential rulemaking to extend the current recreational fishery closure.

- (A) **Fishery management plan:** Review Administrative Team report recommendations regarding management strategy integration.
- (B) **Current fishery closure sunset date:** Proposed rulemaking to extend the recreational red abalone fishery closure beyond the current sunset date.

4. Experimental Fishing Permit Program phase II

Receive Department update and develop potential committee recommendation on proposed experimental fishing permit program, including potential fee structure and application cycle.

5. Marine Life Management Act master plan implementation

Receive Department update on master plan for fisheries implementation efforts, including potential regulations for the California grunion recreational fishery and development of an enhanced status report.

6. Staff and agency updates requested by the Committee

Receive updates from staff and other agencies related to topics for which the Committee has requested an update.

Note: To enhance meeting efficiency in the webinar/teleconference format, the Committee intends to receive updates primarily in writing. The public will be given an opportunity to provide comments, although the level of in-meeting discussion will be at the discretion of the Committee.

- (A) California Ocean Protection Council
- (B) Department
 - I. Overview of potential rulemaking to allow for operation, maintenance, and repair of existing artificial structures in state marine reserves
 - II. Other
- (C) Commission staff: Update on Coastal Fishing Communities Project progress
- (D) Other

7. Future agenda items

- (A) Review work plan agenda topics, priorities, and timeline
- (B) Potential new agenda topics for Commission consideration

Adjourn

California Fish and Game Commission 2020 Meeting Schedule

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

Meeting Date	Commission Meeting	Committee Meeting
August 18		Tribal Webinar/Teleconference
August 19 - 20	Webinar/Teleconference	
September 17		Wildlife Resources Webinar/Teleconference
October 14 - 15	Webinar/Teleconference	
November 9		Tribal Webinar/Teleconference
November 10		Marine Resources Webinar/Teleconference
December 9 - 10	Webinar/Teleconference	

OTHER 2020 MEETINGS OF INTEREST

Association of Fish and Wildlife Agencies

- September 13-16, virtual meeting

Pacific Fishery Management Council

- September 10-17, Spokane, WA
- November 13-20, Garden Grove, CA

Pacific Flyway Council

- August 28, virtual meeting

Western Association of Fish and Wildlife Agencies

- July 9-14, virtual conference

Wildlife Conservation Board

- August 26, Sacramento, CA
- November 18, Sacramento, CA

Important Committee Meeting Procedures Information

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

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

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

PERSONS WITH DISABILITIES

Persons with disabilities needing reasonable accommodation to participate in public meetings or other Commission activities are invited to contact the Reasonable Accommodation Coordinator at (916) 651-1214. Requests for facility and/or meeting accessibility should be received at least 10 working days prior to the meeting to ensure the request can be accommodated.

SUBMITTING WRITTEN MATERIALS

The public is encouraged to attend Committee meetings and engage in the discussion about items on the agenda; the public is also welcome to comment on agenda items in writing. You may submit your written comments by one of the following methods (only one is necessary): **Email** to fgc@fgc.ca.gov; **mail** to California Fish and Game Commission, P.O. Box 944209, Sacramento, CA 94244-2090; or **deliver** to California Fish and Game Commission, 1416 Ninth Street, Suite 1320, Sacramento, CA 95814.

COMMENT DEADLINES

The **Written Comment Deadline** for this meeting is **5:00 p.m. on July 16, 2020**. 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 July 24, 2020**. Written comments received by this deadline will be made available to Commissioners at the meeting.

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

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

PETITIONS FOR REGULATION CHANGE

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

SPEAKING AT THE MEETING

1. Committee meetings operate informally and provide opportunity for everyone to comment on agenda items. If you wish to speak on an agenda item, please follow these guidelines:
2. Raise your hand and wait to be recognized by the Committee co-chair(s). You will raise your hand via the "hand raise" button on Zoom or by pressing "#2" if you are on the phone.
3. Once recognized, please begin by giving your name and affiliation (if any) and the number of people you represent.
4. Time is limited; please keep your comments concise so that everyone has an opportunity to speak.
5. If there are several speakers with the same concerns, please try to appoint a spokesperson and avoid repetitive comments.
6. If speaking during general public comment, the subject matter you present should not be related to any item on the current agenda (public comment on agenda items will be taken at the time the Committee members discuss that item). As a general rule, general 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 **Comment Deadline** and approved by the Commission executive director before the meeting.

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

COMMITTEE STAFF SUMMARY FOR JULY 29, 2020 MRC

2. GENERAL PUBLIC COMMENT**Today's Item**Information Action

Receive public comment for items not on the agenda.

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

MRC receives two types of correspondence or comment under general public comment: requests for MRC to consider new topics and informational items. As a general rule, requests for regulatory change must be submitted to FGC on petition form FGC 1, *Petition to the California Fish and Game Commission for Regulation Change* (Section 662, Title 14, CCR). However, MRC may, at its discretion, request that staff follow up on items of potential interest for possible recommendation to FGC.

Significant Public Comments

1. A commercial kelp harvester and kelp bed lease holder challenges the use of recent (10-year) statewide average landings of giant kelp as the proper metric to establish harvesting caps in regulation as proposed by DFW. The commenter states that the draft as proposed would unnecessarily constrain kelp harvesting businesses, suggesting instead that actual giant kelp availability and variability data should be considered as well as longer trends that reflect differences in the industry over time. He provides additional details to support his suggestions, including a report from MPC Applied Sciences with aerial kelp availability data (Exhibit 1).
2. A group of commercial edible seaweed harvesters offer ten observations and recommendations on the recently-proposed amendments to kelp and algae harvest regulations. The harvesters are seeking more opportunities for input and involvement in the process to update the regulations. Among other things, the group formally requests that FGC recommend a series of fact-finding exercises be conducted, including consultations, expert panel discussions, and field visits with seaweed harvesters (Exhibit 2).
3. Two coastal advocates raise concerns that lobster traps along a Laguna Beach marine protected area present a potential impediment to gray whale migration and potential entanglement risk. With the comment letter they have submitted a presentation, talking points, and a video (link included) that have been approved to show during the meeting (Exhibit 3).

Recommendation

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

Exhibits

1. [Email from Tony Copp, KNOCEAN Sciences, Inc.](#), received Jun 16, 2020

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2. [Email and attached comments from Jeanine Pfeiffer on behalf of 14 seaweed harvesters and business owners](#), received Jul 6, 2020
3. [Email and attachments from Penny Elia](#), including her comment letter and presentation, as well as a video (<https://youtu.be/q9x5uQXkmlE>) and talking points for Kurt Leiber, Ocean Defenders Alliance, received Jul 16, 2020

Committee Direction/Recommendation (N/A)

COMMITTEE STAFF SUMMARY FOR JULY 29, 2020 MRC

3A. RECREATIONAL RED ABALONE FISHERY MANAGEMENT PLAN**Today's Item**Information Action

Receive DFW update on administrative team report recommendations related to management strategy integration for a red abalone fishery management plan (FMP), and consider a committee recommendation.

Summary of Previous/Future Actions

- | | |
|---|--|
| • FGC supported recreational red abalone FMP development per MRC recommendation | Oct 8, 2014; Mt. Shasta |
| • FGC received peer review results for draft FMP and re-referred to MRC | Oct 17, 2018; Fresno |
| • FGC supported revised process per MRC recommendation | Dec 12-13, 2018; Oceanside |
| • MRC received administrative team report recommendations | Mar 17 and Apr 29, 2020; MRC, webinar/teleconference |
| • Today's discussion and consider potential recommendation | Jul 29, 2020; MRC, webinar/teleconference |

Background

DFW has been developing an FMP for the north coast recreational red abalone fishery since 2014 and has provided regular updates to MRC and FGC (see Exhibit 1 for staff summaries from previous meetings summarizing the process to date). At the Dec 2018 FGC meeting, following peer review of two draft management strategies, FGC approved an MRC recommendation to: (1) support integrating aspects of both strategies using a simulation modeling approach co-developed by DFW and a stakeholder team led by The Nature Conservancy (TNC), (2) develop a *de minimis* fishery option with defined triggers in lieu of the current total closure, and (3) request that DFW develop a process to integrate increased stakeholder and MRC involvement.

Between Mar 2019 and Mar 2020, in response to FGC recommendations, DFW worked with three collaborative teams—an administrative team, a modeling team, and a project team—to develop options for an integrated draft management strategy and explore *de minimis* fishery options. At its Mar/Apr 2020 meeting, MRC received a draft administrative team report titled *Summary of the Management Strategy Integration Process for the North Coast Recreational Red Abalone Fishery Management Plan*. The draft report included a synthesis of the modeling team's results regarding length of time until a fishery was projected to be viable under various conditions; the team found that a *de minimis* fishery option is not on the immediate horizon, and advised a more deliberative approach to considering recommendations. The draft report also outlined eight recommendations regarding management strategy integration for potential inclusion in a revised draft red abalone FMP.

MRC discussed the eight recommendations at its Mar/Apr 2020 meeting; however, MRC requested that the item be continued to the Jul 2020 MRC meeting to allow additional time to

COMMITTEE STAFF SUMMARY FOR JULY 29, 2020 MRC

review the recommendations. MRC also requested that DFW attend the Jul 2020 MRC meeting prepared to (1) clarify which administrative team recommendations require immediate and/or specific decisions from FGC to advance an FMP and (2) suggest options for tribal engagement in abalone data and management efforts. MRC also recommended, and FGC supported, that the administrative team finalize its report and that DFW disband the three collaborative teams.

The administrative team finalized its report in Apr 2020 (Exhibit 2; extract of recommendations in Exhibit 3). At today's meeting, DFW will clarify the report recommendations for which MRC/FGC guidance is needed (Exhibit 4); such guidance will allow DFW to move forward with developing an FMP. Note that DFW's presentation also covers agenda item 3B, regarding the red abalone closure sunset date.

Significant Public Comments

1. A former member of the FMP integration administrative team provides independent comments and requests that FGC direct DFW to include in the FMP additional programmatic alternatives to the recommended biological and *de minimis* fisheries (Exhibit 5).
2. The Waterman's Alliance requests that FGC direct DFW to include an option in the FMP to immediately open a small recreational fishery (600-900 per year), sometimes referred to as a biological fishery, and submits a petition containing over 2,500 signatures and a table with individual comments in support of the request (Exhibit 6).

Recommendation

FGC staff: Develop a recommendation on DFW-identified priority items from the administrative team report and support DFW preparation of a draft FMP for further review.

DFW: Provide input for a draft FMP related to administrative team report recommendations 1 (select a management strategy, including a harvest control rule and number of fishery zones), 3 and 4 (biological and *de minimis* fishery considerations), 5 (exceptional circumstances development proposal), and 7 (data management plan development) (Exhibit 3).

Exhibits

1. Background documents: Staff summaries for [Dec 12-13, 2018 FGC meeting, agenda item 15](#); [Mar 20, 2019 MRC meeting, agenda item 5](#); and [Mar 17, 2020 MRC meeting, agenda item 4](#).
2. [Final administrative team report](#), dated Apr 17, 2020
3. [Recommendations extracted from final administrative team report](#)
4. [DFW presentation](#)
5. [Email from Jack Likins](#), received May 7, 2020
6. [Email from Joshua Russo, Watermen's Alliance, transmitting petition with over 2500 signatures and comments table](#), received Jun 11, 2020

COMMITTEE STAFF SUMMARY FOR JULY 29, 2020 MRC

Committee Direction/Recommendation

The Marine Resources Committee recommends that the Commission support DFW developing a draft FMP for further MRC and public review to include all FMP elements identified in the administrative team report recommendations with the following options selected:

Harvest control rule: _____

Number of fishing zones: _____

De minimis/biological fishery option: _____

COMMITTEE STAFF SUMMARY FOR JULY 29, 2020 MRC

3B. RECREATIONAL RED ABALONE FISHERY CLOSURE SUNSET DATE**Today's Item**Information Action

Receive DFW update and consider developing a committee recommendation related to a proposed rulemaking to extend the recreational fishery closure beyond the current sunset date.

Summary of Previous/Future Actions

- FGC closed recreational red abalone fishery for one year Dec 7, 2017; San Diego
- FGC extended fishery closure to 2021 Dec 12-13, 2018; Oceanside
- **Today's update and potential recommendation** Jul 29, 2020; MRC, webinar/teleconference
- Proposed notice hearing Aug 19-20, 2020; webinar/teleconference

Background

Until a fishery management plan (FMP) is developed and adopted (agenda item 3A), red abalone fishery management is guided by the Abalone Recovery and Management Plan (ARMP). In 2017, following dramatic environmental conditions that led to extensive loss of bull kelp beds and significant abalone die-off, FGC closed the recreational red abalone fishery; this unprecedented action was taken consistent with the ARMP and DFW observations, data and analysis. The closure included a sunset provision to re-open the fishery on Apr 1, 2019, or upon adoption of an abalone FMP, whichever came first.

In 2018, FGC determined that conditions had continued to worsen and, to facilitate recovery of the red abalone population during FMP preparation, in Dec 2018 FGC extended the fishery closure for two additional years, to Apr 1, 2021 (see Exhibit 1 for additional background). The red abalone FMP will establish guidance and options to move from closure to scaled reopening of the fishery, including a *de minimis* option, as environmental indicators and abalone stock condition meet reopening criteria (see agenda item 3A, this meeting).

In Jun 2020, FGC received a DFW report that poor environmental and abalone stock conditions have continued to persist or worsen in northern California, warranting a continued fishery closure beyond the current sunset date (exhibits 2 and 3). FGC directed MRC to further discuss closure options and provide a recommendation to either extend or remove the closure sunset date, consistent with the DFW recommendation made at the Jun meeting. DFW initially proposed removing the sunset date because the forthcoming FMP and its implementing regulations, once adopted, are likely to adjust the closure; however, today DFW will present a revised recommendation to extend the closure sunset date by five years rather than indefinitely (see DFW presentation in Exhibit 4 under agenda item 3A, this meeting).

Significant Public Comments (N/A)

COMMITTEE STAFF SUMMARY FOR JULY 29, 2020 MRC

Recommendation

FGC staff: Recommend that FGC extend the red abalone closure sunset date for five years to Apr 1, 2026 through a rulemaking to commence in Aug 2020, consistent with DFW's updated recommendation. Request that DFW report annually to FGC on the status of environmental and abalone stock conditions and recovery.

DFW: Revise the closure sunset date currently in regulation to extend the recreational red abalone fishery closure for five years (to Apr 1, 2026).

Exhibits

1. [Staff summary from Aug 22-23, 2018 FGC meeting, agenda item 12](#) (for additional background)
2. [Staff summary from Jun 24-25, 2020 FGC meeting, agenda item 14](#) (for additional background)
3. [DFW presentation from Jun 24-25, 2020 FGC meeting, agenda item 14](#) (for additional background)

Committee Direction/Recommendation

The Marine Resources Committee recommends that the Commission extend the current recreational red abalone fishery closure for five years, with a sunset date of April 1, 2026, through a rulemaking to commence in August 2020, and request that the Department provide annual reports to the Commission regarding the status of environmental and abalone stock conditions and recovery.

COMMITTEE STAFF SUMMARY FOR JULY 29, 2020 MRC

4. EXPERIMENTAL FISHING PERMIT PROGRAM PHASE II**Today's Item**Information Action

Receive DFW update and develop potential MRC recommendation on proposed experimental fishing permit (EFP) program, including potential fee structure and application cycle.

Summary of Previous/Future Actions

- | | |
|---|--|
| • FGC approved two-phase rulemaking approach | Jun 12-13, 2019; Redding |
| • FGC adopted EFP Phase I regulations | Oct 9-10, 2019; Valley Center |
| • MRC reviewed initial proposed Phase II regulations and provided direction | Mar 17 and Apr 29, 2020; MRC, webinar/teleconference |
| • Today's update and consider potential recommendation | Jul 29, 2020; MRC, webinar/teleconference |

Background

On Jan 1, 2019, California Fish and Game Code Section 1022, part of the Fisheries Innovation Act of 2018, took effect and provides FGC authority to approve EFPs that authorize for a variety of purposes—such as research, data collection and exploratory fishing—commercial or recreational marine fishing activities otherwise prohibited by code or regulation. Section 1022 requires that FGC establish by regulation “an expeditious process” for DFW review, public notice and comment, FGC approval, and prompt DFW issuance of EFPs. The new law repealed and replaced Section 8606, which formerly authorized FGC to approve experimental gear permits with a more limited scope.

In Jun 2019, FGC divided development of implementing regulations for an EFP program into two-phases:

- Phase I, focused on adopting EFP regulations to continue the experimental brown box crab fishery (adopted in Oct 2019); and
- Phase II, focused on establishing a comprehensive EFP program consistent with the new law (now underway).

At the Nov 2019 MRC meeting, DFW highlighted initial planning efforts for Phase II EFP program development, including plans for a public workshop to be hosted by DFW and FGC staff in partnership with The Nature Conservancy. The workshop was held on Jan 14, 2020 and supported dialogue amongst stakeholders regarding how to best design a state EFP program to meet the requirements of the new law while accounting for stakeholder needs.

At the Mar/Apr 2020 MRC meeting, DFW presented an overview of the workshop; draft EFP Program concepts shaped through workshop feedback, including initial concepts for a tiered permit fee structure and an EFP application process; and a draft regulatory timeline (Exhibit 1). MRC was generally supportive of the program concepts as proposed but requested that DFW analyze options for a tiered permit fee structure and refine the draft EFP application cycle for discussion in Jul 2020 (this meeting); at its Jun 2020 meeting, FGC approved MRC's recommendation to request the additional information.

COMMITTEE STAFF SUMMARY FOR JULY 29, 2020 MRC

Today, DFW will present the requested information (Exhibit 2) to clarify the proposal and inform a potential MRC recommendation related to a draft rulemaking. Note that a draft timeline proposing specific dates for this rulemaking was placed on hold at the Jun FGC meeting due to DFW and FGC regulatory staff capacity constraints; however, DFW Marine Region staff are poised to develop regulatory materials based on MRC's recommendation and FGC approval in order to be prepared for the time when regulatory staff constraints are eased.

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

FGC staff: Discuss and potentially develop a recommendation for the proposed permit tiers, associated fee structure and EFP application cycle, and consider supporting advancing the proposed EFP Program regulations to rulemaking with a timeline to be determined.

Exhibits

1. [DFW presentation from the Mar 17 and Apr 29 MRC meeting](#) (for additional background)
2. [DFW presentation](#)

Committee Direction/Recommendation

The Marine Resources Committee recommends that the Commission advance to rulemaking the proposed Phase II regulations to establish an Experimental Fishing Permit Program as proposed by the Department, including the proposed permit tiers, associated fee structure and application cycle as discussed today, on a timeline to be determined.

COMMITTEE STAFF SUMMARY FOR JULY 29, 2020 MRC

5. MARINE LIFE MANAGEMENT ACT MASTER PLAN IMPLEMENTATION**Today's Item****Information** **Action**

Receive DFW update on implementation of the Marine Life Management Act (MLMA) master plan for fisheries, including developing an enhanced status report and potential regulations for the California grunion recreational fishery.

Summary of Previous/Future Actions

- | | |
|---|--|
| • FGC adopted 2018 MLMA master plan for fisheries | Jun 20-21, 2018; Sacramento |
| • DFW implementation updates | 2019-2020; MRC, various |
| • Today's update and discussion | Jul 29, 2020; MRC, webinar/teleconference |

Background

This is a standing agenda item for MRC to track progress on actions related to the *2018 Master Plan for Fisheries: A Guide for Implementation of the Marine Life Management Act* (2018 Master Plan), which was adopted by FGC and is being implemented by DFW as a framework for fisheries management.

Consistent with California Fish and Game Code Section 7073(b)(2) a key step in implementing the MLMA and 2018 Master Plan is developing a priority list for developing fisheries management plans (FMPs) and other scaled management efforts based on the prioritization framework established through the 2018 Master Plan. Fisheries that DFW determines have the greatest need for changes in conservation and management measures to comply with MLMA policies and principles are given highest priority.

As part of the prioritization process, DFW is developing ecological risk assessments (ERAs) and enhanced status reports (ESRs) that consider the status of the fishery and current and future management and data needs. DFW prepared an interim prioritization list in 2018 for 45 state-managed fisheries; in Nov 2019, DFW presented an updated prioritization list for key finfish fisheries and highlighted progress on integrating invertebrate species.

In Feb 2020, DFW staff presented FGC with an up-to-date implementation work plan, including an updated priority list that now includes several invertebrate species. DFW highlighted that it would be evaluating giant kelp and California grunion and adding these species to the priority list, and that it had identified California halibut as the next prioritized species for FMP development (Exhibit 1).

DFW Updates*California Fisheries Portal Release*

At this meeting, DFW will highlight its new *Marine Species Portal* website for California fisheries (Exhibit 2). The web-based portal is a tool described in the 2018 Master Plan and

COMMITTEE STAFF SUMMARY FOR JULY 29, 2020 MRC

implementation work plan to provide searchable access to ESRs for state-managed fisheries. Funded by the California Ocean Protection Council, DFW demonstrated the new tool via public webinar on Jul 8 and the portal went live on Jul 10 (<https://marinespecies.wildlife.ca.gov/>).

Potential California Grunion Recreational Fishing Regulation Changes

In Feb 2020, FGC granted a regulation change petition to amend take regulations for California grunion to be more conservative and requested that DFW develop specific proposed changes upon completing an ESR for the species. For today's meeting, DFW provided a written update (Exhibit 3), noting that it completed the grunion ESR in May and is developing potential regulation changes consistent with FGC's request. DFW is prepared to bring specific potential regulation changes to the Nov MRC meeting following an online public survey and tribal outreach.

Significant Public Comments

Three California residents expressed support for extending the closed recreational fishing season and setting a bag limit for California grunion, as requested in the original petition granted by FGC (see example in Exhibit 4).

Recommendation

FGC staff: Schedule a follow-up MRC discussion of proposed grunion regulations in Nov 2020 or after DFW completes the public survey and tribal outreach, and develops specific recommendations.

Exhibits

1. [MLMA master plan implementation work plan](#), dated Feb 7, 2020
2. [DFW slide displaying the Marine Species Portal homepage](#)
3. [DFW written update on California grunion](#), received Jul 13, 2020
4. [Email from Silvio Curtis](#), received Jul 12, 2020

Committee Direction/Recommendation (N/A)

COMMITTEE STAFF SUMMARY FOR JULY 29, 2020 MRC

6. STAFF AND AGENCY UPDATES**Today's Item****Information** **Action**

Receive updates from staff and other agencies related to topics for which MRC has requested an update.

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

This is a standing item for DFW and other government agencies to provide an update on marine-related activities of interest. For this meeting, FGC requested that agencies focus on updates relevant to MRC's work and, where possible, provide written updates in advance.

(A) California Ocean Protection Council (OPC)

OPC has provided a written update regarding efforts related to marine aquaculture, a statewide kelp recovery research program, and fishing gear innovation testing, including testing of trap buoy pop-up gear as requested by MRC (Exhibit 1). OPC's Fisheries Program Manager Paige Berube will be available to answer any questions.

(B) DFW**I. Operation, maintenance, and repair of existing artificial structures in marine protected areas (MPAs)**

At its Jun 2020 meeting, FGC referred to MRC an emerging management issue related to MPAs: artificial structures that were installed under permits issued by federal, state, or local agencies prior to MPA designation. The required operation and maintenance of artificial structures may result in incidental injury, damage, take or possession of living, geological or cultural resources that are otherwise protected. The issue of artificial structures identified during the south coast regional MPA planning process, and regulations for activities within specific south coast MPAs were written to allow for continued operation and maintenance of existing structures.

There are artificial structures within other MPAs throughout the state that require operation and maintenance activities not explicitly permitted in the MPA regulations. Members of the MPA Statewide Leadership Team discussed the issue, and DFW is developing a proposed regulatory pathway to allow ongoing operation and maintenance of artificial structures that were installed prior to MPAs being designated. DFW anticipates that the proposed regulatory pathway will be ready for MRC review and potential recommendation in Nov 2020.

II. Other

None identified at the time of this report.

COMMITTEE STAFF SUMMARY FOR JULY 29, 2020 MRC

(C) **FGC staff***Coastal Fishing Communities Project update*

Rose Dodgen, Sea Grant State Fellow to FGC since Feb 2020, has resumed staff work on the Coastal Fishing Communities Project, which was most recently discussed by MRC in Nov 2019 (see Exhibit 2 for project background). Rose has reviewed the ten staff recommendations from the final FGC *Staff Synthesis Report on California Coastal Fishing Communities Meetings* (available at <https://fgc.ca.gov/Committees/Marine/Coastal-Fishing-Communities-Project>), which was received by MRC in Jul 2019. The staff recommendations were intended to serve as “initial concepts for potential development.” MRC directed staff to further develop the staff recommendations in order to help evaluate and prioritize those recommendations on which FGC may choose to act. Rose has prepared informational sheets for each staff recommendation that record relevant efforts made by staff, collaborators, and/or through external sources as a starting point for further evaluation (Exhibit 3). Staff has also been exploring a more cohesive approach to evaluate the staff recommendations and has developed a straw proposal to initiate dialogue with stakeholders and MRC (Exhibit 4).

(D) **Other**

This is an opportunity for other agencies in attendance to provide updates relevant to MRC topics.

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

FGC staff: Schedule discussion on the proposal for accommodating preexisting artificial structures within MPAs for the Nov 2020 MRC meeting. Provide direction regarding next steps for the Coastal Fishing Communities Project.

Exhibits

1. [OPC agency update](#), received Jul 16, 2020
2. [Staff summary from Nov 5, 2019 MRC meeting, agenda item 10, regarding coastal fishing communities](#) (for additional background)
3. Overview of recent efforts associated with recommendations in *2019 Staff Synthesis Report on California Coastal Fishing Communities Meetings* (to be provided separately)
4. A potential framework for evaluating recommendations in the 2019 staff synthesis report (to be provided separately)

Committee Direction/Recommendation (N/A)

COMMITTEE STAFF SUMMARY FOR JULY 29, 2020 MRC

7. FUTURE AGENDA ITEMS**Today's Item**Information Action

Review upcoming agenda items scheduled for the next and future MRC meetings, discuss priorities and timeline, and consider requests for new agenda items.

Summary of Previous/Future Actions

- | | |
|-----------------------------|--|
| • FGC approved MRC agenda | Jun 24-25, 2020; webinar/teleconference |
| • Today's discussion | Jul 29, 2020; MRC, webinar/teleconference |
| • Next MRC meeting | Nov 10, 2020; MRC, webinar/teleconference |

Background

Committee topics are referred by FGC and scheduled as appropriate. FGC-referred topics and their current schedule are shown in the MRC work plan (Exhibit 1), and currently include several complex and time-intensive topics under development. MRC has placed emphasis on issues of imminent regulatory or management importance; thus, scheduling current topics and considering new topics for MRC review will require planning relative to existing workload and timing considerations.

July MRC Meeting Topics

At the Jun 24-25, 2020 FGC meeting, staff highlighted that MRC's work plan and draft agenda for this meeting included more topics than could be addressed in a single day. Staff recommended that FGC consider selecting fewer substantive topics for individual MRC meetings to allow more in-depth dialogue, consistent with the intent of committee meetings, provided that the goal of advancing the most sensitive or urgent management issues under FGC's jurisdiction not be compromised.

FGC discussed a strategy to prioritize and schedule in-depth discussions based on a topic's stage of development and readiness for MRC direction or recommendation. FGC also provided guidance that updates on topics still in the formative stage could be provided in writing to abbreviate the in-meeting discussion in favor of the more substantive discussion items; in that spirit, several updates are provided in writing for today's meeting. In addition, for today's meeting FGC approved deferring five of the twelve originally-proposed agenda topics to a future date:

1. Update on next steps for developing an aquaculture action plan,
2. update on kelp restoration and recovery tracking,
3. update on draft commercial kelp and algae harvest regulations,
4. update on recreational swordfish fishery, and
5. cowcod rockfish recovery and stock status (South of Cape Mendocino).

COMMITTEE STAFF SUMMARY FOR JULY 29, 2020 MRC

MRC Work Plan and Timeline

The work plan (Exhibit 1) has been updated to reflect a revised schedule for the five deferred topics and two completed topics (herring eggs on kelp regulations, and whale and turtle protections in Dungeness crab fisheries) which moved via MRC recommendation from MRC to FGC.

Potential Topics for Nov 2020 MRC Meeting

The updated work plan identifies 11 topics as potential agenda items for the Nov 2020 MRC meeting, including the items deferred from today. Potential agenda topics are grouped here by the type of anticipated action (receive update or potential recommendation) to help inform a discussion about prioritization.

Updates

1. MLMA master plan for fisheries implementation (standing agenda item)
2. Red abalone fishery management plan development
3. Coastal Fishing Communities Project
4. Cowcod rockfish recovery
5. Kelp restoration and recovery tracking
6. Marine aquaculture: Statewide aquaculture action plan development

Potential Recommendations

7. Marine aquaculture: Consider ending or extending FGC's six-month hiatus in accepting new aquaculture lease applications
8. Kelp and algae: Discuss potential changes to commercial harvest regulations
9. California grunion: Discuss proposed recreational take regulations
10. Swordfish: Receive and discuss DFW recommendation regarding potential changes to recreational take regulations
11. Marine protected areas: Discuss a potential regulation change to authorize take during maintenance of preexisting artificial structures

Discuss and Recommend New MRC Topics

Today is an opportunity to identify any potential new agenda topics to recommend to FGC for referral to MRC. No new topics are recommended by staff for FGC referral to MRC.

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

FGC staff: Discuss priorities and consider narrowing discussion topics for the next MRC meeting. Consider removing cowcod rockfish recovery, as DFW provided a thorough verbal presentation at the Mar/Apr MRC meeting.

COMMITTEE STAFF SUMMARY FOR JULY 29, 2020 MRC

Exhibits

1. [MRC work plan](#), dated Jul 22, 2020
2. [FGC perpetual timetable for regulatory actions](#), dated Jul 22, 2020

Committee Direction/Recommendation

The Marine Resources Committee recommends that the Commission remove cowcod rockfish recovery from the list of topics on the committee work plan, and that the work plan be updated with the following changes: _____.

From: Tony Copp [REDACTED]
Sent: Tuesday, June 16, 2020 02:52 PM
To: Flores Miller, Rebecca@Wildlife <Rebecca.FloresMiller@wildlife.ca.gov>; FGC <FGC@fgc.ca.gov>; Ashcraft, Susan@FGC <Susan.Ashcraft@fgc.ca.gov>; Thesell, Harold(David)@FGC <Harold.Thesell@FGC.ca.gov>; [REDACTED]
Cc: Pat Carmichael [REDACTED]
Subject: Re: MBC link

Warning: This email originated from outside of CDFW and should be treated with extra caution.

To: California Fish and Wildlife Commission,

Melissa Miller-Henson, Executive Director,

California Fish and Game Commission

1416 Ninth Street, Suite 1320, Sacramento, CA 95814

CC: Members,

- Eric Sklar, President
- Samantha Murray, Vice President
- Jacque Hostler-Carmesin, Member
- Russell Burns, Member
- Peter S. Silva, Member

To: California Department of Fish and Game

Charlton H. Bonham, Director

c/o California Resources Agency

1416 Ninth Street

Sacramento, CA

Dear Commission and CDFW:

Here are my comments to the California Fish and Wildlife Commission on the California Fish and Wildlife Webinar Presentation (enclosed) sent to me after the conference call meeting. I appreciate reviewing as well that Kelp Reserve Potential Study by MBC Aquatic Science, Inc. (enclosed) done for the Commission for the past several years and that has been used recently as official data Giant Kelp for the Commission. Though I am aware that the Commission indicated that "Landings" were being used as a proxy for

Giant Kelp availability, it seems this MBC report funded for the Commission was timely provided to be a Commission source of authoritative data for any "New Amendments." This comment is directly primarily at the inappropriate proposal to impose a new amendment for a total cap of 3,500 tons per annum of annual harvest for all of California for all Kelp businesses derived from a simple average of Landings per year for the past 10 years.

 [2018 Kelp Report Final to California Commission...](#)

As the Commission knows, I am the signatory for KNOCEAN Sciences, Inc. Kelp Bed Lease No 3 at Point Loma on the initial Lease and its recent renewal, and we have been doing a lot of technical work on our Kelp extract lab work and the detailed technical work on our Giant Kelp extract technology, focused on *Macrocystis pyrifera*, Giant Kelp in Southern California. Our consultant team has in some cases over 40 years experience in the density of Giant Kelp not only offshore State Waters in California, but also Baja, CA, MX. Years ago we share with the Commission when we first filed for an Kelp Bed Lease, we provided this view below of our expectations of Giant Kelp harvesting potential. I know the Commission understands the material difference between annual "Landings" of wet Giant Kelp and the Forest Reserve potential of actual available Kelp that is on the potential supply side of this discussion. As we will note there has been variability in the various years of El Nino and storms, and urchin barrens over time, the most recent being during our first Lease of 2014-2016. that the Giant Kelp ultimately restored itself. The historical data show that. From experience of our team, we knew that this variability would be overcome in different ways and areas. Let us first share our Giant Kelp slide shown to the Commission some years ago.



KSI will Dominate Access to an Estimated 80% of Highest Yield Kelp (*Macrocystis pyrifera*) Locations - The Kelp Oil Supply

Harvest Capacity

- Baja California, (MX) 90,000 tons (Northern and Southern Permisos)
- Southern California 125,000 tons
- Central California 15,000 tons
- Total Average Annual Potential 230,000 tons.*



As you can see, we were pleased that the Commission provided our Lease to what we think is the most productive one offshore Southern California at Point Loma over time.

Overview to Proposal to Use a Statistical Average of 3,500 tons per annum as a Total California Cap on Kelp Harvesting:

I understand I was not on the list in advance to see the Presentation as KNOCEAN had not started harvesting, even though we held the Lease and have approved with Department confirmation one marine scientist to harvest with an SCP, and now, another group at SeaWorld is finalizing arrangement with us to provide to the Commission for another SCP. We now understand without any concern that this communication is resolved and in that spirit we offer these comments having seen the full Presentation and the MBC Aquatics report.

That includes the data and map the Commission has used plus prior F & G uses of pre-MBC Giant Kelp density estimates versus actual landings over time, and we have embedded that with our own prior professional work led by Dale Glantz, co-Author of

the noted *The Amber Forest: Beauty and Biology of California's Submarine Forests*, with a forward by the noted Professor Wheeler J. North, who for decades was involved in the science, direct observations per California Kelp Lease Location, and the density of Giant Kelp forests. Dale was also in charge of all marine operations by Kelco/ISP Alginates, Inc. with its nine large vessels until they had to abandon their Leases due to the negative financial impact of higher operational new state taxes that made operations there uneconomic in 2004, so they were forced by the economics to shut down.

As the Commission understands, there is a massive difference in data based on actual landings of Giant Kelp by all kelp industries and the available of Kelp Forest density available to be harvested, since Landings are a function of the actual industry demand for abalone and other onshore markets used by customers, not the natural marine Pacific Ocean supply that harvesters of kelp work with. Years ago, KNOCEAN started with this potential for Giant Kelp reserves developed by the KNOCEAN team including Mexican Kelp Leases off Baja, CA (MX) where they use sampans to collect the kelp. I know that one of our competitors, Estee Lauder with La Mer, decided to scuba for kelp off Vancouver to tout to customers that their cosmetic products have kelp content.

Barring a major El Nino and starfish/purple urchin problem, we saw this as a national abundant treasure to environmentally and carefully work with.

Of course, all know of the serious and periodic El Nino's which also killed off the offending starfish/purple urchin barrens. But the fact is that Giant Kelp rebounded from those events and as MBC states, 2018 and 2019 are solid Kelp density surpluses. None of the tables below used in this debate do anything but rely on "Landings" not Giant Kelp Forest reserves that would result in quite a different conclusion. In the presentation at the Webinar that I listened in on, I was startled that no mention was made of the current coronavirus pandemic that for months required social distancing, shut down of major operations all over California, high unemployment, bankruptcies, major death rates and new Covid-19 patients still occurring, a condition worst than the Great Depression...instead we are talking about a cap of 3,500 tons per annum on landed harvests as a compromise to shutting down the industry entirely. which will just add to more State unemployment and state costs. I know the existing pandemic and California economy is not the purview of the Commission, but this is a negatively historic time, like not recognizing we are in a Pearl Harbor environment that impacts everything, certainly from the smallest to the larger kelp related California businesses which requires segmented policies and segmented thoroughly analyzed suggested amendment to consider for each part of that business.

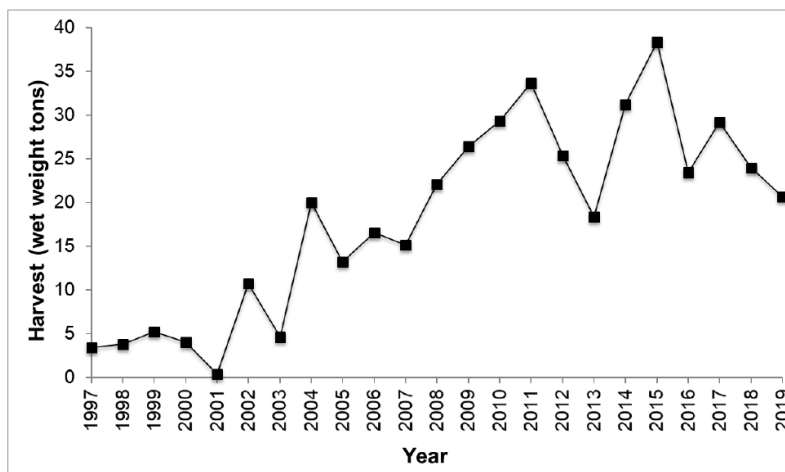
Here are the comments on that "My Amendments" slide to 2019 and the cap proposal of 3,500 tons per year for all kelp businesses using a 10 year average of "landings", used versus those provided to the Commission by MBC. I will cite verbatim from the MBC report the Commission has.

1. The My Amendments Graphs:



Why Amendments?

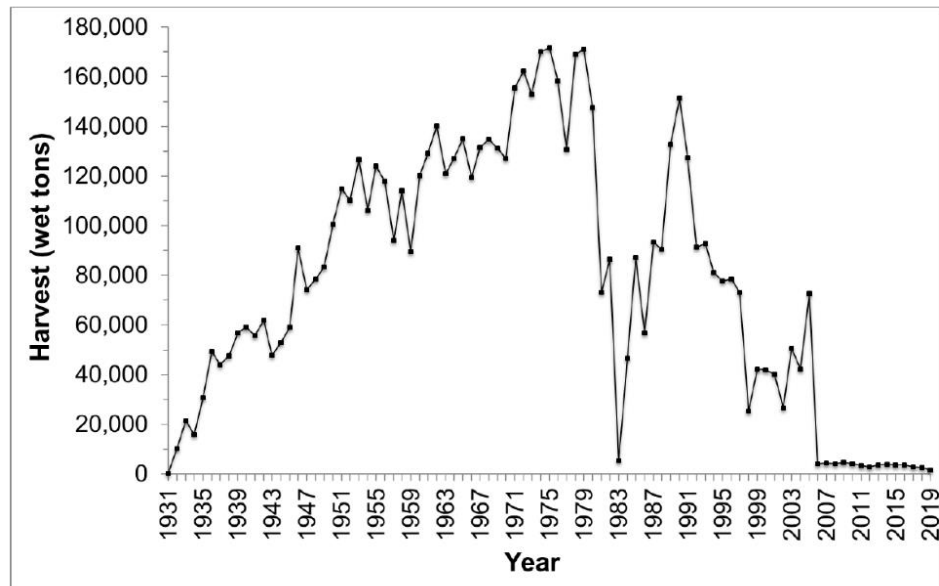
Commercial Edible Seaweed (and Agar-Bearing) 1997-2019





Why Amendments?

Commercial Kelp 1931-2019



To KNOCEAN Sciences, Inc., these graphs are totally misleading, and the other graphs from MBC Aquatics below will show. The graph implies that kelp is almost becoming extinct based on actual harvests. In reality, the graph shows the entire start, growth, and the exit of the algin industry as it relates to kelp harvests in California. The graph from 1931 to 1981 shows the growth of the business. There was much more kelp available for sustainable harvests during that period, but it wasn't needed for business. The only true indication of actual kelp availability for harvest in the graph is displayed from about 1982 to the late 1980's when California was subjected to tremendous 100 and 200- year storms and severe El Niños. You can see on the graph how the kelp resource rapidly improved even after those catastrophic events. From approximately 1990 to 2005, the graph shows the exit of the algin industry from California. On our team, Dale Glantz was probably the only person still alive that observed all these events. There was as much kelp available during that period as when the algin industry was growing, but during that period the algin industry in California could no longer compete with other countries on the world market, so the kelp harvests were targeted only towards higher profit markets. Basically the California algin industry slowly exited the business as it transitioned from a high tech products to an ordinary commodity product. As the Commission knows, Kelco/ISP Alginates, Inc. closed in 2004 which operated nine very large Giant Kelp Harvesting vessels. The reason for shutting down the San Diego alginate plant was not that they had a better site in Scotland. As one Kelco GM then said in an industry interview: "In recent years, the kelp-harvesting business has been hurt by a rise in the cost of fuel, labor and raw materials, site

manager Paul Altamirano said. The biggest blow came in recent months with rate increases for the company's water and sewage service. ISP's sewage fees rose from \$1.3 million to roughly \$2.8 million after new rates were introduced in 2004, Altamirano said. "Our Scotland facility pays one-20th of the costs we pay," Altamirano said. "We're competing with manufacturing facilities in places that don't have the same environmental regulations we have (In California), and they have lower cost structures." The water and sewer rate hikes were mandated by the state, said Michael Scahill, a spokesman for the Metropolitan Wastewater Department. The San Diego City Council approved new rate rules in 2004, which apportioned bills according to usage and the treatments required to clean a company's wastewater." Over 100 hundred employees were laid off. Dale Glantz was one of them.

Dale Glantz was personally responsible for monitoring the resources by aerial surveys and scheduling harvests during this period, and he can attest to the fact that the amount of kelp harvested during this period was in no way indicative of the abundance of kelp available. After 2006 the harvests in the graph only show the relatively low harvests by the abalone industry and a few other "fringe" kelp-related businesses. These slides in no way justify the suggestion for new Amendments.

From local news reports, it is well known that the San Diego area's 2014 "Blob," a mass of stagnant warm water, settled off the Pacific Coast. Kelp as you know relies on upwelling of nutrients from cold water to sustain their growth. The Blob became a El Nino weather pattern in 2015 and 2016, during the first years of the KNOCEAN Kelp Bed Lease which we then subsequently renewed as we believe Giant Kelp will come back and it has. This was compounded by strong storms that shred the kelp strands from their holdfasts on the sea floor. But it is key to understand that Kelp makes its living growing back fast. Giant Kelp evolved from those El Nino cycles which as you know can grow up to two feet per day to a length of 175 feet, and a single Kelp can live for 8-10 years. This regrowth replaced that lost by these storms and El Nino's. As we stated, statistically, the biggest decline in landings from 2005 had to do with the shutdown of Kelco's algin business, and then the demand for abalone, a fraction of what Kelco was doing annually. So what this 10 year average from the chart is from that abalone led demand, which during a recession is totally down. The statistical average thus adopted is irrelevant for amendments to managing in a sound, safe way for California. From MBC, the Central Region also benefited, but the Northern region was not as fortunate. A separate incident also impacted Point Loma, not overharvesting. Recently CBS's "90 Minutes" featured a serious health problem for the US Navy Seal Training area off Point Loma due to a massive sewage leak that polluted the waters where the seals train and a number got sick.

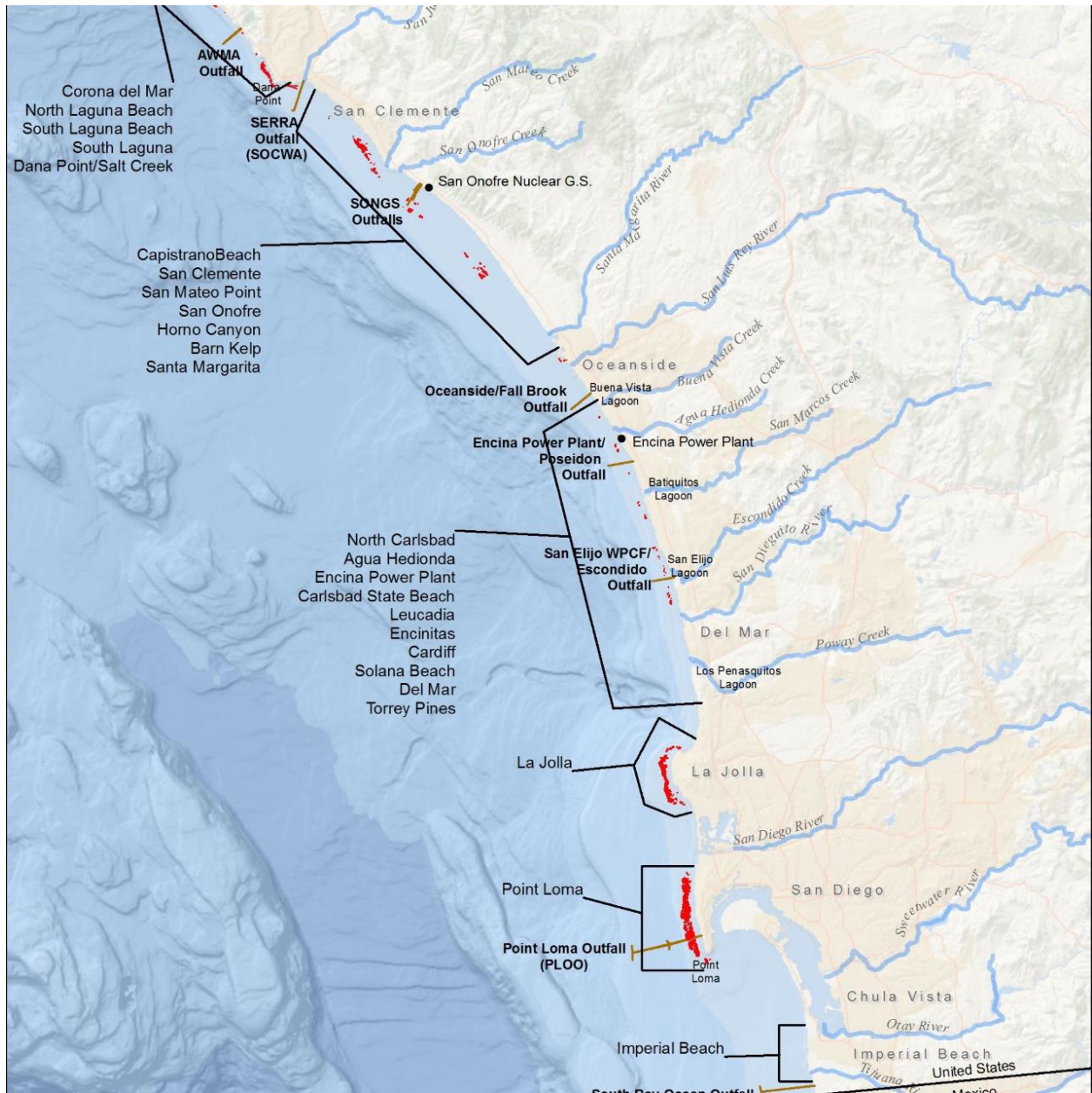
San Diego has agreed starting in 2019 to spend \$3.6 million studying the region's kelp forests, a key part of the local ecosystem that scientists say could disappear as climate change spikes ocean temperatures. The money will cover a five-year research partnership with the Scripps Institute of Oceanography, which has agreed to conduct 450 dives per year at 21 local areas with kelp forests or extensive kelp beds. The new

deal, which the City Council approved, extends a partnership that began in 1992 with Scripps, which is part of UC San Diego.

The partnership was prompted by a rupture that year of the city's sewer pipeline off Point Loma, which released 200 million gallons of untreated sewage into waters near the Point Loma kelp forest. The city's sewer treatment plant on Point Loma has been subject to stricter federal oversight since then.

The MBC Charts and Text Available to the Commission

Below what I will call the Point Loma area map, and also reference the other areas MBC Aquatic Sciences sends to you which is the Central region that you also note in your Presentation.



Region Nine (Point Loma) Study Area from MBC Aquatic Sciences



Central Study Area

From the MBC Aquatic Sciences conclusions:

SOUTHERN CALIFORNIA BIGHT REGIONAL AERIAL KELP SURVEYS

2018 was a good year for kelp.

Central Region :

- Total coverage increased from 4.9 to 7.9 km²
- 23 beds increased in size
- 1 bed decreased in size

Region Nine (Point Loma):

- Total coverage increased from 3.3 to 11.0 km²
- 15 beds increased in size
- 4 beds decreased in size

The total amount of kelp in the Central Region in 2019 was the highest amount observed in over 50 years (see Figure 1). The total amount of kelp in Region Nine was also high, but not as extensive as what has often been observed over the past ten years (see Figure 2) The MBC text tells the story.

III - RESULTS

III.1 - 2018 KELP CANOPY SUMMARY

III.1.A - MONITORING QUESTIONS

One of the objectives of the CRKSC and RNKSC programs is to answer several basic monitoring questions regarding the status of kelp beds within the two regions:

1. What is the maximum areal extent of the coastal kelp bed canopies each year?
 - Central Region - maximum total kelp canopy covered 7.868 km² in 2018,
 - Region Nine - maximum total kelp canopy covered 11.037 km² in 2018.
2. What is the variability of the coastal kelp bed canopy over time?
 - Central Region:
 - maximum total kelp canopy increased in size in 2018 by 61% (from 4.881 km² to 7.868 km²),
 - 23 kelp beds increased in size, including La Costa, Las Flores, and Topanga, which reappeared in 2018,
 - one kelp bed decreased in size,
 - Region Nine:
 - maximum total kelp canopy increased in size in 2018 by 237% (from 3.277 km² to 11.037 km²),
 - 15 kelp beds increased in size,
 - four kelp beds decreased in size, including Carlsbad State Beach which disappeared in 2018.
3. Are coastal kelp beds disappearing? If yes, what are the factors that could contribute to the disappearance?
 - Central Region
 - no beds disappeared in 2018 that had been visible in 2017,
 - Horseshoe and Huntington Flats, which historically have been absent, were not visible in 2018,
 - Region Nine
 - Carlsbad State Beach disappeared in 2018,
 - Five beds continued not to be visible in 2018, including Santa Margarita and Torrey Pines which disappeared in 2014, Agua Hedionda and Del Mar which disappeared in 2016, and Imperial Beach which disappeared in 2017.
4. Are new kelp beds forming?
 - Central Region
 - La Costa, Las Flores and Topanga reappeared in 2018, the first two having been absent since 2015 and the last since 2016,
 - Region 9
 - no new beds reappeared in 2018.

POINT LOMA WAS THE LARGEST THEY HAD SEEN IN THE PAST 10 YEARS!!

IV.2 - REGION NINE KELP BEDS

The combined canopy coverage within the 24 kelp beds of Region Nine increased in size from 3.277 km² to 11.037 km², an increase of 237% (Figure 13). Despite nearly tripling in size in 2018, total canopy coverage remained below levels recorded in 2008 and 2014 (Figure 14). The La Jolla and Point Loma kelp beds accounted for most of the total canopy coverage (86%) as usual. Both beds increased substantially in 2018, as the La Jolla kelp bed more than doubled and the Point Loma kelp bed more than quadrupled in size. The kelp beds in the northern portion of Region Nine (North Laguna Beach to San Onofre) generally were larger in 2018 than during any of the previous three years (Table 8). However, kelp beds to the south (Homo Canyon to Torrey Pines) generally were smaller in 2018. The La Jolla kelp bed was larger than in 2016 or 2017, and the Point Loma kelp bed was larger than at any time over the past 10 years.

All but four kelp beds in Region Nine increased in size in 2018; only the Horno Canyon, Bam Kelp, Solana Beach, and Carlsbad State Beach declined. Approximately half of these beds more than doubled in size. Carlsbad State Beach was the only kelp bed that disappeared in 2018. No kelp beds reappeared this year.

Vessel surveys of all Region Nine kelp beds conducted in January 2019 indicated that the amounts of surface canopy and subsurface kelp in the northern area (North and South Laguna) and southern area (La Jolla and Point Loma) were similar to levels observed during the previous year's surveys (December 2017 and January 2018). However, surface canopy at the other kelp beds in the region generally was less in January 2019 than during the prior survey and very little subsurface kelp was observed. Diver surveys conducted in January 2019 at the

Status of the Kelp Beds in 2018

Homo Canyon and Encina Power Plant kelp beds in January 2019 indicated that few kelp plants were observed on the bottom at either of these two locations.

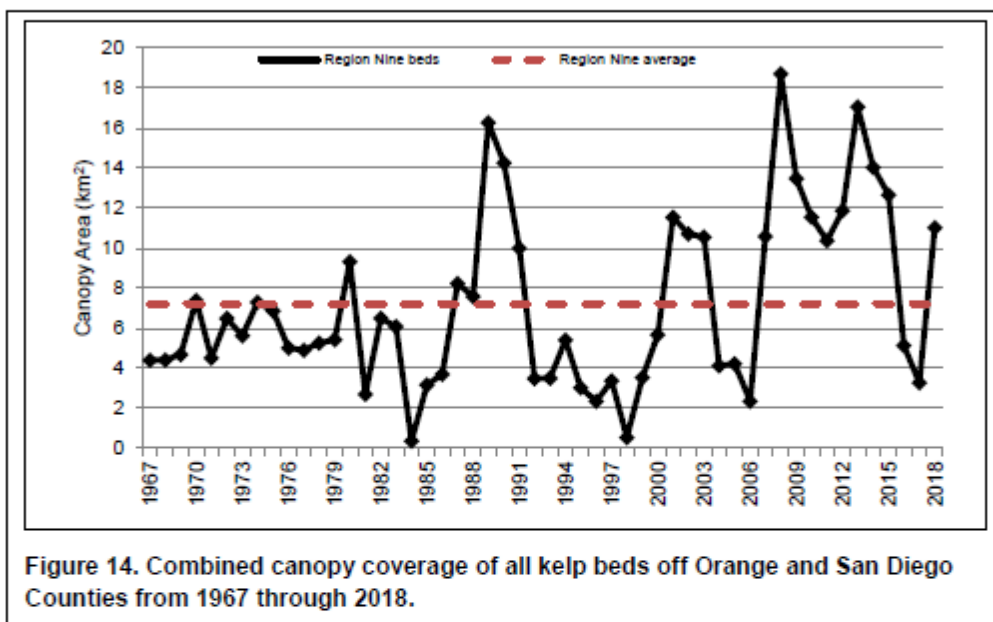


Figure 14. Combined canopy coverage of all kelp beds off Orange and San Diego Counties from 1967 through 2018.

IV.3 - ENVIRONMENTAL VARIABLES

The general correspondence between seawater temperature and the geographical distribution of kelp has long been known. Critical temperatures limit essential events in kelp life history stages. In addition, there is an inverse relationship between temperature and nutrient availability which affects kelp productivity. Strong seasonal upwelling can bring nutrients to kelp beds. However, low water temperatures and high nutrient levels can lead to phytoplankton blooms in surface waters, thereby attenuating light to benthic areas. On large spatial and temporal scales, ENSO events are associated with correlative changes in temperature, nutrients, severe water motion through storm activity, and alterations of the light environment due to the loss of canopy species, which combined can cause large changes in giant kelp forests over the years (Schiel and Foster, 2015).

IV.3.A - WATER TEMPERATURE

Sea surface water temperature (SST) can be a useful surrogate for nutrient availability (water temperature is inversely related to nutrient availability). Although there appears to be good evidence that seawater density also can be used as a surrogate, and in some cases, may predict nutrient availability better than temperature, long-term measurements of density are not available for broad areas of the Central Region or Region Nine. In contrast, nearshore temperature measurements have been ongoing for decades, resulting in readily accessible data sets.

ON THE RESTORATION PROJECTS REGION NINE, BUT EXIST FOR ALL OFFSHORE (I.E., CENTRAL) AREAS AS WELL

IV.4.B – REGION NINE

The Orange County Giant Kelp Restoration Project began in 2002 with an aim to restore historical giant kelp forests along the Orange County Coastline via outreach and education. Orange County Coastkeeper has worked with volunteers to grow, plant, and monitor giant kelp in northern Orange County. Restoration sites, control sites, and a reference site were chosen in Crystal Cove State Park (Newport Beach), Heisler Park (Laguna Beach) and Salt Creek (Dana Point). Volunteers working with marine biologist Nancy Caruso also removed sea urchins that had overpopulated kelp reefs, relocating them to deeper water.

Beginning in 2002, the kelp beds at San Clemente were enhanced by the placement of approximately 50 small artificial reefs (each measuring 40 m x 40 m) on barren sand at depths of about 12 to 15 m. Kelp immediately recruited to these reefs, and canopies in the shape of small squares were visible during most of the aerial surveys of 2002 and 2003. In early 2008, Southern California Edison (SCE) added additional reef material (covering 0.712 km² in total) and kelp recruited to the new reefs in late 2008. SCE has determined that the 174-acre San Clemente reef is only sustaining approximately half the volume of fish required by its 1991 agreement with the California Coastal Commission. In February 2019, the Coastal Commission approved the SCE proposal to add construct an additional 210-acre kelp reef to expand the existing 174-acre Wheeler North Reef. SCE proposes to place 175,000 tons of quarried rock in 23 new polygons north and inshore of the existing reef. The expansion project is scheduled to begin in July 2019 and expected to be completed in 2020.

Status of the Kelp Beds in 2018

Open	Available to harvest by all commercial kelp harvesters	33 kelp beds
Leasable	Available to harvest by commercial kelp harvesters until an exclusive lease is granted by the California Fish and Wildlife Commission, then only available to lessee	28 kelp beds (5 are currently leased)
Lease only	Commercial harvest of kelp is prohibited unless an exclusive lease is granted by the California Fish and Wildlife Commission	3 kelp beds
Closed	Commercial harvest of kelp is prohibited	18 kelp beds

Approximately 41% of the State's kelp beds have been designated as available for leasing, while approximately 38% have been designated as available for kelp harvest by any licensed kelp harvester (ensuring that smaller kelp harvesters have access to kelp and are not shut out by lease agreements). Approximately 21% of kelp beds are closed to kelp harvesting, as harvest has been deemed too potentially disruptive to the environment.

All commercial harvesters of marine algae must purchase an annual commercial kelp harvester license and abide by commercial algae harvest regulations (California Code of Regulations, Title 14, Sections 165 and 165.5). Eelgrass (*Zostera* species) and surfgrass (*Phyllospadix* species) are prohibited from commercial harvest. There currently are no provisions for the commercial harvest of other large kelps, such as elk kelp (*Pelagophycus*), feather boa kelp (*Egregia*), or members of the genus *Pterygophora*. Members of the genera *Porphyra*, *Laminaria*, *Monostrema*, and other aquatic plants utilized fresh or preserved as human food are classified as edible seaweeds. Agar-bearing marine algae are defined as members of the genera *Gelidium*, *Pterocladia*, *Gracilaria*, *Iridaea*, *Gloiopeltis*, and *Gigartina*. Edible and agar algae harvesting are governed by regulations.

Kelp harvesters may not cut attached giant and bull kelp at a depth greater than four feet below the sea surface at the time of cutting, allow no cut kelp to escape from harvest, weigh and report the amount harvested, and pay a royalty to the State for each wet ton of kelp harvested. A Commission-approved kelp harvest plan is required for kelp bed lease holders and for the mechanical harvest of kelp in all locations where harvest is allowed.

Recreational harvest of marine algae for personal use is permitted in California. Those harvesting for personal use must abide by the regulations governing the recreational harvest. The daily bag limit for recreational harvesters of marine algae is 10 pounds wet weight in the aggregate. Commonly harvested kelp and marine algae include bull kelp (*Nereocystis luetkeana*), giant kelp (*Macrocystis pyrifera*), grapestone or Turkish washcloth (*Mastocarpus papillatus*), bladderwrack (*Fucus distichus*), kombu (*Laminaria setchellii*), wakame (*Alaria marginata*), sea cabbage or sweet kombu (*Saccharina sessilis*), bladder chain kelp or sea fem (*Stephanocystis osmundacea*), nori *Pyropia* species), and sea lettuce (*Ulva* species).

Recreational harvesters are prohibited from harvesting or disturbing eelgrass (*Zostera* species), surfgrass (*Phyllospadix* species), and sea palm (*Postelsia palmaeformis*). Marine aquatic plants may not be cut or harvested in state marine reserves. Regulations may prohibit

Status of the Kelp Beds in 2018

cutting or harvesting of marine aquatic plants within state marine conservation areas and state marine parks (California Code of Regulations, Title 14, Section 632b).

The administrative kelp bed status in the Central Coast region is shown in Figure 35. Kelp areas 13 and 14 are open (except for portions that are closed within marine protected areas), kelp area 15 is closed, and kelp areas 16 and 17 are leasable (except for portions that are closed within marine protected areas).

The administrative kelp bed status in the Region Nine study area is shown in Figure 36. Kelp areas 1 and 2 are open, kelp area 3 is leased, kelp areas 4, 5, and 6 are leasable (except for portions that are closed within marine protected areas), kelp areas 7, 8, and 9 are open (except for portions of 9 that are closed within marine protected areas), and kelp area 10 is closed.

Commercial marine algae harvest data are shown in Figure 37 for the period from 1931 to 2015 (<https://www.wildlife.ca.gov/Conservation/Marine/Kelp/Commercial-Harvest>). The annual harvest exceeded 100,000 metric tons in the 1950s, 1960s and 1970s, but declined considerably in the early 1980s. The annual harvest again exceeded 100,000 metric tons in the early 1990s, but subsequently declined. Since 2006, the annual harvest has been relatively low (less than 5,000 metric tons per year).

Table 13 shows how the CRKSC kelp bed designations correspond to the California Department of Fish and Wildlife (F & W) administrative lease kelp area designations. Multiple CRKSC kelp beds fall within each of the F & W lease areas 13 through 16. Table 13 also shows how the RNKSC kelp bed designations correspond to the F & W administrative lease kelp bed designations. Multiple RNKSC kelp beds fall within each of F & W lease areas 5 through 9. Lease area 4 contains the La Jolla kelp bed, lease areas 2 and 3 contain the Point Loma kelp bed, and lease area 1 contains the Imperial Beach kelp bed.

In March 2018, Knocean Sciences (Dallas, Texas) applied to F & W to renew its existing Kelp Bed No. 3 lease issued in July 2013. Bed No. 3 extends from the southern tip of Point Loma to the south jetty of Mission Bay, and covers an area of 2.58 square miles. Knocean Sciences proposed to harvest a maximum of 200 tons per year of giant kelp during the first two years of the five-year lease renewal, and 2,000 tons per year during years three through five. As part of the renewal process, Knocean Sciences proposed a royalty bid to the F & G Commission of \$3.00 per wet ton of kelp harvested. Knocean Sciences plans to harvest giant kelp from May through November via mechanical harvesting from vessels specially modified for this purpose. The lease renewal was approved by F & W in June 2018. F & W subsequently authorized Dr. Matthew Edwards, San Diego State University, to perform research activities involving giant kelp in Kelp Bed No. 3 (August 2018).

Kelp harvesting peaked in the 1970s, exceeding 150,000 metric tons per year in some years (Figure 36). However, kelp harvesting has been relatively low (less than 10,000 metric tons per year) since 2006. It is unlikely that this low amount of kelp harvesting would have any impact on the health of the kelp beds in the Central Region or Region Nine.

CONCLUSIONS:

As we are mentioned in the MBC report, as indicated, we expect that next there will be added a San Diego SeaWorld SCP arrangement to go with Dr. Edwards. We are completing discussions with them as to their needs which are

larger than Dr. Edwards and I know it has to be reviewed by the Commission for the SCP.

But the key is this conclusion that even for the full Central and Region Nine areas (Point Loma) harvesting has been relatively low since 2006 at less than 10,000 metric tons---a far cry from the artificial data point which would kill the total business for all current players at 3,500 tons per annum total based on a 10 year landing average

.
We conclude that the table used to justify any amendments is flawed to the core to justify or create new amendments based on the data the Commission arranges with MBC. No such cap as an amendment is justified based on a 10 year average of landings. If anything, the Giant Kelp does what it has been doing in nature for decades, respond to external natural events. If there is a need for amendments it should only be based on Giant Kelp potentially harvestable, not landings. Landings calculate the Commission's fees from the efforts of the true commercial risk takers in the offshore Giant Kelp business. Reading the MBC report requires a more sophisticated per business evaluation--not a blanket average cap that will terminate all businesses. Certainly the Central and Nine Regions are being managed appropriately, and further North, which we do not focus on here, additional more complete studies need to be considered.

We strongly recommend the Commission reject this amendment or reliance on Landings as a proxy for harvesting potential. Solid, real data the State has paid for does not justify that conclusion.

Sincerely,

Tony Copp, CEO and Founder
KNOCEAN Sciences, Inc.
Dallas, TX

From: Jeanine Pfeiffer [REDACTED]
Sent: Monday, July 6, 2020 09:04 AM
To: FGC <FGC@fgc.ca.gov>; Miller-Henson, Melissa@FGC <Melissa.Miller-Henson@fgc.ca.gov>
Cc: Ashcraft, Susan@FGC <Susan.Ashcraft@fgc.ca.gov>
Subject: Harvester Statement for the MRC 29 July 2020 Meeting Binder

Warning: This email originated from outside of CDFW and should be treated with extra caution.

Dear Commissioners and Commission Staff:

Attached please find an updated version of the background statement submitted to the Commission following public testimony regarding item 33(b) on Thursday, June 25, 2020.

This version of the statement has been signed by 14 seaweed harvesters and business owners.

We are submitting this well in advance of the deadline for inclusion in the binder for the Marine Resources Committee meeting on July 29, 2020.

As noted during testimony on June 25, 2020, **seaweed harvesters are still waiting for a written version of the proposed draft regulations regarding commercial marine algae harvesting.** These draft regulations were read multiple times during multiple meetings by CDFW staff member Rebecca Flores Miller, and harvesters were promised a written version during the April 20, 2020 webinar.

We hope the Commission and the Department will meaningfully and substantively engage with harvesters regarding the ten points contained in this statement.

Respectfully,

Jeanine Pfeiffer, PhD
ethnoecologist

California Fish and Game Commission

Via fgc@fgc.gov as public comment and inclusion in the Marine Resources Committee Meeting Binder on July 29, 2020



To the Commissioners:

Regarding the process to revise the commercial marine algae harvest regulations initiated by California Department Fish and Wildlife (CDFW), we would like to make the following observations and recommendations:

1. California's 36 seaweed harvest license holders represent a unique group of experts with tremendous place-based knowledge who are deeply dedicated to stewardship and sustainability.
2. Commercial seaweed harvesters use hand and mechanical methods to harvest around a dozen species of native California seaweeds from North, Central, and Southern California. Many harvesters have been operating for decades, and collectively represent a body of individuals with the highest aggregate number of observational hours for the broadest geographical range and diversity of native California seaweeds.
3. Seaweed harvesters support the unified goal of improving the clarity and efficiency of State commercial algae harvesting regulations for the long-term benefit of future generations. We advocate for regulations that accurately reference current sustainable use practices and lead to adaptive management of the resource.
4. We envision regulations that are beneficial for the species and their associated ecosystems, for commercial, recreational, and indigenous harvesters, and that create usable data the Department can employ for efficient management.
5. We have witnessed a troubling lack of understanding about our harvesting methodology amongst CDFW staff, scientists, conservationists, and the general public. We are formally requesting the Commission recommend a series of fact-finding exercises be conducted, including (but not limited to) extensive consultations, expert panel discussions, and accompanying seaweed harvesters in the field.
6. We strongly advocate for a data-driven process. We are eager to assist the Department with identifying and compiling relevant data and scientific studies relating to California's marine algae. Sustainable harvest objectives must be based on regionally and species specific data, and should be centered within an adaptive management plan.
- 7a. We urge the Department to adhere to the consultation guidelines developed in the 2001 Kelp CEQA, as stated in Chapter 7, "the Department's fisheries staff works closely with local commercial harvesters (etc.)." We deserve to be engaged as partners – not merely as informants, users, or survey respondents.
- 7b. California's commercial seaweed harvesters, who include seaweed harvesters who participated in the 2000-2001 regulatory update have a reasonable expectation that any regulations facing the industry would be updated with a similar science-driven and publicly transparent process; thus we request more time and a significantly more robust process consistent with the last marine algae regulatory update.

7c. The Department should allow for an extensive stakeholder process to happen over the next two years while its new Extension Fellow Dr. Gini Contolini, who is working on an Enhanced Status Report (ESR) and/or statewide management plan for bull kelp and giant kelp, completes her work. This timeline will facilitate extensive public and commercial harvest input for any proposed regulatory changes and for the process to be informed by the ESR.

8a. Given significant regional differences between California's North and South coastlines, resulting in widely varying species' distributions, assemblages, phenologies, and population ecologies, we believe that regionally-informed regulations will best serve and protect the resource.

8b. The proposed draft regulatory changes presented verbally thus far by the Department do not adequately reference existing sustainable harvesting practices, or recognize the vastly different approaches and harvest seasons for each specie unique to different geographical regions of California coastline.

8c. The Statewide seaweed resource is extensively protected by the network of Marine Protected Areas, a narrow seasonal window, and expansive areas of remote inaccessible coastline, both of which significantly restrict the harvest of seaweeds.

9. The existing body of kelp harvesting regulations provide a framework for regional adaptive management through the use of administrative kelp beds, which give the Commission explicit authority to act in a responsive manner on a regional scale.

10. In light of the Department's recognized staffing shortages, and the distinct possibility of the involvement of outside agencies in future stakeholder processes (viz., the funding of the MLPAL by the Resources Legacy Fund Foundation and the Red Abalone RFMP by The Nature Conservancy), we respectfully request that any stakeholder working groups and facilitation performed by non-governmental organizations on the behalf of or in collaboration with the Department be directed by the Commission to be fully compliant with Brown Act rules for noticing and transparency.

Signed:

Brandon Barney, *Primary Ocean*
Doug Bush, *The Cultured Abalone*
Andrew Daunis, *Pacific Wildcraft*
Julie Drucker, *Yemaya Seaweeds*
Terry D'Selkie, *Ocean Harvest Sea Vegetables*
Heidi Herrmann, *Strong Arm Farms*
James Jungwirth, *Naturespirit Herbs*

Larry Knowles, *Rising Tide*
Jules Marsh, *Kelpful*
Ian O'Hollaren, *Seaquoia*
Catherine O'Hare, *Saltpoint Seaweed*
Avery Resor, *Saltpoint Seaweed*
Art Seavey, *Monterey Abalone*
Tanya Stiller, *Seaweed Tours*

Reply to: [REDACTED]

From: Penny Elia [REDACTED]
Sent: Thursday, July 16, 2020 10:06 AM
To: Ashcraft, Susan@FGC <Susan.Ashcraft@fgc.ca.gov>
Cc: Hofmeister, Jennifer(Jenny)@Wildlife <Jennifer.Hofmeister@Wildlife.ca.gov>; Kurt Lieber [REDACTED]
Subject: Presentation at July MRC virtual meeting - meeting materials attached and sent via links

Good morning, Susan -

Please find attached:

- * Overview of comments to accompany PPS for Penny Elia
- Talking points to accompany video for Kurt Leiber, Ocean Defenders Alliance

Under separate cover:

- Link to Hightail for Penny Elia PPS <https://spaces.hightail.com/receive/4Tnyk9vJUN>
- Kurt is sending you an invitation to DropBox for his video from his email

If there is any additional information you or the Commissioners (or Jenny) need, please let us know.

Many thanks for this opportunity.

Best -

Penny

July 15, 2020

California Fish and Game Commission
Marine Resources Committee
P.O. Box 944209
Sacramento, CA 94244

**Re: July 29, 2020 MRC Agenda Item 2 – Public Comment
Lobster trap impacts to whales along California coast**

Dear Co-Chairs Silva and Murray and Commissioners:

As requested by your staff, please find included with this letter the PowerPoint presentation that I will be sharing with you at your upcoming virtual meeting on July 29, 2020. Although my complete testimony is not included in this comment letter, I was advised by staff that I needed to put the majority of my comments into document format prior to the meeting to afford you the opportunity of review and consideration. Thank you for this opportunity.


During the process of establishing the MPAs in Southern California, Laguna Beach coastal advocates worked collaboratively to protect our entire coastline. As a 35-year resident of Laguna Beach and a coastal advocate, I was proud to play a small role in this effort. I have witnessed a recovery that we are all very thankful for, and hope to see this recovery continue in the years to come. The byproduct of this recovery at both the northern and southern boundaries of the MPA in Laguna Beach is the return of lobster. With the return of lobster, we have seen many, many more lobster traps set each year at these northern and southern boundaries. I would like to address with this Committee, and ultimately the Commission, the impact this is having on whales - - entanglement as well as migration impacts.

Following several conversations with your staff, as well as other natural resource agency staff, it has been brought to my attention that there just isn't enough data to conduct a proper analysis of the impacts these huge "fields" of lobster traps are having on the California Gray Whale and other whale species along the southern California coast. Given the very limited time for presentation to this Committee, my PowerPoint, along with the presentation by Kurt Leiber of Ocean Defenders Alliance, attempts to quickly convey our plan for data collection during the upcoming lobster season beginning in October. It also addresses other impacts faced by the migrating Gray Whale in the LA/Long Beach area, before they reach the waters of South Laguna.

The last slide of my presentation is a simple question to this Committee: What are the next steps after we provide you with the data your staff and other agency staff have advised that you are lacking? How do we move towards greater protection and preservation of this endangered species?

I look forward to making your "virtual" acquaintance on the 29th and to learning more about how we can work together.

Sincerely,



Penny Elia
Coastal Advocate/Laguna Beach Resident

Attached: Kurt Leiber Quick Time Movie and Talking Points
Penny Elia PowerPoint

c: Jenny Hofmeister – Environmental Scientist, Invertebrate Program
Marine Region, CDFW



- **Collecting Data to Illustrate the Impacts of Lobster Traps on Migrating Whales Along the Southern California Coast**
- **Resolving the Conflicts Between Lobster Fishing and Gray Whales**

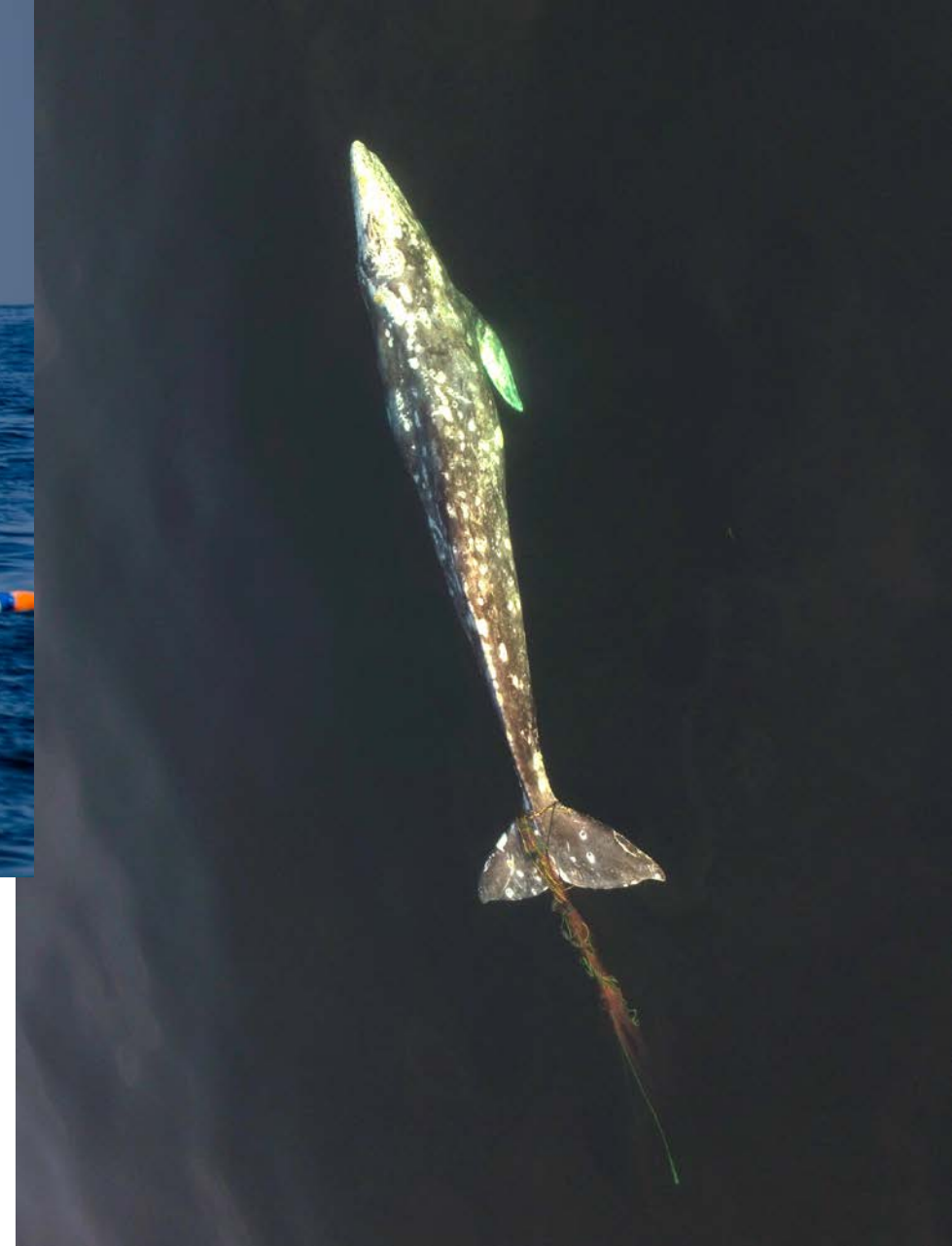


Photo Credit Gray Whale: Mark Girardeau



Areas immediately adjacent to Marine Protected Areas along the Southern California coast have allowed for a positive increase in the lobster population, but have also allowed for an increase in the number of lobster traps. Questions arise as to permits that have been issued for this large number of traps.

South Laguna alone estimates approximately 3,000 traps in a very small area, while estimates for the entire coast hover at well over 50,000 traps.



Ten whale deaths were attributed to ship strikes in 2018 — the highest number on record in California since NOAA Fisheries began tracking in 1982. The mortality rate represents an enormous increase from the average 3.4 ship strike victims recorded annually in the five previous years.

Large whales in U.S. waters haven't been commercially targeted with harpoons since the 1970s, but ships still pose a significant threat to the giants that swim beneath the ocean's surface.

And now...there are an undocumented number of miles of lobster traps along the coast thwarting whale migration and creating entanglement impacts. Along MPAs alone there are approximately 25 miles of traps in just that limited area.



In South Laguna (pictured), just south of the MPA boundary, lobster traps have created yet another barrier to whale migration once the whales hopefully navigate around the wall of freighters off the LA/San Pedro Harbors. Many whales are forced to navigate around Catalina Island to avoid the line of freighters.

Environmental Plan to Collect Needed Data for Agency Analysis and Protective Action

October 2020

- Flyover 200 yards offshore, traveling parallel to the shore, originating in Point Loma and flying north to the Palos Verdes demarcation at Santa Monica Bay.
- Flyover will allow for GPS mapping of areas of high density lobster trap sets along these approximate 125 miles of coast.
- Following the flyover, utilizing the GPS mapping data, several on-the-water data collection sessions will commence to actually count the number of traps within each high density area.
- Once all of the data is collected it will be entered electronically and data sheets will be created for presentation to the various agencies involved in the protection and preservation of our endangered species that are protected under the CESA.
- Does the proposed data collection meet your standard of evaluation?

The California Endangered Species Act (CESA) declares that "all native species of fishes, amphibians, reptiles, birds, mammals, invertebrates, and plants, and their habitats, threatened with extinction and those experiencing a significant decline which, if not halted, would lead to a threatened or endangered designation, will be protected or preserved.



Next Steps?

Kurt Leiber, Ocean Defenders Alliance

Talking Points

- Brief history of Ocean Defenders Alliance.
- How do whales become entangled?
- Discuss NOAA's documentation of confirmed whale entanglements along southern CA coast.
- Slide showing trap lines between the border of Palos Verdes and Santa Monica Bay.
- Slide showing traps along the northern border of the Pt. Vicente MPA.
- Video clip of drone footage of trap line along south border to the Laguna Beach MPA.
- Slide of trap lines along the north border of Laguna Beach MPA.
- Slide of trap lines along the south border of Laguna Beach MPA.
- Underwater footage showing how closely the traps are set, how the trap lines get tangled with each other, and create an even worse situation for whales.
- Slide of Gray whale tail fluke completely severed - - Dana Point.

FOR BACKGROUND PURPOSES ONLY
STAFF SUMMARY FOR DECEMBER 12-13, 2018

15. RED ABALONE FISHERY MANAGEMENT PLAN

Today's Item

Information

Action

Discuss next steps in Red Abalone Fishery Management Plan (FMP) development and consideration of peer review results.

Summary of Previous/Future Actions

- | | |
|--|-----------------------------------|
| • FGC supported red abalone FMP development per MRC recommendation | Oct 8, 2014; Mt. Shasta |
| • DFW updates to MRC on FMP process | 2015-2017; MRC meetings |
| • Received update on FMP process | Dec 6-7, 2017; San Diego |
| • Discussed FMP scope and content | Apr 18-19, 2018; Ventura |
| • Last update on FMP schedule | Aug 22-23, 2018; Fortuna |
| • Received peer review results for draft FMP | Oct 17, 2018; Fresno |
| • MRC discussed next steps | Nov 14, 2018; MRC, Sacramento |
| • Today discuss next steps and timeline | Dec 12-13, 2018; Oceanside |

Background

Since 2014, DFW has been developing a red abalone FMP for adoption by FGC, with regular updates to MRC and FGC on the process, progress, and stakeholder input. DFW abalone project staff have also kept FGC and MRC updated on the unprecedented environmental conditions on the north coast and subsequent biological impacts to abalone, and how those are affecting the FMP process and possible provisions. For a more detailed background on the process to date, see Exhibit 1.

This year, attention has focused on two proposed harvest control rules (HCRs) for the FMP: the DFW-recommended HCR, and an alternate HCR proposed by The Nature Conservancy using stakeholder-developed metrics. FGC supported analysis of both HCRs through an external, independent scientific peer review convened by the California Ocean Science Trust (OST), with support from the California Ocean Protection Council.

At the Oct 2018 FGC meeting, OST presented results and recommendations from the peer review (Exhibit 2). In particular, the peer review panel highlighted that a management strategy employing a combination of aspects from each proposed HCR may be more robust against uncertainty under different fishery conditions; the panel recommended an analysis to determine how to best integrate the HCRs. FGC referred to MRC's Nov 2018 meeting a discussion of next steps and possible pathways to respond to the peer review recommendations.

At the Nov 2018 MRC meeting, DFW presented MRC with a draft approach to responding to peer review recommendations and revising the draft FMP based on outcomes. Following

FOR BACKGROUND PURPOSES ONLY
STAFF SUMMARY FOR DECEMBER 12-13, 2018

discussion, MRC developed a recommendation (see below). Today, FGC will discuss next steps in developing the red abalone FMP, including consideration of peer review results.

Significant Public Comments

1. Support for MRC's recommendations (see below), using an outside facilitator to coordinate and organize public outreach during the harvest control rule integration process, and involving fishermen in data collection.

Recommendation

FGC staff: Approve MRC recommendation.

MRC: (1) Support addressing peer review recommendations to integrate aspects of both draft management strategies, based on a modeling approach developed by DFW and including engagement with abalone divers and other stakeholders; (2) revise FMP goals to allow for a *de minimis* fishery option; (3) develop triggers for the *de minimis* fishery option in consultation with stakeholders; and (4) request that DFW develop a proposed process and timeline which accounts for active public and MRC engagement.

Exhibits

1. Staff summary for Agenda Item 11, Oct 17, 2018 (for background purposes only)
2. OST red abalone FMP peer review report, dated Oct 2018
3. Email from Jack Likins, received Nov 29, 2018

Motion/Direction

Moved by _____ and seconded by _____ that the Commission approves the Marine Resources Committee recommendation for the Red Abalone Fishery Management Plan as proposed.

FOR BACKGROUND PURPOSES ONLY
COMMITTEE STAFF SUMMARY FOR MARCH 20, 2019

5. RED ABALONE FISHERY MANAGEMENT PLAN (FMP)

Today's Item **Information** **Action**

Receive DFW update on collaborative progress to complete the red abalone FMP.

Summary of Previous/Future Actions

- FGC supported red abalone FMP development per MRC recommendation Oct 8, 2014; Mt. Shasta
- DFW updates to MRC on FMP process 2015-2017; MRC meetings
- FGC received update on FMP process Dec 6-7, 2017; San Diego
- FGC discussions of FMP scope and content 2018; various
- Received peer review results for draft FMP and re-referred to MRC Oct 17, 2018; Fresno
- MRC discussion of revised FMP process Nov 14, 2018; MRC, Sacramento
- **Today's update** **Mar 20, 2019; MRC, Sacramento**

Background

A red abalone FMP has been under development by DFW since 2014, with regular updates to MRC and FGC. DFW staff has also reported unprecedented environmental conditions on California's north coast with significant biological impacts to abalone, and how those impacts are affecting the FMP process and its possible provisions.

Last year, two sets of proposed harvest control rules (HCRs) for the FMP—one proposed by DFW, and an alternate proposed by The Nature Conservancy (TNC) using stakeholder-developed metrics—went through independent scientific peer review with FGC's support. Peer review results (available online at http://www.oceansciencetrust.org/wp-content/uploads/2018/10/AbalonePeerReview_Final_Oct2018.pdf) presented to FGC in Oct 2018 recommended possible integration of aspects from each HCR, to be more robust against uncertainty under different fishery conditions. FGC referred the item back to MRC to explore possible pathways for considering HCR integration. For a more detailed background on the process to date, see exhibits 1 and 2.

At the Nov 2018 MRC meeting, DFW presented a draft approach for responding to peer review recommendations and revising the draft FMP. Based on discussion, MRC recommended that FGC: (1) support addressing peer review recommendations to integrate aspects of both draft management strategies based on a modeling approach developed by DFW, engaging abalone divers and other stakeholders in the process; (2) revise FMP goals to allow for a *de minimis* fishery option; (3) develop triggers for the *de minimis* fishery option in consultation with stakeholders; and (4) request that DFW develop a proposed process and timeline which accounts for active public and MRC engagement. FGC approved the recommendations in Dec 2018.

FOR BACKGROUND PURPOSES ONLY
COMMITTEE STAFF SUMMARY FOR MARCH 20, 2019

Today, MRC will receive an update from DFW and TNC staff on developing a collaborative team structure to support management strategy integration and opportunities for public engagement. Staff will highlight next steps.

Significant Public Comments

1. A recreational abalone fisherman expressed his appreciation for FGC and DFW leadership efforts in the red abalone FMP, specifically the peer review and integration of both the DFW and TNC proposals, and the allowance for a *de minimis* fishery, which could serve to act as a blueprint for other fisheries (Exhibit 3).

Recommendation (N/A)

Exhibits

1. Staff summary for FGC Agenda Item 11, Oct 17, 2018 (for background purposes only)
2. Staff summary for MRC Agenda Item 5, Nov 14, 2018 (for background purposes only)
3. Email from Jack Likins, received Mar 6, 2019

Committee Direction/Recommendation (N/A)

FOR BACKGROUND PURPOSES ONLY

COMMITTEE STAFF SUMMARY FOR MARCH 17, 2020 MRC

4. RECREATIONAL RED ABALONE FISHERY MANAGEMENT PLAN (FMP)

Today's Item

Information

Action

Discuss the recreational red abalone administrative team report and report recommendations, and consider potential committee recommendation.

Summary of Previous/Future Actions

- | | |
|---|--------------------------------------|
| • FGC supported recreational red abalone FMP development per MRC recommendation | Oct 8, 2014; Mt. Shasta |
| • DFW updated MRC on FMP process | 2015-2017; MRC, various |
| • FGC discussed FMP scope and content | Dec 2017-2018; various |
| • FGC received peer review results for draft FMP and re-referred to MRC | Oct 17, 2018; Fresno |
| • MRC discussed revised FMP process | Nov 14, 2018; MRC, Sacramento |
| • FGC supported revised process per MRC recommendation | Dec 12-13, 2018; Oceanside |
| • DFW updated MRC on FMP process | 2019; MRC, various |
| • Today's discussion and possible recommendation | Mar 17, 2020; MRC, Santa Rosa |

Background

An FMP for the north coast recreational red abalone fishery has been under development by DFW since 2014, with regular updates to MRC and FGC. At the Dec 2018 FGC meeting, following peer review of two draft management strategies, FGC approved an MRC recommendation to: (1) support integrating aspects of both strategies using a simulation modeling approach co-developed by DFW with a stakeholder team led by The Nature Conservancy (TNC), (2) develop a *de minimis* fishery option with defined triggers in lieu of the current total closure, and (3) request that DFW develop a process to integrate increased stakeholder and MRC involvement. For a more detailed background on the process, see Exhibit 1.

At the Mar 2019 MRC meeting, DFW introduced a collaborative FMP development structure designed to support management strategy integration and public involvement as requested by FGC. The structure established three collaborative teams: an administrative team (admin team), a modeling team, and a project team. Using the three-team structure, options for an integrated draft management strategy have been developed.

Six project team meetings (three webinars and three in-person) designed to generate ideas and solicit feedback took place from May through Dec 2019. Based on the input received, the admin team has prepared and submitted a draft administrative team report *Summary of the Management Strategy Integration Process for the North Coast Recreational Red Abalone*

FOR BACKGROUND PURPOSES ONLY**COMMITTEE STAFF SUMMARY FOR MARCH 17, 2020 MRC**

Fishery Management Plan (Exhibit 2). The draft report is reflective of the year-long, time-intensive effort among FGC staff, DFW, TNC and interested members of the public to address FGC direction to integrate the two management strategies. TNC, DFW and the collaborative teams have done admirable work in meeting the requested timeline; staff commends the teams for completing a very challenging task within the specified time frame, including completing the report.

The admin team distributed the draft report to the project team and the public via FGC's MRC mailing list in Feb 2020, providing approximately one month to review the information and recommendations in advance of this meeting.

The draft report outlines eight recommendations from the admin team to FGC for consideration as FGC provides guidance to DFW in drafting the FMP (see Section VI of Exhibit 2). The eight recommendations reflect project team discussions and guidance, including alternative perspectives or issues of note. In light of the report's finding that a *de minimis* fishery option is not on the immediate horizon, a more deliberative approach to considering the recommendations is advisable.

Today, MRC will receive a joint presentation from DFW and TNC staff on the draft report to support a discussion of the recommendations; the public is encouraged to provide comment on the draft report and recommendations.

Significant Public Comments

1. Two recreational abalone fishermen expressed support for a three-zone approach to abalone management on the north coast, while one added that he supports an increase in the minimum size to ten inches (exhibits 3 and 4).
2. A recreational abalone fisherman expressed support for a *de minimis* fishery and a desire to work with DFW on data collection for abalone; however, he opposes the proposed timeframe of 11 years for opening the *de minimis* fishery, arguing that it is feasible on a more immediate time scale (Exhibit 5).
3. A recreational abalone fisherman expressed support for a *de minimis* fishery to maintain the tradition and culture of abalone fishing. He expressed concern that a DFW focus on pursuing scientific data collection is done at the risk of failing to save imperiled species and, instead, believes action should focus on saving seed stock to support recovery (Exhibit 6).

Recommendation

FGC staff: Due to the complexity of the report and its recommendations, ask preliminary questions necessary to clarify the recommendations, hear public input, and schedule further discussion for the Jul 2020 MRC meeting to develop a potential recommendation to FGC. In addition, formally disband the teams as they have fulfilled their commitments.

FOR BACKGROUND PURPOSES ONLY**COMMITTEE STAFF SUMMARY FOR MARCH 17, 2020 MRC****Exhibits**

1. Background document: Staff summary for Jul 11, 2019 MRC meeting Agenda Item 4 (links to associated exhibits are available at <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=170573&inline>)
2. Draft administrative team report and appendices, dated Feb 14, 2020
3. Email from Jack Likins, received Dec 8, 2019
4. Email from Ken Morrill, received Dec 29, 2019
5. Email from Jon Holcomb, received Feb 3, 2020
6. Email from Doug Jung, received Feb 29, 2020

Committee Direction/Recommendation

The Marine Resources Committee recommends placing a discussion of the *Summary of the Management Strategy Integration Process for the North Coast Recreational Red Abalone Fishery Management Plan* on the July 2020 committee meeting agenda to consider the report recommendations. The Marine Resources Committee also asks the Department to clarify any Commission decision points for discussion at the July meeting.

Summary of the Management Strategy Integration Process for the North Coast Recreational Red Abalone Fishery Management Plan



Prepared by Alexis Jackson, Paige Berube, Ian Taniguchi, Jack Likins,
Javier Silva, Elizabeth Pope, and Sonke Mastrup

April 17, 2020

FINAL Administrative Team Report

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Section I – Executive Summary

This summary provides an overview, results, and recommendations from the collaborative process to develop integrated management strategies for the North Coast recreational red abalone fishery management plan (FMP). The red abalone management strategy integration process (integration process) was initiated in January 2019 in response to results from a peer review led by the Ocean Science Trust (OST) of two proposed management strategies submitted by the California Department of Fish and Wildlife (CDFW) and a stakeholder group led by The Nature Conservancy (TNC). Guidance from the Commission, peer review panel, and the public informed the design and focus of an integration process to: (1) integrate the two peer reviewed management strategies and evaluate via Management Strategy Evaluation (MSE), (2) to allow for a *de minimis* fishery option within the FMP, (3) develop triggers for the *de minimis* fishery alongside stakeholders, and (4) allow for public and Marine Resources Committee (MRC) engagement. This guidance ultimately shaped (and somewhat limited) the scope of the integration process to the content addressed within the two peer reviewed proposals submitted by CDFW and the TNC-led stakeholder group. The Administrative (Admin) Team, Project Team (i.e., the public), and a team of quantitative fisheries modelers supported this collaborative project. See **Appendix I** for the Administrative and Project Team Charters.

The integrated management strategies focused on defining thresholds within an indicator-based framework to trigger the transition to and from closed to *de minimis*¹, *de minimis* to open, and open to closed management statuses. During the Project Team meetings, a recurring theme was the need to better coordinate and standardize data collection efforts across the state, as well as the importance and desire for stakeholder participation in data collection. The Admin Team, Project Team, and modelers supported harvest control rule (HCRs) that focused on near-term efforts to rebuild the red abalone resource. HCRs are applied at the fishing zone level and are structured in the form of a decision tree with two indicators (length-based spawning potential ratio (SPR) and density) that would be implemented using a “traffic light” method (see **Section III** and **Appendix A**). Both length and density data streams were considered in the original management strategies from CDFW and the TNC-led stakeholder group, and the associated indicators were extensively discussed by the peer review panel and were also supported by the Project Team. Finally, an Exceptional Circumstances strawman

¹ ‘... level of catch that is anticipated to have little to no effect on the health or recovery of a fishery resource.’ See glossary in **Appendix H**

proposal (see **Appendix G**), outlining a draft protocol to respond to unforeseen or extreme environmental conditions was included as a precautionary first step before consulting the decision tree.

The Project Team aligned on exploring two or three fishing zones to monitor and manage the fishery. The two-zone approach considered one zone with Marin and Sonoma counties and a second zone with Mendocino, Del Norte, and Humboldt counties. The three-zone approach considered one zone with Marin and Sonoma counties, a second zone with Mendocino County, and a third zone with Del Norte and Humboldt counties. The three fishing zone approach received significant support (in the form of a support letter from over 2,000 recreational divers), emphasizing the need to manage Humboldt and Del Norte counties separately because of biological and ecological differences in the marine environment. There was significant interest in exploring how to collect data in and ultimately manage data-poor zones like Humboldt and Del Norte counties, with the potential to mirror any outlined approach in southern California.

Within each fishing zone, three management statuses are possible - closed, *de minimis*, open. If the status of a fishing zone is designated 'closed,' there would be no harvest allowed and the TAC would be defined as zero. Data collection and research activities must continue under a closed fishery to increase understanding of the status of the red abalone resource and the environment. A biological fishery (bio-fishery) was discussed that would allow for limited harvesting activities to fishermen in alignment with pre-defined research objectives, even when the fishery is closed. If the status of a fishing zone is designated '*de minimis*' then a limited level of harvest is allowed through a static (i.e. fixed) TAC. In a *de minimis* fishery it is possible to harvest at all sites within the zone (excluding Marine Protected Areas or closed sites). Over the course of six Project Team meetings, a draft *De Minimis* Fishery Strawman Proposal (see **Appendix F**) was developed that outlined management tools to provide adequate flexibility within the FMP that allows for more responsive and adaptive management, particularly under changing environmental conditions. Finally, if the status of a fishing zone is designated '*open*' this signals an end to the rebuilding period, at which point higher levels of harvest (beyond those of *de minimis* fishery or bio-fishery) could occur at all sites within the zone (excluding Marine Protected Areas or closed sites).

The Project Team helped to identify and refine a range of options for management measures, particularly with respect to the *de minimis* fishery, some of which could carry over into an open fishery. Management measure options included season length, daily bag/possession/annual limit, number of permits, size limit, number of management zones, as well as a data collection scheme, allocation scheme for

permits, and potential special conditions for permits. The proposed management strategies outlined in this process are also expected to function in conjunction with other existing management regulations.

Both this Admin Team report (see **Sections 3B and 3G**) and the modelers technical report (see **Appendix A**) provide a comprehensive overview of base model configurations for the MSE, management strategies and catch levels evaluated, and results from the simulation modeling conducted for the two fishing zone configuration, as well as theoretical analyses to begin exploring a third fishing zone. Two operating models are explored in the MSE that consider uncertainty in how long poor environmental conditions will persist (e.g. through 2020 or prolonged through 2022). Originally, four management strategies were evaluated within each operating model for the two fishing zone configuration, each representing a different combination of reference points for SPR and density. Four total allowable catch (TAC) levels were also simulated for a *de minimis* fishery - 5,000, 10,000, 20,000 and 40,000 individuals per fishing zone. In addition to analyses to evaluate the sensitivity of the operating models to alternative red abalone productivity levels, assumptions about fecundity, and population scaling, an additional six management strategies were evaluated to assess the impact of changing factors such as size limit, density reference points, and density confidence intervals (CIs).

The length of time that it will take for the red abalone resource to recover to a point where it is possible to support an open fishery (i.e., time to recovery) is a function of four primary factors: (1) how depleted the red abalone resource is in the year 2021, (2) the productivity level of the stock, (3) the reference points selected, and (4) future environmental conditions. Median rebuilding times from a closed status to a *de minimis* fishery varied between 11 and 31 years across the different operating models, fishing zones, and rebuilding strategies. Simulated prolonged poor environmental conditions resulted in a longer recovery period, with an additional 8-10 years needed until *de minimis* fishery status was achieved. In the absence of fishing, the median recovery times from closed status to an open fishery status ranged between 28 and 59 years, depending on the operating model, fishing zone, and rebuilding strategy reference points. It was also possible to determine what level of fishing would be possible during a *de minimis* fishery. In the zone including Mendocino, Del Norte, and Humboldt counties, a *de minimis* TAC at levels between 20,000 and 40,000 would affect recovery. In the zone including Marin and Sonoma counties, a *de minimis* TAC greater than 10,000 would affect recovery.

There are considerable trade-offs to be considered with respect to the selection of a management strategy and *de minimis* TAC for the North Coast recreational red abalone fishery. While some management strategies (see A & C in **Section III**)

offered the shortest times to open fishery status, others (see B & D in **Section III**) had a longer recovery timeline to achieve an open fishery, but result in greater red abalone biomass recovery before fishing activities occur. More conservative (i.e. higher) SPR and density reference points will provide the greatest biological protection but fewer fishing opportunities, and the reverse is true where lower reference points result in increased fishing opportunities but reduce biological protections for the resource. Layered on top of this, the magnitude of the TAC chosen for the *de minimis* will impact how long it takes to rebuild the stock to a level where an open fishery could be triggered. Increasing the *de minimis* TAC results in a longer timeline to achieve an open fishery status. Additional management considerations, such as increasing size limits to 8” or 9” could reduce the time to recovery for an open fishery by two to three years. Within this work, the modelers also acknowledged limitations and uncertainty of the simulation modeling work and how this was addressed in the MSE and within HCR design. Because of time constraints associated with the computational intensity of the analyses and the tight process timeline, it was not possible to examine all possible management strategies and narrowing down of the potential indicators also provided computational efficiencies. The MSE and management strategies designed were limited to using existing data collection programs, rather than developing new or alternative data streams, as actual data is required to simulate within the model.

The Project Team generally agreed to a lottery allocation approach to distribute recreational opportunities, in the event that the demand to fish exceeded the number of available permits. They also considered how Tribal subsistence fishing could occur within the FMP and suggested that Tribal subsistence fishing could occur by allocating a subset of the overall TAC designated for either a *de minimis* or open fishery to Tribes and Tribal communities.

At the conclusion of the integration process, the Admin Team considered Project Team feedback and modeling results to develop the following eight recommendations for consideration by the Commission to guide FMP development (see **Section VI** for more detail):

- 1 Consider selecting a management strategy (or consider developing a new one) that addresses the charge provided by the Marine Life Management Act and Commission goals, while being mindful of the Project Team guidance.
- 2 Explore a citizen science-driven data collection program for Humboldt and Del Norte counties that could inform the development of a management strategy and inform future management of these data-limited counties.
- 3 Consider a bio-fishery as a means of allowing for near-term recreational harvest opportunities that also helps support the state's data collection needs.
- 4 Consider adopting the *De Minimis* Fishery Strawman Proposal as guidance for CDFW to incorporate into the draft recreational red abalone FMP.
- 5 Support further development of the Exceptional Circumstances Strawman Proposal with interested stakeholders, ensuring that any indicators used are aligned with peer review guidance.
- 6 Prioritize research needs to enhance the management of the red abalone resource off California.
- 7 Request that CDFW develop a data management plan with stakeholders to better coordinate and streamline data collection efforts across the state.
- 8 Consider selecting an allocation scheme for recreational permits that uses a preference point lottery system for recreational permits and explore a pathway for the Commission to gain authority to consider allocating a subset of the recreational fishery TAC to Tribes and Tribal communities for subsistence.

Section II – Summary of Management Strategy Integration Process

This section is intended to provide an overview of the management strategy integration process developed to ensure collaborative and transparent decision-making and strengthen the scientific merits of the North Coast recreational red abalone fishery management plan (FMP). This includes a summary of those processes and events that were precursors to and influential in shaping the scope of the integration process, as well as a synthesis of key milestones throughout.

A. Overview of Peer Review Process

As set forth in the Marine Life Management Act (MLMA), the scientific basis of a draft FMP may undergo external, independent peer review prior to submission to the California Fish and Game Commission (Commission); this process is one way to provide the Commission and stakeholders with assurance that FMPs are based upon the best scientific information available. The Ocean Protection Council (OPC) provided a grant to OST to facilitate a scientific peer review for the management chapter of the FMP for the North Coast recreational red abalone fishery. At the request of the Commission, at its December 2017 meeting in San Diego, CA, two management strategies, one provided by CDFW and one provided by TNC-led stakeholder team, were included within the peer review. The peer review assessed the scientific and technical components of both the CDFW and TNC-led management strategies to provide a rigorous underpinning for management decisions and regulatory action for the recreational fishery, should they be implemented.

From May 2018 to October 2018, the peer reviewers conducted a thorough review. Peer reviewers acknowledged that data were very limited to describe the red abalone resource and associated ecosystem, and concluded that both management strategies should be revised to reduce uncertainty; they recommended that any final management strategy incorporate a suite of indicators to present the clearest picture of red abalone status. Additionally, they recommended that the management strategies could be strengthened through integration to reduce uncertainty, take advantage of the best available science, and to “ensure accurate and timely tracking of the red abalone population, subject to cost constraints.” The final Recreational Red Abalone Peer Review Report, including a key themes summary from the first public community webinar, is accessible [online](#).²

² http://www.oceansciencetrust.org/wp-content/uploads/2018/10/AbalonePeerReview_Final_Oct2018.pdf

The peer review panel outlined nine key recommendations (see below). Within **Section V** of this report, we provide further clarity on how these recommendations were explicitly considered and incorporated during the integration process.

- 1 These two management strategies should be integrated to reduce uncertainty and take advantage of the best available science.
- 2 The way to integrate indicators, data streams, and analysis should be tested and analyzed using simulation testing from a formal operating model specified to capture low-density population dynamics specific to red abalone.

When Managing Under a Closed Fishery -

- 3 All indicators chosen must be clearly defined, and ideally, all candidate reference points for any indicator should be tested using simulation testing in a closed loop analysis.
- 4 A multi-indicator approach, with little to no tiering, where not all indicators need to be met (i.e. not adopting a “one out, all out” approach), may be more flexible and informative given the uncertainty of changing ocean conditions and the response of red abalone to these changes. The structure of this approach and choice about whether to make it sequential (single indicators triggering another single indicator and so on), tiered (groups of indicators that trigger next tiered group of indicators and so on), or simultaneous (all indicators assessed simultaneously) can and should be tested using a formal operating model, thus building in a structure that is not subjective.

When Managing Under an Open Fishery -

- 5 Setting reference points for every indicator is critical. (See also recommendation 3)
- 6 All indicators should be evaluated alongside each other in formal simulation modeling to set reference points and to test and determine the appropriate suite of indicators.
- 7 All indicators need to transparently indicate, and then formalize, the way in which they deal with uncertainty.
- 8 The science underlying setting catch levels needs to be re-evaluated and re-configured.
- 9 Align the re-opening plan to match how the fishery is managed under other management scenarios to streamline data collection, analysis, and the decisions that follow.

B. Fish and Game Commission Directive

The recommendations from the OST-facilitated peer review were first presented to the Commission at its October 2018 meeting in Fresno, CA. Following the October 2018 Commission meeting, Commissioners and staff had time to synthesize peer review outcomes. They also engaged in additional conversations with stakeholders about the desire for limited harvest opportunities while the red abalone resource recovered, referred to as a *de minimis* fishery.³ The Commission then made the following motion at its December 2018 meeting in Oceanside, CA to inform the development of the North Coast recreational red abalone FMP:

(1) Support addressing peer review recommendations to integrate aspects of both draft management strategies, based on a simulation modeling approach co-developed by CDFW and the TNC-led stakeholder team, including engagement with abalone divers and other stakeholders; (2) revise Fishery Management Plan (FMP) goals to allow for a de minimis fishery option; (3) develop triggers for the de minimis fishery option in consultation with stakeholders; and (4) request that CDFW develop a proposed process and timeline which accounts for active public and Marine Resources Committee (MRC) engagement.

C. Structure and Timeline of Process

With guidance provided by the Commission motion, the management strategy integration process was initiated in January 2019 and originally outlined on a one-year timeline. This timeline was revised throughout the process to be more responsive to the needs of the public, including allowing more time to incorporate public comment and allowing for meeting rescheduling due to wildfires and power outages that would have decreased participation. Groups critical to this integration process included the Admin Team and Project Team, where the Project Team (i.e., the public) was provided quantitative support from a group of modelers.

The Admin Team is a consensus-based decision-making group charged with ensuring that the management strategies integration process occurred in a collaborative, efficient, and timely manner and informs a revised management chapter for the recreational red abalone FMP, in line with the motion from the Commission (see **Appendix I** for charter). The Admin Team is comprised of one

³ The concept of a *de minimis* fishery continued to evolve over the course of the management strategy integration process, as reflected in the summaries in **Appendix B**. The final definition updated in the glossary defines it as “A fishery with a level of catch that is anticipated to have little to no effect on the health or recovery of a fishery resource. It is applied at the fishing zone level and occurs based on predefined thresholds set in an associated harvest control rule.”

representative from the CDFW, OPC, Commission, TNC, recreational red abalone fishing industry, and the Tribes, with designated alternates (Table 2.1).

Table 2.1. Admin Team Members and Roles

Name	Role
Sonke Mastrup	CDFW Primary Representative [Secretary]
Ian Taniguchi	CDFW Alternate
Paige Berube	OPC Primary Representative
Jenn Eckerle	OPC Alternate
Elizabeth Pope	Commission Primary Representative
Maggie McCann	Commission Alternate
Alexis Jackson	TNC Primary Representative [Chair]
Kate Kauer	TNC Alternate
Joshua Russo	Industry Primary Representative
Jack Likins	Industry Alternate
Javier Silva	Tribal Representative, Sherwood Valley Pomo

Admin Team engagement began in January 2019. The group met, on average, bi-weekly for 1.5-hour conference calls, and was integral to engaging the broader public in the integration process, largely through Project Team meetings. Preparation for Project Team meetings and overall process management organization involved coordination and tasking of the modeling work, reviewing and responding to stakeholder proposals for the *de minimis* fishery, and developing meeting materials for review by the public, including a glossary (see **Appendix H**) to ensure a common understanding of technical vocabulary, the Data Stream Comparison table (see **Appendix E**), and strawman proposals for the *de minimis* fishery (see **Appendix F**) and management in the face of unusual or extreme environmental circumstances (see **Appendix G**). Strategic Earth Consulting was contracted to provide neutral facilitation support for and between Project Team meetings. The Admin Team also provided updates in March, July, and November 2019 to the Commission’s MRC, as well as the full Commission in October 2019.

The Project Team was an advisory group open to members of the public (see **Appendix I** for charter), including all members of the Admin Team and the modelers.

Its primary purpose was to discuss and provide feedback on all scientific analyses conducted and provide input on the framework for a *de minimis* fishery. Such advice is critical to informing the revised management chapter for the North Coast recreational red abalone FMP. Throughout the integration process, representation included non-governmental organizations (NGOs), academic researchers, recreational and commercial industry, Tribes and Tribal communities, and state and federal agency staff. Members of the public who consistently engaged in Project Team meetings had the opportunity to identify themselves as ‘core’ Project Team members. Core Project Team members were helpful in reviewing Project Team meeting summaries to ensure they accurately captured key discussion points and next steps before they were finalized and shared with the full Project Team, as well as this Admin Team report.

Project Team engagement began in May 2019. The Project Team met six times throughout the process in a combination of two four-hour webinars and four full day, in-person meetings (see **Appendix B** for key themes summaries and meeting highlights). All in-person meetings were convened in Santa Rosa, CA. Project Team meetings provided an opportunity for the quantitative fisheries modelers and Admin Team to share new information and results and engage in a multi-directional dialogue with the Project Team to learn of their perspectives, priorities, and recommendations. In advance of and following all Project Team meetings, materials from the Admin Team and/or modelers were circulated to Project Team members via email and posted to the OPC website for their review and feedback. Meeting materials included, but were not limited to: agenda, strawman proposals or modeling summaries, and PowerPoint presentations. Project Team meetings convened by webinar were also recorded and made available on the OPC website.

The Project Team and quantitative fisheries modelers exchanged information and ideas during meetings to guide the development of the MSE. The MSE was conducted by lead modeler (Bill Harford, University of Miami), who worked in consultation with state agency and NGO staff (Table 2.2).

Table 2.2. Modeling Consultants

Name	Organization
Julia Coates	CDFW
Laura Rogers-Bennett	CDFW
Jono Wilson	TNC

The lead modeler led on all scientific analyses, as well as on report and presentation drafting. Separate modeling-focused calls, focused on the technical details of the models that were beyond the scope of Project Team discussions, were scheduled and attended by the Chair of Admin Team and facilitated by Strategic Earth. These calls provided opportunities for input and feedback to be incorporated by supporting CDFW and TNC staff based on the latest model revisions and results from the MSE. Given the highly technical nature of these calls, they were not open to the Project Team. A full day in-person meeting was also scheduled in August 2019 for the modelers and Admin Team to outline potential scenarios for the MSE and discuss assumptions and parameters of the operating model. While the Project Team was not engaged at the level of modeling-focused calls, the results of these discussions, as well as a high-level summary of the modeling efforts, were shared and discussed with the Project Team.

Upon conclusion of the public-facing portion of the integration process (i.e., the Project Team) in December 2019, the Admin Team was charged to deliver a final report to the Commission. Next steps for the development of this report, and opportunities for future public engagement were outlined at the final Project Team Meeting (see **Appendix B**). The Admin Team noted that it would provide a draft of its report to the core Project Team for review before submitting to the MRC for consideration and discussion. If endorsed by the MRC, the Admin Team would then incorporate any necessary changes and deliver a final report to the Commission at its April 2020 meeting. Upon approval by the Commission, the CDFW-led FMP redrafting process will occur during the remainder of 2020, with potential FMP adoption in 2021.

Milestone meetings and guidance from the management strategy integration process are outlined below:

January 2019

- Management strategy integration process was initiated, reflective of Commission directive.
- Modeling support acquired for Project Team (Dr. Bill Harford).

February 2019

- Management strategy integration process timeline and structure outlined for MRC consideration.
- Admin Team Charter and Project Team Charter drafts developed.

March 2019

- **March 20:** MRC Co-Chairs endorsed increased public engagement through Project Team and approved the overall process involving completion of simulation modeling work, design of a *de minimis* fishery, design of an integrated management strategy, and final Admin Team report development.
- Admin Team Charter finalized.

April 2019

- Admin Team continues preparation for first Project Team meeting (May 2019).

May 2019

- OPC finalized a grant to support third-party neutral facilitation of the Project Team meetings.
- Admin Team solicits proposals and ideas from the public related to the red abalone FMP process for the Project Team's consideration, including proposals for a *de minimis* fishery. Proposals received and accepted between May 22, 2019 and December 18, 2019 received a response from the Admin Team and were posted publicly on the OPC project webpage.
- **May 22:** Project Team Meeting #1: "*Review and Discuss Management Strategies and Brainstorm on Managed/Restricted Access Fishery Options,*" was held in-person in Santa Rosa. The Project Team Work Plan and Project Team Charter were shared and reviewed. See **Appendix B** for key themes and discussion highlights.

June 2019

- Admin Team developed a Glossary of Key Terms (**Appendix H**) for the red abalone management strategy integration process to help support Project Team discussions.
- Admin Team developed a Data Streams Comparison Table (**Appendix E**) that outlines available sources of information, as well as associated costs, to inform ongoing management of the North Coast recreational red abalone fishery, which was continually updated to serve as a reference to inform ongoing red abalone FMP Project Team discussions. Tribes and Tribal communities are still working to provide traditional ecological knowledge data streams for this table.
- Admin Team developed a Proposed Next Steps for Modelers document.

- Admin Team followed up on data requests from the May 22 meeting (e.g., accessing Reef Check California data) and investigated other available data sources to inform the July 18 discussion.
- Admin Team developed a draft *De Minimis Fishery* Strawman Proposal (**Appendix F**) to inform July Project Team meeting.

July 2019

- **July 11:** Representatives from CDFW and TNC provided an update to the MRC on the progress of the overall red abalone management strategies integration process.
- **July 18:** Project Team Meeting #2: “*Update on Work Plan and Discussion of Data Streams and De Minimis Fishery Design Options,*” was held via webinar. See **Appendix B** for key themes and discussion highlights.
- Admin Team updated the Proposed Next Steps for Modelers document.
- The Admin Team continued updating the Data Stream Comparison Table to include the Marine Protected Area (MPA) monitoring data (which was shared with modelers) and to provide a more comprehensive picture of associated costs or potential cost savings associated with the available data streams to support a draft management strategy.
- The Admin Team broadened representation on the team by welcoming Javier Silva of the Sherwood Valley Band of Pomo Indians to continue learning how best to collaborate with Tribes and Tribal communities in FMP development and implementation.

August 2019

- **August 27:** Project Team Meeting #3 “*Discussion of Draft Management Strategies,*” was held in-person in Santa Rosa. See **Appendix B** for key themes and discussion highlights.
- The Admin Team provided a high-level summary of the draft management strategy to support the Project Team discussion on August 27.
- During the August Project Team meeting, the Project Team reviewed a draft management strategy for a *de minimis* recreational red abalone fishery along the North Coast, including a discussion of HCR design (i.e., decision tree using traffic light approach), proposed indicators, and potential data streams.
- Admin Team updated the Data Streams Comparison Table and developed an updated Next Steps for Modelers document following the August Project Team meeting.

- Following the August 27 Project Team meeting, the Admin Team facilitated an in-person working meeting for the modelers to discuss feedback from the Project Team and decide on next steps to advance work.

September 2019

- **September 19:** Project Team Meeting #4, “*Revised Management Strategy & Continued Discussion on De Minimis Fishery,*” was held via webinar. See **Appendix B** for key themes and discussion highlights.
- The draft Technical Report on the Revised Management Strategy was posted publicly for review.
- The modeler’s next steps included conducting a MSE for the proposed two fishing zones. Upon reviewing proposals for other fishing zone configurations, the modelers would assess current availability of data and run one additional zone alternative through the MSE. Proposals involving zones with very low TACs (like those indicated by the data-limited fishery that has been discussed) will not require MSE to evaluate and will continue to be discussed and evaluated by the Admin and Project Team outside of the framework of MSE.
- The Project Team was invited to submit county or landmark-based boundaries for alternative fishing zone configurations by October 4, 2019 for consideration by the modelers.
- The Admin Team updated the draft *De Minimis Fishery* Strawman Proposal to reflect the management measures and allocation ideas and priorities shared by the Project Team and identified elements requiring further discussion, as well as updated the Next Steps for Modelers document.

October 2019

- After careful consideration, a Project Team webinar that was initially scheduled for October 30, 2019 was rescheduled due to the wildfires and power outages that were impacting North and Central California where many stakeholders were based.

November 2019

- **November 5:** Admin Team provides update on MSE results and outstanding issues to the MRC
- Admin Team developed a draft Exceptional Circumstances Strawman Proposal (see **Appendix G**) to inform the November Project Team discussion.

- **November 21:** Project Team Meeting #5, “*Review Management Strategy Evaluation Results & Develop Recommendations for Draft De Minimis Fishery,*” was held in-person in Santa Rosa. See **Appendix B** for key themes and discussion highlights.
- Admin Team updated Next Steps for Modelers document, *De Minimis Fishery* Strawman Proposal, and Exceptional Circumstances Strawman Proposal to reflect the November 21 Project Team discussions and feedback.
- Project Team continued to submit public comments and/or proposals (see **Appendix D**).
- The Modelers completed the tasks outlined in the Next Steps for Modelers document, including evaluating additional management strategies for a two-zone MSE, impacts of increasing the size limit on abalone recovery and fishing opportunities, a sensitivity analysis on red abalone size limit, and hypothetical modeling of a sampling regime under a scenario with three fishing zones.

December 2019

- **December 19:** Project Team Meeting #6, “*Develop & Confirm Guidance for the North Coast Recreational Red Abalone Management Strategy,*” was held via webinar; the Project Team developed specific feedback on MSE and *de minimis* options to inform the Admin Team’s final report to the Commission. See **Appendix B** for key themes and discussion highlights.

January and February 2020

- Modelers finalize Technical Report on MSE.
- Admin Team developed draft report to the Commission to share with Project Team for feedback.
- Admin Team incorporating Project Team guidance and feedback and submits draft report to the Commission one month in advance of the March 2020 MRC meeting.

March 2020

- **March 17:** Admin Team presented draft report at the MRC

Please note that many of the aforementioned documents were updated continually throughout the management strategy integration process to incorporate Project Team feedback and inform ongoing Project Team discussions. All resources regarding the recreational red abalone Project Team, including Project Team meeting agendas, meeting materials, presentations, and webinar recordings, are

available on the [OPC red abalone management strategies integration webpage](#). For more information on the red abalone fishery management plan (FMP), please visit the [CDFW Red Abalone Page](#).

Section III – Management Strategies

A management strategy provides a framework for optimizing a fishery to achieve desired ecological and/or socioeconomic objectives. It defines a feedback loop whereby information from the data collection program informs an assessment of the resource and/or fishery status relative to established reference points, which results in a change to management action. Performance of these management strategies is then evaluated via simulation testing known as management strategy evaluation (Smith et al. 1999, Butterworth 2007, Rademeyer et al. 2007, Punt et al. 2016). MSE is used to simulate the connections between field sampling, method of indicator calculation (i.e., data analysis), and decision-making via an HCR.

All proposed management strategies are structured in two parts - 1) Exceptional Circumstances (see **Section 3B** and **Appendix G**) and 2) an HCR structured using a decision-tree framework and traffic light approach (see **Section 3E**). This section outlines critical components of the management strategies (see **Section 3G**) developed during the integration process, including data collection, HCRs, fishing zones, and management measures, in addition to a synthesis of modeling results.

These management strategies provide a decision-making framework to enable a recovering abalone population to go from a closed fishery, to a *de minimis* fishery, and eventually an 'open' fishery upon recovery. Modeling provides reasonable confidence in the viability of shorter-term management strategies (i.e., rebuilding plans), but various modeling limitations result in less confidence in much longer-term management actions. As such, specific guidance is not provided for how management should proceed during an open fishery, as the biology of red abalone and the state of the coastal environment suggest that full recovery (i.e., to move from closed to an open management stages [see **Section 3D**]) ranges from 28 years to several decades. Improved science in the future may be the best option for addressing 'open' regulations at the time when they are needed. Although the Project Team explored what thresholds would trigger the transition from closed to *de minimis* and from *de minimis* to an open fishery, given the estimated length of time to achieve the 'open' management status, the Project Team focused efforts on defining an approach to a *de minimis* fishery and not explicitly how an open fishery would function (e.g. how TACs would be adjusted year to year, etc.).

A. **Data Collection**

The optimal operation of any fishery management strategy is predicated on the premise that enough data is collected in a timely manner to inform the indicators that drive fishery management decisions. Throughout the integration process there were

ongoing conversations around data collection and data streams. As early as the first Project Team meeting, there was clear interest from members in better understanding what data sources were available, how to ensure data quality, how data could be made more accessible, and the importance of citizen science and coordinating data collection efforts among sampling entities across the state.

Available Data Sources

Project Team members identified a variety of available data sources that could inform future management efforts. The Admin Team also furthered conversations with the Tribes and Tribal communities to learn how best to incorporate traditional knowledge and Tribal data once broader intertribal coordination had occurred. A table was developed that highlighted the spatial and temporal scale of sampling efforts throughout the state, along with approximate costs, as documented in the Data Streams Comparison Table (see **Appendix E**). The Data Stream Comparison Table was critical to guide Project Team conversations around trade-offs associated with various data streams. It can also serve as an important reference for CDFW as they explore the need to track a broader variety of biological and environmental indicators as “early warning” signs (see **Section 3B** below). During this process, Project Team members also identified a wish list of data sources that could support management, but may be in development or currently unavailable including: size frequency and abundance data, enhanced recreational diver report card, reproductive indicators (e.g., gonadal data), size structure, nearest neighbor, crowd sourced underwater photos, traditional knowledge, kelp cover, chlorophyll reports, and socioeconomic data. Ongoing efforts to increase the quality and quantity of data available will require the support of the public (e.g., citizen scientists, NGOs, academics) and the state.

Length-based SPR and density were the primary indicators incorporated within the HCRs. Both these indicators were informed by data streams collected by CDFW and Reef Check California (RCCA). While only CDFW and RCCA field sampling designs are explicitly represented in the MSE, this does not preclude the addition of other sampling locations and data sets for these indicators from a larger network of collaborative organizations from being integrated into the proposed rebuilding strategy.

There were several reasons why only two indicators were included in the HCR. First, both length and density data streams were considered in the original management strategies from CDFW and the TNC-led stakeholder group, and the associated indicators were extensively discussed by the peer review panel and were also supported by the Project Team. Second, the Project Team felt that the indicators that

were directly related to the condition of the red abalone resource were the most useful to inform management decisions. Third, simulation modeling involved in MSE requires a clear mechanistic link between indicators and the red abalone resource. These mechanisms are not well defined or understood well enough for the majority of the proposed environmental and productivity indicators (e.g., urchin density, kelp density, etc.), although it is important to note that these indicators are still considered elsewhere (see **Section 3B** and **Appendix G**). Finally, reliability and cost-effectiveness were considered. The Project Team acknowledged the need to keep data collection programs simple and streamlined, and to select a reasonable number of indicators such that information conveyed is not too redundant and data coordination does not become overwhelming and cost prohibitive. While the Data Stream Comparison Table (see **Appendix E**) outlined a wide variety of potential data streams, robust data streams were unavailable to managers for many of these indicators, although there is some data available through outside programs (e.g., MPA monitoring, etc.). With more time and resources, it could be possible to develop these and other data streams to allow for management at smaller spatial scales.

Data collection for length and density data is ultimately informed by the following considerations for annual decision-making:

- A management decision applied in year y , is informed from decision-making that occurs in the previous year ($y-1$), and data analysis from field sampling that occurred in the three years previous to decision-making ($y-2$, $y-3$, $y-4$).
- A one-year time lag between data analysis and implementing a decision the following year was specified as a precaution to enable various entities time to carry out analysis and decision-making processes.
- Recursive annual decision-making relies on a 3-year moving window of field sampling. Need to utilize field sampling in years $y-2$, $y-3$, $y-4$ reflected the desirability to have obtained sufficient geographic sampling coverage to most reliably characterize the fishing zone as a whole. In any instance where a site is visited two or more times within the 3-year moving window, the most recent site visit is to be used in data analysis.

In selecting length and density data streams, it is still important to acknowledge the limitations of this data and their associated indicators (see further discussion in Recommendation 7 of **Section V**). For red abalone density surveys, the precision with which this quantity can be estimated has been called into question, and directly reflects its information content (OST 2014). For length frequency distributions, information quality reflects the uncertain reliability of life history information used in analyzing this data stream and reflects a persistent information lag between changes

to spawning condition and subsequent detection of these changes (Prince 2016, OST 2018).

Coordinating Data Collection Efforts

Coordinating data collection efforts across the state could provide a more cost effective, comprehensive, and robust understanding of environmental conditions and the health of the red abalone resource.

Coordinated partnerships focused on leveraging additional data to supplement CDFW collected data streams have already proven effective on issues such as kelp (e.g., Noyo Center for MARINE Sciences, Kelp Ecosystem & Landscape Partnership for Research on Resilience (KELPRR), Greater Farallones Association, RCCA). Based on the breadth of entities highlighted in the Data Stream Comparison table, recommendations were made several times throughout the integration process by Project Team members on the need to better partner and coordinate data collection efforts among these entities.

When coordinating across sampling entities, data collection efforts can be standardized and formalized through a data management plan. Such a data management plan would outline data collection standards and activities to best meet management needs and goals outlined within the final FMP could meet these needs. A data management plan also provides an opportunity to improve data accessibility, exploring a path for all data that is used to inform management of the red abalone fishery to be made publicly available in a timely manner. The management strategies developed within this process were also constructed on the premise of coordination. They assume that CDFW maintains its historical site sampling regiment and additional sampling by other entities like Reef Check is needed to meet the data coverage expectations for a given management unit (see discussion of fishing zones in **Section 3C**).

Stakeholder Participation in Data Collection

The Project Team also highlighted the importance of citizen scientists and fishermen to collect data. During Project Team discussions, members emphasized that involving harvesters in data collection was critical to keep fishermen involved in the fishery, provide revenue to CDFW to cover management costs, and could disincentivize poaching. The recreational fishing report card could be updated to allow recreational stakeholders to provide data on abalone size, catch location, depth, gonad indices, body condition indices, behavior, aggregations beyond density, and general observations. This is particularly valuable for those sites where

CDFW and RCCA are not actively monitoring. Technology could also play an important role in supporting citizen science data collection effort by harvesters, particularly with respect to length data; length data could be acquired manually or using applications that utilize machine learning and benefit from generating more reliable estimates.

Biological Fishery

Recreational divers in particular, emphasized that assistance with data collection efforts also provides a small opportunity for harvest as some biological data requires abalone mortality. The concept of a biological fishery was created to address this need, where a bio-fishery is defined as *'a fishery in which limited harvesting activities are permitted to fishermen to collect biological information in alignment with pre-defined research objectives. A bio-fishery can be site-specific or applied at the fishing zone level and may occur even when the recreational fishery is at a closed status.'* This allows for some harvest opportunities, regardless of whether the fishery is at an open, *de minimis*, or closed management status, and most likely provides the most near-term pathway to recreational harvest opportunities. Should the state implement a bio-fishery, the Project Team generally believes that fishermen should receive training from CDFW and scientists before being allowed to participate.

B. Accounting for Environmental Variability

In accordance with the MLMA 2018 Master Plan for Fisheries, changing climate and ocean conditions should be considered across all state-managed fisheries. There has been broad consensus that any FMP developed for the recreational red abalone fishery should be responsive to a broad array of potential future environmental scenarios. Throughout the process, Project Team members recounted extreme environmental conditions seen off the North Coast over the past several years, with an observed “perfect storm” of mass die offs, disease outbreak, species movements, and critical habitat loss. Significant attempts have been made through proposal development (see discussion below and **Appendix G** on Exceptional Circumstances) and modeling work to support more precautionary and responsive decision-making to reduce negative impacts to the red abalone resource.

Environmental variability and recent environmental conditions were first accounted for within the base operating model for the MSE (see Technical MSE Report in **Appendix A**). It was important to include such considerations given the impact of stochastic environmental conditions on growth and natural mortality of red abalone. First, the two operating models explored consider uncertainty in how long unfavorable environmental conditions will persist - continuing either through 2020

(Operating Model #1) or continuing through 2022 (Operating Model #2). Mass die off events associated with environmental changes or disturbances were also included in the model based on empirical and experimental evidence (Tegner et al. 2001, Vilchis et al. 2005, Jiao et al. 2010, Rogers-Bennett et al. 2010, 2019, Cavanaugh et al. 2011). Increases in natural mortality of red abalone, driven by the El Niño-Southern Oscillation (ENSO), were also incorporated into both the historical and forward forecasts within the model. Evidence of a 35% average reduction in density associated with a harmful algal bloom event in 2011 (Rogers-Bennett et al. 2019) was incorporated in the model as an additional instantaneous mortality rate of 0.43 per year. Finally, a decline in density detected in both the RCCA and CDFW data sets from 2015 through 2017, which could be a result of unfavorable environmental conditions was accounted for in the model (imposed through visual tuning) with an additional instantaneous mortality rate (0.3 per year).

The Project Team also conceived of the idea to consider environmental and productivity indicators before applying the HCR, initially referred to as performing an “environmental safety check” to gain an understanding of current environmental conditions. This part of the management strategy was intended to serve as an ecological safeguard and is reflective of the Project Team’s desire to incorporate a variety of environmental and red abalone productivity indicators into a more holistic decision-making framework. Throughout several meetings, the Project Team brainstormed a list of potential indicators. In support of the Project Team recommendation, these environmental and productivity indicators were incorporated into the first part of the management strategy (see **Appendix G** - Exceptional Circumstances). In the event that unusual or extreme conditions were observed in the ecosystem, either Commission direction would be solicited or collection of additional or more up-to-date abalone data would be triggered. Because of limited time during the integration process, the specific details and protocol within the Exceptional Circumstances strawman proposal have yet to be defined (including rules, triggers, and an implementation protocol), and requires more detail than has been provided by the Project Team thus far. Members of the Project Team expressed that there may be value in convening an organized committee (with leads and logistics to be determined) to review the data and indicators associated for this portion of the management strategy. The Recreational Abalone Advisory Committee (RAAC) was identified as a possible body of people to perform this work.

C. Fishing Zones

For any FMP, it is critical to outline the spatial scale at which the resource will be monitored and managed. The recreational red abalone fishery is currently authorized to only occur in northern California, tracking information across 56 report card sites.

In the past, when abalone abundance was higher and before the advent of a number of the unique environmental challenges now present, this fishery was effectively managed as one region. Management of the fishery evolved towards a two region system using differential management measures beginning with the 2011 harmful algal bloom and subsequent die off. This approach acknowledged that 95% of the catch and fishing effort historically came from Mendocino and Sonoma counties, with the remainder occurring in Marin, Del Norte, and Humboldt counties. There was also more focus around site-specific management to occur (e.g. closures/openings) at the established index sites.

The management strategies evaluated in this integration process use a fishing zone as the only unit of management, where a fishing zone is defined as *“geographic areas of the coastline comprising a number of the formerly defined abalone report card sites.”* Use of larger fishing zones is an alternative to managing at the individual site level (i.e., for each report card site). Fishing zones were designed to simplify the management strategy and rely on established sampling programs (from CDFW and other research and non-profit entities in the state) for density and length data. Additionally, the fishing zone approach helps to ensure a pragmatic approach to coordination of data collection and the application of management via the use of existing indicators and corresponding reference points within an HCR.

A major topic of discussion during Project Team meetings was the rationale and approach to delineate fishing zones within the recreational red abalone fishery. Proposals ranging from one to four fishing zones were discussed and considered. These largely considered exploring management using the county lines as boundaries (e.g., separate zones for Marin, Sonoma, Mendocino, and Humboldt and Del Norte counties, and combinations thereof). There were also some discussions about defining fishing zones based on alternative boundary lines such as eco-regions or a four-zone approach including - 1) Marin and Southern Sonoma counties, 2) Northern Sonoma county, 3) Southern Mendocino county (south of Cabrillo Lighthouse in Caspar), and 4) Northern Mendocino, Humboldt, and Del Norte counties (north of Cabrillo Lighthouse in Caspar to Oregon border). There were also requests to consider much smaller report card site-specific management strategies, but this proposal was not further pursued or evaluated via MSE largely due to the fact that: 1) current and near future monitoring efforts are insufficient to cover the amount of data collection needed at this fine scale of management, 2) serial depletion of the abalone resource could be more problematic when fishing is concentrated at only a few sites, relative to effort being dispersed across many sites within a zone, and 3) concerns from enforcement staff in exploring beyond three fishing zones.

Numerous trade-offs were considered around how many fishing zones should be considered. If too many zones are considered, there was concern that managers would not have enough information to make a decision about when and how fishing should occur while ensuring the recovery and sustainability of the resource. Managing under fewer fishing zones would potentially lower data collection costs and increase ease of enforcement efforts. However, by managing with fewer zones, zones must be larger in size (incorporating more report card sites) and thus density and SPR survey data (as well as other monitoring efforts) may yield conflicting information due to the heterogeneity of and among sites.

Based on stakeholder interest aligning around a two or three fishing zone proposal (see **Figure 3.1**), time constraints associated with the computational intensity of the analyses, and the tight process timeline, only a two-fishing zone and three-fishing zone configuration were evaluated via modeling efforts. The two fishing zone approach considered the following spatial configuration - 1) Marin and Sonoma counties and 2) Mendocino, Del Norte, and Humboldt counties. The two-zone approach was formally evaluated by MSE and was the primary focus of the modeling efforts within this integration process. This approach is most similar to the scale of management currently used for the North Coast recreational fishery. The three fishing zone approach considered the following spatial configuration - 1) Marin and Sonoma counties, 2) Mendocino county, and 3) Humboldt and Del Norte counties. The three fishing zone approach received significant support (in the form of a support letter from over 2,000 recreational divers), emphasizing the need to manage Humboldt and Del Norte counties separately because of biological and ecological differences in the marine environment. Due to limitations in quantity of data currently available to support a multi-indicator HCR in Humboldt and Del Norte counties, an analysis was conducted to examine whether limited collection of length frequency data could theoretically support an SPR-based HCR. The HCR focused on length data given the challenges associated with using currently established protocols to estimate density for this geographic area and the fact that these counties lack historical baseline density data.

Acknowledging severe data limitations in the third potential zone (Humboldt and Del Norte counties), there was interest in exploring how to manage data-poor zones, with the potential to mirror any approach outlined to explore pathways to revisit recreational harvest in southern California. Results suggested that an HCR could be designed relying upon 60 to 300 observations every three years. Based on this outcome, it is worth further conversations to explore how the state and other research and non-profit entities in the state could work together to develop a coordinated approach to data collection in this proposed fishing zone. With a data

collection program in place in this area, it would be possible to generate enough data to explore an MSE and associated HCR in the near future. It should be noted, however, that Tribes and Tribal communities did express concerns with a two fishing zone approach to manage the North Coast fishery. They also indicated the desire to increase the number of zones to consider ecological and geographical factors but understand the limited data to manage this approach. Tribes are in support of increased data to increase the number of management zones, but support the two-zone approach in the meantime.

D. Management Status

The FMP would subdivide the fishery management area (i.e., North Coast) into distinct fishing zones. Within each fishing zone, an HCR (see **Section 3E**) would be applied on an annual basis to assign a management status to guide fishing activities within the zone. If a third zone were to be considered, an alternative approach would need to be developed and considered given the challenges unique to Humboldt and Del Norte counties that have been discussed. The management strategies, and associated HCR, designed during the integration process consider three management statuses: closed, *de minimis*, and open. When the HCR is applied, it is possible to determine whether management status will be maintained or changed based on indicators outlined within the HCR. Rules associated with how fishery managers would transition between statuses in any given year is pre-defined (see **Figure 3.2**) and codified into the HCRs. If the status of the resource is improving, it is possible to only move one step (i.e., from closed to *de minimis* or from *de minimis* to open but not closed to open). If the status of the resource is deteriorating, multiple steps can be taken as needed (i.e., from open to closed, open to *de minimis*, or *de minimis* to closed). Additionally, as the HCR is applied for each individual fishing zone, the associated management status of each zone is also independent of one another. In other words, one fishing zone could be closed, while the others operate under a *de minimis* or open fishery.

Closed Fishery

If the status of a fishing zone is designated 'closed,' there would be no harvest allowed and the TAC would be defined as zero. Recreational harvest activities would be prohibited for one year, after which the HCR would be applied to determine if the health of the resource had improved and a *de minimis* status could be designated. Data collection and research activities must continue under a closed fishery to increase understanding of the status of the red abalone resource and the environment. Thus, mortality associated with a biological fishery would be allowed.

De Minimis Fishery

The *de minimis* fishery was a request that came from stakeholders after the peer review was completed, that addressed a desire for near-term harvest by stakeholders and to ameliorate the negative socioeconomic impacts to local communities affected by the fishery closure. As part of its 2018 motion, the Commission recommended that a framework be developed for a *de minimis* fishery in consultation with the public. The Admin and Project Teams worked to refine a definition to more clearly describe *de minimis* levels of harvest. A *de minimis* fishery was defined as ‘a fishery with a level of catch that is anticipated to have little to no effect on the health or recovery of a fishery resource. It is applied at the fishing zone level and occurs based on predefined thresholds set in an associated harvest control rule.’ If the status of a fishing zone is designated ‘*de minimis*’, there would be a limited amount of harvest allowed through a static (i.e. fixed) TAC. If the status of a fishing zone is designated ‘*de minimis*,’ it is possible to harvest at all sites within the zone (excluding Marine Protected Areas or closed sites). During these discussions there was interest from recreational divers in exploring a more site-specific approach to a *de minimis* fishery, which could occur at an individual site and not the zone level. Despite interest from Project Team members, this was not further pursued from the modelers because of logistical and financial constraints associated with establishing a data collection protocol that would allow for tracking of the red abalone resource at the individual site level. Based on MSE results, a *de minimis* fishery is unlikely to occur for another 11 to 31 years.

Over the course of six Project Team meetings, a draft *de minimis* fishery framework was developed (see **Appendix F**). This framework outlines management tools available to help inform guidelines for future regulatory consideration. It will ensure adequate flexibility is incorporated into the FMP that allows for more responsive and adaptive management, particularly under changing environmental conditions that put sustainability of the resource at increased risk. Break out groups and discussions were facilitated during Project Team meetings, and proposals submitted to the Admin Team continued to inform framework design. The Admin Team developed and updated a strawman proposal as new ideas were added or expanded upon during Project Team discussions. Framework development was also guided by principles that were shared by the Admin and Project Teams, including: ensuring recovery and long-term productivity of the stock while maximizing recreational fishing/diving opportunities, optimizing economic values to local communities, and supporting cost-effective, reliable data collection that includes more opportunities for interested stakeholders (including fishermen). The Project Team helped to identify and refine a range of options for management issues including season length, daily

bag/possession/annual limit, number of permits, size limit, number of management zones, as well as a data collection scheme and allocation scheme for permits and potential special conditions for permits.

Open Fishery

The open management status is used to signal the end of the rebuilding period, at which point higher levels of harvest (beyond those of *de minimis* fishery or bio-fishery) could occur. If the status of a fishing zone is designated 'open', it is possible to harvest at all sites within the zone (excluding Marine Protected Areas or closed sites). Recreational harvest under an open fishery, however, would still experience a level of effort control as designed by a TAC. Prior to the closure of the recreational red abalone fishery in December 2017, the fishery operated with effort controls (e.g., bag and annual limit) to keep harvest at a target level of catch (although there was no formally defined TAC or quota). Based on MSE results, an open fishery is unlikely to occur for another 28 to 59 years.

E. Harvest Control Rules

HCRs developed during the integration process focused on the near-term efforts to rebuild the red abalone resource. It is important to clarify that while HCRs developed could be applied under either a two or three fishing zone scenario, at this time, because of limited density and length data currently available, they could not specifically be applied to the third zone in Humboldt and Del Norte counties.

The Project Team was supportive of HCRs being structured in a decision-tree format and implemented using a 'traffic light method'. Indicators derived from density and length frequency data streams (i.e. SPR and density) are assigned a color category (red, yellow, green; see **Figure 3.3**) that is determined by comparing the indicator value against pre-agreed reference points. Red indicates a dangerous condition, far from enabling open fishery status. Yellow reflects unsatisfactory conditions, occurring during transition from red to green. Green reflects satisfactory conditions aligned with enabling open fishery status.

Generally speaking, the traffic light method enables a coarse characterization of a defined geographic region according to the measurement of prevailing conditions (via indicators). The traffic light method enables multiple indicators (specifically SPR and density in this case) to inform decision-making. It also simplifies data into a set of value judgements, presented in an understandable form, and enables uncertainty in indicators to be embraced while providing a basis for coarse adjustment to

management status (Mangel and Levin 2005, Caddy 2015) on an annual basis, based on a running average of the previous three years of data.

A suite of candidate reference points (see Table 3.1 in Appendix A) were defined and evaluated via MSE, for both density and SPR, and used to assess performance of proposed management strategies. Target reference points define the desirable expectations of the fishery and the stock, where the level of concern for fishery sustainability is low. Intermediate reference points are established so that management actions are triggered as concern for sustainability of the resource grows. Limit reference points define a state of the resource that is to be avoided, aiming to select a value that is conservative enough to buffer abundance away from low levels, given red abalone are vulnerable to environmental conditions in terms of their survival, growth, and reproductive success.

In the case of SPR, categories are assigned relative to a limit reference point (see Technical MSE Report in **Appendix A**). SPR limit reference points (0.4, 0.5) were selected based on theoretical work applied to other long-lived marine species. Several studies have concluded that SPR targets greater than or equal to 0.4 should produce close to optimum harvest, especially for long-lived species (Mace 1994, Clark 2002, Punt and Ralston 2007, Harford et al. 2019b). And like other studies, maintaining SPR above such a target during an open fishery may be a reasonable means to buffer against environmentally-induced abundance fluctuations in the longer-term (Harford et al. 2018). Percentiles are used to score this indicator relative to the limit reference point within the HCR. If more than 75% of the SPR estimates fall below the limit reference point, RED is assigned in the decision tree. If less than 25% of the SPR estimates fall below the limit reference point, GREEN is assigned. All other scenarios are considered YELLOW.

In the case of density, a more involved approach was used that requires specification of limit, intermediate, and target reference points (see Technical MSE Report in **Appendix A**). Density reference points were proposed by CDFW and were accordingly specified as 0.2 abalone per m^2 (limit reference point), 0.3 abalone per m^2 (intermediate reference point), and 0.4 abalone per m^2 (target reference point). These quantities appear to be consistent with historical density levels and align with evidence that productivity could be compromised below 0.2 abalone per m^2 , as seen for red abalone populations at Santa Rosa and Santa Cruz Islands (Tegner et al. 1989a, Karpov et al. 1998). Northern abalone have also showed reduced productivity along the west coast of Vancouver Island, British Columbia, Canada following declines in density below 0.3 abalone per m^2 (Tomascik and Holmes 2003). In South Australia at West Island, given the assumption that declining parental stock contributed to poor recruitment, Shepherd and Brown (1993) measured densities

between 0.25 and 0.015 abalone per m^2 prior to the period of poor recruitment. Although the limit reference point was set to avoid the onset of the Allee effect, however, it is still challenging to pinpoint this exact threshold (as discussed in detail in **Section V** under Recommendation 2). Additional reference points, termed intermediate and target densities are also required and were considered relative to past CDFW density surveys in northern California. To guide scoring of density within the HCR, first a CI of the mean of each site is calculated. For each site, then determine whether the lower bound of its site-specific CI is greater than the density limit reference point (0.2). The established fraction (percentile; set at 75% or 100% depending on selected strategy) of the density CIs that meet this criterion will determine the traffic light color of the density limit indicator. If fewer than 75% (or 100% depending on selected strategy) meet this criterion, then the density limit indicator is RED, otherwise YELLOW. The above steps are separately repeated for the density intermediate reference point (0.3 per m^2), determining whether this indicator traffic light color should be YELLOW or GREEN. Finally, the above steps are separately repeated for the density target reference point (0.4 per m^2), determining whether this indicator traffic light color should be YELLOW or GREEN.

Having assigned color categories to both indicators, an HCR is then used to interpret indicator color combinations and produce a recommended management action. The same HCRs are applied for each fishing zone, with the same indicators and trigger therein applied as well across fishing zones. Selection of the correct decision tree to be applied is determined based on the management status in the previous decision interval:

- If the previous management status is closed, proceed to tree #1 (see **Figure 3.4**)
- If the previous management status is *de minimis*, proceed to tree #2 (see **Figure 3.5**)
- If the previous management status is open, proceed to tree #3 (see **Figure 3.6**)

In any instance where density or length frequency distribution data are unavailable to proceed to a decision tree, an interim decision is to be made at the discretion of the Commission. When following a path through a decision tree, paying attention to the text on the left side of the tree is important. This text will state which indicator to apply at each node, always beginning with the SPR, and following with density.

F. Management Measures

Throughout the management strategy integration process a number of management measures were discussed with the Project Team, particularly with respect to the *de minimis* fishery (see **Appendix F**). Management measures under consideration for the *de minimis* fishery, some of which could carry over to the open fishery, included: season length, daily bag/possession/annual limit, and size limits. Project Team members emphasized the importance of maintaining flexibility and a range of management measures within the final FMP to allow for more adaptive management of red abalone. There were also discussions about defining a suite of management measures that would allow for equity between the various fishery sectors (e.g. recreational divers, bobbers, rock pickers, Tribes and Tribal communities). Discussions around annual limits and size limits, in particular explored the ability to increase or decrease these values based on the state of the resource to accelerate recovery and then maximize fishing opportunity. The impact of changing size limits was explored via MSE to address substantial public comments about the interest in increasing the size limit within a *de minimis* fishery. Results suggested that increasing the size limit from 7" to 8" or 9", would have little effect on the timeline to a *de minimis* fishery, but could reduce the time to recovery for an open fishery by two to three years. Noting this, there was continued interest by the Project Team in maintaining flexibility to increase size limits in the FMP, although there was not full consensus around a specific size limit.

The management strategies outlined in this process are also expected to function in conjunction with other existing management regulations including, but not limited to, the following: 7" size limit; required documentation of prescribed data (date of effort, catch, location, etc.); ban on scuba; no taking abalone for someone else; no high grading, taking a larger abalone and putting a smaller one back; no co-mingling abalone with another fishermen; uniform start time for fishery; and other existing CDFW regulations.

G. MSE Analysis and Results

Both the High Level Summary and Technical MSE Report (found in **Appendix A**) provide a comprehensive overview of base model configurations, management strategies and catch levels evaluated, and results from the simulation modeling that was done for the two fishing zone configuration, as well as theoretical analyses to begin exploring a third fishing zone. As mentioned earlier (see **Section 3B**), evaluation of the protocol outlined in the Exceptional Circumstances strawman proposal was excluded from this MSE analysis but can still play an important part in precautionary decision-making. **A thorough review of both the summary and**

technical report is essential to understanding analysis outcomes and limitations that will ultimately inform Commission decision-making on future management for the North Coast recreational red abalone fishery. With this in mind, this sub-section is intended to highlight key components of the MSE, as well as results and takeaway messages, with modeling limitations highlighted in **Section 3H**.

Two Fishing Zone MSE

Ecological uncertainty was addressed within the MSE operating model. Two operating models (referred to as OM1 and OM2) were explored due to ecological uncertainties about the current state of the red abalone resource and how long unfavorable environmental conditions would persist. Differences in the persistence of such unfavorable conditions have an impact on the estimated recovery timeline.

The MSE was conducted to evaluate the performance of four primary management strategies (known as A, B, C, D). Two hundred simulations were run for each operating model and management strategy combination. Each management strategy represents a combination of different reference points for SPR (0.4 and 0.5) and percentiles of density ($T_{DL} = T_{DI} = T_{DT}^4 = 100\%$ and $T_{DL} = T_{DI} = T_{DT} = 75\%$) (**Figure 3.7**)

- Management Strategy A: SPR (0.5), density percentile (75%)
- Management Strategy B: SPR (0.5), density percentile (100%)
- Management Strategy C: SPR (0.4), density percentile (75%)
- Management Strategy D: SPR (0.4), density percentile (100%)

Four TAC levels were also simulated for a *de minimis* fishery: 5,000, 10,000, 20,000 and 40,000 individuals per fishing zone. Noting that a management strategy is applied separately to each fishing zone, it is not necessary to select the same TAC for each fishing zone.

Six additional management strategies were evaluated following the November 2019 Project Team meeting to address requests made by Project Team members and additional considerations from the lead modeler. These represent alternative configurations of management strategy A, at a *de minimis* TAC of 5,000 red abalone, in each fishing zone. The following changes were made:

⁴ Percentile of site-specific density estimates that must cross a corresponding threshold. Subscripts refer to limit, intermediate, and target density reference points.

- Strategy A.1 - change minimum harvest size to 8 inches (203 mm)
- Strategy A.2 - change minimum harvest size to 9 inches (229 mm)
- Strategy A.3 - change density reference points to limit: 0.2 m⁻², intermediate: 0.25 m⁻², target: 0.3 m⁻²
- Strategy A.4 - change density percentiles to 90%
- Strategy A.5 - change density confidence intervals to 25%
- Strategy A.6 - change density confidence intervals to 10%

Finally, analyses were conducted to evaluate the sensitivity of the operating models (specifically using OM1 and evaluating against management strategy A) to different red abalone productivity levels, different assumptions about fecundity, and the impact of how overestimation of site-specific population size might impact rebuilding at various *de minimis* TAC levels.

As is common with MSE, a range of management strategies is evaluated so that policy makers can select a strategy that aligns with their desired level of risk tolerance. MSE results for the two-zone configuration indicated that it will be at least a decade until a *de minimis* fishery would occur, with median rebuilding times varying between 11 and 31 years (see Table 3.4 in Technical MSE Report in **Appendix A** and **Figure 3.8**). Considerations of prolonged environmental decline (OM 2) resulted in 8 to 10 years of additional delay in recovery relative to OM 1. Selection of reference points of each management strategy also contributed substantially to rebuilding times. Differences in time to achieve a *de minimis* fishery were most pronounced in the selection of density percentiles, principally reflecting the degree of among-site density variation that is allowed relative to density thresholds. Shorter recovery times were observed for less precautionary density triggers (management strategies A & C) and longer recovery times for more precautionary density triggers (management strategies B & D). The differences in recovery time between these two sets of management strategies also has an impact on how depleted the resource is when the *de minimis* fishery opens. For rebuilding strategies A & C, *de minimis* fishing would begin at a depletion⁵ level of approximately 0.2, while rebuilding strategies B & D delayed *de minimis* fishing until a higher level of recovery has been achieved (approximate depletion of 0.3 to 0.4). In selecting a management strategy, the Commission must consider this trade-off. Although it is possible for fishing to occur sooner (management strategies A & C),

⁵ Depletion level is measured on a scale from 0 to 1 and used to understand proportion of stock available to reproduce. Higher levels indicate a more robust or stable stock status.

the resource will have had less time to rebuild (relative to delayed fishing under management strategies B & D) (see **Figure 3.9**).

The next consideration for the Commission concerns the length of time to transition from a *de minimis* to an open fishery. As a point of reference, in the absence of fishing (i.e., TAC=0), the median recovery times to move from a closed status to an open fishery ranged between 28 and 59 years. Again, this variability is due to differences in the operating model evaluated, fishing zone evaluated, and reference points used. With increased understanding of the median recovery time in the absence of fishing, it was then possible to determine what level of fishing would be possible during a *de minimis* fishery. In Zone 1 (Mendocino, Del Norte, and Humboldt counties), a *de minimis* TAC at levels between 20,000 and 40,000 would affect recovery. In Zone 2 (Marin and Sonoma counties), a *de minimis* TAC greater than 10,000 would affect recovery. Results of *de minimis* TAC evaluation, however, should be considered cautiously, as the performance of these quantities depends on total abundance specified in the operating model. Total abundance is likely to be a highly uncertain component of this data-limited MSE.

At the time of triggering an open fishery status, each of the rebuilding strategies varied with respect to how depleted the resource is when the open fishery is triggered and what cumulative catches look like. Rebuilding strategies A & C tended to trigger open fishery status at lower median depletion levels (i.e., the resource is more depleted), which correspondingly reflects initiation of a *de minimis* fishery at a lower depletion level. More conservative rebuilding strategies B & D tended to trigger open fishery status at higher median depletion levels (i.e. resource is less depleted), which similarly reflects initiation of a *de minimis* fishery at a higher depletion level. With respect to cumulative catch, higher catch occurs for high *de minimis* TACs. The impact of this, however, is that higher levels of *de minimis* TAC increase the length of time it takes to transition from a *de minimis* to an open fishery status.

Taken together, recovery to open status requires consideration of three trade-offs: 1) length of time to open fishery status, 2) depletion at open status, and 3) cumulative catches prior to achieving open status. To further examine and help visualize the trade-offs between these three performance metrics, plots were produced by the modelers (see **Appendix A**, Figure 3.10 & 3.11) to help to group sets of management strategies that are similar in performance. For the discussion here, scenarios were outlined to address these three trade-offs (see **Figures 3.10 & 3.11**) to better contextualize the impacts of selecting one management strategy over another. Generally speaking, rebuilding strategies A & C offer the shortest times to open fishery status, even under higher *de minimis* TAC levels. Rebuilding strategies B & D offer improved levels of depletion upon recovery (relative to A & C), and

because recovery times are longer, can offer the highest levels of cumulative catch during rebuilding. In conceptual scenario #1 shown in **Figure 3.10**, a trade off plot is shown with time on the x-axis and abalone abundance on the y-axis to support consideration of the impacts of TAC. With a higher *de minimis* TAC (in green) it is possible to have higher cumulative catches over time, but the length of the *de minimis* phase is extended, and thus length of time it takes to return to an open fishery is extended. Alternatively, with a lower *de minimis* TAC (in green), there are fewer cumulative catches over time, but the resource rebuilds more quickly and achieves an open fishery sooner. In conceptual scenario #2 shown in **Figure 3.11**, the impacts of selecting a more conservative (i.e., higher) versus a less conservative (i.e. lower) trigger area are shown. It is possible to allow for *de minimis* fishing opportunities to occur sooner, but abalone abundance will be lower at this point (see Management Strategy C). Alternatively, it is possible to wait longer to allow for *de minimis* fishing opportunities, at which point the resource will be in better condition (see Management Strategy B).

Notable trends in recovery time and depletion level were also observed in the additional management strategies (A.1 to A.6), and with respect to sensitivity analyses. Changing minimum harvest size (management strategies A.1 and A.2) and changing density reference points (management strategy A.3) had little effect on the recovery time to achieve a *de minimis* fishery. However, the recovery time to achieve an open fishery was reduced by 2 to 3 years and 5 years, respectively. Changing density percentiles to 90% (management strategy A.4) resulted in performance that was more similar to management strategy B (density percentile of 100%), than to the original management strategy A (density percentile of 75%). Management strategies reducing the density confidence intervals (A.5 (25%) and A.6 (10%)) resulted in shorter time durations to achieve the *de minimis* fishery, but also allowed fishing to occur at a more depleted resource state relative to the base case density confidence interval of 50%. The three sensitivity analyses investigating the effect of lower productivity levels resulted in delayed recovery times and slightly lower depletion levels at the onset of both the *de minimis* and open fishery. Changes to model assumptions about fecundity ultimately had no effect on performance of the model. Finally, lowering site-specific estimates of fecundity resulted in notable increases to the length of time required to achieve an open fishery, particularly with *de minimis* TACs > 5,000.

Considerations for Sampling Under a Management Scenario with Three Fishing Zones

While an MSE was not conducted to explicitly look at three fishing zones, as a preliminary step, an analysis was conducted to examine whether limited collection of

length frequency data could theoretically support an SPR-based HCR. Throughout the management strategy integration process there was extensive conversation about the need to consider Humboldt and Del Norte counties as a separate fishing zone. During Project Team discussions it became evident that data from these regions are extremely limited, presenting challenges to developing suitable indicators on which to inform decision-making.

A length-based management strategy was ultimately explored, due to challenges associated with using currently established protocols to estimate density for this geographic area. Two sampling regimes were considered one that gathered 20 length measurements per year (60 observations collected every three years, each time the HCR rule is applied) and a second that gathered 100 length measures per year (300 observations each decision interval). Results of the analysis indicate similar performance of the two sampling regimes. Results from this analysis could also be used to inform a data collection protocol for Humboldt and Del Norte counties and guide research priorities for the region. Further, it is an important step to explore management approaches in regions where there is limited to no data. Creativity is also needed in exploring a wider variety of management approaches (e.g., precautionary catch or size limits) that may be suitable for managing these counties as a distinct fishing zone.

While this analysis specifically focused on a length-based approach, a wide variety of options could be explored in the future. Such options could include using other indicators in a similar multi-indicator approach or other experimental approaches. Fishermen were also interested in exploring the use of precautionary TACs and the effect of simply increasing the size limit as a way to limit harvest. If the Commission should decide to consider managing three fishing zones, CDFW can work with stakeholders to design a pilot study or sampling protocol to acquire all necessary data and recommend how a potential third zone would be managed based on the data acquired.

H. Additional Considerations When Interpreting MSE Results

MSE is intended to approximate reality in a simulation model and to test hypotheses that can ultimately inform decision-making. However, as a simplified version of reality, models must make a number of assumptions that cause some differences between the model and reality. Some of these assumptions may add an added level of precaution, while others may be overly optimistic. Additionally, uncertainty is a factor that can and should be acknowledged around indicators used, trajectory of unfavorable environmental conditions, catch levels, depletion levels, population dynamics, and life history characteristics. A brief overview of limitations and

uncertainty in relation to the MSE and management strategy design is provided below. Detailed discussions are provided in the relevant sections within the report, as well as in the Technical MSE Report (see **Appendix A**).

Indicators

Data limitations were a challenge throughout this process. Similar to other marine life, fine-scale spatial stock structure of red abalone is at odds with feasible scales of data collection. This constraint on data quantity required developing management strategies relying on site-specific signals about resource changes, while attempting to guide decision-making at much larger spatial scales. Within the modelers' technical report (see **Appendix A**), there is an evaluation of the measurable precision of the two data streams used for red abalone to help understand associated uncertainty.

Better understanding of sampling precision of these two datasets is critical in defining reference points and triggers for management action for the indicators associated with these data streams (SPR and density, respectively).

For red abalone density surveys, the precision with which this quantity can be estimated has been called into question, and directly reflects its information content (OST 2014). Challenges arise due to the length of time required to revisit and resample each site (three years), as well as the low levels in the power analysis at any scale smaller than that of the whole fishery. These make density challenging to use to inform annual management decisions, especially when environmental conditions change rapidly. Acknowledging the variability around estimates of density (as measured by coefficient of variance), and a desire to not potentially cause the fishery to either close or re-open when not warranted, a confidence interval was calculated separately for density estimates for each individual site. Subsequently, the fraction (percentile) of the CIs that meet density criteria are used to determine the status of the resource within the harvest control rule. The density 50% CI was utilized as a way to identify a conservative threshold, as a metric aimed at ensuring sufficient red abalone abundance is present to support future catch. It does not appear advantageous to utilize 95% CI, as initial MSE exploration demonstrated overly detrimental effects on fishing opportunities when the 95% CI was used because imprecision in density can produce very wide tails. Additionally, because of a non-negligible number of zero count transects, a log-normal or delta log-normal sampling distribution was applied.

Performance of management strategies that rely on SPR can be sensitive to biases in life history parameters, especially when other indicators do not work to ameliorate

such circumstances (Hordyk et al. 2015, Harford et al. 2019a). Because of this, and because SPR also reflects a persistent information lag between changes to spawning condition and subsequent detection of these change, density was paired with SPR within the HCR. Given additional concerns that when density declines to low levels SPR masks Allee effects, more precautionary SPR reference points were selected and evaluated to avoid population decline at small population numbers (i.e. Allee effects), given the exact level of depletion at which it occurs is unknown.

Trajectory of Environmental Conditions

It remains unclear how far into the future the current poor environmental conditions will persist. Given this uncertainty, environmental variability was accounted for within the base operating models. It was important to include such considerations given the impact of stochastic environmental conditions on growth and natural mortality of red abalone. The two operating models explored consider uncertainty in how long unfavorable environmental conditions will persist - continuing either through 2020 or continuing through 2022. If poor conditions do continue through 2022, it could increase the recovery period to achieve a *de minimis* fishery by 8 to 10 years.

Setting Catch Levels

Although several *de minimis* TAC options were evaluated under the operating models specified in this analysis, risk associated with *de minimis* TACs is the most uncertain component of the MSE analysis. Like other data-limited fisheries, historical trends in abundance are not well established for red abalone. Testing alternative TACs requires scaling of populations, using site-specific unfished recruitment parameters that lead to estimates of total abundance. The sensitivity analysis conducted (see **Section 3G**) revealed that alternative assumptions about population scaling can have remarkable effects on rebuilding time frames depending on how high a *de minimis* TAC is set.

In general, data-limited management strategies tend to require catch limits that are more precautionary than those that could be implemented under equivalent data-rich fishery circumstances (Ralston et al. 2011, Dichmont et al. 2017). While there is little consensus on the precise approach to doing so, data-limited fishery management tends to reduce catch limits in acknowledgement of scientific uncertainty (Newman et al. 2015). Because of data limitations, the MSE is insufficient to provide complete guidance on the selection of a *de minimis* TAC. Continued discussion is likely warranted to determine whether additional research and analyses may be useful to inform TAC selection. Such studies, if feasible, could include abundance estimation from nearest neighbor data or mark-recapture study to ground-truth abundance

estimates made through catch-only methods. As another option, implemented TACs could be coupled with rotating sites closure schedules, to reduce the likelihood of serial depletion of any site.

Depletion

A key ecological uncertainty is the exact current state of the red abalone resource based on limited data available. This is considered within the MSE as the level of depletion (i.e. relative spawning biomass) and addressed during model tuning. Predicted length of time required to achieve a *de minimis* and open fishery is very sensitive to the initial depletion levels specified. It should be noted that the resulting depletion levels associated with triggering a *de minimis* fishery or an open fishery are a function of the technical specification of the operating model, particularly the initial conditions specified for 2002. It was assumed that depletion was relatively stable prior to 2011. The overall process of tuning ultimately resulted in depletion levels that were consistent with expectations about SPR, and relative abundance trends consistent with observed red abalone density data (noting the aforementioned limitations of density).

Population Dynamics and Life History Parameters

The underlying population dynamics models used in the MSE were parameterized using currently available scientific information. Operating models include estimates of life history parameters, accounting for variation in space and time, based on the scientific literature. The spatial representation of population dynamics considers larval and adult movement and metapopulation dynamics. As a precaution against building reliance on larval exchange into management strategy performance, within the model sites have no such exchange of red abalone represented in simulations.

Alternate life history parameters were also explored via sensitivity analyses. As the stock-recruitment relationship for red abalone is not known, sensitivity to red abalone productivity was assessed by evaluating a lower value of stock-recruitment steepness (reduced from 0.7 to 0.6). Reducing steepness (i.e., lower productivity) delayed recovery times and slightly lowered depletion levels associated with the onset of both the *de minimis* and open fisheries. To address uncertainty about patterns in eggs production in the largest size classes, alternate fecundity was explored such that the exponential increase in egg production with increasing length plateaued at the length of 254 mm (baseline asymptotic length). Performance of the management strategy was insensitive to this change within the operating model.

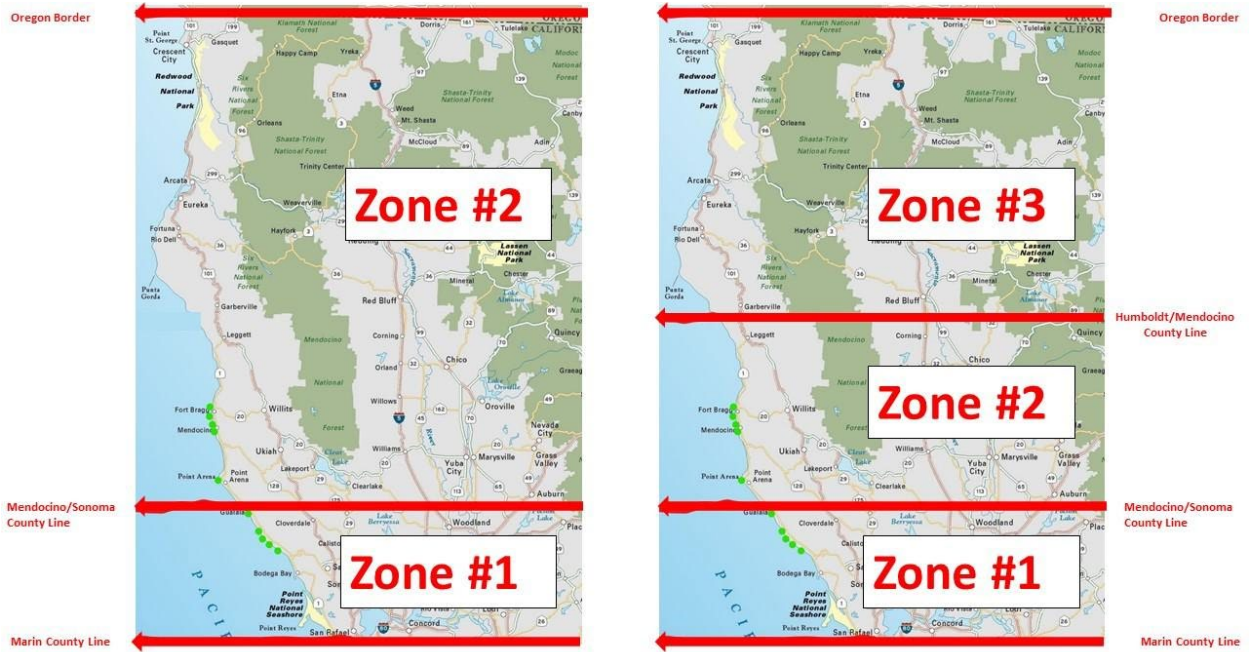


Figure 3.1. Maps of the two and three fishing zone proposals.

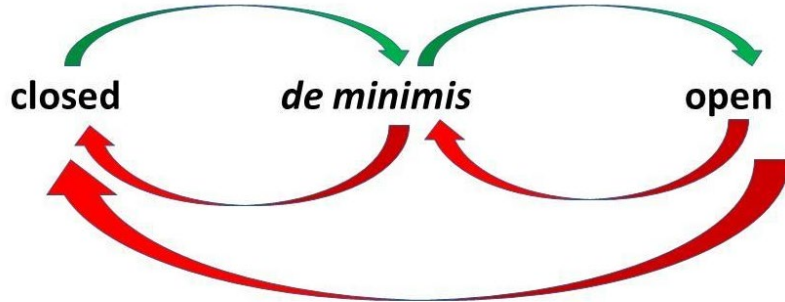


Figure 3.2. Rules to move between management statuses in annual decision-making.

Management objective: enable open fishery status

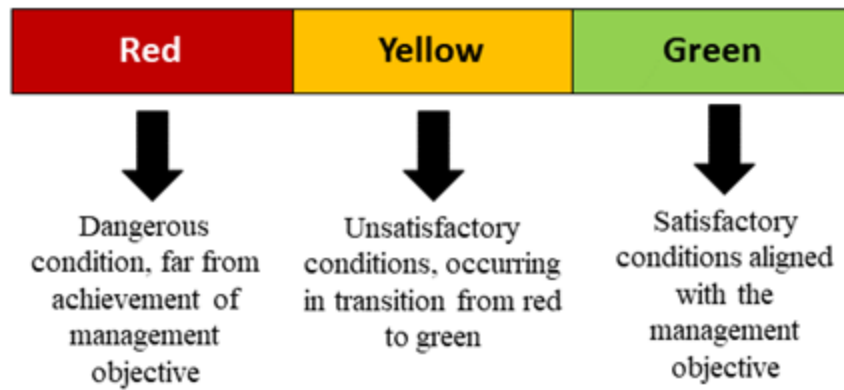


Figure 3.3. Traffic light method.

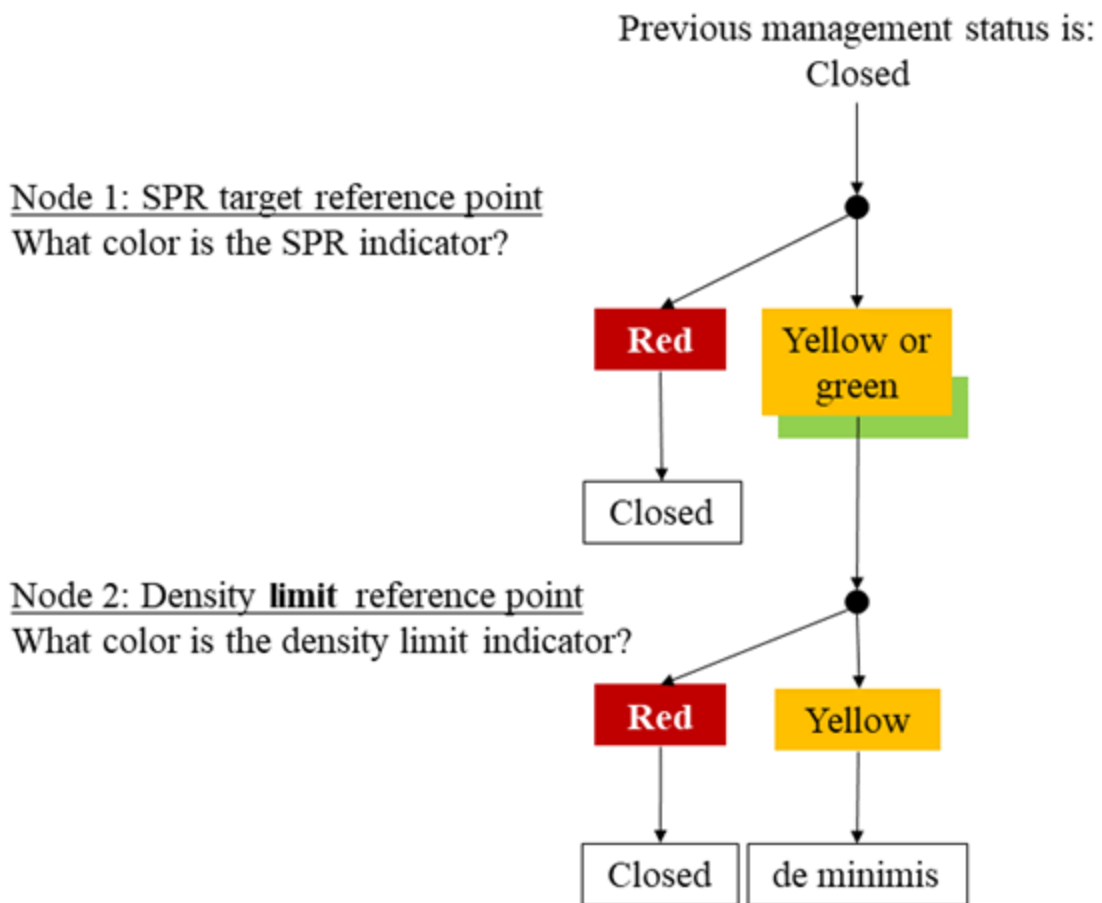


Figure 3.4. Part B of the management strategy. Decision tree #1. Applied when previous management status is closed.

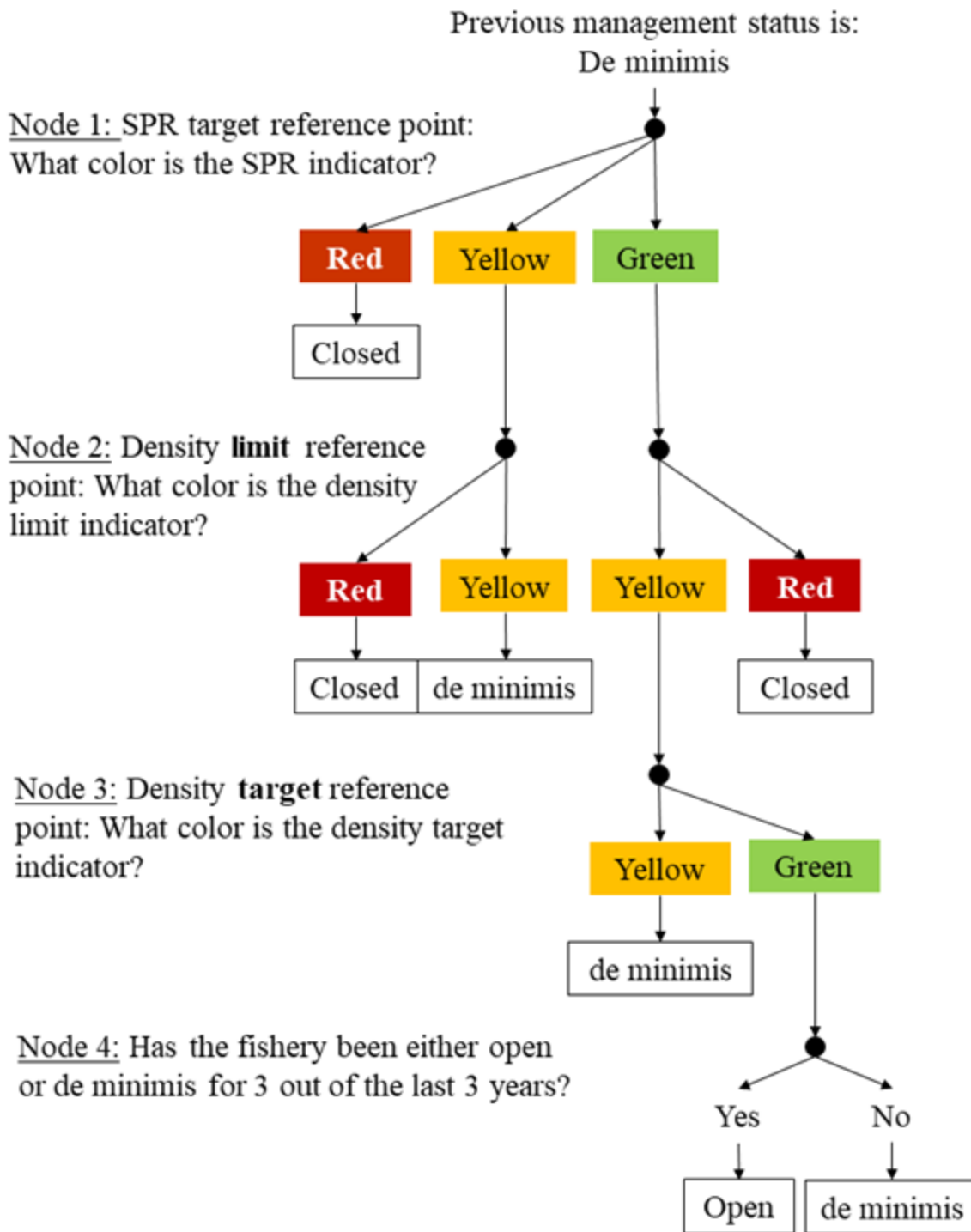


Figure 3.5. Part B of the management strategy. Decision tree #2. Applied when previous management status is *de minimis*.

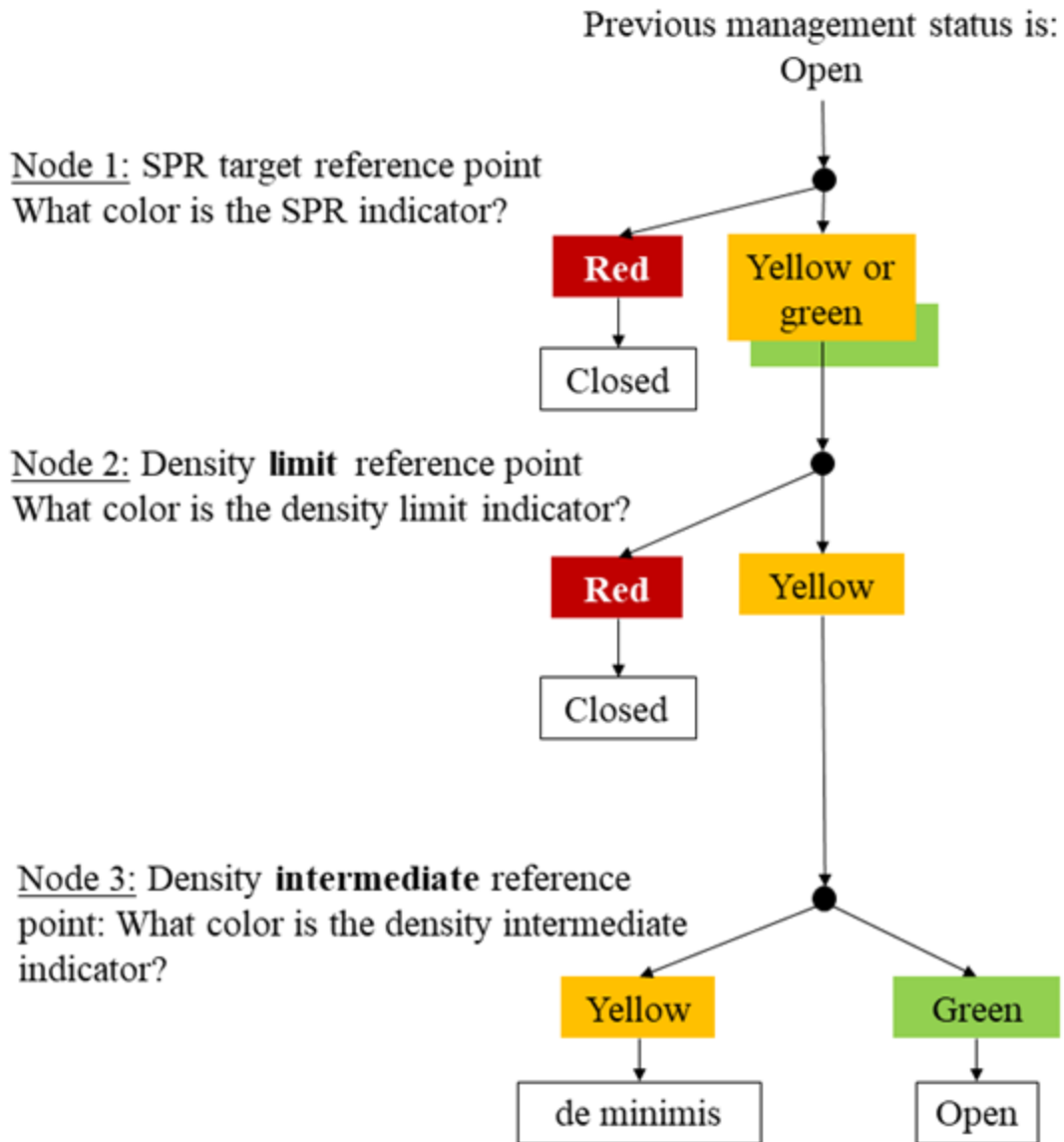


Figure 3.6. Part B of the management strategy. Decision tree #3. Applied when previous management status is open.

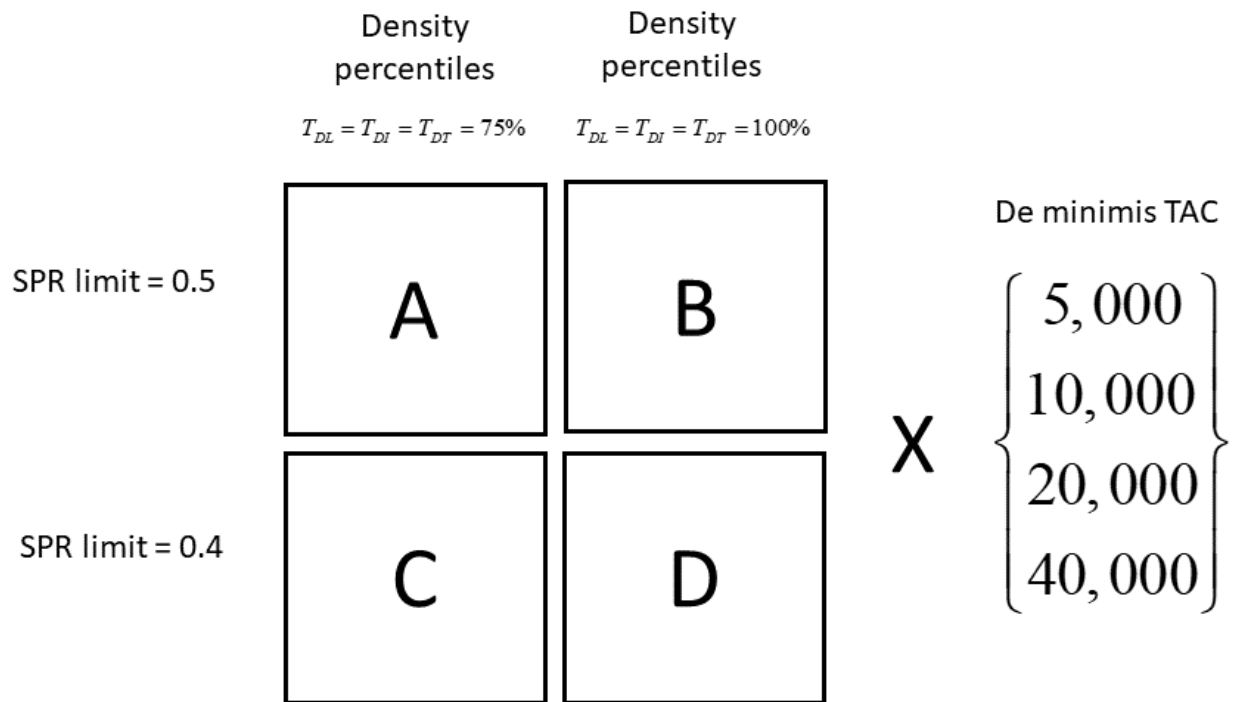


Figure 3.7. Factorial design of management strategies.

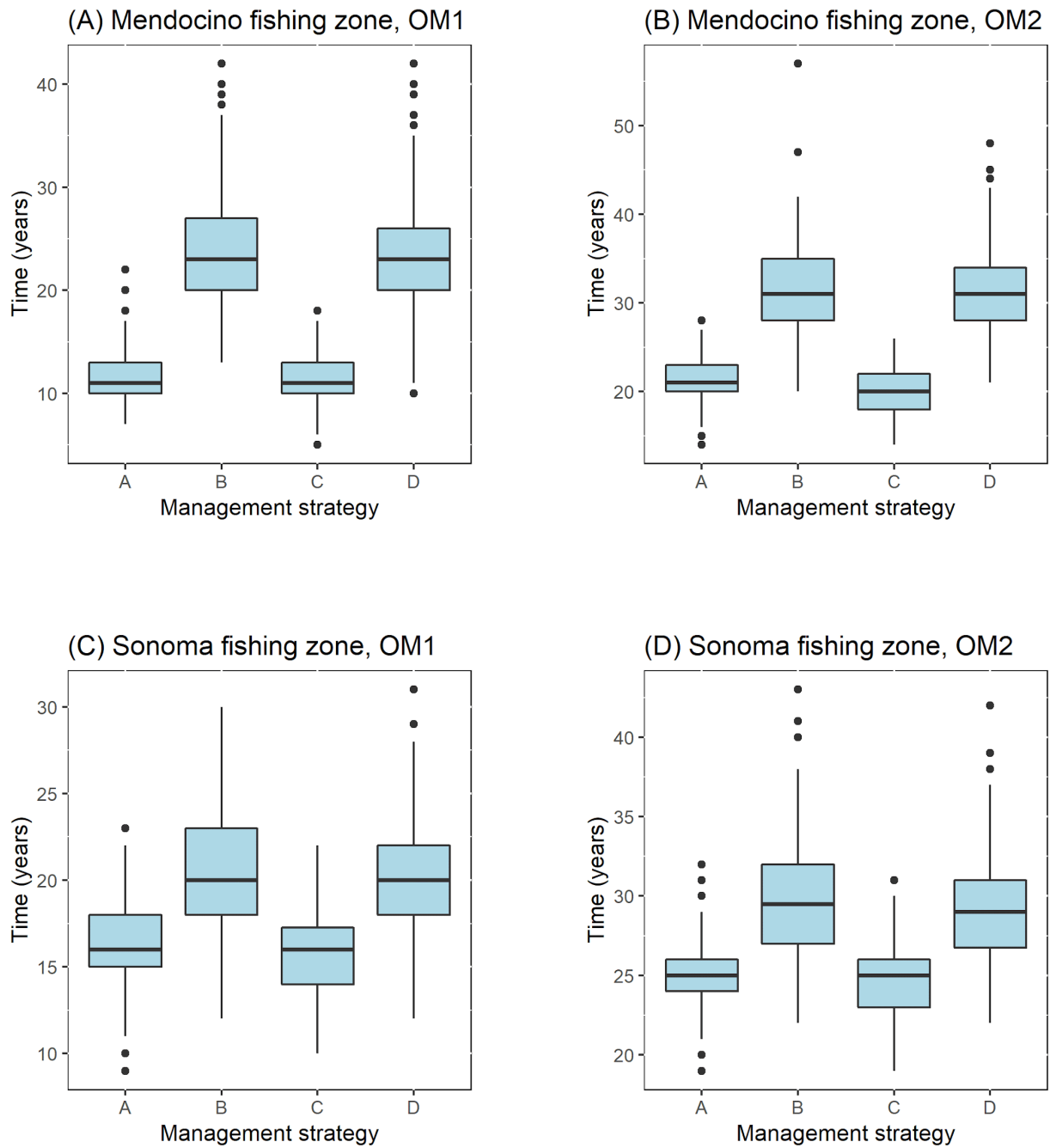


Figure 3.8. Box plots of time in years to reach *de minimis* fishery status for four management strategies. (A) through (D) indicate fishing zone and operating model (OM) configurations. Boxes are inter-quartile range, whiskers extend 1.5 times the inter-quartile range, and points are outliers.

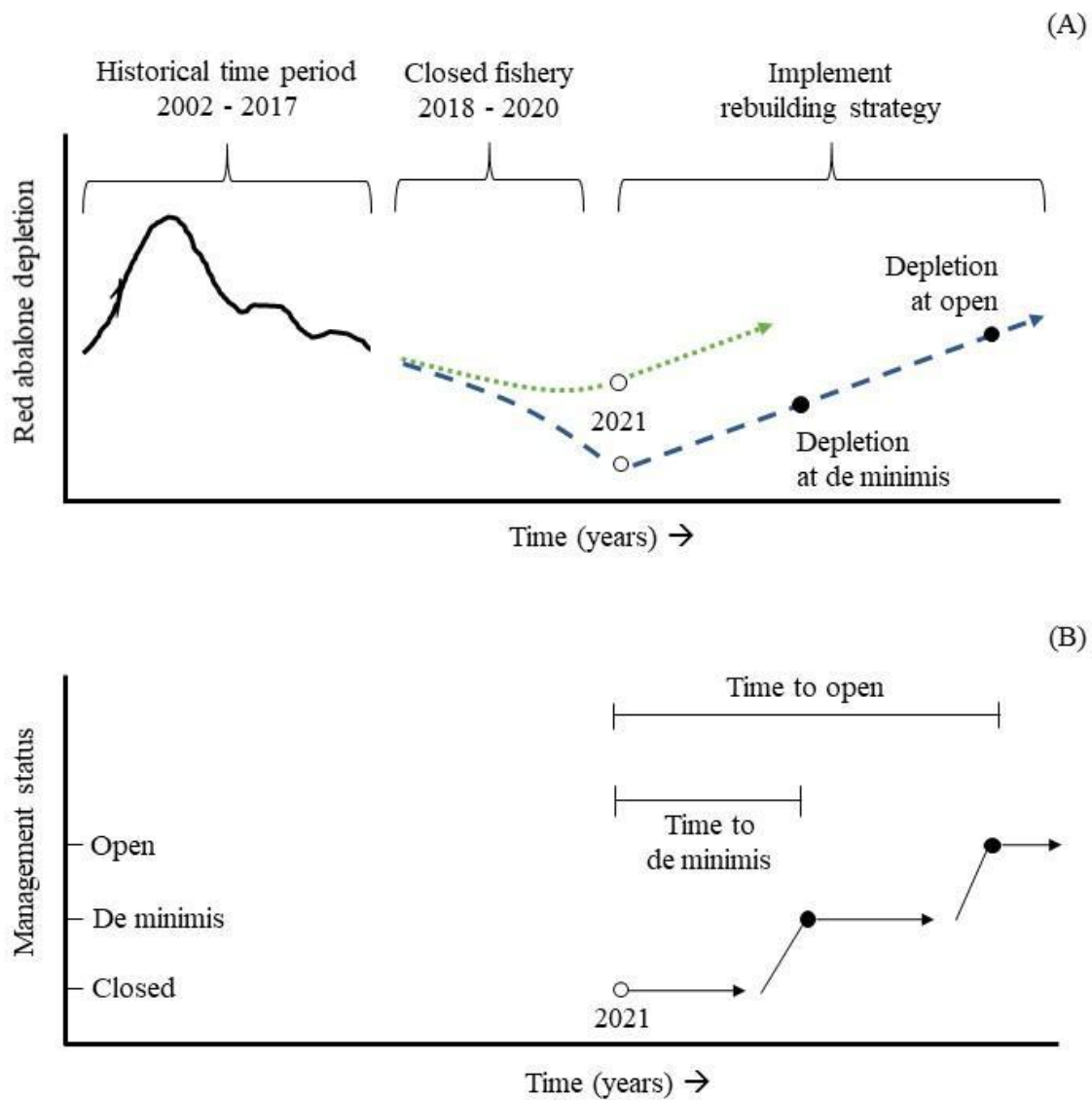


Figure 3.9. Management strategy description and summary of performance metric. (A) Highlights two operating model configurations that differ in the duration of poor environmental conditions, along with the measurement of depletion at different fishery statuses. (B) Demonstrates the transition from closed, to *de minimis*, to open fishery status and the measurement of rebuilding time performance metrics.

Trade off Scenario #1:

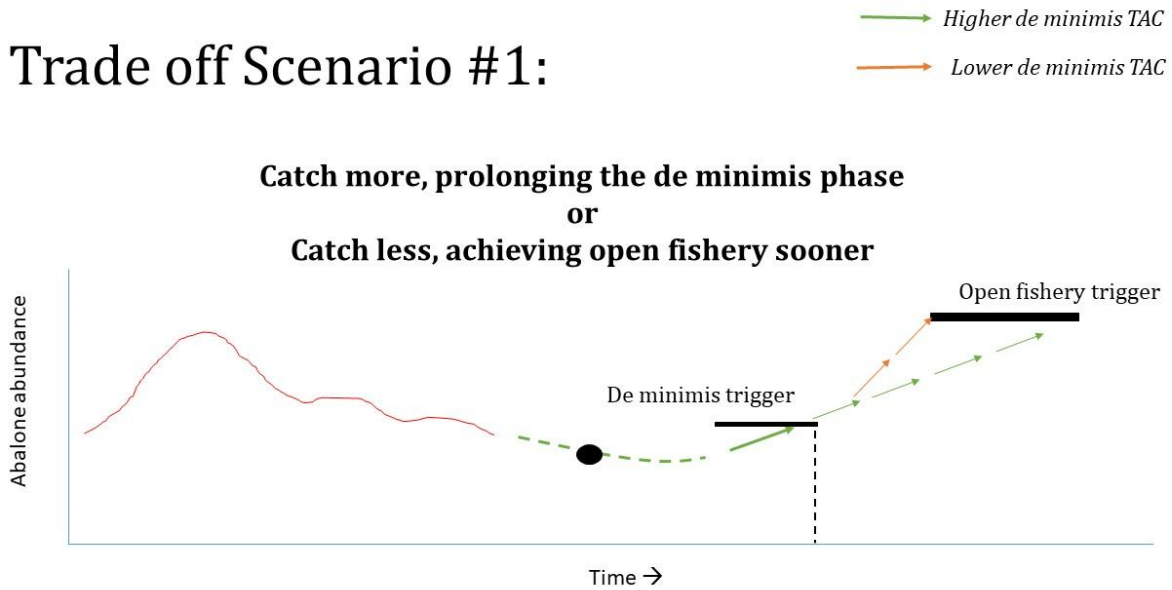


Figure 3.10. Trade-off plot for scenario #1: whether to start the *de minimis* fishery sooner or afford more protection to abalone? This figure represents a conceptual scenario to support visualizing trade-offs.

Trade off Scenario #2:

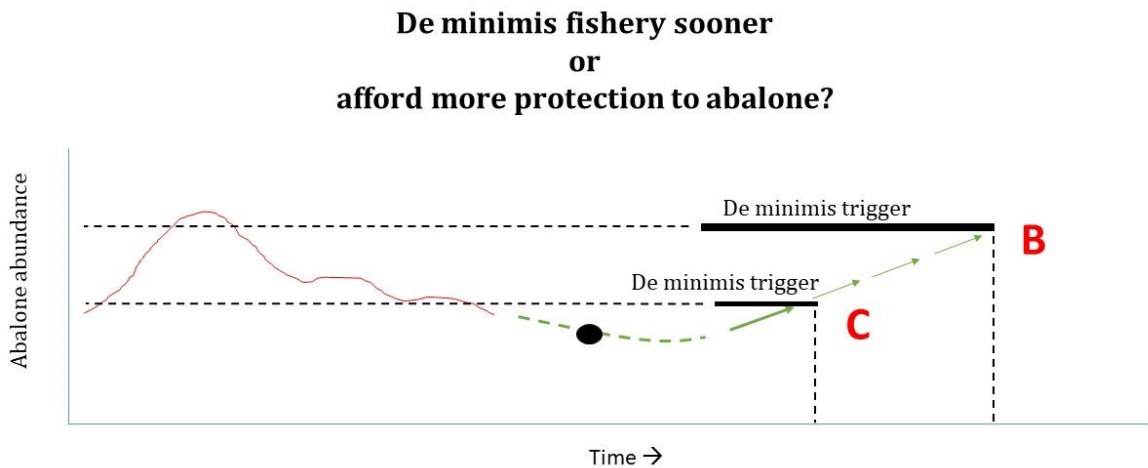


Figure 3.11. Trade-off plot for scenario #2: whether to catch more, prolonging the *de minimis* phase or catch less, achieving open fishery sooner? This figure represents a conceptual scenario to support visualizing trade-offs.

Section IV – Allocation of Fishing Opportunities

This section is intended to outline how harvest opportunities would be distributed among user groups, once a TAC is defined. Although MSE is a powerful tool for assessing the level of risk associated with a given level of harvest and estimating the length of time until the stock is rebuilt, it is not a tool for allocating quotas or TACs.

A. Recreational Fishing Opportunities

Assuming that the demand for recreational red abalone permits would exceed the opportunity, the Project Team engaged in discussions around how limited harvesting opportunities would be equitably subdivided among user groups and individuals. In management of deer, the lottery approach has been successfully utilized by CDFW. Three lottery approaches were discussed as options for permit allocation in the recreational red abalone fishery, particularly for *de minimis* status - 'random draw', 'pay to play', and 'preference point'. With a random draw allocation scheme, permit recipients are selected out of the pool for each opportunity and each person would have equal odds of being selected. A pay to play option was discussed where limited fishing opportunities would be provided to those willing to pay a higher price for permits, fishing outside the 10 index sites outlined in the Abalone Recovery and Management Plan (ARMP). Finally, with a preference point allocation scheme, permit recipients are randomly selected out of the pool. Those applicants not selected would receive a point, increasing their odds of getting a permit in the following year. The second year that opportunities are offered, applicants would be separated into two groups, with a random drawing occurring first for the group with one point and any remaining fishing opportunities would be distributed using a second random draw using the group with no points.

The majority of the Project Team favored the preference points approach over the random draw or pay to play allocation schemes, as well as the notion of a party tag (i.e., multiple individuals could apply for the lottery as a unit and if their application is selected everyone gets a tag). There was agreement that the allocation scheme should be simple in design, optimize economic support to local communities, promote safe harvesting practices, and support a cost-effective and reliable data collection that involves stakeholders. Project Team perspectives were that the preference point approach could provide the greatest number of opportunities to stakeholders and potentially decrease the amount of time before stakeholders could harvest again under the FMP. However, Tribes and Tribal communities expressed that they did not support any of the allocation schemes as subsistence harvest is not comparable to recreational harvest by fishermen.

B. Tribal Subsistence Fishing

At the August Project Team Meeting in Santa Rosa, representatives of the Tribes and Tribal communities first introduced the notion of exploring Tribal subsistence fishing within the FMP. Red abalone play a spiritual, cultural, and central role in the lives of Tribes and Tribal communities, with songs and dances providing an opportunity to honor red abalone and their family (the ecosystem). During the meeting, representatives of the Tribes and Tribal communities expressed that they did not feel their priorities, spiritual philosophies, or knowledge of red abalone and the ecosystem were being considered during the development of the management strategy. As such they requested that CDFW and the Commission collaborate with them to inform decision-making and management. One way of doing so was to consider a fourth management status – tribal subsistence-only fishery – as is done in other states. It was suggested that the management status should progress from closed to subsistence-only to *de minimis* to open, and vice versa. The Project Team as a whole ultimately suggested that Tribal subsistence fishing could occur by allocating a subset of the overall TAC designated for either a *de minimis* or open fishery to Tribes and Tribal communities. This sentiment has been documented in the *De Minimis* Fishery Strawman Proposal (see **Appendix F**). Beyond this, the Admin Team suggested that the conversation and collaboration among CDFW and the Commission to discuss this issue occur outside the confines of Project Team meetings.

Tribes and Tribal communities will seek to work with the Commission and Legislature to understand how subsistence harvest can be supported in the FMP, ideally outside of an allocation scheme, as subsistence take fundamentally differs from recreational take. If the Commission supports the perspective of the Project Team in allowing for Tribal subsistence fishing under the FMP, it is still unclear whether they have the authority to create a Tribal member only allocation. Such authority may need to be created by the Legislature. Tribes and Tribal communities are also in discussions about what traditional ecological knowledge could be incorporated into the final FMP to guide management and designating a Tribal indicator that could ensure that the historical knowledge of Tribes is recognized and utilized.

Section V – Response to Peer Review Recommendations

This section is intended to provide clarity on how recommendations of the OST-facilitated peer review (described in **Section 2A**) were incorporated into the proposed integrated management strategies. Detailed responses are outlined below, as well as a brief discussion of the request for an additional peer review.

A. Response to Peer Review Recommendations

Recommendation 1: These two management strategies should be integrated to reduce uncertainty and take advantage of the best available science.

The Commission passed the following motion at its December 2018 meeting:

“(1) Support addressing peer review recommendations to integrate aspects of both draft management strategies, based on a simulation modeling approach co-developed by CDFW and the TNC-led stakeholder team, including engagement with abalone divers and other stakeholders; (2) revise Fishery Management Plan (FMP) goals to allow for a de minimis fishery option; (3) develop triggers for the de minimis fishery option in consultation with stakeholders; and (4) request that CDFW develop a proposed process and timeline which accounts for active public and Marine Resources Committee (MRC) engagement.”

In direct response to components #1 and #4 of this recommendation, the management strategy integration process began in January 2019 to carry out the task of integrating components of the original two proposals to “reduce uncertainty and take advantage of the best available science” in partnership with stakeholders (i.e., Project Team). Section 3G of this report provides an overview of the proposed integrated management strategies developed during this process. Throughout the process, the Project Team was informed of modeling work, which incorporated best available science, and engaged in discussions with respect to components #2 and #3. With respect to component #2, the Admin Team co-developed a strawman proposal for the design of a *de minimis* fishery. With respect to component #3, the Admin Team and Project Team discussed and reviewed the reference points set to trigger management action within the HCR. Finally, at the last Project Team meeting and in subsequent communications, the Admin Team shared a draft timeline of upcoming Commission and MRC meetings where the management strategies integration process would be included in the agenda and invited the Project Team to continue their engagement by attending these public meetings.

Recommendation 2: The way to integrate indicators, data streams, and analysis should be tested and analyzed using simulation testing from a formal operating model specified to capture low-density population dynamics specific to red abalone.

Density and length-based SPR were ultimately the only indicators that were integrated from the original two management strategies. Performance of these indicators within the various management strategies was evaluated via MSE, which uses a simulation modeling approach. As mentioned in the peer review report and the final MSE technical report (see Appendix A), these two indicators differ in their strengths. Density is responsive to rapid and catastrophic declines in abundance, like those seen in recent years, while SPR may be better characterized as a 'slow reacting' indicator. On the other hand, SPR reflects the reproductive status of the red abalone population (except when reduced gonad condition is present) and, unlike density, allows for decision-making in relation to a biological reference point. Furthermore, SPR reference points can be chosen in a manner that may better optimize long-term yield (Harford et al. 2019b).

With respect to incorporating low-density population dynamics (specifically the Allee effect), there is a lot of uncertainty around what the exact reproductive thresholds are for red abalone (Tegner et al. 1989b, Shepherd and Brown 1993, Catton et al. 2016). However, noting that these low density conditions are an important limitation around red abalone reproduction, the modelers addressed this in a few ways. First, density is included in the management strategies as a precautionary way to help to avoid reaching low-density situations and avoid encountering Allee effects. Stock-recruitment simulations were also conducted, during which recruitment failure occurred when the reproductive output fell below 1% of what would be seen for the egg production of an unfished red abalone resource. Additionally, modeling work explored the probability of depletion levels of the red abalone resource falling below 0.05, 0.10, or 0.20 during the period between triggering of a *de minimis* fishery and an open fishery to examine whether the rebuilding strategies would generally help avoid depletion levels that could be associated with the onset of an Allee effect (see Table 3.19 in Appendix A). Depletion did not fall below thresholds of 0.05 or 0.10 during any simulation runs.

Recommendation 3: All indicators chosen must be clearly defined, and ideally, all candidate reference points for any indicator should be tested using simulation testing in a closed loop analysis.

Only the two indicators selected for including in the harvest control rules underwent simulation testing - SPR and density. At the beginning of the Project Team process,

a long list of candidate indicators (see Appendix E) were discussed for inclusion in the management strategy. The August Project Team meeting was critical in deciding the final list of indicators to be included in the harvest control rules and the remainder of the management strategy. At this meeting, the Project Team proposed that only three indicators be included: SPR, density, and either gonad index or body condition. After a subsequent all-day meeting with the modelers, where the limitations of gonad and body condition data were discussed, this list was further refined to only include SPR and density. This change was shared with and approved by the Project Team at the September meeting. Narrowing down the list of potential indicators provided efficiencies, reducing unnecessary computational analyses given the short timeline of the integration process.

There were several reasons why only two indicators were included in the HCR. First, both length and density data streams were considered in the original management strategies from CDFW and the TNC-led stakeholder group, and the associated indicators were extensively discussed by the peer review panel and were also supported by the Project Team. Second, the Project Team recognized the indicators that were directly related to the condition of the red abalone resource were the most useful to inform management decisions. Third, simulation modeling involved in MSE requires a clear mechanistic link between indicators and the red abalone resource. These mechanisms are not well defined or understood well enough for the majority of the proposed environmental and productivity indicators (e.g., urchin density, kelp density, etc.). Finally, reliability and cost-effectiveness were considered. The Project Team acknowledged the need to keep data collection programs simple and streamlined, and to select a reasonable number of indicators such that information conveyed is not too redundant and data coordination across entities becomes overwhelming and cost prohibitive. While the Data Stream Comparison Table (see Appendix E) outlined a wide variety of potential data streams, robust data streams were unavailable to managers for many of these indicators, although there is some data available through outside programs (e.g., MPA monitoring). There were also cost efficiencies created by designing a management strategy centered around prioritizing existing and routinely collected data streams, rather than prioritizing new data streams or collection approaches (which would necessitate a larger research/analysis component separate from what was achievable under the set integration timeline).

Recommendation 4: A multi-indicator approach, with little to no tiering, where not all indicators need to be met (i.e. not adopting a “one out, all out” approach), may be more flexible and informative given the uncertainty of changing ocean conditions and the response of red abalone to these changes.

The structure of this approach and choice about whether to make it sequential (single indicators triggering another single indicator and so on), tiered (groups of indicators that trigger next tiered group of indicators and so on), or simultaneous (all indicators assessed simultaneously) can and should be tested using a formal operating model, thus building in a structure that is not subjective.

Within the information-limited context of red abalone management, the presence of observation error remains a primary motivation for considering a multi-indicator framework. Estimation of both density and SPR may be subject to non-trivial levels of error. Although alternate structures of the multi-indicator framework were not evaluated through simulation modeling, with only two indicators there were limitations in the sequential/tiering configurations that made sense for density and SPR. If more indicators become available that are regularly measured, have clear mechanistic linkages to abalone population dynamics, and have defined quantifiable reference points, it may be useful to revisit this recommendation. The structure was, however, developed based on the general agreement of the Project Team and flexibility was built in for instances where both data streams are not available.

Members of the Project Team were supportive of the harvest control rule design proposed - a decision-tree using the traffic light method. Use of the traffic light method within a harvest control can be implemented in various forms (Caddy 1999, 2015, Caddy et al. 2005), and offers several benefits in addressing the management circumstances facing red abalone. It simplifies data into a set of value judgments and enables uncertainty in indicators to be embraced while providing a basis for coarse adjustment to management status (Mangel and Levin 2005, Caddy 2015). Members of the Project Team generally agreed that the HCRs were presented in a format that made the management decisions to be made from the framework easy to understand.

Flexibility is also incorporated into the framework in a number of ways. First, with respect to the density indicator, noting that high variability exists within the data set, three different percentiles (75%, 90%, 100%) were explored for the number of site-specific density estimates required for an indicator to be triggered within the control rule; lower percentiles provided more flexibility. Second, recognizing that some instances may arise where there is no density or length frequency distribution data to proceed to a decision tree, the management strategies allow for an interim decision to be made at the discretion of the Commission.

Recommendation 5: Setting reference points for every indicator is critical. (See also recommendation 3)

A suite of candidate reference points (see Table 3.1 in Technical MSE report within Appendix A) were evaluated via MSE for both density and SPR, and used to assess performance of proposed management strategies. Target reference points define the desirable expectations of the fishery and the stock, where the level of concern for fishery sustainability is low. Intermediate reference points are established so that management actions are triggered as concern for sustainability of the resource grows. Limit reference points define a state of the resource that is to be avoided, aiming to select a value that is conservative enough to buffer abundance away from low levels, given red abalone are vulnerable to environmental conditions in terms of their survival, growth, and reproductive success.

In the case of SPR, categories are assigned relative to a limit reference point (see Technical MSE Report in Appendix A). SPR reference points were chosen relative to theoretical work applied to long-lived species. Several studies have concluded that SPR targets greater than or equal to 0.4 should produce close to optimum harvest, especially for long-lived species (Mace 1994, Clark 2002, Punt and Ralston 2007, Harford et al. 2019b). And like other studies, maintaining SPR above such a target during an open fishery may be a reasonable means to buffer against environmentally-induced abundance fluctuations in the longer-term (Harford et al. 2018).

In the case of density, a more involved approach was used that requires specification of limit, intermediate, and target reference points (see Technical MSE Report in Appendix A). Density reference points were proposed by CDFW and were accordingly specified as 0.2/m² (limit reference point), 0.3/m² (intermediate reference point), and 0.4/m² (target reference point). These quantities appear to be consistent with historical density levels. Project Team and CDFW staff discussed a limit reference point in proximity to 0.2 abalone per m². The following rationale was shared, summarizing available evidence that appears to suggest that productivity could be compromised below this density level. At Santa Rosa and Santa Cruz Islands, Kelp Forest Monitoring Program (National Parks Service) data show that red abalone populations in 1983 were below 0.2 abalone per m², and following these densities, populations continued to decline to <0.05 abalone per m² (Tegner et al. 1989a, Karpov et al. 1998). Red abalone densities before 1983 at these island sites (1978-1982) were <0.3 abalone per m² (Tegner et al. 1989a). In Washington State, northern abalone *H. kamtschatkana* densities have declined by 77% with all sites now <0.15 abalone per m² (Rothaus et al. 2008). At these low densities, populations continued to decline and there is now apparent recruitment failure (Rothaus et al.

2008, Rogers-Bennett et al. 2011). Northern abalone have also showed reduced productivity along the west coast of Vancouver Island, British Columbia, Canada following declines in density below 0.3 abalone per m² (Tomascik and Holmes 2003). In South Australia at West Island, given the assumption that declining parental stock contributed to poor recruitment, Shepherd and Brown (1993) measured densities between 0.25 and 0.015 abalone per m² prior to the period of poor recruitment. Additional reference points, termed intermediate and target densities, are also required and were considered relative to past CDFW densities surveys in northern California.

In the HCRs provided, indicators derived from density and length frequency data streams are assigned a color category that is determined by comparing the indicator value against pre-agreed reference points. Red indicates a dangerous condition, far from enabling open fishery status. Yellow reflects unsatisfactory conditions, occurring during transition from red to green. Green reflects satisfactory conditions aligned with enabling open fishery status indicators derived from density and length frequency data streams are assigned a color category that is determined by comparing the indicator value against pre-agreed reference points. These reference points are used as thresholds to trigger a change in management status when reference points are exceeded. It will ultimately be up to the Commission to select adequate reference points that meet the needs of the biological resource and stakeholders, as informed by MSE results.

Recommendation 6: All indicators should be evaluated alongside each other in formal simulation modeling to set reference points and to test and determine the appropriate suite of indicators.

As mentioned in the response to Recommendation #3, there were extensive discussions about the list of indicators listed in Table 1 of the peer review report. Although the Project Team recognized the merits of the range of indicators, only two were ultimately included in the proposed harvest control rules. A combination of cost-effectiveness of data collection and increased understanding of the mechanistic links between SPR and density and the red abalone resource were important factors in their selection. The remainder of environmental and productivity safeguard indicators (e.g. ocean temperature, canopy-forming kelp, and urchin density) were still included within the overall management strategy within the Exceptional Circumstances strawman proposal (see Appendix G). Performance of these indicators (using a variety of reference points) was then evaluated via MSE, which uses a simulation modeling approach.

Recommendation 7: All indicators need to transparently indicate, and then formalize the way in which they deal with uncertainty.

Within the modelers' technical report (see Appendix A), there is an evaluation of the measurable precision of the two data streams used for red abalone to help understand associated uncertainty - length frequency composition and density surveys (from Reef Check California and CDFW). Better understanding of sampling precision of these two datasets is critical in defining reference points and triggers for management action for the indicators associated with these data streams (SPR and density respectively).

For length data, the precision of length frequency sampling is quantified by examining the observed sample sizes at each site. Given complications of field sampling, length samples collected from n sampling events (i.e., transects) may not represent a completely random sample, but instead may be subject to errors attributable to data collection methods, especially measurement of clusters of individuals with similar lengths (Hulson et al. 2012). Simulation modeling of length-based management strategies for red abalone ultimately revealed that observed sample sizes between 150 – 300 individual red abalone per site could be a reasonable rule of thumb for a minimum data collection standard. A bootstrap analysis was also conducted to provide guidance on the minimum number of sites that should be visited to sufficiently characterize the variation in SPR among sites. The analysis revealed that sampling more than 10 sites appears necessary to characterize variation in SPR at the geographic scales considered in the analysis. However, this analysis may still underestimate the number of sites needed to sufficiently characterize regional SPR variation because most SPR estimates made to date are obtained from the most heavily fished sites, rather than some randomized and/or stratified-random design with respect to fishing intensity. Within the MSE simulations, it was assumed that life history parameters that are needed to estimate SPR could be reliably obtained (see Prince 2016). Some care should be taken in ensuring that reliable life history information can be obtained before applying this indicator, as management strategies that rely on SPR can be sensitive to biases in life history parameters, especially when other indicators do not work to ameliorate such circumstances (Hordyk et al. 2015, Harford et al. 2019a).

For density data, whole site density of emergent red abalone should be calculated according to an appropriate statistical distribution thought to give rise to the data. This consideration is explored, revealing a right-skewed distribution of counts, which sometimes includes a non-negligible number of zero count transects. Occurrence of zero count transects is consistent with log-normal or delta log-normal sampling distributions (Pennington 1983, Lo et al. 1992, Fletcher 2008). Thus, for each year-

site combination, summary statistics of density should be calculated by applying a delta-lognormal distribution to red abalone transect counts and estimating summary statistics (including confidence interval (CI) of the mean). Because of the variability around estimates of density (as measured by coefficient of variance), a CI was also calculated separately for density estimates for each individual site, and then the fraction (percentile) of the CIs that meet density criteria are used to determine the status of the resource within the harvest control rule.

Additionally, the traffic light method used to structure the harvest control rule integrates indicators into decision-making according to their known information limitations. The traffic light method has been implemented in various forms (Caddy 1999, 2015, Caddy et al. 2005), and offers several benefits in addressing the management circumstances facing red abalone. It simplifies data into a set of value judgments, presented in an understandable form, and enables uncertainty in indicators to be embraced while providing a basis for coarse adjustment to management status (Mangel and Levin 2005, Caddy 2015).

Recommendation 8: The science underlying setting catch levels needs to be re-evaluated and re-configured.

Like other data-limited fisheries, historical trends in abundance are not well established for red abalone. Historical trends are used to initialize the simulation prior to the application of a management strategy. A scenario was re-constructed about red abalone stock dynamics from 2002 to 2017, based on fishery-independent data sets from CDFW and RCCA and the site-specific catch history from the fishery.

First, data-limited assessment methods are described that were used to gain insight into historical stock size and depletion. The operating model requires use of site-specific unfished recruitment (R_0) that scales relative abundance trends to absolute stock size at each site. This parameter was estimated using two data-limited assessment methods, each of which provides a site-specific estimate of maximum sustainable yield (MSY; in numbers of red abalone). After obtaining MSY, the operating model was tuned so that site-specific R_0 produced the corresponding estimate of MSY. Estimates of MSY were obtained using observed site-specific catch histories and the data-limited methods known as DB-SRA (Depletion-Based Stock Reduction Analysis) and catch-MSY. Ultimately, R_0 was tuned using MSY estimates from DB-SRA because this model accounts for skewness of the surplus production curve (i.e., the quantity B_{msy}/K), which is fixed at 0.5 in Schaefer form of surplus production used by catch-MSY. However, catch-MSY was useful as a comparison and MSY estimates were similar between approaches.

The management strategies developed during this process were ultimately focused on allowing for *de minimis* fishing opportunities, due to the extended length of time estimated until the red abalone resource is rebuilt. As such, analyses around catch setting largely focused on evaluating what level of catch would be considered *de minimis* (i.e., “...having a level of catch that is anticipated to have little to no effect on the health or recovery of a fishery resource.”) This level of catch would be fixed during the *de minimis* phase, and thus the harvest control rules are not designed to make annual changes to the TAC. Four TAC levels were simulated for a *de minimis* fishery: 5,000, 10,000, 20,000 and 40,000 individuals per fishing zone.

Acknowledging the uncertainty associated with estimates of TAC with this modeling approach, results for Zone 1 (Mendocino, Del Norte, and Humboldt counties) in the two-fishing zone approach suggested a *de minimis* TAC at levels between 20,000 and 40,000 would affect recovery. In Zone 2 (Marin and Sonoma counties), a *de minimis* TAC greater than 10,000 would affect recovery.

The MSE was carried out within the realm of data-limited fishery management and because of this limitation, total abundance is highly uncertain. Because total abundance is uncertain, there is also uncertainty surrounding selection of a *de minimis* TAC. The MSE presented herein may be useful for advancing discussion of a *de minimis* TAC, but the MSE is insufficient to provide complete guidance on its selection. Continued discussion is likely necessary to determine whether additional research and analyses may be useful to support selection of a *de minimis* TAC. Further, data-limited management strategies tend to require catch limits that are more precautionary than those that could be implemented under equivalent data-rich fishery circumstances (Ralston et al. 2011, Dichmont et al. 2017). While there is little consensus on the precise approach to ensuring that these catch limits are sufficiently precautionary, data-limited fishery management tends to reduce catch limits in acknowledgement of scientific uncertainty (Newman et al. 2015).

A more detailed discussion of methodologies is outlined within the Technical MSE Report within **Appendix A**.

Recommendation 9: Align the re-opening plan to match how the fishery is managed under other management scenarios to streamline data collection, analysis, and the decisions that follow.

Neither of the original two management strategies provided alignment in how the fishery was managed across management scenarios. In the TNC-led stakeholder management strategy, there was no mechanism provided for re-opening the fishery; the strategy was developed before the December 2017 closure of the fishery, and simply used a relative adjustment based on the previous year’s TAC. In the CDFW

management strategy, different data streams were used to open and close the fishery. When re-opening the fishery at a specific site, three criteria are evaluated: 1) environmental conditions, 2) size distribution of abalone (legals and sub-legals), and 3) density. Assuming all these met the threshold, it was possible to re-open. Alternatively, when the fishery was open, a different suite of indicators was evaluated to make adjustments to catch including environmental data, density, and productivity indicators such as abalone gonad index and body condition.

Under the harvest control rules proposed in Section III, density and SPR are used as indicators to guide decisions about when to open and close the fishery, as well as when to transition to or from a *de minimis* fishery. Using this approach, the same length and density data streams collected by CDFW and RCCA are used to guide annual decision-making to determine whether a management status (open, *de minimis*, closed) will be maintained in a fishing zone or whether it changes. Indicators calculated for the re-opening plan also mirrored those used to close the fishery and transition to a *de minimis* fishery. Across the management strategies provided through the integration process, multiple reference points were defined and evaluated which impact the timeline to recovery of the stock and allow for different risk tolerance thresholds for fishery managers to consider relative to the likelihood of stock rebuilding and fishing needs of stakeholders.

B. Requests for Additional Peer Review

The management strategy integration process, and resulting integrated management strategies outlined in this report, is in direct response to the recommendations made by the OST-facilitated peer review panel. The Commission then made a recommendation in December 2018 that endorsed the peer review recommendation to integrate the two peer reviewed management strategies. As such, the integrated strategies provided in this report are informed by an MSE model and significant content that has already undergone peer review.

During the December 2019 meeting, a member of the Project Team inquired about whether the integrated management strategy would undergo another peer review. The request arose based on the fact that at the time of the original peer review, the management strategies were not drafted to specifically consider a *de minimis* fishery. Commission and CDFW staff clarified that the Commission will ultimately determine whether an additional peer review is necessary. The Commission may look to guidance in the Code (§7059, §7075), in consultation with CDFW, as to whether another peer review is required or if the integrated management may be exempt from an additional peer review based on outlined criteria or if a prior peer review has occurred within a reasonable time period.

Section VI – Final Recommendations from Administrative Team

This section outlines recommendations from the Admin Team to the Commission for consideration as they provide guidance to CDFW in drafting the North Coast recreational red abalone FMP. These recommendations reflect Project Team discussions and guidance including alternative perspectives or issues of note. While recommendations reflect items where there was general support from the Project Team, not all members of the Project Team may agree with one or more of these recommendations. Where possible, the recommendations reference Commission directives from the Commission’s December 2018 motion to inform the development of the North Coast recreational red abalone FMP:

(1) Support addressing peer review recommendations to integrate aspects of both draft management strategies, based on a simulation modeling approach co-developed by CDFW and the TNC-led stakeholder team, including engagement with abalone divers and other stakeholders; (2) revise Fishery Management Plan (FMP) goals to allow for a de minimis fishery option; (3) develop triggers for the de minimis fishery option in consultation with stakeholders; and (4) request that CDFW develop a proposed process and timeline which accounts for active public and Marine Resources Committee (MRC) engagement.

Recommendation #1: Consider selecting a management strategy (or consider developing a new one) that addresses the charge provided by the Marine Life Management Act and Commission goals, while being mindful of the Project Team guidance.

In addressing the Commission’s first directive “to integrate aspects of both draft management strategies, based on a simulation modeling approach,” it is important that the Commission consider selecting a management strategy that is informed by MSE results to best ensure the long-term recovery and sustainability of the red abalone resource.

As part of the selection of a management strategy, the Commission may consider the following potential actions:

- Approve the proposed harvest control design (HCR) that incorporates SPR and density or evaluate the possibility of developing an alternative.
- Select a management strategy (either A, B, C, or D) or evaluate the possibility of developing an alternative management strategy that incorporates aspects of A.1 through A.6 or sensitivity analyses.
- Determine the appropriate number of fishing zones (two or three).

- Select a *de minimis* TAC level for each fishing zone.

With respect to HCR design, the Admin Team recommends that the Commission consider approving the proposed HCRs, including identified indicators. Both design and selection of indicators have been supported by the Project Team. The HCR design satisfies the Commission's first directive "to integrate aspects of both draft management strategies, based on a simulation modeling approach," and to use trigger-based management where possible. The selection of indicators within the HCR can also be supported by existing sampling programs and available data, based on the understanding of the Commission's directive.

With respect to selection of an explicit management strategy or combination of strategies, it will be important for the Commission to consider its risk tolerance and how to best weigh the precautionary approach and need to manage in uncertain environmental conditions with a mandate to also allow for sustainable harvest opportunities. **Section 3G** highlights the trade-offs associated with any option. As stated earlier, these primary trade-offs include: (1) length of time to open fishery status, (2) depletion at open status, and (3) cumulative catches prior to achieving open status. In weighing these trade-offs, and ultimately selecting a management strategy, **Figures 3.9 and 3.10** provide a visual reference to inform Commissioners review of how the various management strategies perform against one another. Additionally, the Commission may consider stakeholder perspectives when selecting a management strategy, although this is difficult given the diversity of perspectives and priorities. Fishermen of the Project Team were more supportive of prioritizing management strategies that support a *de minimis* fishery in the near-term (e.g., strategies A or C) while others, including Tribes and Tribal community members favored more conservative and precautionary options (e.g., strategies B or D) to better protect the resource. It will be important for the Commission to consider priorities around resource recovery and harvest opportunity, to ultimately inform when take opportunities, including a *de minimis* fishery or a bio-fishery, may occur (see Recommendation #3).

There was Project Team support for either a two- or three-zone approach to management. There is currently no support for a one or four-zone approach. The Project Team acknowledged that management under a two-zone fishing configuration would closely resemble CDFW's current management approach. There was broad support for exploring data and sampling needs in Humboldt and Del Norte counties to learn if and how a third zone may be managed in this area. There is concern by some Project Team members that the lack of data, and/or low red abalone densities and population sizes in Humboldt and Del Norte counties will prevent the opening of a fishery if the same approaches and assumptions were used

for the northern counties as for Sonoma and Mendocino counties. Some participants suggested managers start with a two-zone strategy and move to three zones when a data sampling strategy and additional information (i.e., natural mortality rates, etc.) are available for the two northern counties. Site-specific management is challenging because of limited sampling and data availability. The modelers highlighted that MSE is not sensitive enough to model zones where low and/or no data is available; however, the modelers conducted a hypothetical modeling exercise to explore sampling intensity required to explore managing Humboldt and Del Norte counties as a third zone under a separate SPR-only management strategy. It is important that any decisions regarding fishing zones reflect the technical capabilities of MSE, directives set by the Commission for management strategy integration, CDFW capacity for both management oversight and enforcement, and stakeholder perspectives and priorities.

Finally, with respect to selection of a *de minimis* TAC, some members of the fishing sector suggested the Commission maximize fishing opportunities within the context of responsible fishing without overharvesting in the near-term. This could suggest a lower level of *de minimis* TAC either at or below levels indicated in **Section 3G** (i.e. 20,000 to 40,000 abalone for Mendocino, Humboldt, Del Norte and < 10,000 abalone for Marin and Sonoma). When considering harvest opportunities for recreational divers, some fishermen were also interested in exploring a TAC at a level between a bio-fishery and a *de minimis* fishery, which could include a TAC below what was modeled (i.e., a few hundred to 5,000 abalone). See Recommendation #3 regarding a bio-fishery as a means of allowing recreational harvest opportunities in the near-term, while also supporting data collection needs. See Recommendation #4 regarding a *De Minimis* Fishery Strawman proposal as guidance for developing the North Coast recreational red abalone FMP. Participants representing the Tribes and Tribal communities expressed that the recovery of the red abalone resource is the highest priority and supported a more precautionary management approach.

Recommendation #2: Explore a citizen science-driven data collection program for Humboldt and Del Norte counties that could inform the development of a management strategy and inform future management of these data-limited counties.

The Admin Team recommends that the Commission support an effort to fill data gaps for a potential third fishing zone in Humboldt and Del Norte counties. Over the course of the integration process, there were substantial public comments about how to manage abalone in these counties and an interest in managing them as a third fishing zone for the reasons mentioned in Recommendation #1. However, due to logistical challenges of sampling in these regions, and naturally low occurring

abundance of abalone that make the current density survey protocols ineffective, CDFW has not historically sampled in those areas. Numerous conversations at Project Team meetings focused on how to potentially manage these areas of limited or no data, as it has implications for similar areas in southern California, where recreational and commercial harvest is currently closed under a moratorium (Fish and Game Code § 5521).

Citizen science could play a critical role in filling these data gaps, and there was broad support for CDFW to consider the use of citizen science data in the management of red abalone across the state. The simulation modeling efforts that occurred during this process provide a potential path forward, with a suggestion that collecting 20-100 samples of length data per year in Humboldt and Del Norte counties would meet the state's sampling needs for managing the area as a third zone. As mentioned earlier, technology could play an important role in supporting citizen science data collection effort by harvesters, particularly with respect to length data; length data could be acquired manually or using applications that utilize machine learning and benefit from generating more reliable estimates. Should data collection begin in any such zone(s) where there has been little to no previous data, the Commission could, in a future action, could consider conducting another MSE to inform the design of a decision-tree like framework that incorporates length or any other indicators of note (see **Appendix E**). Dependent on time and interest, a wider variety of management options could be considered for this zone using other indicators or other experimental approaches.

Recommendation #3: Consider a biological fishery (bio-fishery) as a means of allowing for near-term recreational harvest opportunities, that also helps support the state's data collection needs.

Throughout the integration process, members of the recreational diving community emphasized the importance of rebuilding the red abalone stock while maintaining any opportunity for harvest. While a number of divers originally envisioned this as a *de minimis* fishery, results of the MSE indicated that the timeline to recovery could be substantial, with median rebuilding times to move from a closed to *de minimis* fishery ranging from 11 to 31 years. As mentioned earlier in the report, even when the fishery is in closed status, it is crucial that data collection efforts continue so that adequate information is available to inform annual decision-making. Given the long recovery timeline to reach a *de minimis* fishery, and the high likelihood of the fishery remaining closed for the next few years, a bio-fishery would allow for limited harvest opportunities while also meeting the data needs for management. As such, the Admin Team recommends the Commission consider a bio-fishery within the northern California recreational red abalone FMP to fulfill the state's identified data needs while providing a near-term opportunity by interested stakeholders. Should the state

implement a bio-fishery, the Project Team supports training from CDFW and scientists for all participants prior to initial participation.

Recommendation #4: Consider adopting the De Minimis Fishery Strawman Proposal (Appendix F) as guidance for CDFW to incorporate into the draft recreational red abalone FMP.

Stakeholder buy-in can be a crucial element in ensuring compliance with any management measure. As such, the Admin Team recommends that the *De Minimis* Fishery Strawman proposal (see **Appendix F**) co-developed by the Admin and Project Teams be incorporated into the recreational red abalone FMP. The second and third components of the Commission's 2018 motion were to "revise Fishery Management Plan (FMP) goals to allow for a *de minimis* fishery option," and "to develop triggers for the *de minimis* fishery option in consultation with stakeholders." In response to and to inform this directive, a *De Minimis* Fishery Strawman proposal was developed and refined throughout the integration process to provide a framework for a *de minimis* fishery within the North Coast recreational red abalone FMP. This document outlines a range of management tools available to help inform guidelines for future regulatory consideration to provide for added flexibility in management and to capture the range of stakeholder perspectives. Its content has been informed by discussions at Project Team meetings, as well as email submissions from Project Team members. Modeling work conducted as part of the management strategy integration process will inform the appropriate level of take of such a fishery.

Recommendation #5: Support further development of the Exceptional Circumstances strawman proposal (Appendix G) with interested stakeholders, ensuring that any indicators used are aligned with peer review guidance.

During both the peer review and management strategy integration processes, there was significant discussion about how to manage red abalone effectively in the face of significant environmental changes. Project Team members recounted extreme environmental conditions seen off the North Coast over the past several years, with an observed "perfect storm" of mass die offs, disease outbreak, species movements, and critical habitat loss. The Exceptional Circumstances strawman proposal (see **Appendix G**) was created noting the interest of Project Team members to incorporate environmental indicators into the management strategy, while acknowledging that their mechanistic links were not as well defined to allow for incorporation within the MSE. Before the harvest control rule is consulted, environmental conditions within the proposal would be assessed as a precautionary measure. As part of these discussions, the Project Team recommended checking for

whether exceptional circumstances had occurred, such as oil spills, harmful algal blooms, and warm water anomalies, as well as reviewing a variety of biological and environmental indicators (e.g., urchin density, kelp abundance, oxygen levels) to determine if environmental conditions are poor or unusual. The latter might require a more immediate response to proactively protect red abalone rather than proceeding through the decision tree.

While the proposal developed was a good starting point, there are still a number of outstanding issues that warrant further discussion. A more detailed protocol is still needed, if this clause is eventually included in the FMP. The identification of indicators is in itself insufficient and does not negate the need for refining the justification for the types of information and the manner in which these indicators trigger an exceptional circumstance (as noted in **Section 3B**). For some indicators identified, additional research regarding the mechanistic linkages in system dynamics would also likely be beneficial. For these reasons, the Admin Team recommends that the Commission support further collaborative development of the Exceptional Circumstances strawman proposal by CDFW and stakeholders. Members of the Project Team expressed that there may be value in convening an organized committee (with leads and logistics to be determined) to review the data and indicators associated with the exceptional circumstances portion of the management strategy before it is implemented. This working group could outline a more clear set of rules and triggers (if warranted) for implementing this portion of the management strategy, and should look to peer review recommendations that cautioned about arbitrary or unjustified selection of reference points for indicators.

Recommendation #6: Prioritize research needs to enhance the management of the red abalone resource off California.

Through the management strategy integration process, a number of research needs and priorities were identified through modeling work and during Project Team meetings. The Admin Team recommends that the Commission endorse these research priorities to encourage state and academic researchers to more actively address filling data gaps. Some of the research needs identified included, but were not limited to:

- Additional research to more clearly define the mechanistic linkages between the red abalone resource and indicators outlined in **Appendix G** (as noted in Recommendation 5).
- Pilot studies to assess sampling feasibility for collection of 60-100 length (and size at reproductive maturity) samples per year in Humboldt and Del Norte counties.

- Exploring methodologies to obtain better life history parameters (including size at reproductive maturity and fecundity).
- Studies to estimate natural mortality rates and the magnitude of inter-site variation.

Recommendation #7: Request that CDFW develop a data management plan with stakeholders to better coordinate and streamline data collection efforts across the state.

The Admin Team recommends that the Commission request CDFW to work with stakeholders (e.g., academics, industry, NGOs, Tribes and Tribal communities) to develop a data management plan for the North Coast recreational red abalone fishery. During the Project Team meeting process there were several conversations about the variety of data collection efforts happening across the state (see **Appendix E**). Given data limitations expressed throughout the process by modelers, there is a need to fill data gaps and have a more comprehensive understanding of the red abalone resource and the broader ecosystem. Coordinating data collection efforts from state and non-state entities, as well as citizen scientists and fishermen, working along the North Coast could provide a more cost effective, efficient, and comprehensive approach. The Project Team strongly supported improving data coordination, where there can be more efficiencies across data collection efforts by the state and other organizations. When coordinating across sampling entities, data collection efforts should be standardized and formalized through a data management plan.

It would be important for such a data management plan to outline data collection standards and activities to best meet management needs and the goals outlined within the final FMP. It could also include an approach to making all data collected more broadly accessible to the public in a timely manner and provide a wish list of data sources that could support management. In the future, the Commission may consider the development of such data management plans as best practice and consider their application broadly across state-managed fisheries.

Recommendation #8: Consider selecting an allocation scheme for recreational permits that uses a preference point lottery system for recreational permits and explore a pathway for the Commission to gain authority to consider allocating a subset of the recreational fishery TAC to Tribes and Tribal communities for subsistence.

Assuming that the demand for recreational red abalone permits would exceed the opportunity, an approach is needed to equitably subdivide harvesting opportunities

among user groups and individuals. The Admin Team recommends that the Commission explore a preference point lottery (as outlined in **Section IV** to accomplish this, given the Project Team reached consensus on this approach. The lottery could apply to single individuals or groups of individuals; in the latter case, a party could apply as a group and all receive tags if drawn. This addresses the recreational diving culture, where groups of individuals engage in the activity together, and it may also increase safety considerations to allow dive buddies or dive groups to dive together.

However, Tribes and Tribal communities clearly expressed a lack of support for any of the allocation schemes, as subsistence harvest is not comparable to recreational harvest. For these reasons, and given the cultural importance of abalone to Tribes and Tribal communities, the Admin Team recommends the Commission continue working with Tribes and Tribal communities to consider allocating a subset of the overall TAC designated for either a *de minimis* or open fishery to Tribal subsistence fishing. This may require engaging in conversations with the Legislature to achieve a Tribal allocation for subsistence fishing and opportunities.

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Appendix A – Final Modeler Technical Report and High Level Summary

A high-level overview was generated for the Project Team meetings to describe operating models, management strategies, and updated results from a management strategy evaluation (MSE) for the North Coast recreational red abalone fishery. That overview can be found below, and a full technical report with additional details accompanies this summary document and is included here: [Draft Technical Report on Management Strategy Evaluation](#).

This document provides a high-level overview of the operating models and updated management strategies and updated results from a management strategy evaluation (MSE) for the North Coast recreational red abalone fishery. All management strategies consider three states for the fishery - closed, *de minimis*⁶, and open. Within these analyses, a two fishing zone configuration was evaluated using the boundary line between Sonoma and Mendocino county. An additional hypothetical analysis was also conducted to consider the level of sampling intensity required to support a three fishing zone configuration. A full technical report with additional details will accompany this summary document.

Operating Model

A key ecological uncertainty is the current state of the red abalone resource. Data from Reef Check California (RCCA) and the California Department of Fish and Wildlife (CDFW) have shown a downward trend in their density estimates that were assumed to reflect unfavorable environmental conditions, however it is unclear how long into the future such environmental conditions may occur. To account for this uncertainty, two operating models are explored in the MSE. Operating model #1 (OM1) assumes that unfavorable environmental conditions will continue through 2020, during which a mortality rate is imposed to deplete red abalone abundance in accordance with these unfavorable conditions. In operating model #2 (OM2), unfavorable environmental conditions are prolonged through 2022.

Within these operating models, sampling efforts for length-based spawning potential ratio (SPR) and density data from CDFW and RCCA were simulated. Utilizing data streams from both entities helps to maximize site coverage and better inform decision-making. The potential management strategies are designed to be applied

⁶ A *de minimis* fishery is defined as having a level of catch that is anticipated to have little to no effect on the health or recovery of a fishery resource

annually and independently at the individual fishing zone level. Decision-making relies on data analysis of the three previous years of data (using the most recent available) for length and density.

Management Strategies and Total Allowable Catch Evaluated

The performance of four management strategies were evaluated within each operating model for the two fishing zone figuration. Two hundred simulations were run for each operating model and management strategy combination. Each management strategy represents a combination of different reference points for SPR (0.4 and 0.5) and percentiles of density ($T_{DL} = T_{DI} = T_{DT} = 100\%$ and $T_{DL} = T_{DI} = T_{DT} = 75\%$)⁷.

- Management Strategy A: SPR (0.5), density percentile (75%)
- Management Strategy B: SPR (0.5), density percentile (100%)
- Management Strategy C: SPR (0.4), density percentile (75%)
- Management Strategy D: SPR (0.4), density percentile (100%)

Four total allowable catch (TAC) levels were also simulated for a *de minimis* fishery - 5,000, 10,000, 20,000 and 40,000 individuals per fishing zone. Noting that a management strategy is applied separately to each fishing zone, it is not necessary to select the same TAC for each fishing zone.

Six additional management strategies were evaluated following the November 2019 Project Team meeting to address requests made by Project Team members and additional considerations from the lead modeler. These represent alternative configurations of management strategy A, at a *de minimis* TAC of 5,000 red abalone in each fishing zone. The following changes were made:

- Strategy A.1 - change minimum harvest size to 8 inches (203 mm)
- Strategy A.2 - change minimum harvest size to 9 inches (229 mm)
- Strategy A.3 - change density reference points to 0.2 m⁻², 0.25 m⁻², 0.3 m⁻²
- Strategy A.4 - change density percentiles to 90%
- Strategy A.5 - change density confidence intervals to 25%
- Strategy A.6 - change density confidence intervals to 10%

⁷ Confidence intervals (CI) for the density indicator were set to 50%, as a conservative threshold to ensure sufficient red abalone abundance is present to support future catch, given the variability in the data stream. Percentiles are then used to score density (as red, yellow, green) in the decision tree. Percentiles are based on the frequency with which confidence intervals contain the density limit (DL) reference point (0.2 per m²), density intermediate (DI) reference point (0.3 per m²), or density target (DT) reference point (0.4 per m²).

Finally, analyses were conducted to evaluate the sensitivity of the operating models (specifically using OM1 and evaluating against management strategy A) to different red abalone productivity levels (measured by stock-recruitment steepness), different assumptions about fecundity, and the impact of how overestimation of site-specific population size might impact rebuilding at various *de minimis* TAC levels (measured by the unfished recruitment parameter in the model [R_0]).

Rebuilding Trajectories

The length of time that it will take for the red abalone resource to recover to a point where it is possible to support an open fishery (i.e., time to recovery) is a function of four primary factors - 1) how depleted the red abalone resource is in the year 2021⁸, 2) the productivity level of the stock, 3) the reference points selected, and 4) the environmental conditions that may impact growth and mortality of red abalone in the future.

Recovery times were evaluated in two ways:

- Length of time until a *de minimis* fishery could occur
- Length of time until an open fishery could occur.

Median rebuilding times from a closed status to a *de minimis* fishery for management strategies A - D varied between 11 and 31 years across the different operating models, fishing zones, and rebuilding strategies.

In the absence of fishing, the median recovery times from closed status to an open fishery status for management strategies A - D ranged between 28 and 59 years, depending on the operating model, fishing zone, and rebuilding strategy reference points. Understanding the median recovery time in the absence of fishing, it was then possible to determine what level of fishing would be possible during a *de minimis* fishery. In Zone 1 (Mendocino, Del Norte, and Humboldt counties), a *de minimis* TAC at levels between 20,000 to 40,000 would affect recovery. In Zone 2 (Marin and Sonoma counties), a *de minimis* TAC greater than 10,000 would affect recovery.

Differences in times to a *de minimis* fishery for management strategies A - D varied by operating model. Prolonged poor environmental conditions simulated in OM2

⁸ The red abalone season closure is in place through March 31, 2021.

resulted in a longer time period, with an additional 8-10 years needed until *de minimis* fishery status was achieved.

Preliminary results also suggest there is a clear trade-off among the four rebuilding strategies. Management strategies A & C allow the opportunity to fish at a *de minimis* state sooner, however the abalone resource is much more depleted when fishing begins (depletion level⁹ of 0.2). Because thresholds for fishing are generally lower, strategies A & C also reach the open status in the shortest amount of time, which was generally triggered at depletion levels between 0.4 and 0.5. Management strategies B & D delay fishing opportunities, however the red abalone resource would be in a much less depleted state (i.e., depletion levels between 0.3 and 0.4) once *de minimis* harvest was allowed. Recovery of the resource under management strategies B & D takes more time to reach an open status, which was generally triggered at higher depletion levels between 0.6 and 0.8.

In addition, recovery trends coupled with different *de minimis* TAC levels produce different recovery times. Higher TACs result in higher overall levels of harvest, however they extend the length of time necessary to achieve an open fishery status.

Notable trends were also observed upon evaluation of the additional management strategies A.1 to A.6. Changing minimum harvest size (management strategies A.1 and A.2) had little effect on shorter-term metrics like time to *de minimis* fishery; however, time to open fishery was reduced by two to three years on average. Similarly, changing density reference points to 0.25 m⁻² and 0.3 m⁻² (management strategy A.3) reduced time to open fishery by, five years on average, but had no effect on time to *de minimis* fishery. Changing density percentiles to 90% (management strategy A.4) resulted in performance that was more similar to management strategy option B (density percentile of 100%), than to the original management strategy option A (density percentile of 75%). Strategies A.5 and A.6 changed the density confidence intervals to 25% or 10%, respectively, relative to the base case density percentile of 50%. Strategies A.5 and A.6 resulted in shorter time durations to *de minimis* fishing, but also allowed fishing to occur at a more depleted resource state.

With respect to results from the three sensitivity analyses investigating the effect of lower productivity levels resulted in delayed recovery times and slightly lower depletion levels at the onset of both the *de minimis* and open fishery. Changes to model assumptions about fecundity ultimately had no effect on performance of the

⁹ Depletion level is measured on a scale from 0 to 1 and used to understand proportion of stock available to reproduce. Higher levels indicate a more robust or stable stock status.

model. Finally, lowering site-specific estimates resulted in notable increases to the length of time required to achieve an open fishery, particularly with *de minimis* TACs > 5,000.

Considerations for Sampling Under a Management Scenario with Three Fishing Zones

Throughout the management strategy integration process there has been extensive conversation about the need to consider Humboldt and Del Norte counties as a separate fishing zone. During Project Team discussions it became evident that data from these regions are extremely limited, presenting challenges to developing suitable indicators on which to inform decision-making. In response to these comments, and as a preliminary step, an analysis was conducted to examine whether limited collection of length frequency data could theoretically support a SPR-based harvest control rule (HCR).

This management strategy only serves to demonstrate how sampling intensity could affect decision-making and does not explore issues of risk in applying such a strategy (e.g., alternative reference points are not explored). A length-based management strategy was explored based on challenges associated with using currently established protocols to estimate density for this geographic area. Results of this analysis indicate that similar performance of the two sampling regimes - sampling of 20 length measurements per year (60 observations collected every three years, each time the HCR rule is applied) leads to reasonably similar recovery trajectories relative to sampling 100 length measures per year (300 observations each decision interval). Results from this analysis could be used as a preliminary step, with subsequent steps requiring identifying the feasibility of data collection and other research priorities, as well as creatively exploring a wider variety of management approaches that may be suitable for managing these counties as a distinct fishing zone.

Takeaway Messages

There are considerable trade-offs to be considered by the Project Team, the Admin Team, and ultimately the Fish and Game Commission, as they decide on the selection of a management strategy and *de minimis* TAC for the North Coast recreational red abalone fishery. Rebuilding strategies A & C offer the shortest times to open fishery status, while rebuilding strategies B & D have a longer recovery timeline to achieve an open fishery but result in greater red abalone biomass recovery before fishing activities occur. More conservative (i.e. higher) SPR and density reference points will provide the greatest biological protection but fewer

fishing opportunities, and the reverse is true where lower reference points result in increased fishing opportunities but reduce biological protections for the resource. Layered on top of this, the magnitude of the TAC chosen for the *de minimis* will impact how long it takes to rebuild the stock to a level where an open fishery could be triggered. Increasing the *de minimis* TAC results in a longer timeline to achieve an open fishery status. Additional management considerations, such as increasing size limits to 8" or 9", while they would have little effect on the timeline to a *de minimis* fishery, could reduce the time to recovery for an open fishery by two to three years. Finally, if the Commission should decide to consider managing under three fishing zones, it needs to identify data collection and research priorities that would allow a management strategy, and associated HCR, to be developed for this zone.

Appendix B – Project Team Meetings: Key Themes Summaries and Meeting Highlights

Meeting summary documents were created after each Project Team meeting between May 2019 and December 2019. The Key Themes Summary documents were intended to provide an overview of the discussion topics, key questions, and identified next steps that emerged from the meeting discussions. The summaries were intended to capture high-level details and key themes, rather than a transcript of the discussion. Towards the end of the process the Admin Team and Strategic Earth transitioned to meeting highlight documents to generate a more streamlined and concise meeting overview. These Meeting Highlights documents are intended to provide a high-level overview of the key meeting discussion highlights and outputs including specific feedback on MSE and *de minimis* options to inform the Admin Team's final report to the Commission.

Key Theme Summaries and Meeting Highlights were developed by Strategic Earth to ensure the exchange of information and ideas was captured in neutral language and inclusive of the diverse perspectives shared during meetings. The Admin Team and core Project Team reviewed and refined the summary documents, providing assurance that the key discussion points and next steps were accurately characterized. Summary documents were then shared with the full Project Team and posted publicly on the OPC project webpage.

Key Theme Summaries and Meeting Highlights are linked below:

- May 22, 2019 Project Team Meeting: [Key Themes Summary](#)
- July 18, 2019 Project Team Meeting: [Key Themes Summary](#)
- August 27, 2019 Project Team Meeting: [Key Themes Summary](#)
- September 19, 2019, Project Team Meeting: [Key Themes Summary](#)
- November 21, 2019 Project Team: [Meeting Highlights](#)
- December 19, 2010 Project Team: [Meeting Highlights](#)

Additional resources regarding the recreational red abalone Project Team, including Project Team meeting agendas, meeting materials, presentations, and webinar recordings, are available on the OPC red abalone management strategies integration webpage.

Appendix C – De Minimis Fishery Proposals Received

Members of the Project Team were invited to share ideas, proposals, comments, and questions regarding the integration of red abalone management strategies and development of a *de minimis* fishery option for consideration and discussion during Project Team meetings. Proposals and comments were made publicly available on the OPC project webpage as they were received and reviewed by the Admin Team. The Admin Team responded to each submitted proposal via email (see **Appendix D**) with information on whether and how comments were considered and integrated. The Admin Team included reference to if/how comments were considered in presentations and relevant meeting materials (i.e., *De Minimis* Fishery Strawman Proposal) during Project Team meetings. Content from the Project Team proposals could be directed to either the Admin Team, peer review panel representatives, and/or the quantitative fisheries lead modeler and modeling team for consideration. Project Team members and others also conveyed their thoughts regarding proposals verbally during meetings.

Throughout the North Coast recreational red abalone management strategies integration process, nineteen proposals were received from Project Team between the first Project Team meeting on May 22, 2019 and the final Project Team meeting on December 19, 2019. These proposals are linked below:

- [Jack Likins- Submitted May 22, 2019 Project Team meeting](#)
- [Steven Rebuck- Submitted May 22, 2019 Project Team meeting](#)
- [Brandi Easter- Submitted May 22, 2019 Project Team meeting](#)
- [Don Thompson- Submitted May 22, 2019 Project Team meeting](#)
- [Steven Rebuck- Submitted June 12, 2019](#)
- [Edward Schulze- Submitted June 19, 2019](#)
- [Ken Morrill- Submitted June 26, 2019](#)
- [Brandi Easter – Submitted July 10, 2019](#)
- [Doug Jung- Submitted August 11, 2019](#)
- [Steve Rebuck- Submitted August 12, 2019](#)
- [Scott Taylor – Submitted September 2019](#)
- [Jack Likins – Submitted September 24, 2019](#)
- [Jan Freiwald – Submitted October 3, 2019](#)
- [Ken Morrill – Submitted October 9, 2019](#)
- [Petition for New Abalone Management Zone – Submitted October 18, 2019](#)
- [Ken Morrill – Submitted November 18, 2019](#)
- [Ed Schulze – Submitted November 19, 2019](#)
- [Steven Rebuck – Submitted November 29, 2019](#)
 - [Supplemental materials here and here](#)
- [Don Thompson – Submitted December 18, 2019](#)

Appendix D – Response to Comments Received throughout Integration Process

This appendix documents the responses provided by the Admin Team to proposals sent by Project Team members, with the exception of the petition that would have involved a response to over 2,000 individuals (see **Appendix C**). The petition was however highlighted in the Admin Team update presentation at the October 2019 Project Team meeting.

Proposal Author: Jack Likins

Date Submitted: May 22, 2019

Admin Team Response: Thank you for providing some context and demonstrating the added value of a *de minimis* fishery. Your proposal provides important context on how such a fishery could effectively balance science, management, and recreational needs. We agree that fishermen and citizen scientists can play an important role in data collection for a recreational fishery and that a *de minimis* fishery should be designed to align with those data collection goals. Finally, we will continue to take your questions into consideration as *de minimis* fishery discussions continue at the upcoming Project Team meetings. *Response sent 4:04pm 9/18/2019*

Proposal Author: Steven Rebuck

Date Submitted: May 22, 2019

Admin Team Response: Thank you for submitting your detailed proposal for a *de minimis* fishery. We agree that such a fishery can be designed that allows for harvest and data collection by fishermen while posing a minimal threat to the red abalone resource. We also agree with your outlined benefits, particularly those around a fishery benefiting coastal economies and providing additional resources to the Department of Fish and Wildlife. Unfortunately, the scope of the current management strategy integration process is limited to the North Coast recreational fishery. As such we are not exploring a fishery, recreational or commercial, for Southern California. However, we are hopeful that we can learn from the process, ideas shared, and final management strategy to inform future discussions about Southern California. *Response sent 4:12pm 9/18/2019*

Proposal Author: Brandi Easter

Date Submitted: May 22, 2019

Admin Team Response: Thank you for providing a number of interesting draft concepts for the Project Team to consider around a *de minimis* fishery. As you highlighted, we are seeking to strike a balance between allowing the stock to recover and allowing a limited, sustainable level of harvest. We also agree with the need to add clear criteria around fishery re-opening within the harvest control rule, and draft ideas have been included in the latest draft of the management strategy. We have also incorporated the idea of a random lottery or draw into the strawman proposals ([here](#)) that have been developed for consideration by the Project Team. *Response sent 4:15pm 9/18/2019*

Proposal Author: Don Thompson

Date Submitted: May 22, 2019

Admin Team Response: Thank you for your comprehensive comments which provide a thorough overview of the management history of red abalone. Although the scope of the current FMP is focused on the North Coast recreational fishery, as directed by the Fish and Game Commission, and thus cannot address your desire for a coastwide fishery, you raise a number of important issues that we are currently working to address. First, you mentioned a desire for a risk assessment of varying levels of harvest of the red abalone resource. A management strategy evaluation will allow us to do just this and explore trade-offs associated with increased harvest and the rate of recovery of the stock. This work will occur within the next few months and the results will be shared with the Project Team. Second, you highlighted a major concern with density as an indicator for management. Although the Project Team still feels density can be an informative indicator, through this management strategy integration process we are re-evaluating density and other potential indicators, how best to estimate them, address uncertainty around estimates, and set appropriate reference points for them. Lastly, we are hopeful that we can learn from the process, ideas shared, and final management strategy to inform future discussions about Southern California, as others have mentioned this concern as well. *Response sent 4:21pm 9/18/2019*

Proposal Author: Steven Rebuck

Date Submitted: June 12, 2019

Admin Team Response: Thank you for providing a comprehensive public comment, as well as citations to a broad body of literature around the value of advisory groups in management, marine protected areas, and red abalone research studies. To your point about the need to evaluate the effectiveness of management measures such

as total allowable catch and trip limits on maintaining a healthy resource, management strategy evaluation will be used to do just that. This work will occur within the next few months and the results will be shared with the Project Team. We also agree about the value of advisory groups, revisiting their past recommendations as they relate to peer review recommendations and the charge provided by the Commission; members of the Recreational Abalone Advisory Committee (RAAC) have also been invited and are participating in the management strategy integration process. We also appreciate a number of the management measures you have suggested for the *de minimis* fishery in Section 5 of your comment letter. The Administrative and Project Team, as well as the broader public, have access to your letter, and these specific management measures, as all public comments and proposals are posted on the Ocean Protection Council website ([here](#)). We welcome you to discuss these ideas in further detail during the ongoing Project Team meetings. Finally, we have passed on your requests that are outside the scope of the current management strategy integration process (e.g., delisting sea otters from the Endangered Species Act, allocating TAC to a commercial fishery, exploring sport or commercial fisheries from south of San Francisco to Santa Barbara county, exploring a fishery for green abalone, conducting an environmental impact analysis of the northern wine industry, tracking flows of fire retardants to the nearshore environment), to the members of the Administrative Team from the Department of Fish and to be responsive to the requests. *Response sent 4:36pm 9/18/2019*

Proposal Author: Edward Schulze

Date Submitted: June 19, 2019

Admin Team Response: Thank you for submitting a detailed proposal for a *de minimis* fishery. A number of the ideas you have presented such as considering zonal management, and assigning a specific total allowable catch (TAC) to each zone are concepts that have been incorporated into the latest draft of the management strategy ([here](#)). Depending on the management status of the fishery (open, *de minimis*, closed) that TAC would vary, as you suggested, based on what the selected indicators tell us about the health of the red abalone resource. We will continue to explore more specific management details for a *de minimis* fishery at upcoming Project Team meetings. Your thinking about a lottery or drawing for tags has been incorporated into the *de minimis* fishery strawman proposals ([here](#)) drafted by the Administrative Team for continued consideration by the Project Team. *Response sent 4:30pm 9/18/2019*

Proposal Author: Ken Morrill

Date Submitted: June 27, 2019

Admin Team Response: Thank you for providing comprehensive public comments, as well as for proposing specific elements of a *de minimis* fishery. A number of the ideas you have presented such as considering zonal management, and assigning a specific total allowable catch (TAC) to each zone are concepts that have been incorporated into the latest draft of the management strategy ([here](#)). Depending on the management status of the fishery (open, *de minimis*, closed) that TAC would vary based on what the selected indicators tell us about the health of the red abalone resource. Conversations to date at the Project Team meetings have focused on either a random or preference point lottery. We will continue to explore more specific management details, including allocation details, for a *de minimis* fishery at upcoming Project Team meetings. The strawman proposals discussed to date at Project Team meetings are linked [here](#) for reference. As you noted, this process is focused on the North Coast recreational red abalone fishery. We are hopeful that we can learn from the process, ideas shared, and final management strategy to inform future discussions about Southern California; however, those discussions are not within the scope of this current process. We look forward to your continued insights at upcoming Project Team meetings. *Response sent 3:30pm 9/18/2019*

Proposal Author: Brandi Easter

Date Submitted: July 10, 2019

Admin Team Response: Thank you for submitting a detailed proposal for a *de minimis* fishery, as well as additional draft ideas for Project Team and Admin Team consideration. A number of the ideas you have presented such as considering zonal management, and assigning a specific total allowable catch (TAC) to each zone are concepts that have been incorporated into the latest draft of the management strategy ([here](#)). Depending on the management status of the fishery (open, *de minimis*, closed) that TAC would vary, as you suggested, based on what the selected indicators tell us about the health of the red abalone resource. Conversations to date at the Project Team meetings have focused on either a random or preference point lottery, similar to your suggestions. We will continue to explore more specific management details, including allocation details, for a *de minimis* fishery at upcoming Project Team meetings. The strawman proposals discussed to date at Project Team meetings are linked [here](#) for reference. The “DATA” tag idea that you’ve proposed aligns well with the “bio-fishery” strawman proposal. We agree that fishermen and citizen scientists can play an important role in data collection for a recreational fishery and that a *de minimis* fishery should be designed to align with

those data collection goals. We look forward to your continued insights at upcoming Project Team meetings. *Response sent 4:33pm 9/18/2019*

Proposal Author: Doug Jung

Date Submitted: August 11, 2019

Admin Team Response: Thank you for your comments and desire to inform the allocation of fishing opportunities for a *de minimis* fishery. Conversations to date at the Project Team meetings have focused on either a random or preference point lottery. As you suggested, an alternative to a lottery approach is the exploration of qualifying criteria for how to allocate TAC among stakeholders (e.g. involvement in volunteer urchin removals). However, because the utilization of qualifying criteria is an unprecedented concept for recreational fisheries, its use would require a discussion with the Fish and Game Commission before exploring it in any greater detail. Thus, as an alternative the Project Team could consider establishing some criteria whereby volunteers helping with management (via data collection efforts) could earn a "bonus" point that would apply to a preference point draw system.

Response sent 4:38pm 9/18/2019

Proposal Author: Steven Rebuck

Date Submitted: August 12, 2019

Admin Team Response: Thank you for your ongoing involvement in this process. We recognize that red abalone is a resource that is found along the entire California coast, however, the scope of the current FMP provided by the Fish and Game Commission is focused on the North Coast recreational fishery. A successful management solution in the North could be a model for discussions regarding a Southern California fishery in the future. The California Department of Fish and Wildlife (CDFW) and The Nature Conservancy (TNC) have been working in partnership with the Ocean Protection Council (OPC), California Fish and Game Commission (Commission), Tribes and tribal communities, and representatives from the recreational red abalone fishing community to ensure a timely and collaborative integration process for the two management strategies that were peer reviewed in the Ocean Science Trust-facilitated process. You can find more information on the peer review process [here](#). *Response sent 4:40pm 9/18/2019*

Proposal Author: Scott Taylor

Date Submitted: September 10, 2019

Admin Team Response: Thank you for sharing your thoughts around the value of fishery-dependent data. We agree that the North Coast recreational red abalone FMP can allow for harvest and data collection by fishermen while posing a minimal threat to the red abalone resource. To address your concerns about the Department of Fish and Wildlife exploring new management methods and procedures, we are using management strategy evaluation and a host of new indicators to better manage the red abalone resource, with an open exchange of dialogue with the Project Team as you are aware. Although we can track densities of urchin in the environment, your recommendations around adjusting the current bag for purple urchins would have to be addressed in a separate regulation by the Commission. *Response sent 3:59pm 9/18/2019*

Proposal Author: Edward Schulze

Date Submitted: September 16, 2019

Admin Team Response: Thank you for providing comments and a draft data collection form. We will consider the recommended form fields as we continue to develop a proposal for the first tier of the decision tree, which incorporates environmental data and observations. The Admin Team agrees that harvester-collected information can play an important role in the North coast red abalone fishery. Your recommendation that harvesters/citizen scientists should be involved in data collection is in line with comments provided by Department of Fish and Wildlife staff during the August 27, 2019 Project Team meeting where they highlighted the value of harvesters providing observational data, in addition to the information already required on report cards. *Response sent 2:45pm 10/31/2019*

Proposal Author: Jack Likins

Date Submitted: September 24, 2019

Admin Team Response: Thank you for providing a proposal to consider three fishing zones. You have highlighted a number of important considerations for the modelers and Project Team as they continue exploring the appropriate number of zones to consider for management of the red abalone resource - including ecological boundaries, data availability, and ease of enforceability. We appreciate your comprehensive understanding of data collection efforts in California, and your concerns around data availability and data limitations are also in line with ongoing discussions at previous Project Team meetings. As these conversations are still ongoing, we have shared your proposal with the modelers and posted it online for

the Project Team to help inform upcoming Project Team discussions. *Response sent 2:49pm 10/31/2019*

Proposal Author: Jan Freiwald

Date Submitted: October 2, 2019

Admin Team Response: Thank you for providing feedback on the four fishing zone proposal presented during the September 19, 2019 Project Team meeting, as well as for providing a three zone proposal. Given Reef Check California's leadership and involvement in ongoing data collection efforts, we value your perspectives on how to align the proposed scale of management with current data availability. As these conversations are still ongoing, we have shared your proposal with the modelers and posted it online for the Project Team to help inform upcoming Project Team discussions. *Response sent 2:52pm 10/31/2019*

Proposal Author: Ken Morrill

Date Submitted: October 9, 2019

Admin Team Response: Thank you for providing feedback around fishing zones and measures that could be used to manage the recreational red abalone fishery. Recent discussions by the Project Team, as well as the Commissioners at the October 2019 Fish and Game Commission meeting also emphasized your point about Humboldt and Del Norte counties being ecologically different, and a need to treat them as so in management. Additionally, your recommendation to use a total allowable catch and size limits are among the list of approaches currently under consideration by the Project Team for managing fishing zones. As conversations on zones are still ongoing, we have shared your proposal with the modelers and posted it online for the Project Team to help inform upcoming Project Team discussions. *Response sent 2:55pm 10/31/2019*

Proposal Author: Ken Morrill

Date Submitted: November 18, 2019

Admin Team Response: Thank you for your comment and for remaining engaged throughout the management strategy integration process. We agree that fishermen should be involved in discussions around ensuring a sustainable level of take (i.e. total allowable catch [TAC]) for the recreational fishery, and are working to ensure that the best science is available to ultimately inform these decisions. With respect to the evaluation of a third zone, due to substantial public comment the modelers will

now be exploring what level of sampling intensity would be required to support management of a third zone for Humboldt and Del Norte counties. Relative to increasing size limits, the Department must ensure the interests of all user groups are considered, not just those that would cater to trophy hunters (as highlighted in your example). The modelers, however, will evaluate how rates of recovery would change for the red abalone resource if the size limit were increased beyond 7".

Response sent 9:00am 12/17/2019

Proposal Author: Ed Schulze

Date Submitted: November 18, 2019

Admin Team Response: Thank you for your comment and request to consider enforceability in any management measures under consideration for the North Coast recreational red abalone fishery. We agree that management measures should be enforceable, and CDFW fishery managers will continue to work with enforcement staff throughout the FMP development process to ensure this. However, reviewing bail schedules and the level of infraction for violations are not within the scope of this FMP. *Response sent 8:31am 12/17/2019*

Proposal Author: Steven Rebuck

Date Submitted: November 29, 2019

Admin Team Response: Thank you for your comment and for remaining engaged throughout the management strategy integration process. We agree that current and former commercial divers bring a wealth of knowledge and expertise, and will continue to look for ways to engage these stakeholders to address challenges to the red abalone resource, unfortunately the Department is not in a position to hire outside divers. With respect to your recommendation to open an area to abalone harvest in southern California using Appendix H of the ARMP, this is outside the scope of the FMP. The scope is limited to the North Coast recreational fishery and, as previously mentioned, we are not exploring a fishery, recreational or commercial, for southern California. We are hopeful, however, that new FMP for northern California will develop approaches and concepts that might be applied to other parts of the state including southern California. *Response sent 9:00am 12/17/2019*

Proposal Author: Don Thompson

Date Submitted: December 18, 2019

Admin Team Response: Thank you for your perspectives around peer review and future management of the red abalone resource. With respect to the request for a peer review of the draft integrated fishery management plan (FMP), as was mentioned during the final Project Team meeting on December 19, 2019, the California Fish and Game Commission will ultimately determine whether an additional peer review is required, looking to guidance provided in Fish and Game Code and by CDFW. Further comments on this matter can be referred to the March 2020 Marine Resources Committee meeting. With respect to use of the SPR and density data, data poor methodologies were used in the MSE that take advantage of some of the indicators (i.e. SPR and density) highlighted by the peer reviewers because data available to inform the current status of the red abalone resource is extremely limited. Finally, with respect to recovery goals, the goal is to manage a fishery sustainably no matter the condition of the stock. California state law requires that there is an attempt to restore stocks to their former levels. The *de minimis* fishery discussed during the integration process would address the desire to maintain some level of fishing opportunity while the stock is recovering or rebuilding.
Response sent 2:15pm 1/15/2020.

Appendix E – Data Streams Comparison Table

This Data Stream Comparison (Table E.1) will serve as a reference to inform ongoing Red Abalone Fishery Management Plan (FMP) Project Team discussions regarding trade-offs associated with evaluating which data streams to use in managing the North Coast recreational fishery. It is imperative to consider which combination of data streams will result in appropriate spatial and temporal coverage, as well as be scientifically robust and cost-effective to ensure long-term, sustainable management of the red abalone resource.

Data streams can be considered in four categories: red abalone fishery variables (1-3), red abalone population variables (4-17), red abalone body condition variables (18-19), and environmental variables (20-28). For each data stream within each section, we provide information on - 1) the data source, 2) sampling entity (e.g., government, NGO, academic, industry), 3) length of data set, 4) number of landing sites sampled, 5) frequency of sampling, and 6) total cost of survey (i.e. all associated survey costs including salary). Additionally, please note that in some instances survey costs are reflected in aggregate, as sampling entities can simultaneously collect multiple data streams on the same survey. For instance, during CDFW's creel survey they generate body condition and length data, for a total cost of \$11,100. We will continue to update information as it is made available.

Table E.1. Data Stream Comparison Table.

Data Stream [Source/ Associated Survey]	Sampling Entity	Length of Data Set [# years]	CDFW Landing Sites Sampled [# sites out of 56 total]	Frequency of Sampling	Total Cost of Survey [\$ per year]
1. Catch [Report cards]	CDFW	16-30	53	Sporadic (pre-2002); Annually (2002- 2016)	\$26,400
2. Catch [Creel Survey]	CDFW/ Citizen Scientists	42	10	Annually (pre-2003); Every 2 years (2003 onward)	\$11,100
3. Length [Creel Survey]	CDFW/ Divers	42	10	Annually (pre-2003); Every 2 years (2003 onward)	Cost included in total survey estimate in Row 2
4. Length [Subtidal survey]	CDFW	5-29	3-15 ^{^^^}	Sporadic (pre-2002); Every 3 to 4 years (2002-2018)	\$125,000 *
5. Length [Subtidal survey]	MPA Monitoring [Reef Check]	13	15	Annually	\$110,000 ++
6. Length [Random Swimming]	Reef Check	3	20	Annually	Cost included in total survey estimate in Row 5
7. Length [Subtidal survey]	MPA Monitoring (HSU, MARINe)	3-6	11	Annually	\$123,000 +++
8. Length [Intertidal plot survey]	MPA Monitoring (MARINe/ PISCO UCSC)	1-17	4-11	Annually (for 4 funded sites); Sporadic (7 additional)	\$32,000 ^^
9. Length [Intertidal swath survey]	MPA Monitoring (MARINe/ PISCO UCSC)	1-7	31	Every 3-5 years	\$49,600 ^^

Data Stream [Source/ Associated Survey]	Sampling Entity	Length of Data Set [# years]	CDFW Landing Sites Sampled [# sites out of 56 total]	Frequency of Sampling	Total Cost of Survey [\$ per year]
10. Density ^ [Subtidal survey]	CDFW	5-29	3-15 ^^^	Sporadic (pre-2002); Every 3 to 4 years (2002-2018)	Cost included in total survey estimate in Row 4
11. Density [Subtidal survey]	MPA Monitoring (HSU, MARINe)	3-6	11	Annually	Cost included in total survey estimate in Row 7
12. Density [Subtidal survey]	MPA Monitoring (Reef Check)	13	15	Annually	Cost included in total survey estimate in Row 5
13. Density/ Counts [Intertidal plot survey]	MPA Monitoring (MARINe/ PISCO UCSC)	1-17	4-11	Annually (for 4 funded sites); Sporadic (7 additional)	Cost included in total survey estimate in Row 8
14. Density [Intertidal swath survey]	MPA Monitoring (MARINe/ PISCO UCSC)	1-7	31	Every 3-5 years	Cost included in total survey estimate in Row 9
15. Recruitment module [Juvenile stage recruitment]+	CDFW	18	1	Annually	Cost included in total survey estimate in Row 4
16. Recruitment [Plankton tow]+	CDFW	10	2-3	Every 3 to 4 years (2002-2018)	Cost included in total survey estimate in Row 4
17. Recruitment [Boulder sampling]+	CDFW	10	2-3	Every 3 to 4 years (2002-2018)	Cost included in total survey estimate in Row 4
18. Gonad index [Creel Survey]	CDFW	10	2	Every 2 years	Cost included in total survey estimate in Row 2

Data Stream [Source/ Associated Survey]	Sampling Entity	Length of Data Set [# years]	CDFW Landing Sites Sampled [# sites out of 56 total]	Frequency of Sampling	Total Cost of Survey [\$ per year]
19. Body condition [Creel Survey]	CDFW	3-4	10	Every 2 years	Cost included in total survey estimate in Row 2
20. Kelp Density [Aerial survey]	CDFW	12	53	Sporadic (annually in 2008, 2014-2016)	\$250,000 **
21. Kelp Density [Subtidal survey]	MPA Monitoring (Reef Check)	13	15	Annually	Cost included in total survey estimate in Row 5
22. Kelp Density [Subtidal Survey]	MPA Monitoring [HSU, MARINe]	2-6	11	Annually	Cost included in total survey estimate in Row 7
23. Pacific Decadal Oscillation	NOAA Fisheries	129	---	Annually	---
24. Urchin Density [Subtidal survey]	CDFW	5-29	3-15 ^^^	Sporadic (pre-2002); Every 3 to 4 years (2002-2018)	Cost Included in total survey estimate in Row 4
25. Urchin Density [Subtidal survey]	MPA Monitoring (Reef Check)	13	15	Annually	Cost included in total survey estimate in Row 5
26. Urchin Density/ Counts [Intertidal Plot Survey]	MPA Monitoring (MARINe/ PISCO UCSC)	1-7	13	Annually (for 9 funded sites); Sporadic (4 additional)	\$20,800 ^^
27. Water Temperature	CDFW	12	1	Annually	Cost included in total survey estimate in Row 4
28. Water Temperature	Reef Check	2	~10	Every 15 min (Year round)	\$2,000

* Includes costs for various permanent and temporary staff salaries and factoring in pre-survey preparation, conducting surveys, and post survey data processing and QA/QC. This is an annual cost estimate for three weeks of survey on the North Coast.

** Cost is likely higher than listed amount; reflects the current cost for a contract to provide aerial survey and post processing of data for GIS use.

*** Cost likely higher than listed amount; reflect transect survey costs (e.g. survey operations and staff compensation beyond regular work hours) but does not account for costs associated with data entry and QA/QC

+ Data streams under development

++ Includes costs for all data collected by Reef Check (including length [i.e. “random swimming”] and density survey for kelp forest community), as well as staff time for Reef Check staff and part-time contractor

+++ Includes costs for all data collected by HSU (including length and density survey for kelp forest community), as well as staff time for HSU including travel, benefits, and boat usage

^^ Includes costs to survey all sites, travel, salary and benefits, overhead, and database support.

^^^ CDFW can either run the rapid assessments (i.e., 10 index sites per year) or the regular index site survey (i.e., 3 index sites per year) under this cost and FTE

Appendix F – De Minimis Fishery Strawman Proposal

At the direction of the Ocean Science Trust-facilitated peer review panel and the Fish and Game Commission (Commission), the Project Team, in partnership with the Administrative Team, has been exploring the design of a de minimis fishery for the North Coast recreational red abalone fishery. This document is intended to provide a framework for a de minimis fishery within the North Coast recreational red abalone FMP. It outlines management tools available to help inform guidelines for future regulatory consideration and has been updated to include additional options that were identified during the December 19, 2019 Project Team meeting. Its content has been informed by discussions at previous Project Team meetings, as well as email submissions from Project Team members¹⁰. This document has been streamlined for consideration by the Project Team. Modeling work being conducted as part of the management strategy integration process will continue to inform the appropriate level of take (if possible without impacting the resource) of such a fishery. Upon conclusion of the management strategy integration process, this proposal will be included as an Appendix in the final report to the Commission and will continue to be used as a resource to guide FMP development.

Updated De Minimis Fishery Proposal

Current components for consideration in the development of a de minimis fishery proposal are as follows:

- **Season Length:**
 - Maintain status quo (i.e., year-round harvest opportunities)
 - Condensed fishing season (i.e., July to October)

¹⁰ All proposals submitted by the Project Team were reviewed and considered by the Administrative Team:

- Jack Likins- Submitted May 22, 2019 Project Team meeting
- Steven Rebeck- Submitted May 22, 2019 Project Team meeting
- Brandi Easter- Submitted May 22, 2019 Project Team meeting
- Don Thompson- Submitted May 22, 2019 Project Team meeting
- Steven Rebeck- Submitted June 12, 2019
- Edward Schulze- Submitted June 19, 2019
- Ken Morrill - Submitted June 27, 2019
- Brandi Easter - Submitted July 10, 2019
- Doug Jung - Submitted August 11, 2019
- Steve Rebeck - Submitted August 12, 2019
- Scott Taylor - Submitted September 10, 2019
- Ed Schulze - Submitted September 16, 2019
- Jack Likins - Submitted September 24, 2019
- Jan Freiwald – Submitted October 3, 2019
- Ken Morrill – Submitted October 9, 2019
- Petition for New Abalone Management Zone – Submitted October 18, 2019
- Ken Morrill – Submitted November 18, 2019
- Edward Schulze – Submitted November 18, 2019
- Steve Rebeck – Submitted November 29, 2019
- Don Thompson – Submitted December 18, 2019

- Consider different Seasons for rock pickers (e.g., April to May) and other sectors (e.g., May to October)
- **Daily Bag/Possession/Annual Limits:**
 - Discussed as few as 1 to 2 abalone per permit per season
 - Need flexibility to increase limits as stock recovers
 - Limits could vary or scale based on de minimis fishery TAC under consideration to maximize opportunity
- **Number of permits:** (*TBD, results from MSE will inform potential opportunity levels*)
- **Size Limit:**
 - Maintaining status quo (7")
 - Include flexibility to increase size limit to ensure recovery (8" or 9" or 10")
- **Management Zones:**
 - Option #1: Considers two fishing zones
 - Marin and Sonoma counties
 - Mendocino, Del Norte, Humboldt counties
 - Option #2: Considers three fishing zones
 - Marin and Sonoma counties
 - Mendocino, Del Norte,
 - Given current data limitations in Del Norte and Humboldt counties, additional discussions are needed to evaluate sampling needs and to outline what a management strategy could look like
- **Data Collection Scheme:**
 - Prioritize collecting length and density data (as the primary data streams feeding into harvest control rule)

- CDFW to coordinate data collection with pre-determined governmental and non-governmental entities to inform collection of length [sources: Reef Check, harvesters] and density data [source: CDFW], as well as other data streams under consideration for Part A of decision tree [sources: *TBD*]
- Can align data needs with permit conditions to have harvesters assist with collecting data that isn't as easily attainable (e.g. body condition or gonad index)
- **Permit Allocation Scheme: Preference Point Lottery**
 - A random drawing would pick the permit recipients out of the pool of applicants for each opportunity
 - The first year that *de minimis* fishing opportunities are offered, licensed fishermen may apply for at least one of the opportunities
 - Those applicants not selected would receive a point
 - Selected applicants must purchase the applicable report card (permit) to fish
 - Failure to report the required data by the prescribed date would prohibit the person from applying for permits the following year
 - The second year that opportunities are offered, applicants would be separated into two groups: those with one point and those without any points
 - A random drawing for opportunities would be conducted using the group with one point
 - Any remaining fishing opportunities would be distributed using a second random draw using the group with no points.
 - All applicants not selected would receive one point.
 - Process repeated annually as/if resources allows
 - Potential to include party tags in a lottery system (e.g., up to 6 individuals). If group gets drawn all members get a tag.

- **Special Conditions:**

- Permit holders must submit their completed report cards (permits) or enter required data online by October 31.
- Punitive measures to incentivize data collection – consider fine, loss of preference points, and inability to re-apply the following year
- Permit holders must provide length data (manually or using machine learning applications) and report on underwater observations
- Potential Tribal subsistence fishing allocation for Tribes and Tribal communities¹¹

This draft proposal incorporates feedback from the Project Team in the following ways –

- Avoids slot limits
- Limits season lengths to increase enforceability
- Uses size limits
- Conservative daily bag limits and spreads take across multiple dates to encourage multiple trips to North Coast
- Balances the priorities of supporting the recovery of red abalone while allowing fishing opportunities
- Involves fishermen in data collection efforts
- Provides a precautionary fishing opportunity by limiting access and spreading fishing pressure over a larger area
- Provides an opportunity to gather and provide data in a large region where very little data currently exists

¹¹ During the September 19, 2019 Project Team meeting, it was highlighted that the preference point lottery allocation scheme would not meet subsistence needs of Tribes and Tribal communities. California Fish and Game Commission will need to explore whether they have the authority to allocate a portion of the overall TAC to subsistence only harvest by Tribes and Tribal communities.

Appendix G – Exceptional Circumstances Strawman Proposal

Framework Background

The North Coast recreational red abalone fishery management plan (FMP) will provide a framework to help ensure long-term management of the resource, where management is objective, transparent, and more responsive and adaptive, particularly under changing environmental conditions. The FMP is intended to serve as an overarching management document that identifies and discusses key issues that should be considered when drafting and adopting regulations to manage the fishery. Once developed, the Project Team may propose that a discussion on exceptional circumstances such as those identified in this draft proposal be included in the recreational red abalone FMP.

The State will need the ability to respond to anomalous and/or extreme environmental conditions, some of which have not been seen or cannot be predicted. In the face of unforeseen or extreme environmental conditions that could drastically impact the red abalone resource, more precautionary measures may be needed. Better monitoring for signs of these conditions will be critical to inform precautionary decision-making in red abalone management. At its August 27th meeting, the Project Team recommended conducting a “catastrophic environmental safety check” for major events like oil spills, harmful algal blooms, and warm water anomalies. They also recommended reviewing other “investigative triggers” (e.g. biological and environmental indicators such as urchin density, kelp abundance, oxygen levels) to determine if conditions are poor and a more immediate response is needed to proactively protect red abalone. These would be considered ‘exceptional circumstances’. Given the challenge of verifying the mechanistic links between some of these ecological and environmental indicators and the status of the red abalone resource, the harvest control rule was streamlined to include only density and length-based spawning potential ratio (SPR). Without clear mechanistic links it would have been difficult to include and evaluate other suggested ecological and environmental indicators in the management strategy evaluation (MSE). Recognizing the importance of monitoring other biological and environmental indicators, the Project Team decided to include these indicators as a precautionary check before consulting an indicator-based decision tree informed by density and length data.

The draft management strategy is currently structured in two parts - Part A and Part B. Part A, incorporates the precautionary thinking that came from the discussions at the August 27 Project Team meeting to account for the presence of unusual and/or extreme environmental conditions that may impact the red abalone resource. If an exceptional circumstance has occurred, then further action or decision making is

required before determining the status of the fishery (i.e., closed, de minimis, open). If no exceptional circumstances have occurred, Part B follows an indicator-based decision tree.

Exceptional Circumstances Strawman Proposal

Part A of the decision tree would evaluate presence of broader scale ecosystem events or impacts, and/or rapidly assess indicators to evaluate any risks that may result in a catastrophic decline of the red abalone resource.

Broader-scale ecosystem events and impacts could include:

- Persistence of large marine heat waves
- Presence of disease (e.g., withering syndrome)
- Presence of toxic harmful algal blooms
- Oil spills

Rapid assessment could include an evaluation of all or a subset of the indicators listed below. Baseline data would also be required to demonstrate a true deviation from 'normal' conditions, and peer review guidance on some of these indicators should be taken into consideration.

- Ocean Warming
 - Dissolved oxygen level
 - Ocean temperature
- Environmental Shifts
 - Kelp abundance
 - Sea urchin density
 - Sea star density
- Ocean pH/acidification
- Red Abalone Reproductive State
 - Body condition
 - Gonad condition (secondary check)
 - Presence of empty abalone shells

If/when an exceptional circumstance is triggered, four potential actions could occur

- Collect more data and evaluate whether to continue on to Part B
- Management action occurs in one or more fishing zone
- A stakeholder consultation process is triggered - an advisory group evaluates data before management action is taken
- Consult Fish and Game Commission for direction on management action

Questions for CDFW Consideration During FMP Development

As CDFW further refines Part A of the management strategy during the FMP development process, they should consider the following questions and work with peer review panelists, stakeholders, and Tribes and Tribal Communities to best address them.

- Given capacity and cost constraints and current data availability, which indicators could be prioritized for monitoring in Part A?
- Are the indicators under consideration directly or indirectly related to impacts on red abalone health and productivity? Is the mechanism clearly understood or does a clear threshold exist?
- Which exceptional circumstances would trigger closure of all fishing zones and which would trigger closures at the individual fishing zone? Could closures occur at the site level?
- What could data collection/sampling protocols look like during rapid assessments? Would data sources and sampling entities be pre-defined?
- How do we account for persistence of events like marine heat waves?

Appendix H – Glossary of Key Terms

This document is intended to serve as a resource to members of the Project Team to provide definitions for some common terminology encountered during their engagement in the fishery management plan (FMP) development process for the North Coast recreational red abalone fishery. Definitions are provided in normal font and context specific to the Red Abalone FMP process are indicated in *italics*. For a more comprehensive list of fishery terms please see the following glossaries: [NOAA Fisheries, 2018 Marine Life Management Act \(MLMA\) Master Plan for Fisheries](#), [California Water Board](#), and [FAO](#).

For more information about the Project Team, and access to additional resources, visit: [Recreational Red Abalone Management Strategies Integration](#) and [Red Abalone Fishery Management Plan](#).

Abundance: The total number of a kind of fish or invertebrate in a population.

- *True estimates of abundance are rarely known, and usually estimated from the relative abundance, such as the case with the red abalone density surveys.*

Administrative Team: A team comprised of representatives from the California Department of Fish and Wildlife (CDFW), the Ocean Protection Council (OPC), the Fish and Game Commission (Commission), the Nature Conservancy (TNC), Tribes and tribal communities, and the red abalone fishing community, charged with ensuring that the management strategies integration process occurs in a collaborative, efficient, and timely manner and informs a revised management chapter for the recreational red abalone FMP, in line with the recommendation from the Commission.

- *The Administrative Team Charter is available [here](#)*

Allee effect: Biological occurrence characterized by a correlation between population density and per capita growth rate. Either overcrowding (i.e., very high density) or under crowding (i.e., very low density) can have a negative impact on population survival, growth, and development. Below a critical density threshold, spawning success declines, resulting in population declines and even localized extinctions.

Allocation: In regard to fisheries, allocation means the direct and deliberate distribution of the opportunity to participate in a fishery, or to receive a share of a catch quota, among identifiable, discrete user groups or individuals.

Bag limit: A limit per day or per trip on the number or weight of fish, invertebrates, or plants that a recreational fisherman may legally retain.

Bobber: Anglers that search for abalone in between the waterline and a depth they can reach without fins by “bobbing”. They do not reach depths beyond about 6 ft.

Body condition: A metric used to assess red abalone health. It is scored from 0 to 3 based on the appearance of the foot muscle, where a 0 score represents a healthy abalone where the foot muscle fully fills the circumference of the shell and a 3 is the opposite where the foot is severely shrunken.

Biological fishery (Bio-fishery): A fishery in which limited harvesting activities are permitted to fishermen to collect biological information in alignment with pre-defined research objectives. A bio-fishery can be site-specific or applied at the fishing zone level, and may occur even when the recreational fishery is at a closed status.

Catch: The total number (or weight) of fish [or invertebrates] caught by fishing operations. Catch should include all fish [or invertebrates] killed by the act of fishing, not just those landed.

Citizen science: Public participation in data collection and/or scientific research.

Catch Per Unit Effort (CPUE): The catch obtained by a vessel, gear, or fisherman per unit of fishing effort (e.g., number or weight of fish [or invertebrates] caught per hour of trawling).

Data stream: A continuous flow of data (information) from a fishery which can be analyzed to inform management decisions.

Decision interval: Frequency or interval at which the management status recommendation is evaluated by re-assessing the harvest control rule.

- *For red abalone, an annual decision interval is proposed that is based on a running average of the previous three years of data.*

De minimis fishery: A fishery with a level of catch that is anticipated to have little to no effect on the health or recovery of a fishery resource. It is applied at the fishing zone level and occurs based on predefined thresholds set in an associated harvest control rule.

- *One approach to achieving a de minimis fishery for red abalone is through a managed or restricted access policy.*

Density: Number of organisms per unit of area.

- *In the case of current red abalone management, density represents the number of abalone per square meter (CDFW).*

Diver: A fisherman who uses free diving (i.e., being completely submerged underwater with the use of swim fins) as a method to catch fish or other species.

Eggs Per Recruit (EPR): Average number of eggs a recruit produces over its lifetime. Similar to Spawning Potential Ratio (SPR) [see below].

Exceptional Circumstance: A deviation from “normal” environmental conditions (i.e. anomalous and/or extreme environmental conditions) which may result in a catastrophic decline in red abalone

- *In the case of the proposed red abalone management, Part A of all proposed management strategies would involve a precautionary evaluation of environmental conditions and/or biological conditions for red abalone before proceeding to Part B (the decision-tree)*

Facilitation Team: In the context of this project, the facilitation team are third-party, neutral facilitators funded by a grant from the Ocean Protection Council in support of the FMP development process.

Fishery: The combination of fish and fishers in a region, the later fishing for similar or the same species with similar or the same gear types

- *For red abalone, refers to harvesting from commercial fishermen, recreational divers, rock pickers, and bobbers.*

Fishery-dependent data: Information collected directly from a fishery, such as sampling catch at landing sites and information from commercial landing receipts and commercial fishing passenger vessel logbooks.

- *For red abalone, refers to the data collected from abalone report cards and creel surveys.*

Fishery-independent data: Information collected separately or independent of fishery landing or catch data.

- *Examples include in-water subtidal surveys conducted by CDFW, Reef Check, and MARINE/PISCO*

Fishery Management Plan: A planning document based on the best-available scientific knowledge and other relevant information that contains a comprehensive review of the fishery along with clear objectives and measures to ensure its sustainability. Components of an FMP are described in the MLMA.

Gonad index: The gonadosomatic index, abbreviated as GSI, is the calculation of the gonad mass as a proportion of the total body mass. It is represented by the formula: $GSI = [\text{gonad weight} / \text{total tissue weight}] \times 100$.

Harmful Algal Bloom (HAB): HABs occur when colonies of algae — simple plants that live in the sea and freshwater — grow out of control and produce toxic or harmful effects on people, fish, shellfish, marine mammals and birds.

Harvest Control Rule (HCR): Describes how harvest is intended to be controlled by management in relation to the state of some indicator of stock status.

- *For example, a harvest control rule can describe the various values of fishing mortality that will be aimed at for various values of the stock abundance. It formalizes and summarizes a management strategy.*
- *A decision-tree is a type of harvest control rule, and may be used interchangeably during this management strategy integration process*

Index sites: The 10 landing locations used by the CDFW when conducting subtidal dive surveys and collecting data to inform decision-making.

- *Red abalone density data used in the Abalone Recovery and Management Plan (ARMP) are generated from these subtidal surveys.*

Indicator: A measure of a component or process that can serve as a proxy for values that are difficult to calculate, such as abundance of a species or ecosystem health.

- *For example, CPUE is often used as an indicator of stock abundance or availability. In the case of red abalone, density, SPR, and catch are some examples of indicators evaluated in the peer review process.*

Intertidal: The area on a seacoast between the highest and lowest tide.

Invertebrate: An animal lacking a backbone.

- *Examples include abalones, jellyfish, shellfish, etc.*

Landings: The number or poundage of fish or other species unloaded at a dock by commercial fishermen or brought to shore by recreational fishermen for personal use. Landings are reported at the locations at which fish are brought to shore.

Managed access: A fisheries management tool which seeks to protect the rights of fishermen by giving them exclusive access to fish certain areas.

Management strategy: A strategy adopted by a management authority to reach established management goals. In addition to the objectives, it includes choices regarding all or some of the following: access rights and allocation of resources to stakeholders, controls on inputs (e.g. fishing capacity, gear regulations), outputs (e.g. quotas, minimum size at landing), and fishing operations (e.g. calendar, closed areas, and seasons).

- *For the red abalone FMP development process, the OST-facilitated peer review recommended that elements of each of the two management strategies should be combined into a single management strategy to form a more cohesive plan and reduce the risk of overfishing and increase management performance (i.e., management strategy integration)*

Management strategy evaluation (MSE): MSE is a modeling-based approach aimed at testing the robustness of possible management [strategies] by examining which sets of decision rules, which are used to adjust Total Allowable Catch or effort controls, perform the best in achieving the management objectives for a fishery. This simulation testing can also be used to determine how robust the management [strategies are] likely to be to uncertainties. These analyses enable the choice of which management planning option has the most reasonable likelihood of achieving the management goals.

Maximum Sustainable Yield (MSY): The highest average yield over time that does not result in a continuing reduction in stock abundance, taking into account fluctuations in abundance and environmental variability.

Model: A mathematical means of explaining a system, studying the effects of various components, and making predictions about behavior or management outcomes, as informed by hypothetical and/or measured values.

Open access: Condition in which access to a fishery is not restricted (i.e. no license limitation, quotas, or other measures that would limit the amount of fish that an individual fisher can harvest).

- *In the case of the abalone fishery, open access means that anyone may buy an abalone report card but they are still required to adhere to regulations/restrictions (e.g., bag limits, size limits).*

Operating model: A central model to a management strategy evaluation (MSE) that simulates all relevant aspects of the fisheries system and proposed management strategy. It includes all plausible hypotheses about the biology of the stock, such as recruitment, and aspects of the fishery, such as the level of illegal fishing activity.

Precautionary management: A resource management framework that implements conservation measures even in the absence of scientific certainty that fish stocks are being overexploited.

Project Team: A team charged with discussing and providing feedback on all scientific analyses conducted by the modelers to inform the management strategies integration process and provide input on de minimis (i.e., restricted/managed) fishery design in the red abalone FMP development process.

- *The Project Team is open to all members of the public, including members of the abalone fishing community, Tribes and tribal communities, non-governmental organizations, scientists, resource managers, the Recreational Abalone Advisory Committee, as well as staff of state agencies (i.e. CDFW, OPC, Commission). The Project Team Charter is available [here](#).*

Quota: A limit on the amount of fish which may be landed in any one fishing season or year. May apply to the total fishery, a geographical area, or an individual share.

Recruitment: A measure of the number of fish [or invertebrates] that survive to a particular life stage, often used to predict future population size.

- *Some examples include the number of offspring that survive the larval stage and reach the juvenile stage (larval recruitment), the number of individuals that survive (i.e., recruit) to the next year (e.g., age two recruits), the number of fish that reach sexual maturity (i.e., recruit to the spawning population), or in the case of a fishery, the number of fish that recruit to the catchable component of the population.*

Reference point: Quantitative (numerical) values that inform managers about the current status of a stock. *Target reference point* is a numerical value that indicates that the status of a stock is at a desirable level; often times management is geared towards achieving or maintaining this target. *Threshold (limit) reference point* is a

numerical value that indicates that the status of a stock is unacceptable (e.g. overfished), and that management action should be taken to improve stock status.

Relative abundance: A relative measure of the weight or number of fish in a stock, a segment of the stock (e.g. the spawners), or an area. Often available in time series, the information is collected through scientific surveys or inferred from fishery data.

- *For red abalone, relative abundance is a comparison of density transect surveys at one period in time to another.*

Report card: Cards issued to recreational fishermen (i.e. divers, rock pickers, bobbers) for recording the landing location (out of a total of 56 sites), date and time, method used, and number of abalone taken. Also referred to as punch cards or tags.

Restricted access: Restriction of the right to participate in a fishery, using permits or other means. This is one method managers may use to ensure sustainable fisheries, reduce fishing effort, or protect recovering or threatened stocks.

Rock picker (or shore picker): An angler whose method of take involves searching for abalone in the exposed intertidal habitats during low tides without the use of fins.

Size limit: A minimum or maximum limit on the size of fish [or invertebrate] that may be legally be caught.

- *Minimum size limits are typically intended to prevent the harvest of juvenile or young individuals before they have reproduced. Maximum size limits are typically intended to prevent the harvest of highly fecund female fish. Size limits may be sex-specific for some species.*

Spawning Potential Ratio (SPR): A ratio of reproductive potential for a fished population relative to that of an unfished population, used to characterize the amount of impact that all forms of mortality (natural and fishing-based) have on a population's ability to reproduce. Similar to EPR.

Subtidal: Permanently below the level of low tide, an underwater environment.

Sustainable: "Sustainable," "sustainable use," and "sustainability," with regard to a marine fishery, mean both of the following: (a) Continuous replacement of resources, taking into account fluctuations in abundance and environmental variability; and 2018 Master Plan for Fisheries Glossary 85 (b) Securing the fullest possible range of present and long-term economic, social, and ecological benefits, maintaining

biological diversity, and, in the case of fishery management based on MSY, providing for a fishery that does not exceed optimum yield.

Total Allowable Catch (TAC): A specified numerical catch (including discard mortality) for each fishing season, the attainment (or expected attainment) of which may cause closure of the fishery.

Tribal Tradition and Culture: Uses of water that support the cultural, spiritual, ceremonial, or traditional rights or LIFEWAYS of CALIFORNIA NATIVE AMERICAN TRIBES, including, but not limited to: navigation, ceremonies, or fishing, gathering, or consumption of natural aquatic resources, including fish, shellfish, vegetation, and materials.

Tribal Subsistence Fishing: Uses of water involving the non-commercial catching or gathering of natural aquatic resources, including fish and shellfish, for consumption by individuals, households, or communities of California Native American Tribes to meet needs for sustenance.

Zones: Geographic areas of the coastline comprising several of the formerly defined abalone report card sites

Appendix I – Administrative and Project Team Charters

Red Abalone Management Strategies Integration | Administrative Team Charter

Updated October 2019

I. Background

The Ocean Protection Council (OPC) provided a grant to the Ocean Science Trust to facilitate a scientific peer review of the management strategies provided by the California Department of Fish and Wildlife (CDFW) and The Nature Conservancy (TNC)-led stakeholder team. The final Recreational Red Abalone Peer Review Report, including a key themes summary from the first community webinar, is accessible here.

After the completion of the peer review process and review of the final report, the Fish and Game Commission (Commission) made the following recommendation at its December 2018 meeting: (1) Support addressing peer review recommendations to integrate aspects of both draft management strategies, based on a simulation modeling approach co-developed by CDFW and the TNC-led stakeholder team, including engagement with abalone divers and other stakeholders; (2) revise Fishery Management Plan (FMP) goals to allow for a *de minimis* fishery option; (3) develop triggers for the *de minimis* fishery option in consultation with stakeholders; and (4) request that CDFW develop a proposed process and timeline which accounts for active public and Marine Resources Council (MRC) engagement.

II. Purpose of the Administrative Team

The primary function of the Administrative Team (Admin Team) is to ensure that the management strategies integration process occurs in a collaborative, efficient, and timely manner and informs a revised management chapter for the Recreational Red Abalone Fishery Management Plan (FMP), in line with the recommendation from the Commission.

In order to ensure a successful outcome, the Admin Team will conduct the following activities:

- Develop a charter to inform structure and charge of the Project Team;
- Assess funding needs to convene Project Team and secure necessary funding;
- Provide clear tasks and feedback to modeler(s) to inform modeling work based on recommendations of peer reviewers and Project Team;

- Schedule regular check-in calls before and after Commission and Project Team meetings, and as needed;
- Schedule third-party facilitated Project Team meetings;
- Draft progress reports for Commission and MRC meetings on overall progress of Project Team;
- Periodically update the OPC and CDFW websites to share information about the management strategies integration process (i.e. Project Team charter, work plan, meeting summaries); and
- At conclusion of management strategies integration process, develop and submit to the Commission a report for fishery managers that summarizes the discussions, proposals, and suggestions by the Project Team and lead modeler to inform the re-drafting of the FMP.

III. Membership

The Admin Team is comprised of one representative from the CDFW, OPC, Commission, TNC, and recreational Red Abalone fishing industry, with designated alternates for each organization (Table I.1):

Table I.1. Admin Team Members and Roles.

Name	Role
Sonke Mastrup	Primary CDFW Representative [Secretary]
Ian Taniguchi	CDFW Alternate
Paige Berube	Primary OPC Representative
Jenn Eckerle	OPC Alternate
Elizabeth Pope	Primary Commission Representative
Maggie McCann	Commission Alternate
Alexis Jackson	Primary TNC Representative [Chair]
Kate Kauer	TNC Alternate
Joshua Russo	Primary Industry Representative
Jack Likins	Industry Alternate
Javier Silva	Sherwood Valley Rancheria of Pomo Indians

If there is a need to update membership to the Admin Team due to transition or inability to participate actively and consistently in meetings, this will be discussed during an Admin Team call. Primary representatives will use a consensus-based approach to determine an appropriate and timely process for appointment of a new representative, or alternate will be determined and implemented on a consensus basis. If the team is unable to reach consensus during discussions, they will seek guidance from either the MRC co-Chairs or from the full Commission.

The Admin Team will leverage the experiences, expertise, and insight of key individuals at organizations committed to the successful integration of management strategies. They may also solicit the expertise of the peer reviewers, as needed, throughout the process. Individually, Admin Team members should:

- Understand the significance of the management strategies integration process for coastal communities and conservation and represent those interests; and
- Commit to fully participate in the integration process by being an active contributor during Admin Team meetings and complete any assigned tasks.

All primary representatives on the Admin Team are:

- Expected to actively participate in Admin Team meetings;
- Responsible for keeping their peers, interest groups, and/or organizations informed about the Admin Team process;
- Act as a conduit to share information from interest group and responsible for ensuring accurate dissemination of information; and
- Represent interest group in formulating recommendations.

All alternates on the Admin Team:

- Represent interest group when Primary is absent;
- May listen to Admin Team meetings to ensure continuity, but defer to Primary to speak on behalf of respective interest group; and
- May ask clarifying questions but will not be included in any consensus to make a recommendation.

As members of the Admin Team, all agree to adhere to the following Meeting Agreements:

- Support CDFW during the FMP development to ensure a successful outcome;
- Listen to build mutual understanding;
- Openly and constructively discuss issues with others, respect differences;
- Focus on brainstorming ideas, with the intention to develop creative solutions;
- Arrive at each meeting prepared to discuss agenda items, including reviewing materials and information distributed in advance of the meeting or conference call;
- Contribute to and support constructive discussions focused on charge of group rather than personal interests; and
- When participating in a Project Team meeting as a key contributor, that individual is expected to stay for the duration of the meeting unless prior arrangements have been made with the meeting facilitators.

Failure to follow Meeting Agreements can result in removal from Admin Team.

IV. Administrative Team Meetings

The Admin Team shall hold meetings in advance of and immediately following Commission and/or MRC meetings, Project Team meetings, or as needed. All members of the Admin Team will work collectively to make consensus-based decisions. If the team is unable to reach consensus on any issue, they will seek guidance from either the MRC co-Chairs or from the full Commission, consistent with the process outlined in Section II.

The Admin Team shall have a Chairperson responsible for facilitating Admin Team meetings and a Secretary responsible for documenting discussions and follow-up actions. At each meeting, the Chair or other appropriate Admin Team member will report on project status using an agenda outline that includes but is not limited to:

- Introductory items including agenda review and review of actions from previous meetings;
- Review project status and agenda items requiring Admin Team approval or recommendations;
- Task actions for modeler(s) arising from the Project Team meeting;
- Assign responsibility to Admin Team members for actions arising from the meeting; and
- Plan for the next Project and Admin Team meetings.

Notes will be made available to the Admin Team via email or Google Drive within 3 days after an Admin Team meeting.

Red Abalone Management Strategies Integration | Project Team Charter

Updated June 2019

I. Background

The Ocean Protection Council (OPC) provided a grant to the Ocean Science Trust to facilitate a scientific peer review of the management strategies provided by the California Department of Fish and Wildlife (CDFW) and The Nature Conservancy (TNC)-led stakeholder team. The Final Recreational Red Abalone Peer Review Report, including a key themes summary from the first community webinar, is accessible here.

After the completion of the peer review process and review of the final report, the Fish and Game Commission (Commission) made the following recommendation at its December 2018 meeting: (1) Support addressing peer review recommendations to integrate aspects of both draft management strategies, based on a simulation modeling approach co-developed by CDFW and the TNC-led stakeholder team, including engagement with abalone divers and other stakeholders; (2) revise Fishery Management Plan (FMP) goals to allow for a *de minimis* fishery option; (3) develop triggers for the *de minimis* fishery option in consultation with stakeholders; and (4) request that CDFW develop a proposed process and timeline which accounts for active public and Marine Resources Committee (MRC) engagement.

II. Purpose of the Project Team

The primary purpose of the Project Team is to discuss and provide feedback on all scientific analyses conducted by the modelers to inform the management strategies integration process and provide input on *de minimis* (i.e., restricted/managed) fishery design. Such advice is critical to informing the revised management chapter for the Recreational Red Abalone FMP for the North Coast.

In order to ensure a successful outcome, the Project Team will conduct the following activities:

- Consider all recommendations from the final Recreational Red Abalone Peer Review Report;
- Review all scientific documents provided by the lead modeler and affiliates;
- Provide constructive feedback on science reported by the lead modeler and affiliates;
- Contribute to the design of *de minimis* fishery;

- Propose candidate management strategies based on outcomes of simulation modeling work; and
- Engage in productive and respectful discussions with all Project Team members and the facilitation team.

III. Participation

Participation on the Project Team will be open to all members of the public, including members of the abalone fishing community, Tribes and tribal communities, non-governmental organizations, scientists, resource managers, the Recreational Abalone Advisory Committee, as well as staff of state agencies (i.e. CDFW, OPC, Commission). The Project Team, with the assistance of the facilitation team, will leverage the experiences, expertise, and insights of all participants committed to the success of the management strategies proposal integration process. A quantitative fisheries modeler will support the work of the Project Team during and between meetings.

There will be no formal assigned seats unless it becomes necessary at a later time to maintain the productivity of the team. Project Team members are not directly responsible for managing project activities, rather they are charged with providing advice and guidance to inform activities of the Administrative Team in their role to "generate a summary report for fishery managers to inform re-drafting of (the recreational Red Abalone) fishery management plan."

As members of the Project Team, all agree to adhere to the following Meeting Agreements:

- Support CDFW during the FMP development to ensure a successful outcome;
- Listen to build mutual understanding;
- Openly and constructively discuss issues with others, respect differences;
- Focus on brainstorming ideas, with the intention to develop creative solutions;
- Arrive at each meeting prepared to discuss agenda items, including reviewing materials and information distributed in advance of the meeting or conference call;
- Contribute to and support constructive discussions focused on the charge of the group rather than personal interests; and
- When any individual is attending a Project Team meeting as a key contributor, that individual is expected to stay for the duration of the meeting unless prior arrangements have been made with the meeting facilitators.

Peer review panel representatives may attend Project Team meetings following the procedures below, as well as review work products to provide input to the process to ensure products are in line with peer review recommendations.

IV. Project Team Meetings and Procedures

The Project Team shall convene over a series of six full-day meetings (in-person or via webinar) between May and December 2019 in order to fulfill its advisory responsibilities. All Project Team meetings will be under third-party, neutral facilitation provided by Strategic Earth Consulting, and funded by the OPC. Project Team meetings will be informed by an agenda as put forth by the Administrative Team. Materials for review will be made available 1 week before any Project Team meeting.

During any small group breakout sessions for proposal development, each group will be provided with clear objectives, guidance, and background information. Breakout groups will incorporate a mix of scientists, industry, non-profit practitioners, and agency staff, with those individuals from any under-represented demographic or area of expertise floating between groups. Discussions held in break out groups will be reported out to the full Project Team in plenary to promote information sharing and to be captured in meeting summaries.

Project Team Decision Making

No formal voting will take place within the Project Team. While all proposed ideas and recommendations will be taken into consideration, those ideas/proposals that have strong support from a broad representation of Project Team members (i.e., across stakeholder interests) will be prioritized by the Administrative Team for consideration in their final report to the Commission. The Administrative Team's report will aim to articulate background/context on minority options/ideas where broad agreement by the Project Team is not reached.

Proposal Development

Members of the Project Team and other interested stakeholders are invited to share ideas, proposals, comments, and questions regarding the integration of management strategies and development of a *de minimis* fishery option for consideration and discussion during Project Team meetings. Input and guidance may be directed to the Administrative Team, peer review panel representatives, and the quantitative fisheries lead modeler and affiliates. Proposals and comments will be made publicly available and efforts will be made by the Project Team and/or Administrative Team to be responsive to proposals submitted for consideration. Participants and others

may convey their thoughts verbally during meetings (in-person only) or in a written format at any time.

For more information about the Project Team or the Recreational Red Abalone FMP process, please visit the OPC red abalone management strategy integration webpage.

Section VI - Final Recommendations from Administrative Team

This section outlines recommendations from the Admin Team to the Commission for consideration as they provide guidance to CDFW in drafting the North Coast recreational red abalone FMP. These recommendations reflect Project Team discussions and guidance including alternative perspectives or issues of note. While recommendations reflect items where there was general support from the Project Team, not all members of the Project Team may agree with one or more of these recommendations. Where possible, the recommendations reference Commission directives from the Commission's December 2018 motion to inform the development of the North Coast recreational red abalone FMP:

(1) Support addressing peer review recommendations to integrate aspects of both draft management strategies, based on a simulation modeling approach co-developed by CDFW and the TNC-led stakeholder team, including engagement with abalone divers and other stakeholders; (2) revise Fishery Management Plan (FMP) goals to allow for a de minimis fishery option; (3) develop triggers for the de minimis fishery option in consultation with stakeholders; and (4) request that CDFW develop a proposed process and timeline which accounts for active public and Marine Resources Committee (MRC) engagement.

Recommendation #1: Consider selecting a management strategy (or consider developing a new one) that addresses the charge provided by the Marine Life Management Act and Commission goals, while being mindful of the Project Team guidance.

In addressing the Commission's first directive "to integrate aspects of both draft management strategies, based on a simulation modeling approach," it is important that the Commission consider selecting a management strategy that is informed by MSE results to best ensure the long-term recovery and sustainability of the red abalone resource.

As part of the selection of a management strategy, the Commission may consider the following potential actions:

- Approve the proposed harvest control design (HCR) that incorporates SPR and density or evaluate the possibility of developing an alternative.
- Select a management strategy (either A, B, C, or D) or evaluate the possibility of developing an alternative management strategy that incorporates aspects of A.1 through A.6 or sensitivity analyses.
- Determine the appropriate number of fishing zones (two or three).

- Select a *de minimis* TAC level for each fishing zone.

With respect to HCR design, the Admin Team recommends that the Commission consider approving the proposed HCRs, including identified indicators. Both design and selection of indicators have been supported by the Project Team. The HCR design satisfies the Commission's first directive "to integrate aspects of both draft management strategies, based on a simulation modeling approach," and to use trigger-based management where possible. The selection of indicators within the HCR can also be supported by existing sampling programs and available data, based on the understanding of the Commission's directive.

With respect to selection of an explicit management strategy or combination of strategies, it will be important for the Commission to consider its risk tolerance and how to best weigh the precautionary approach and need to manage in uncertain environmental conditions with a mandate to also allow for sustainable harvest opportunities. **Section 3G** highlights the trade-offs associated with any option. As stated earlier, these primary trade-offs include: (1) length of time to open fishery status, (2) depletion at open status, and (3) cumulative catches prior to achieving open status. In weighing these trade-offs, and ultimately selecting a management strategy, **Figures 3.9 and 3.10** provide a visual reference to inform Commissioners review of how the various management strategies perform against one another. Additionally, the Commission may consider stakeholder perspectives when selecting a management strategy, although this is difficult given the diversity of perspectives and priorities. Fishermen of the Project Team were more supportive of prioritizing management strategies that support a *de minimis* fishery in the near-term (e.g., strategies A or C) while others, including Tribes and Tribal community members favored more conservative and precautionary options (e.g., strategies B or D) to better protect the resource. It will be important for the Commission to consider priorities around resource recovery and harvest opportunity, to ultimately inform when take opportunities, including a *de minimis* fishery or a bio-fishery, may occur (see Recommendation #3).

There was Project Team support for either a two- or three-zone approach to management. There is currently no support for a one or four-zone approach. The Project Team acknowledged that management under a two-zone fishing configuration would closely resemble CDFW's current management approach. There was broad support for exploring data and sampling needs in Humboldt and Del Norte counties to learn if and how a third zone may be managed in this area. There is concern by some Project Team members that the lack of data, and/or low red abalone densities and population sizes in Humboldt and Del Norte counties will prevent the opening of a fishery if the same approaches and assumptions were used

for the northern counties as for Sonoma and Mendocino counties. Some participants suggested managers start with a two-zone strategy and move to three zones when a data sampling strategy and additional information (i.e., natural mortality rates, etc.) are available for the two northern counties. Site-specific management is challenging because of limited sampling and data availability. The modelers highlighted that MSE is not sensitive enough to model zones where low and/or no data is available; however, the modelers conducted a hypothetical modeling exercise to explore sampling intensity required to explore managing Humboldt and Del Norte counties as a third zone under a separate SPR-only management strategy. It is important that any decisions regarding fishing zones reflect the technical capabilities of MSE, directives set by the Commission for management strategy integration, CDFW capacity for both management oversight and enforcement, and stakeholder perspectives and priorities.

Finally, with respect to selection of a *de minimis* TAC, some members of the fishing sector suggested the Commission maximize fishing opportunities within the context of responsible fishing without overharvesting in the near-term. This could suggest a lower level of *de minimis* TAC either at or below levels indicated in **Section 3G** (i.e. 20,000 to 40,000 abalone for Mendocino, Humboldt, Del Norte and < 10,000 abalone for Marin and Sonoma). When considering harvest opportunities for recreational divers, some fishermen were also interested in exploring a TAC at a level between a bio-fishery and a *de minimis* fishery, which could include a TAC below what was modeled (i.e., a few hundred to 5,000 abalone). See Recommendation #3 regarding a bio-fishery as a means of allowing recreational harvest opportunities in the near-term, while also supporting data collection needs. See Recommendation #4 regarding a *De Minimis* Fishery Strawman proposal as guidance for developing the North Coast recreational red abalone FMP. Participants representing the Tribes and Tribal communities expressed that the recovery of the red abalone resource is the highest priority and supported a more precautionary management approach.

Recommendation #2: Explore a citizen science-driven data collection program for Humboldt and Del Norte counties that could inform the development of a management strategy and inform future management of these data-limited counties.

The Admin Team recommends that the Commission support an effort to fill data gaps for a potential third fishing zone in Humboldt and Del Norte counties. Over the course of the integration process, there were substantial public comments about how to manage abalone in these counties and an interest in managing them as a third fishing zone for the reasons mentioned in Recommendation #1. However, due to logistical challenges of sampling in these regions, and naturally low occurring

abundance of abalone that make the current density survey protocols ineffective, CDFW has not historically sampled in those areas. Numerous conversations at Project Team meetings focused on how to potentially manage these areas of limited or no data, as it has implications for similar areas in southern California, where recreational and commercial harvest is currently closed under a moratorium (Fish and Game Code § 5521).

Citizen science could play a critical role in filling these data gaps, and there was broad support for CDFW to consider the use of citizen science data in the management of red abalone across the state. The simulation modeling efforts that occurred during this process provide a potential path forward, with a suggestion that collecting 20-100 samples of length data per year in Humboldt and Del Norte counties would meet the state's sampling needs for managing the area as a third zone. As mentioned earlier, technology could play an important role in supporting citizen science data collection effort by harvesters, particularly with respect to length data; length data could be acquired manually or using applications that utilize machine learning and benefit from generating more reliable estimates. Should data collection begin in any such zone(s) where there has been little to no previous data, the Commission could, in a future action, could consider conducting another MSE to inform the design of a decision-tree like framework that incorporates length or any other indicators of note (see **Appendix E**). Dependent on time and interest, a wider variety of management options could be considered for this zone using other indicators or other experimental approaches.

Recommendation #3: Consider a biological fishery (bio-fishery) as a means of allowing for near-term recreational harvest opportunities, that also helps support the state's data collection needs.

Throughout the integration process, members of the recreational diving community emphasized the importance of rebuilding the red abalone stock while maintaining any opportunity for harvest. While a number of divers originally envisioned this as a *de minimis* fishery, results of the MSE indicated that the timeline to recovery could be substantial, with median rebuilding times to move from a closed to *de minimis* fishery ranging from 11 to 31 years. As mentioned earlier in the report, even when the fishery is in closed status, it is crucial that data collection efforts continue so that adequate information is available to inform annual decision-making. Given the long recovery timeline to reach a *de minimis* fishery, and the high likelihood of the fishery remaining closed for the next few years, a bio-fishery would allow for limited harvest opportunities while also meeting the data needs for management. As such, the Admin Team recommends the Commission consider a bio-fishery within the northern California recreational red abalone FMP to fulfill the state's identified data needs while providing a near-term opportunity by interested stakeholders. Should the state

implement a bio-fishery, the Project Team supports training from CDFW and scientists for all participants prior to initial participation.

Recommendation #4: Consider adopting the De Minimis Fishery Strawman Proposal (Appendix F) as guidance for CDFW to incorporate into the draft recreational red abalone FMP.

Stakeholder buy-in can be a crucial element in ensuring compliance with any management measure. As such, the Admin Team recommends that the *De Minimis* Fishery Strawman proposal (see **Appendix F**) co-developed by the Admin and Project Teams be incorporated into the recreational red abalone FMP. The second and third components of the Commission's 2018 motion were to "revise Fishery Management Plan (FMP) goals to allow for a *de minimis* fishery option," and "to develop triggers for the *de minimis* fishery option in consultation with stakeholders." In response to and to inform this directive, a *De Minimis* Fishery Strawman proposal was developed and refined throughout the integration process to provide a framework for a *de minimis* fishery within the North Coast recreational red abalone FMP. This document outlines a range of management tools available to help inform guidelines for future regulatory consideration to provide for added flexibility in management and to capture the range of stakeholder perspectives. Its content has been informed by discussions at Project Team meetings, as well as email submissions from Project Team members. Modeling work conducted as part of the management strategy integration process will inform the appropriate level of take of such a fishery.

Recommendation #5: Support further development of the Exceptional Circumstances strawman proposal (Appendix G) with interested stakeholders, ensuring that any indicators used are aligned with peer review guidance.

During both the peer review and management strategy integration processes, there was significant discussion about how to manage red abalone effectively in the face of significant environmental changes. Project Team members recounted extreme environmental conditions seen off the North Coast over the past several years, with an observed "perfect storm" of mass die offs, disease outbreak, species movements, and critical habitat loss. The Exceptional Circumstances strawman proposal (see **Appendix G**) was created noting the interest of Project Team members to incorporate environmental indicators into the management strategy, while acknowledging that their mechanistic links were not as well defined to allow for incorporation within the MSE. Before the harvest control rule is consulted, environmental conditions within the proposal would be assessed as a precautionary measure. As part of these discussions, the Project Team recommended checking for whether exceptional circumstances had occurred, such as oil spills, harmful algal

blooms, and warm water anomalies, as well as reviewing a variety of biological and environmental indicators (e.g., urchin density, kelp abundance, oxygen levels) to determine if environmental conditions are poor or unusual. The latter might require a more immediate response to proactively protect red abalone rather than proceeding through the decision tree.

While the proposal developed was a good starting point, there are still a number of outstanding issues that warrant further discussion. A more detailed protocol is still needed, if this clause is eventually included in the FMP. The identification of indicators is in itself insufficient and does not negate the need for refining the justification for the types of information and the manner in which these indicators trigger an exceptional circumstance (as noted in **Section 3B**). For some indicators identified, additional research regarding the mechanistic linkages in system dynamics would also likely be beneficial. For these reasons, the Admin Team recommends that the Commission support further collaborative development of the Exceptional Circumstances strawman proposal by CDFW and stakeholders. Members of the Project Team expressed that there may be value in convening an organized committee (with leads and logistics to be determined) to review the data and indicators associated with the exceptional circumstances portion of the management strategy before it is implemented. This working group could outline a more clear set of rules and triggers (if warranted) for implementing this portion of the management strategy, and should look to peer review recommendations that cautioned about arbitrary or unjustified selection of reference points for indicators.

Recommendation #6: Prioritize research needs to enhance the management of the red abalone resource off California.

Through the management strategy integration process, a number of research needs and priorities were identified through modeling work and during Project Team meetings. The Admin Team recommends that the Commission endorse these research priorities to encourage state and academic researchers to more actively address filling data gaps. Some of the research needs identified included, but were not limited to:

- Additional research to more clearly define the mechanistic linkages between the red abalone resource and indicators outlined in **Appendix G** (as noted in Recommendation 5).
- Pilot studies to assess sampling feasibility for collection of 60-100 length (and size at reproductive maturity) samples per year in Humboldt and Del Norte counties.

- Exploring methodologies to obtain better life history parameters (including size at reproductive maturity and fecundity).
- Studies to estimate natural mortality rates and the magnitude of inter-site variation.

Recommendation #7: Request that CDFW develop a data management plan with stakeholders to better coordinate and streamline data collection efforts across the state.

The Admin Team recommends that the Commission request CDFW to work with stakeholders (e.g., academics, industry, NGOs, Tribes and Tribal communities) to develop a data management plan for the North Coast recreational red abalone fishery. During the Project Team meeting process there were several conversations about the variety of data collection efforts happening across the state (see **Appendix E**). Given data limitations expressed throughout the process by modelers, there is a need to fill data gaps and have a more comprehensive understanding of the red abalone resource and the broader ecosystem. Coordinating data collection efforts from state and non-state entities, as well as citizen scientists and fishermen, working along the North Coast could provide a more cost effective, efficient, and comprehensive approach. The Project Team strongly supported improving data coordination, where there can be more efficiencies across data collection efforts by the state and other organizations. When coordinating across sampling entities, data collection efforts should be standardized and formalized through a data management plan.

It would be important for such a data management plan to outline data collection standards and activities to best meet management needs and the goals outlined within the final FMP. It could also include an approach to making all data collected more broadly accessible to the public in a timely manner and provide a wish list of data sources that could support management. In the future, the Commission may consider the development of such data management plans as best practice and consider their application broadly across state-managed fisheries.

Recommendation #8: Consider selecting an allocation scheme for recreational permits that uses a preference point lottery system for recreational permits and explore a pathway for the Commission to gain authority to consider allocating a subset of the recreational fishery TAC to Tribes and Tribal communities for subsistence.

Assuming that the demand for recreational red abalone permits would exceed the opportunity, an approach is needed to equitably subdivide harvesting opportunities among user groups and individuals. The Admin Team recommends that the

Commission explore a preference point lottery (as outlined in **Section IV** to accomplish this, given the Project Team reached consensus on this approach. The lottery could apply to single individuals or groups of individuals; in the latter case, a party could apply as a group and all receive tags if drawn. This addresses the recreational diving culture, where groups of individuals engage in the activity together, and it may also increase safety considerations to allow dive buddies or dive groups to dive together.

However, Tribes and Tribal communities clearly expressed a lack of support for any of the allocation schemes, as subsistence harvest is not comparable to recreational harvest. For these reasons, and given the cultural importance of abalone to Tribes and Tribal communities, the Admin Team recommends the Commission continue working with Tribes and Tribal communities to consider allocating a subset of the overall TAC designated for either a *de minimis* or open fishery to Tribal subsistence fishing. This may require engaging in conversations with the Legislature to achieve a Tribal allocation for subsistence fishing and opportunities.

Recreational Red Abalone Fishery

Fishery Management Plan

Current Fishery Closure Sunset Date

Marine Resources Committee Meeting

July 2020



Presentation Overview

- Fishery Management Plan (FMP)
 - Management Strategy Integration Process Recommendations
- Fishery Closure Sunset Date Proposed Rule Making
- Next Steps



Summary of Process Recommendations

FMP Development

- 1. Select a Management Strategy:** Consider selecting a management strategy that addresses the MLMA and Commission goals, while considering the Project Team guidance
- 2. Citizen Science Data Collection:** Explore a citizen science-driven data collection program for Humboldt and Del Norte counties that further informs management strategy development and future management of these data-limited counties
- 3. Biological Fishery Consideration:** Consider a bio-fishery that allows for near-term recreational harvest opportunities, and supports the state's data collection needs
- 4. De Minimis Fishery Proposal:** Consider adopting the De Minimis Fishery Strawman Proposal as guidance to incorporate into the draft recreational red abalone FMP

Summary of Process Recommendations (Cont.)

FMP Development

- 5. Exceptional Circumstances Development Proposal:** Support development of the Exceptional Circumstances proposal with stakeholders, while ensuring that indicators used are aligned with peer review guidance
- 6. Prioritize Research Needs:** Prioritize research needs to enhance the management of the red abalone resource
- 7. Develop Data Management Plan with Stakeholders:** Request that CDFW develop a data management plan with stakeholders to better coordinate and streamline data collection efforts across the state
- 8. Allocation Systems Including Tribal Subsistence:** Consider selecting an allocation scheme that uses a preference point lottery system for recreational permits and explore ways for the Commission to gain authority to consider a Tribal communities subsistence allocation as part of the recreational fishery TAC

Guidance on Process Recommendations

Recommendation	Guidance	Summary	Timing
1. Select a Management Strategy	Y	Approve/support HCR and number of fishery zones	July/Aug 2020
2. Citizen Science data collection program	N	n/a	n/a
3. Biological Fishery Consideration	Y	Input on draft FMP	TBD
4. De Minimis Fishery Proposal	Y	Input on draft FMP	TBD
5. Exceptional Circumstances Development Proposal	Y	Input on draft FMP	TBD
6. Prioritize Research Needs	N	n/a	n/a
7. Data Management Plan Development with Stakeholders	Y	Input on draft FMP	TBD
8. Allocation Systems Including Tribal Subsistence	N	n/a	n/a

FMP Management Integration Process

Acknowledgements

Admin Team: Sonke Mastrup, Ian Taniguchi, Elizabeth Pope, Paige Berube, Joshua Russo, Jack Likins, Javier Silva, Dr. Alexis Jackson

Facilitation: Strategic Earth Consulting

Modelers: Dr. Bill Harford, Dr. Julia Coates, Dr. Laura Rogers-Bennett, Dr. Jono Wilson



The Nature Conservancy 



Fishery Closure Sunset Date Rule Making

- Current sunset date is April 1, 2021
- Proposed amendment extends sunset date to April 1, 2026
- Rule making timeline:
 - Notice: August 19-20, 2020
 - Discussion: October 14-15, 2020
 - Adoption: December 9-10, 2020



Next Steps

- Draft FMP document Completion
 - MRC/FGC guidance on recommendation # 1
 - FMP draft document by end of this year
 - Continue input from stakeholders on FMP
- Rule making for amending sunset date
 - MRC/FGC approval of 5 year extension of sunset date
 - August FGC Rulemaking notice



Management Strategy discussion supporting slides

Oregon Border



Zone #2

Zone #1

Mendocino/Sonoma County Line

Marin County Line

Oregon Border



Zone #3

Zone #1

Humboldt/Mendocino County Line

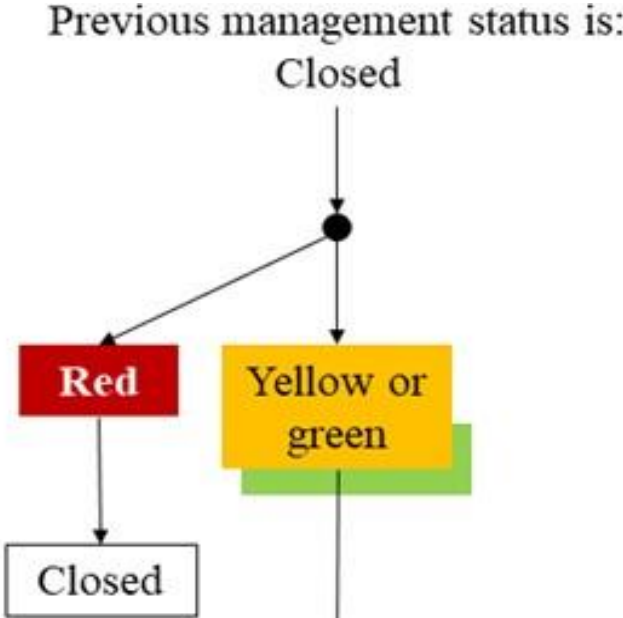
Mendocino/Sonoma County Line

Marin County Line

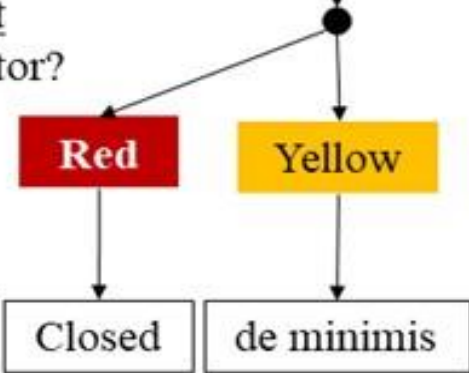
Management Status



Node 1: SPR target reference point
What color is the SPR indicator?



Node 2: Density **limit** reference point
What color is the density limit indicator?



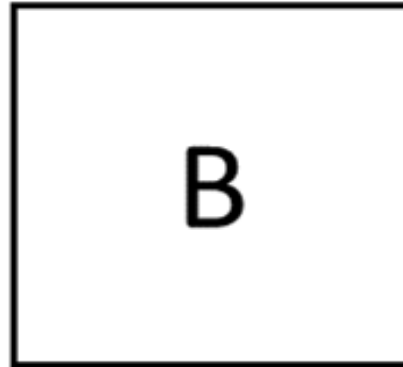
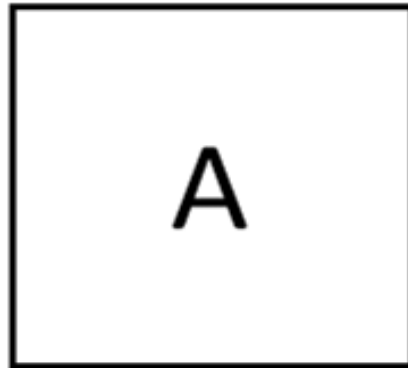
Density percentiles

$$T_{DL} = T_{DI} = T_{DT} = 75\%$$

Density percentiles

$$T_{DL} = T_{DI} = T_{DT} = 100\%$$

SPR limit = 0.5



SPR limit = 0.4



**Most biological protection
Least fishing opportunities**

De minimis TAC

$$X \begin{Bmatrix} 5,000 \\ 10,000 \\ 20,000 \\ 40,000 \end{Bmatrix}$$

**Least biological protection
Most fishing opportunities**

Trade Offs

- Primary trade-offs include: (1) length of time to *de minimis* or open fishery status, (2) cumulative catches prior to achieving *de minimis* and open status, and (3) depletion at *de minimis* and open status.



The Nature Conservancy 

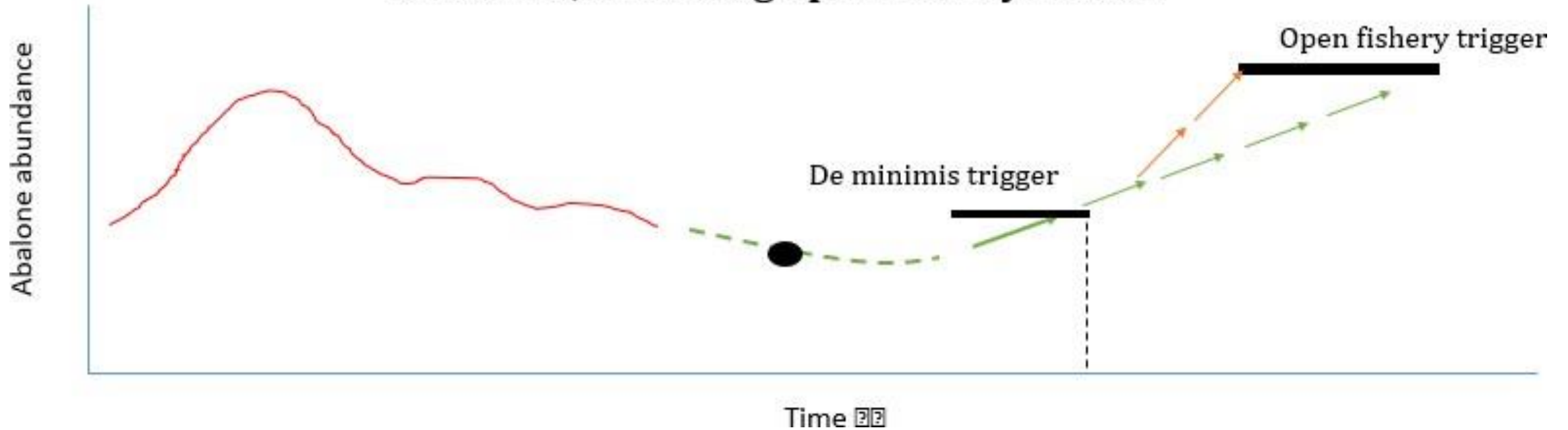


Trade offs #1 and 2:

→ Higher *de minimis* TAC

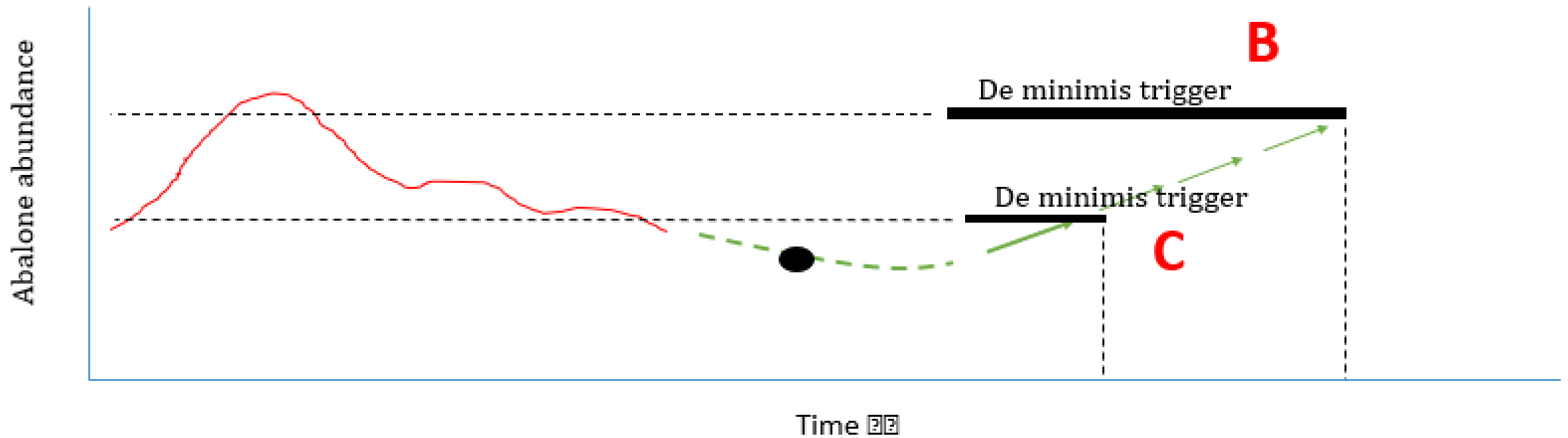
→ Lower *de minimis* TAC

**Catch more, prolonging the *de minimis* phase
or
Catch less, achieving open fishery sooner**



Trade off #3:

**De minimis fishery sooner
or
afford more protection to abalone?**



Thank You

Questions?

Ian Taniguchi

Senior Environmental Scientist Specialist
California Department of Fish and Wildlife

Ian.Taniguchi@Wildlife.ca.gov

Mr. Eric Sklar, President
California Fish and Game Commission
Delivered by email: fgc@fgc.ca.gov

May 7, 2020

RE: Recreational Abalone FMP – Administrative Team’s Final Report.

Dear President Sklar and Commissioners:

I am a co-author of the Final Report from the Administrative Team tasked by the Commission to integrate the two abalone management proposals submitted by the CDFW and TNC. Given my personal involvement and familiarity with both the Final Report and the associated Management Strategy Evaluation (MSE), I am commenting as a member of the public, sharing some insights, and making a recommendation which is not a part of the report.

Because the integration process and final report were limited in both scope and time, ***I am asking the Commission to direct CDFW to include additional pragmatic alternatives to the recommended biological and de-minimis fisheries in the final abalone fishery management plan (FMP) (see suggestions below).***

The Bottom line take-away from the Final Report

The report offers 16 basic combinations of Harvest Control Rules (HCR) and Total Allowable Catches (TAC) which were evaluated using MSE modeling. Each of the 16 proposals were evaluated using two Operating Models (OM1 and OM2). OM1 assumes environmental recovery at the end of this year (2020). OM2 considers recovery at the end of 2022. At this point, it is obvious that environmental conditions will not be adequately improved by the end of this year to consider OM1, effectively leaving OM2 as the only viable operating model. In addition, the environmental conditions (Exceptional Circumstances) required for reopening have not been explicitly determined, nor have scientific mechanistic links to abalone health been established.

Applying OM2, the soonest the fishery could reopen is in 20 years (i.e. 20 years for a de-minimis fishery and 39 years for an open fishery). Additionally, given the assumptions and triggers in the proposals, it is doubtful we will ever see an open-access fishery approaching what we have enjoyed in the past. Due to the long timeframes and the quality of the data, it is likely that an FMP based on any of the recommended proposals, will be outdated before it could be implemented in a fishery.

Why are the Timeframes so Long?

The long timeframes are based on the assumptions, indicators and reference points used in the MSE modeling. We have seen how models can evolve by watching the changes in the corona virus models as newer and better information becomes available. Even though some of the information used in the abalone models comes from peer-reviewed literature, other parts are less understood. To better understand some of the information used in the models, additional research and data will be required. In the absence of reliable data and proven environmental links to abalone health, the assumptions and references used in the models are initially set very

precautious. As more and better data becomes available models can be updated to provide better forecasts.

Although there are multiple proposals, they all rely on only two indicators (density and SPR) with various triggers set for action using four levels of TACs. The reason for using only two indicators was due to the lack of better data and the scope of the project which focused on the two peer reviewed proposals submitted by the CDFW (density) and TNC (SPR). All of the proposals mandate both density and SPR requirements be met. Requiring both indicators to be met simultaneously causes the proposals to be more restrictive to fishing than either of the original proposals considered separately. This conflicts with the Peer Review's recommendation #4, to not adopt a "one-out, all-out" approach. The peer review recommended not using this approach because they recognized, "...the possibility that red abalone may adapt to some of the 'negative' indicators in the future." Anecdotally, I have observed abalones adjusting to their new environment by re-aggregating in shallow water away from the urchins in most areas.

Adding to the already restrictive density and SPR requirements in the decision tree (Part B), there are also yet-to-be defined "Exceptional Circumstances" (Part A – Environmental and Biological Conditions) which must occur before applying the decision-tree.

Suggestions for a Fishery Going Forward:

I request that the Commission ask the Department to assemble a small group of fishermen and scientists to consider mid-sized fishery alternatives for the final FMP at a level between the de-minimis and bio-fisheries proposed in the integration plan. Such a level of harvest provide data and a reasonable, but precautionary fishing opportunity. I recommend, considering a fishery between a few hundred and 5,000 abalones.

- There is an opportunity gap between those catch levels (TAC) described in the de-minimis fishery (5,000 to 40,000 abalones) and the bio-fishery (a few 100s of abalones).
- All landing sites are not in the same condition. Although some sites in Sonoma County, hard-hit by the negative environmental conditions should remain closed, there are other sites in Mendocino, Humboldt and Del Norte Counties which can support small fisheries without having a detectable impact on recovery.
- A mid-sized fishery would provide a "win-win" for both scientists and fishermen by supporting the concepts of data gathering in a bio-fishery and that of more opportunity in a larger de-minimis fishery.
- Because this level of fishery, according to MSE, will have little to no detectable impact on the health or recovery of the overall fishery, it could begin by being managed without using density or SPR data until more or better data is available, which can come from the fishery itself.
- Allowing for smaller sites, shorter fishing seasons and using the data gathered from the catches at those sites, it is possible to manage more proactively and react more rapidly to changes (i.e. season by season). This would be an improvement over the currently proposed large "fishing zones" necessitating 4 years to collect and analyze the required data for annual decision-making.

- Rotating smaller open and closed sites to spread fishing pressure along with higher size limits to protect more spawning potential were concepts suggested by the Project Team and mentioned in the MSE. Because of time, these concepts were not further explored by the modelers or developed enough to be included in the recommendations. I believe they still have merit and support from divers.

Benefits of the Integration Process

In closing, I would like to share a few of the benefits that came from the integration process. If the full benefits are to be realized, more work and input are needed before completing the final abalone FMP. The most notable benefits coming from the process were as follows:

- Everyone involved (DFW, F&GC, OST, OPC, NGOs, Tribes, academics, and the public) learned and shared ideas during the process paving the way for potentially better cooperation and communication in the future.
- The teams recognized the need for environmental indicators to anticipate changes in abalone health and reproduction. There were many different environmental indicators discussed (i.e. water temperature, kelp canopy, acidification, etc.) which seem intuitively promising but the teams agreed that their mechanistic links to abalone health are not well-established and will require more work and research to make those connections and set triggers for action.
- There was general agreement concerning the need for more and better data. This not only included data from more areas, but also the coordination of data collection and protocols among the various entities collecting it (i.e. CDFW, NGOs, Academics, and citizens). The teams recommended that the CDFW coordinate data collection and make it more readily available to the public.
- The teams recognized the need to design and coordinate data collection programs in areas where CDFW is currently not sampling, specifically in areas outside of Sonoma and Mendocino Counties. Humboldt, Del Norte (H/DN), and Marin Counties do not have the density or SPR data used in the proposals, even though they are over ½ of the coastline managed by the proposals.
- The teams provided a strawman proposal for a biological fishery for data collection, however,, more details should be outlined by CDFW, alongside stakeholders, to establish what data to collect, who and how a bio-fishery would be determined, where it might occur, and if the opportunity is enough to incentivize recreational participation.
- The modelers demonstrated that MSE is a valuable tool for comparing alternative proposals but made it clear that outcomes depend on the assumptions used and having reliable data. Thus, MSE may not perfectly predict the future.
- The teams established good “strawman” administrative procedures for tag allocation in a potential de-minimis fishery using a lottery system similar to big game hunting.

Sincerely,

Jack Likins

Email address: 

From: Joshua Russo [REDACTED]
Sent: Thursday, June 11, 2020 05:47 AM
To: FGC <FGC@fgc.ca.gov>; Wildlife DIRECTOR <DIRECTOR@wildlife.ca.gov>;
Mastrup, Sonke@Wildlife <Sonke.Mastrup@wildlife.ca.gov>; Shuman, Craig@Wildlife
<Craig.Shuman@wildlife.ca.gov>
Subject: AGENDA ITEM 14

Esteemed commission,

Please add "(B) Abalone FMP" to item 14 on the commission agenda for 6/24. In the attached petition we are asking the commission to direct the department to design a management plan that begins to allow recreational take at a much lower level than the department intends to do. We need the commission to discuss this petition and give the department clear direction that this is or isn't what the commission wants in order to allow discussion on how to do this at the next MRC meeting.

Since the beginning of this process fishermen have been very clear that responsible access to the fishery is our top concern with the new FMP. Please direct the department to design a management plan that allows restricted access and lower levels of take.

Respectfully,
Joshua Russo
President, Watermen's Alliance
[REDACTED]

To: The California Fish and Game Commission and the California Department of Fish and Wildlife Delivered by email to: fgc@fgc.ca.gov and Chuck.Bonham@wildlife.ca.gov

From: The Watermen's Alliance on behalf of the undersigned interested public

Subject: Petition to Provide a Recreational Abalone Fishery in Northern California



We, the undersigned recreational abalone divers of California, write in support of the Watermen’s Alliance request that California Department of Fish and Game create an opportunity for small-scale recreational harvest (between 600 to 900 abalone) to address data limitations in this fishery while creating sustainable fishing opportunities for the diving community as the resource rebuilds (also known as a biological fishery). We strongly support that this fishery be considered within the final fishery management plan for the North Coast recreational red abalone fishery.

The general public relies on the California Department of Fish and Game to design regulations to manage our shared state resources. We trust that they do this in alignment with the Marine Life Management Act which requires that a fair balance between ecosystem protection and sustainable harvest, as well as the preservation of fishing culture and economy (as outlined in its general policies within §7050).

Several years ago, we embarked on an effort to develop a new FMP for the recreational red abalone fishery. Since the beginning, fishermen have been very clear that their priority ask within this management plan is centered on the issue of access. General consensus from our community is that the department has been too restrictive with the resource under the guidance of the Abalone Recovery Management Plan (ARMP). This was reflected in our feedback provided during the initial public hearings and the mail-in surveys.

Our community has continued to be clear about what we would like – to maintain an opportunity to sustainably harvest the resource. Divers are willing to harvest less and pay more for the opportunity but simply cannot wait 20 to 30 more years for a *de minimis* or fully open fishery opportunity.

However, CDFW would now say that there are only two options for an “entry level” of take in the recreational fishery. One option is a biological fishery where recreational fishermen harvest the abalone that the department needs to provide critical data on the condition of the fishery (~100 abalone). The second option is a *de minimis* fishery with a level of take so low that it would have no effect on the recovery of the fishery (less than 10,000 to 20,000 abalone). However, recent modeling work suggests that it will take decades to reach the point where such a *de minimis* fishery could open.

We would propose that CDFW instead consider a third option for consideration by the California Fish and Game Commission (Commission) to include within the final FMP. This option would provide a level of take between the levels of harvest currently outlined in the biological fishery and those in the *de minimis* fishery. **Such a biological fishery, with a level of harvest between 600 to 900 abalone, would serve to increase the amount of data available to inform management and decision-making without putting the resource at risk.** Further, by engaging fishermen it would increase public confidence in the data. It would also provide ample opportunity to ensure that the recreational dive culture remains alive and well in California. The experts and the data have shown that this can be accomplished with minimal risk to the recovery of the fishery and no delay in the timeline for reaching the *de minimis* fishery. **Within the Administrative Team report, the modelers conducted an analysis to determine what level of data would be needed to manage a third management zone. Three hundred samples was demonstrated to provide enough statistical power to reliably manage a fishing zone, thus we would**

like to ensure that any biological fishery generates enough data to make reliable assessments on the status of the red abalone resource.

We also ask that biological fishing opportunities be distributed across each fishing zone. This could help to distribute any fishing pressure put on the resource as it recovers and acknowledges differences in the state of red abalone between counties. For instance, acknowledging that Sonoma has been hit particularly hard, the resource is further threatened by poaching activities. Poaching has been reported by Fish and Game officers and on Fish and Game’s social media accounts. While any fishing pressure should be limited, the added presence of recreational divers can provide more eyes on the water to curtail poaching activities and ensure that valuable data is collected from any red abalone that leave the water. In Humboldt Del Norte, we could also explore the use of landing based (i.e. catch) data for management due naturally lower abundances of abalone in the region being a poor fit for current density surveys. This opportunity could allow the department to refine data collection and test alternative management methods at low catch levels to build confidence in the approach before reaching higher levels of take.

We are not asking for a guarantee of success each time we go out. We are simply asking for the opportunity to go out and sustainably harvest while helping in state data collection efforts. Small businesses and communities on the North Coast have been struggling since the closure of this fishery in 2017, and increased diving activities and tourism would greatly benefit them as well. We urge you to consider our proposal.

Signatures

Name Location Date

Jack Likins Gualala, CA 2020-05-11

Rich Stachowski Oakland, CA 2020-05-13

Kristine McKee Fort Bragg, CA 2020-05-13

michael wood Fairfield, CA 2020-05-13

Matthew Rice Laguna Niguel, CA 2020-05-13

Tony Rayford Georgetown, CA 2020-05-13

toby chan Sacramento, CA 2020-05-13

Regina Bianchi US 2020-05-13

Glenn Ford Sonora, CA 2020-05-13

Shannon Anderson Napa, CA 2020-05-13

***Blank page place-holder representing 114 pages of signatures
(originals on file)***

Recipient: The California Fish and Game Commission, The California Department of Fish and Wildlife

Letter: Greetings,

Provide a Recreational Abalone Fishery in Northern California

Comments

Name	Location	Date	Comment
michael wood	Fairfield, CA	2020-05-13	"I want to be able to take my grandkids and teach them the hunt"
Timmy Conway	US	2020-05-13	"This is an important fishery."
Devin Eutsler	Yuba City, CA	2020-05-13	"The opportunity to freedive for Abalone in Northern California would be fantastic."
Matt Diestel	Walnut Creek, CA	2020-05-13	"My father taught me abalone diving and I would like to do the same with my children, in a responsible manner."
matt mattison	monte rio, CA	2020-05-13	"I fully support this as it will help gather much needed fishery info and give the people some level of fishing"
Ian Whiston	Santa Cruz, CA	2020-05-13	"I believe we can create a sustainable abalone fishery for our generation and my children's generation."
Meda Woods	San Antonio, TX	2020-05-13	"We love abalone"
Alan Engbrecht	San Francisco, CA	2020-05-13	"I am a fourth generation abalone diver and and fifth generation Californian. This coast and fishery is part of my family, soul, and heritage. I am perfectly satisfied with 1 or two abalone a year, but it would break my heart to know that my father and I have harvested our last abalone together."
Keith Chandler Chandler	Los Angeles, CA	2020-05-13	"Keith Chandler"
Tyler Benson	Moraga, CA	2020-05-13	"It would be amazing to get back in the water and contribute to the data collection."
Thomas Palmer	Santa Rosa, CA	2020-05-13	"Abalone has been a food source for generations of my family. And the exercise alone has no equal. I have looked at some of the reefs and they are full of snails. Do not see the reason to completely stop."
John Lynch	Washington, DC	2020-05-13	"Divers can make a difference."
Greg Fonts	California	2020-05-13	"Abalone diving has been in the blood of Californian divers for generations. While it may not be a "cadillac" fishery from now on, there is still a fishery that take can be fashioned around"
Michael Elliott	Concord, CA	2020-05-13	"I'd like to see the diving and hunting community to stay alive. I believe the third option would work for the recreational diver and abalone hunters. Thank you"
Isabel Silveira	Half Moon Bay, CA	2020-05-13	"I tasted my first abalone over 30 years ago when my husband, a diver in CA prepared it for me. The flavor was one of the best things I had eaten in my entire life. My husband has taught 3 sons to dive, one of them being a USA National Spearfishing Champion. Although they abide by the rules, the opportunity to continue to enjoy abalone in their lifetime, is something I hope to see in my

Name	Location	Date	Comment
			lifetime. I sure hope to eat abalone prepared by my husband for our family again... someday!"
Mark Keller	Benicia, CA	2020-05-13	"I love this fishery and am passionate about preserving it."
Lori Hofmann	Montara, CA	2020-05-13	"This was a family tradition for decades and generations. We are native Northern California fisherman and hunters and truly believe that with proper management our resources for hunting and fishing can be accessible for all forever."
Shirley Moody	US	2020-05-13	"An amazing experience."
Tracy Liller	boise, ID	2020-05-13	"I believe it is important to balance management including the wishes of those who partake in the sport. The resources belong to the people and fair representation in management needs to be part of the process while preserving a species."
nick moranda	Jacksonville, IL	2020-05-13	"Nicholas moranda"
William Chinnock	Stockton, CA	2020-05-13	"We need the state to get involved with protecting and rescuing the crisis on the California coast regarding loss of Bull Kelp, abalone fisher, and the purple urchin bloom. Allow recreational divers and Ocean users to participate in conservation efforts to save the Coast."
Alisa Carlson	Lakeport, CA	2020-05-13	"I would like the 'third' alternative proposal be considered. Everything possible should be done to help rebuild abalone populations ."
ray decker	Fresno, CA	2020-05-13	"I love abalone"
Kent Twomey	San Diego, CA	2020-05-13	"Scientific data is needed."
TRAVIS JONES	San Juan Bautista, CA	2020-05-13	"I want to enjoy the resource and I do not agree with the ban."
Luis Rosa	Modesto, CA	2020-05-13	"I'm signing because fishing is a natural resource that should be experienced by all"
Carter Jessop	Hayward, CA	2020-05-13	"Research regarding the effectiveness and benefit of fisheries regulation consistently shows that buy-in and support from the local community is vital to the success of harvest restrictions and no-take areas. In order to recover the abalone fishery and maintain both the businesses and culture that rely upon the responsible harvest of abalone on the north coast, I support this initiative and ask that you do so as well."
Michael Williams	Orland ca, CA	2020-05-13	"I want to dive like I did as a kid! Teach kids to dive! And enjoy the ocean!"
Roman Smolgovsky	South Lake Tahoe, CA	2020-05-13	"PADI Master Instructor"
Diana Theron	Auckland, New Zealand	2020-05-13	"Please stop over fishing."

Name	Location	Date	Comment
Stephen Page	San Francisco, CA	2020-05-13	"It has been part of my family tradition for a long time"
Douglas Jung	Santa Rosa, CA	2020-05-13	"Save the abalone culture"
Captain Dan Walsh	Carlsbad, CA	2020-05-13	"As a diving instructor I've been diving for over 50 years and want to be sure others can do the same for the next 50 years"
Jared Wilson	Santa Rosa, CA	2020-05-13	"Oversight overreach in government and its facilities is wrecking your wildlife and water ways. Its politicians that sign and pay for toxic dumping at these locations. I know cause the corporations are the only essential workers now payed for to the politicians that allow them to still profit. Its criminal. More people need to be out there keeping an eye on everything . Transparency. Government should spend some money on health of things vs the killing of things and bio terrorism. That's right obammer."
Tammy Willison	Redway, CA	2020-05-13	"I am signing because my grandpa, dad, brother and many friends were all ab divers. Great memories"
Sam Jacobszoon	Ukiah, CA	2020-05-13	"I believe in a managed fishery."
Shirley Simmons	Corning, CA	2020-05-13	"We need this"
Geoff Call	Santa Cruz, CA	2020-05-13	"geoff call"
Kam Chan	Pinole, CA	2020-05-13	"I'm love this game, every year have camping party over there , Enjoy the beautiful coast line and outdoor lifestyle really fun"
Ekaterina Tarasova	San Francisco, CA	2020-05-13	"I care"
Sheralyn Kirby	Gualala, CA	2020-05-13	"I am in support of small scale abalone fishing."
rich nehmer	crescent city, CA	2020-05-13	"I love the accessibility to the ocean."
Mark Mann	San Ramon, CA	2020-05-13	"support of the Watermen's Alliance request that California Department of Fish and Game create an opportunity for small-scale recreational harvest (between 600 to 900 abalone)"
Joe Surwald	Watsonville, CA	2020-05-13	"I love to dive for abalone. I used to dive here in Santa Cruz. Now it illegal 掠"
Jack Johnson	Richmond, CA	2020-05-13	"I believe that there is more than the current management system that makes sense"
Blake Patrich	Chico, CA	2020-05-13	"Blake Patrich"
Stephanie McGuire	Clifton, CO	2020-05-13	"I want limited government in everything!"
Jack Kim	San Jose, CA	2020-05-13	"I want my children to be able to experience what I live to do."
Paul Venker	Concord, CA	2020-05-13	"Open it back up."

Name	Location	Date	Comment
levi cloud	napa, CA	2020-05-13	"I grew up diving for abalone and it is a passion of mine to dive for these snails and would like my children to one day be able to enjoy this great sport as I have been able to do."
Michael Eberhardt	South San Francisco, CA	2020-05-13	"I LIVE OFF THE OCEAN. Without it, my family would not survive."
Jim Vandegrift	Santa Cruz, CA	2020-05-13	"I have been an avid abalone diver for the last 35 years and hope that some accommodation can be made that would allow the resumption of abalone diving that does not compromise the establishment of a healthy abalone population."
Jake White	Sonoma, CA	2020-05-13	"Anything is better than nothing"
Marci Colburn	Eureka, CA	2020-05-13	"I want for myself and future generations to be able to experience the love of this sport again."
Derek Cash	Ukiah, CA	2020-05-13	"I'm a diver that loves the sport and with sustained harvest in certain areas we should still be allowed to harvest abalone."
Robert Sandner	Yigo, Guam	2020-05-13	"There are way more abalone than the computers can predict. Get in the water look around you'll be surprised."
Ron Whang	San Francisco, CA	2020-05-13	"Let us dive before we die!"
james george	Lompoc, CA	2020-05-13	"southern california also needs to reopen.after taking off 15 years from diving im seeing so many abs that were never in previous areas"
Christy Ruhl	Napa, CA	2020-05-13	"Christy Ruhl"
Gabe Silveira	Half Moon Bay, CA	2020-05-13	"I am a free diving and would like the abalone season to open again"
Alan Murakami	Sebastopol, CA	2020-05-13	"I agree with a limited, controlled and measured recreational abalone harvest."
Todd Werling	Farmington, NM	2020-05-13	"Give Tim McCormick Abalone"
Christy Mang	Lompoc, CA	2020-05-13	"This was a part of my childhood. I would love to have my family enjoy as I did:)"
Benjiman Azevedo	Oroville, CA	2020-05-13	"Need to keep recreationaldiving alive!!"
charles zinser	Reno, NV	2020-05-13	"I support a limited abalone season it is very important. Total closure makes no sense and creates negative feelings of the folks that manage our recreational fisheries."
Patrick Ward	Santa Barbara,, CA	2020-05-13	"Patrick Ward"
jackie swaim	Citrus Heights, CA	2020-05-13	"We love abalone diving"

Name	Location	Date	Comment
David Gagne	Elk Grove, CA	2020-05-13	"It's not fair that there's only commercial fishing for abalone. I also a big supporter of the free diving community as well as a also being a diver."
Rogan Seamans	Oakland, CA	2020-05-13	"I love to dive"
Dustan Baker	Ladera Ranch, CA	2020-05-13	"Legal and responsible Recreational take of marine resources for consumption is an important activity. The culture of this practice should not be overlooked, but embraced."
Matthew Wright	Lakeport, CA	2020-05-13	"Because I dive"
Matt Sum	San Bruno, CA	2020-05-14	"I am signing because of people ned to have a balance of life. Have an outdoor life and ocean recreation is important to most of us as Californian."
Steven C Adams	Oxnard, CA	2020-05-14	"I believe! Let's do this..."
Mike Maher	US	2020-05-14	"There are plenty of abs out there, maybe Fish and game just need to bust those that are poaching a little better"
Sean Klinger	Sacramento, CA	2020-05-14	"Because it's the right thing to do"
Steven Clement	Sacramento, CA	2020-05-14	"Because I support the cause"
Claire De Biasio	Novato, CA	2020-05-14	"Recreational abalone divers are responsible, respectful people who hunt in a sustainable manner. They will not abuse this opportunity."
Tiffany Miller	Napa, CA	2020-05-14	"Tiffany Miller"
James O'Brien	Annandale, VA	2020-05-14	"I believe in this cause, having grown up on the Northern California coast, going abalone diving with my father as a young boy is one of my fondest memories. Keep it alive!"
Kathryn Lyons	Reno, NV	2020-05-14	"I believe in this cause."
Max Salgado	Southampton, England, UK	2020-05-14	"The ocean is for all"
Rob Flecksteiner	Penn Valley, CA	2020-05-14	"Sport Diving ensures the continued support for the environment and a controlled take of game helps to ensure good resource management and discourages poaching."
erin mcdonald	Stockton, CA	2020-05-14	"I believe this is a sound proposal to aid in protecting the abalone, gaining accurate data, and providing opportunities for the diving community."
Jocelyn Peach	Vacaville, CA	2020-05-14	"Abalone is awesome!"
Sarah Mitchel	Sebastopol, CA	2020-05-14	"I would like to dive with my son and show him how to collect abalone one day."
Pat Mathews	Fremont, US	2020-05-14	"I love fishing and abalone."

Name	Location	Date	Comment
Laura Lee Fitzpatrick	Napa, CA	2020-05-14	"Such an important hobby good for one's understanding of our seas."
Tom Caldera	Santa Maria, CA	2020-05-14	"Everyone loves abalone."
Amanda Risen	Kansas City, MO	2020-05-14	"I agree with the petition"
Jason Moreci	Novato, CA	2020-05-14	"Jason Moreci"
Sarah Olson-Saunders	Sweet Home, OR	2020-05-14	"The people who follow the rules should not be punished for poachers. This is something I grew up doing with my family, put food on the table. Don't punish the law abiding citizens, crack down hard on them disgusting poachers."
Chris Freitas	Cloverdale, CA	2020-05-14	"I love the ocean"
david currier	Ketchum, ID	2020-05-14	"Sustainability is where it's at."
Rachelle maher	Kelseyville, CA	2020-05-15	"We should support the group"
Melanie Mondo	San Francisco, CA	2020-05-15	"We love abalone"
Kathleen Bunting	Cloverdale, CA	2020-05-15	"Because my family has grownup diving and truly miss it"
Daniel Rodarte	Rocklin, CA	2020-05-15	"Abalone diving on the north coast has suffered tremendously over the past decades through poaching, mismanagement, and the purple urchin invasion. As a result, law abiding divers, dive shops, and tourism businesses have paid the price, from the Bay Area north to Humboldt County. Bring back a limited take to share the joy of diving for abalone again."
John Staggs	US	2020-05-16	"We need to fish"
Shel Barsanti	Mckinleyville, CA	2020-05-16	"Abalone season has been a fun activity for many of our family members."
Christopher Carlton	Magnolia, CA	2020-05-17	"I enjoyed collecting abalone when I used to lived in Commiefornia."
Rick Augustine	Castro Valley, CA	2020-05-17	"Its essential and I only collect fully grown alabones. Not babies ones. Its legal and hunting permit is included."
Jonathan Boykin	Lemoore, CA	2020-05-17	"Great idea."
Raymond Mori	South Lake Tahoe, CA	2020-05-17	"We all dive"
Dean August	US	2020-05-17	"I love diving and an abalone dinner"
Ben Oyle	Novato, CA	2020-05-18	"I support this idea"
Catherine Lamb	Stockton, CA	2020-05-18	"There is nothing like abalone diving in the north coast."
Mark Hamerdinger	Morro Bay, CA	2020-05-19	"I believe there is enough abundance of Abalone to harvest giving that size limits would be strictly enforced."

Name	Location	Date	Comment
Genie Minikel	Redway, CA	2020-05-19	"My family has been diving for abalone long before I was born and would like our children to be able to enjoy this lifestyle also"

**FOR BACKGROUND PURPOSES ONLY
STAFF SUMMARY FOR AUGUST 22-23, 2018**

12. RED ABALONE

Today's Item

Information

Action

Consider authorizing publication of notice of intent to amend regulations to extend the fishery closure sunset date for the recreational red abalone fishery.

Summary of Previous/Future Actions

- **Today's notice hearing** **Aug 22-23, 2018; Fortuna**
- Discussion hearing Oct 17-18, 2018; Fresno
- Adoption hearing Dec 12-13, 2018; Oceanside

Background

In Sep 2017, DFW identified sweeping changes in density, occurrence, depth distribution, size and health of red abalone as well as the kelp upon which it depends for food. In addition, DFW found that the average density of red abalone populations has declined below the Abalone Recovery and Management Plan (ARMP) fishery closure trigger of 0.30 abalone per square meter, indicating that the stock could no longer support a fishery.

In response to the DFW findings of a dramatic fishery-wide decline of red abalone populations from severe starvation conditions, in Dec 2017 FGC adopted regulations to close the recreational abalone fishery consistent with the ARMP. FGC also adopted a sunset provision for the closure based on significant public comments received during the rulemaking process to address concerns about having a fishery closure for an indeterminate period. Under existing regulations, the fishery would re-open on Apr 1, 2019, or upon adoption of a red abalone fishery management plan (FMP) and the guidance it provides for fishery reopening, whichever comes first.

The regulations closing the recreational abalone fishery became effective on Mar 29, 2018. If the existing regulations are not amended to delete or extend the sunset date (subsection 29.15(j)), the fishery will re-open on Apr 1, 2019, which will allow for the recreational take of abalone in open fishing areas during the open season (subsections 29.15(a), (b), and (c)).

Since the closure of the recreational fishery, DFW has found no meaningful changes in the abalone resource conditions described in the Sep 2017 initial statement of reasons. DFW received documented reports from the public of dead and dying abalone washed ashore at various locations in Sonoma and Mendocino counties over the 2017/18 winter and spring seasons. This information suggests that abalone continue to be weak and die due to current environmental conditions and, thus, there are no substantial positive population changes since last year. DFW concludes that re-opening the fishery at this time would be inconsistent with the ARMP and would be detrimental to the recovery of red abalone populations.

Proposed Amendment

DFW proposes to extend the closure of the abalone fishery beyond the current Apr 1, 2019

**FOR BACKGROUND PURPOSES ONLY
STAFF SUMMARY FOR AUGUST 22-23, 2018**

sunset date for another two years, until Apr 1, 2021. Effective dates for take and possession contained in the abalone fishing regulations would be updated as well to reflect the proposed change.

DFW's proposal allows for consideration of a fishery re-opening prior to reaching full recovery (i.e., re-opening the fishery before density standards are fully realized under the ARMP or a red abalone FMP upon adoption by FGC). DFW recommends, however, considering the management triggers in the ARMP or a red abalone FMP once adopted by FGC to determine whether re-opening the fishery to recreational harvesting is warranted. The proposed regulation change is necessary to facilitate recovery of the red abalone population while preparation of the red abalone FMP is currently underway.

Public Comments (N/A)

Recommendation

FGC staff: Authorize publication of the notice as recommended by DFW.

DFW: Authorize publication of the notice as detailed in the draft initial statement of reasons (ISOR).

Exhibits

1. DFW memo, received Jul 30, 2018
2. Draft ISOR

Motion/Direction

Moved by _____ and seconded by _____ that the Fish and Game Commission authorizes publication of a notice of its intent to amend Section 29.15, related to recreational red abalone fishing regulations.

**FOR BACKGROUND PURPOSES ONLY
STAFF SUMMARY FOR JUNE 24-25, 2020**

14. MARINE ITEMS OF INTEREST FROM PREVIOUS MEETINGS

Today's Item

Information

Action

This is a standing agenda item to provide FGC with updates on items of interest from previous meetings. Today, FGC will receive an update on the red abalone recreational fishery closure sunset date and discuss a potential rulemaking to continue the closure.

Summary of Previous/Future Actions

- | | |
|--|--|
| • FGC closed recreational red abalone fishery for one year | Dec 7, 2017; San Diego |
| • FGC extended fishery closure to 2021 | Dec 12-13, 2018; Oceanside |
| • Today's update and possible direction | Jun 24-25, 2020; Webinar/teleconference |

Background

Red abalone fishery management is currently guided by the Abalone Recovery and Management Plan (ARMP). In 2017, following dramatic environmental conditions leading to extensive loss of bull kelp beds and significant abalone die-off, FGC took action to close the recreational red abalone fishery; this unprecedented action was taken consistent with the ARMP and DFW observations, data and analysis. The closure included a sunset provision to re-open the fishery on April 1, 2019, or upon adoption of an abalone fishery management plan (FMP), whichever came first. The hope was that the need for a closure would be temporary and the fishery could re-open after conditions improved. In 2018, FGC determined that conditions had continued to worsen and, in Dec 2018, FGC took action to extend the fishery closure sunset date from Apr 1, 2019 to Apr 1, 2021. See Exhibit 1 for additional background information.

As FGC approved the revised sunset date regulation, it noted that the change was necessary to facilitate recovery of the red abalone population while preparing a red abalone fishery management plan (FMP); the FMP is underway and continues to be on the Marine Resources Committee (MRC) work plan. In early 2020, in light of current conditions, the FMP approach was revised to establish guidance and options to move from closure to scaled reopening of the fishery, including a *de minimis* option, as environmental indicators and abalone stock condition meet reopening criteria (see staff summary from Mar 17, 2020 MRC meeting, agenda item 4 for more background).

DFW recently confirmed that poor conditions continue to persist or worsen and advises that continuing the closure is necessary. A rulemaking to revise or remove the sunset date must be scheduled should FGC wish to extend the closure.

This agenda item today provides an opportunity to hear an update from DFW on environmental and abalone stock conditions and explore possible pathways to extend the closure per DFW recommendation (Exhibit 2). Recognizing that current modeling results project a long recovery period, the sunset date could be extended for longer periods of time (e.g., five-year intervals)

**FOR BACKGROUND PURPOSES ONLY
STAFF SUMMARY FOR JUNE 24-25, 2020**

or removed entirely, recognizing that the FMP under development and its implementing regulations may adjust the closure once adopted.

Significant Public Comments

Two comments were submitted for this agenda item; however, they are provided under Agenda Item 11, as they are more germane to an MRC topic.

Recommendation

FGC staff: Provide direction regarding extending or eliminating the recreational red abalone fishery closure sunset date and potentially add a rulemaking to the FGC rulemaking timetable.

DFW: Add a rulemaking to the FGC rulemaking timetable to remove the fishery closure sunset date.

Exhibits

1. Staff summary from Aug 22-23, 2018 meeting, Agenda Item 12 (for background purposes only)
2. DFW presentation

Motion/Direction (N/A)



Amend §29.15: Rec. Abalone Closure



California Fish and Game Commission
June 24, 2020

Ian Taniguchi, Senior Environmental Scientist
CDFW Invertebrate Management Project

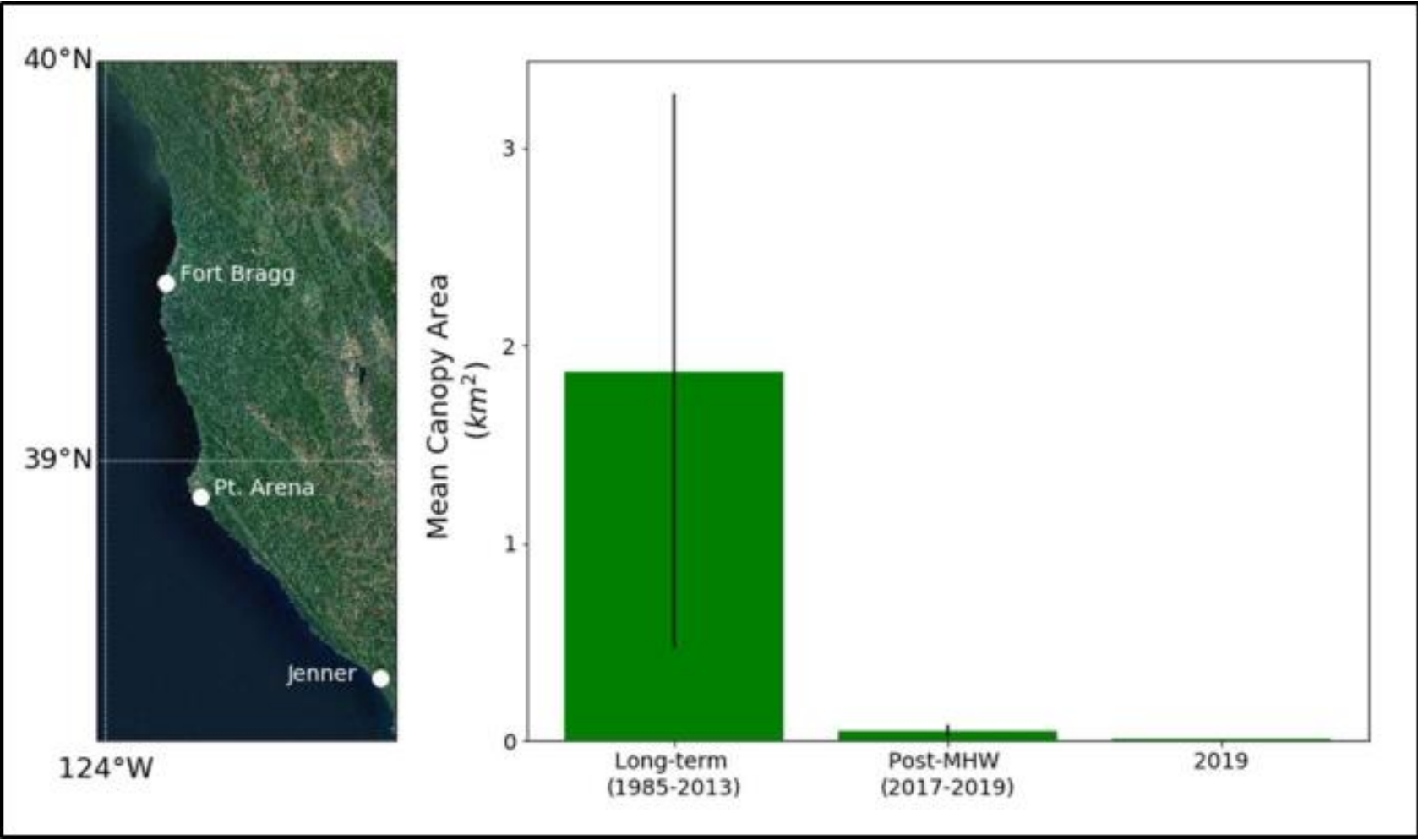


Summary

- Fishery closed since April 1, 2018 due to poor environmental and stock conditions
- Stock and environmental conditions have continued to decline
- Proposed amendment removes current sunset date on closure (April 1, 2021)
- Recently completed collaborative process is informing development of FMP, which will specify thresholds for reopening



Landsat Kelp Cover Decline



Mean Bull Kelp Coverage in Northern California in km² before Marine Heat Wave (MHW), after MHW, and in 2019 (Source: McPherson, Finger, Housekeeper, Bell, Carr, Rogers-Bennett, & Kudela 2020)



CDFW Dive Survey Density Data

Location	2012-2016 Average Density (ab/m ²)	2017-2018 Average Density (ab/m ²)	% Decline in Density
Sonoma County (5 Sites)	0.39	0.15	61%
Mendocino County (5 Sites)	0.49	0.13	73%
Combined Average	0.44	0.12*	72%

* The ARMP fishery closure is 0.30 abalone/m². The overall average, when including past densities as a proxy for sites not sampled since 2016, is 0.28.

- Limited dive surveys in 2019 suggest continued decline in density
 - Density at Van Damme in 2019 was 0.09 ab/m², compared to 0.15 (2018) and 0.33 (2016)



Opportunities for Engagement

- Recreational Abalone Advisory Committee
 - Via webinar date TBA July 2020
- FGC Hearing Schedule:
 - Notice: August 19-20, 2020 (Fortuna)
 - Discussion: October 14-15, 2020 (Oakland)
 - Adoption: December 9-10, 2020 (San Diego)
- Contact: Ian.Taniguchi@wildlife.ca.gov



Current Density Data (Supplemental)

Index Site (Sonoma-SC or Mendocino-MC)	Past Density (ab/m ²) (year sampled)	2017-2019 Density (ab/m ²)	% Decline In Density
Fort Ross (SC)	0.44 (2015)	0.08 (2018) &	81%
Timber Cove (SC)	0.38 (2015)	0.10 (2018)	74%
Ocean Cove (SC)	0.44 (2016)	0.11 (2018) &	75%
Salt Point (SC)	0.38 (2016)	0.06 (2017)	84%
Sea Ranch (SC)	0.37(2012)	0.27 (2017)	27%
SONOMA AVERAGE	0.39	0.15	61%
Point Arena (MC)	0.66 (2014-15)	0.25 (2017) &	62%
Van Damme (MC)	0.33 (2016)	0.15 (2018) 0.09 (2019)	55% 73%
Russian Gulch (MC)	0.60 (2014)	0.05 (2018)	92%
Caspar Cove (MC)	0.35 (2013)	0.01 (2018)	97%
Todd's Point (MC)	0.47 (2013)	0.13 (2018)	72%
MENDOCINO AVERAGE	0.49	0.13	73%
Overall Average	0.44	0.12*	72% 74%

* The ARMP fishery closure is 0.30 abalone/m². The overall average, when including past densities as a proxy for sites not sampled in 2017, is 0.28.

Source: CDFW dive surveys. Red ampersands (&) indicate sites where surveys occurred in 2019 but data were insufficient to calculate densities.



EXPERIMENTAL FISHING PERMIT PROGRAM DRAFT DESIGN AND FRAMEWORK



Photo Credit: D. Stein, CDFW

**Marine Resources Committee Meeting
March 17, 2020 • Santa Rosa, CA
Tom Mason
Marine Region
California Department of Fish and Wildlife**



OUTLINE

- Background and Progress
- EFP Stakeholder Workshop
- Draft Program Design and Framework
- Timeline and Next Steps



Photo Credit: D. Stein, CDFW



FISH AND GAME CODE 1022 (Jan 1, 2019)

The Commission may authorize, for **research, educational, limited testing, data collection, compensation fishing, conservation engineering, or exploratory fishing, or any combination of these purposes**, an EFP that authorizes commercial or recreational marine fishing activities otherwise prohibited by Fish and Game Code or any regulations adopted pursuant to this code



BACKGROUND & PROGRESS

- Two-phase approach for program implementation
 - Phase 1: Process for issuance of box crab EFPs (adopted Oct 2019)
 - Phase 2: Larger programmatic rulemaking (current rulemaking)
- EFP stakeholder workshop held Jan 14, 2020



EFP STAKEHOLDER WORKSHOP

- Total participants: 44
- Locations: Eureka, Sacramento, Monterey, and Los Alamitos
- Key Discussion Points
 - Early and on-going communication
 - Predictability, transparency and flexibility in the permit approval process
 - Third-party sponsorships
 - Congruency of state and federal programs



EFP STAKEHOLDER WORKSHOP, CONT.

- Key Discussion Points
 - Costs associated with EFP participation
 - Data management
 - Aligning application load with review/approval capacity
 - Prioritizing research needs

DRAFT PROGRAM DESIGN AND FRAMEWORK

- Application approval process
 - Pre-application consultation
 - Technical evaluation criteria
 - Grounds for denial
 - Permit terms and special conditions
- Fees
- Renewal
- Reporting requirements
- Revocation process

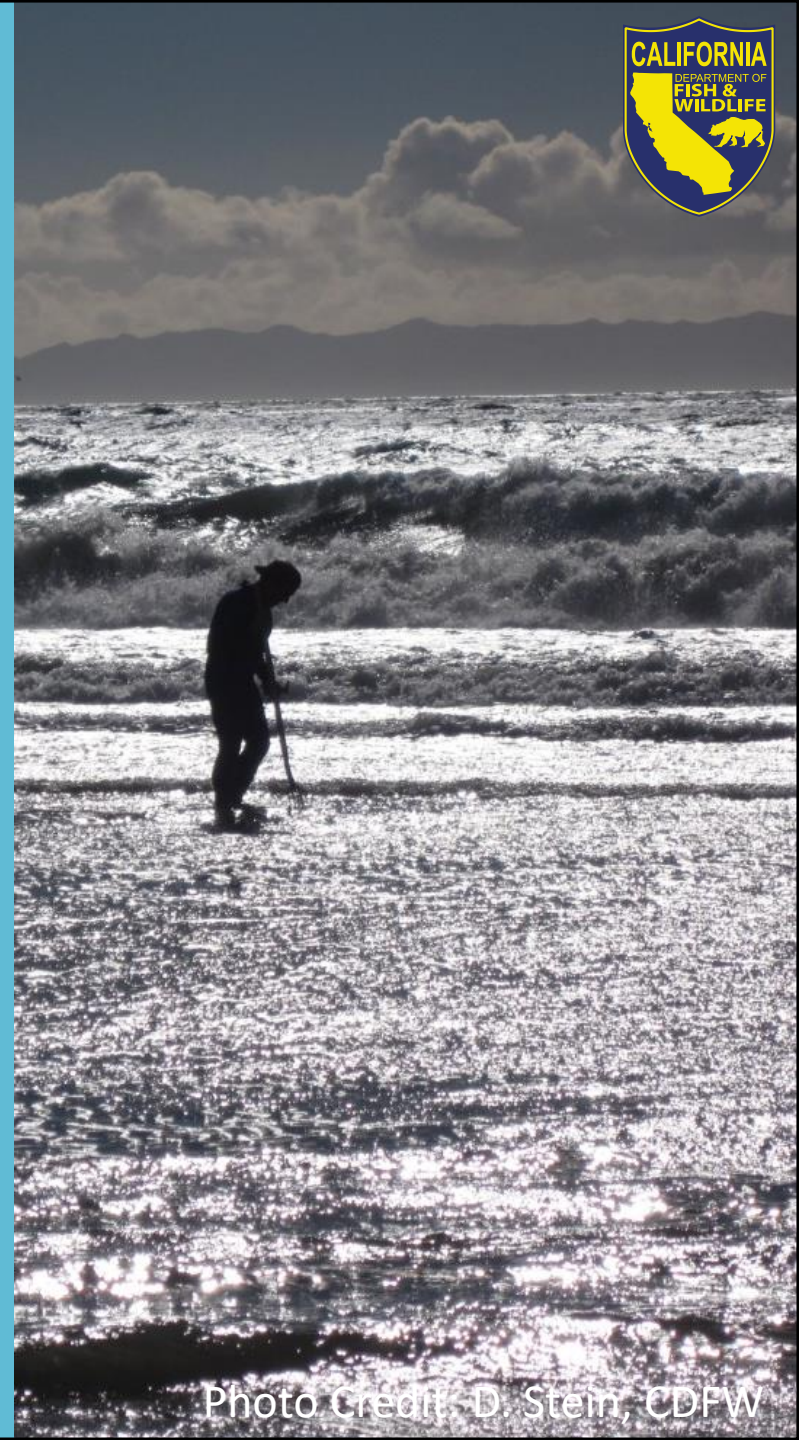
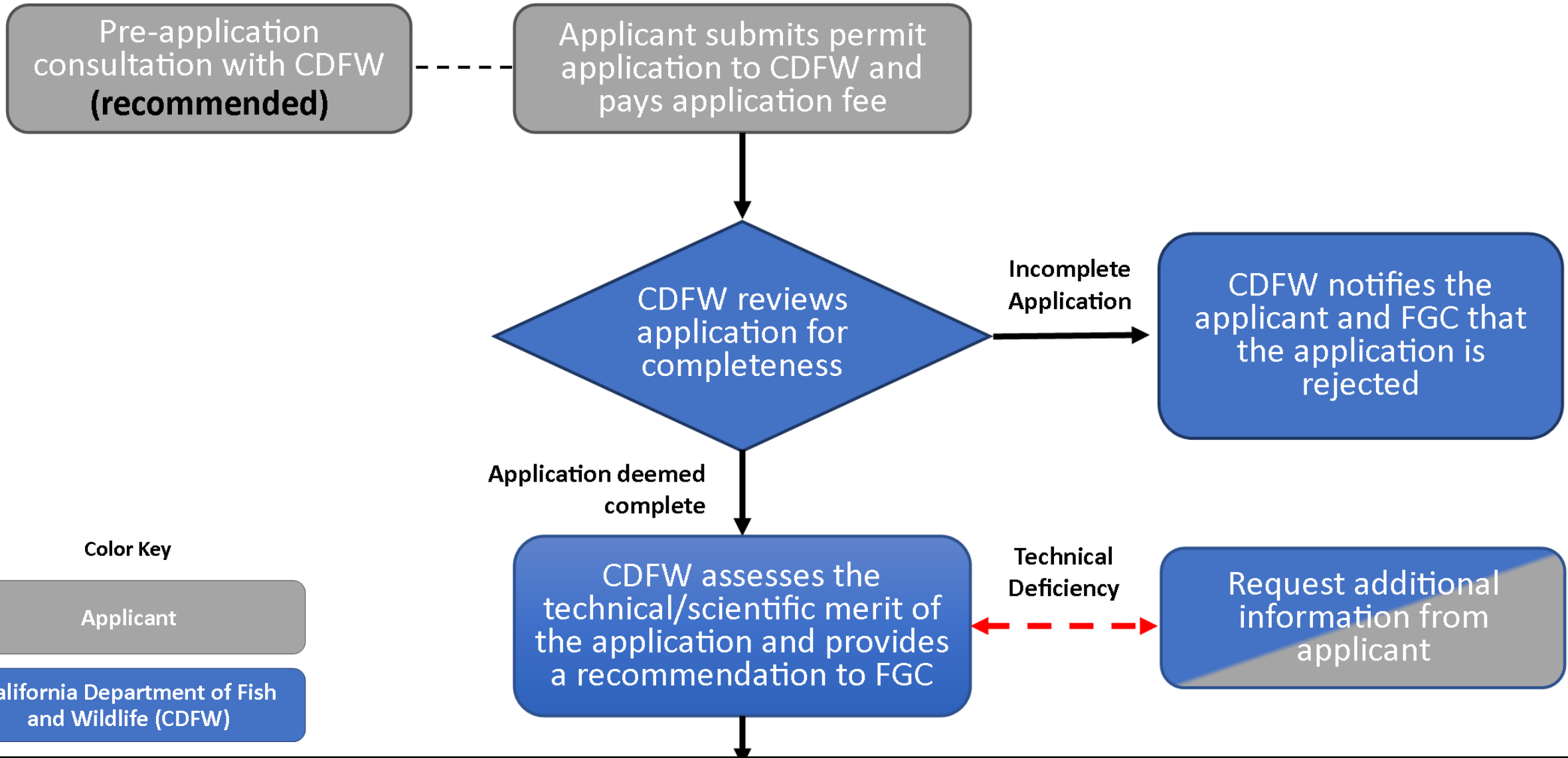


Photo Credit: D. Stein, CDFW

DRAFT APPLICATION PROCESS

Stage 1: Application Submittal & Department Review





TECHNICAL EVALUATION CRITERIA

- Technical and Merit Review:
 - Consistency with FGC 1022 and MLMA
 - Proposed activities are sustainable
 - Methods are clear and appropriate
 - Proposed activities are enforceable
 - Applicant must be in good standing

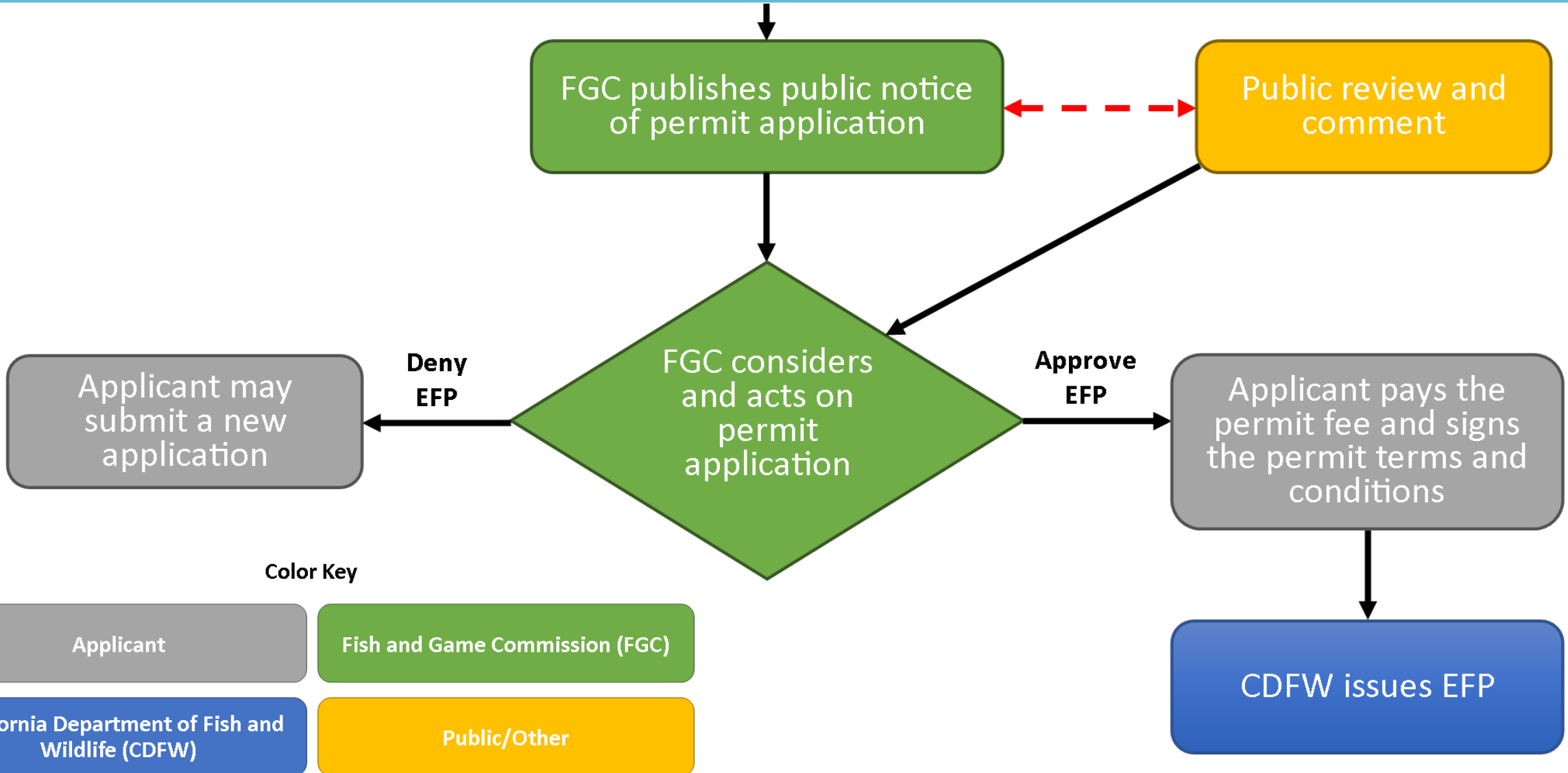


TERMS AND CONDITIONS

- **Standard Terms**
 - Apply to all EFPs
 - General requirements for EFPs
 - Listed in regulations
- **Special Conditions**
 - Unique to each EFP
 - Based on activities in the application
 - Protection of resources and the environment
 - Reduce conflicts with existing fisheries
 - Necessary to administer and enforce the EFP
 - May be amended during term of the permit

DRAFT APPLICATION PROCESS

Stage 2: Commission Review & Action





GROUNDNS FOR DENIAL

- Applicant
 - Fails to disclose required information
 - Provide false statements
 - Have a history of fishing violations or citations under review by the Department or NOAA
- Proposed activities would
 - Cause adverse impacts to marine resources or existing fisheries
 - Interact with protected species
 - Be inconsistent with FGC 1022 and MLMA
 - Impede enforcement



FEES

- Standard application fee (~ \$100-200)
- Prior Experimental Gear Permit fees
 - \$250-10,000
- Tiered permit fees
 - Based upon:
 - Project complexity and purpose
 - Straightforward/Low – Moderate – High
 - Level of Department support /oversight needed



RENEWAL

- Generally, permit valid for 1 year
- EFP holder must submit a request at least 60 days prior to expiration
- Department cannot issue an EFP for the same purpose for more than 4 years



Photo Credit: D. Stein, CDFW



REPORTING REQUIREMENTS

- **EFP holder required to:**
 - Submit a final report summarizing the EFP research and findings
 - More frequent reporting upon request
- **Department must:**
 - Annually
 - Update the Commission on EFP activities
 - Post updates on the Department website
 - Report to the Legislature on EFP Program every 5 years, starting 2025



REVOCACTION PROCESS

Reasons for revocation

- Unforeseen adverse impacts
- Violation of permit terms or applicable laws
- Submittal of false information

Notification. Department will notify EFP holder of any action

Appeal. EFP holder may request reconsideration through the Commission within 30 days of notification

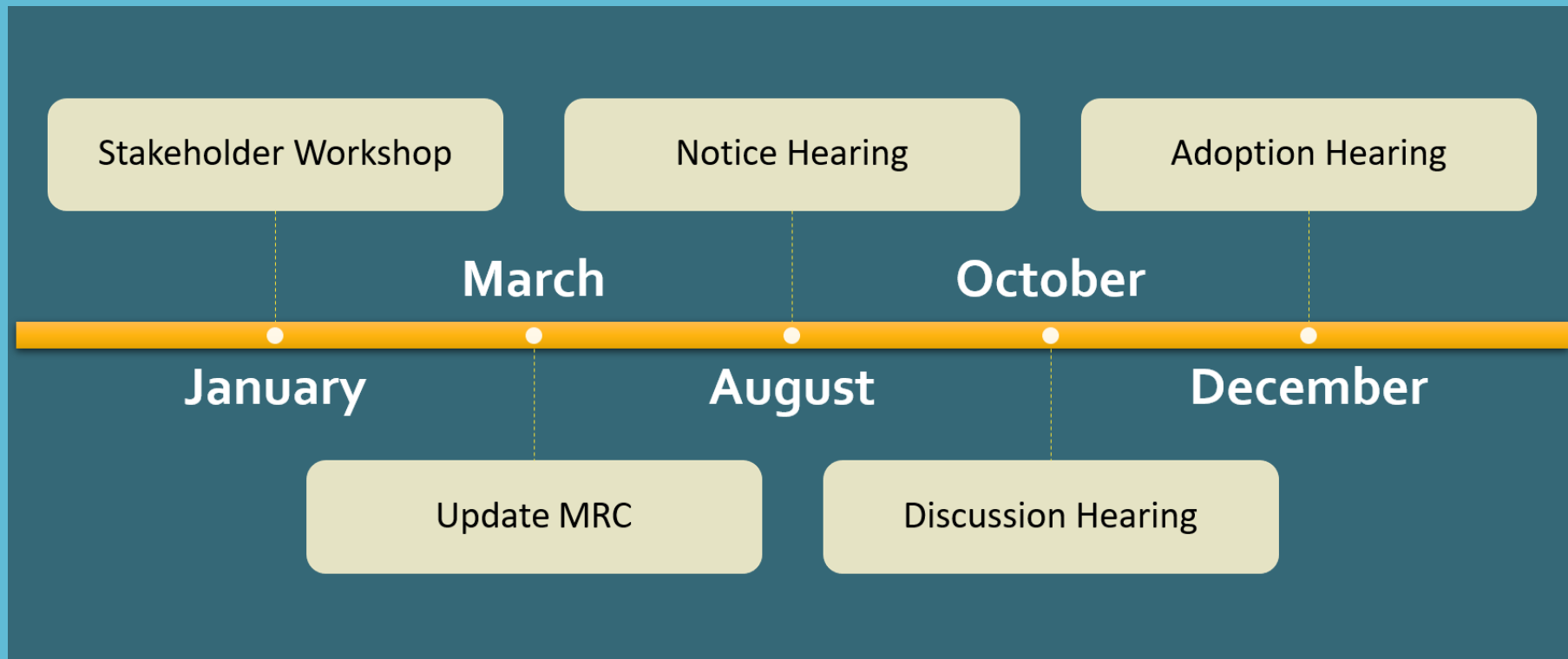


ITEMS FOR CONSIDERATION

- Application and approval cycle
 - Open or bi-annual cycle?
 - FGC 1022 calls for an “expeditious process”
 - Federal EFP process: ~6mo – 1yr
 - Draft state EFP process: ~6-9 mo
 - (may be longer or shorter depending on complexity)
- Cost recovery
 - Permit fee tiering –
 - FGC 1022 allows for a permit fee to “fully recover, but not exceed, all reasonable implementation and administrative costs”

TIMELINE AND NEXT STEPS

Tentative timeline of activities in 2020, with Phase II complete by December 2020 upon final adoption of the regulatory package.





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EXPERIMENTAL FISHING PERMIT PROGRAM PHASE II DEVELOPMENT UPDATE

Marine Resources Committee Meeting
July 29, 2020
Tom Mason
Marine Region
California Department of Fish and Wildlife

OUTLINE

- Proposed Permitting Processes
- Proposed EFP Fee Structure
- EFP Preliminary Cost Estimates
- Next Steps



Photo Credit: D. Stein, CDFW

PROPOSED PERMITTING PROCESSES

- **Changes since April MRC meeting:**
 - Eliminated semi-annual application submittal and approval options
 - Added timeline for Department review
 - Refined EFP fee structure



Photo Credit: D. Stein, CDFW

PROPOSED APPLICATION PROCESS

Pre-Application Consultation

- No additional cost to applicant
- Help reduce permit review time and streamline application processing

Application Submittal & Fee Payment

- Written applications may be submitted (electronically or by mail) to the Department at anytime of the year
- Application fee required

PROPOSED DEPARTMENT REVIEW PROCESS

Completeness Check

- Department provide notification of any deficiencies in the application within **30 days** after receipt of the application fee
- Incomplete applications will be rejected

Technical Review

- **60-day** technical review begins after the application is deemed complete
- Review time may be extended for complex proposals

Department Recommendation

- Application transmitted for Commission consideration with recommendations, including any special conditions

PROPOSED COMMISSION APPROVAL PROCESS

Publication of Notice

- Commission publishes notice of intent to consider the application

Public Comment and Review

- Public may submit written comments on the EFP proposal for Commission consideration

Commission Hearing

- Commission acts to approve or deny application
- If approved, Department will issue the EFP after applicant signs terms and conditions
- Denials cannot be appealed

PROPOSED EFP FEE STRUCTURE

- Recommend tiered permitting

Activity Type and Department Involvement	EFP Tier 1	EFP Tier 2	EFP Tier 3	EFP Tier 4
Conservation engineering, research, or educational	X	X		
Exploratory Fishing			X	X
Self-managed EFP	X		X	
Assisted EFP		X		X

EFP PRELIMINARY COST ESTIMATES

- Estimated Department Staff hrs *

EFP Fee Item	Projected Average	Projected Minimum
Application	3	2
Initial Issuance	25.5	7.5
EFP Tier 1	11	5
EFP Tier 2	25	13
EFP Tier 3	90	42
EFP Tier 4	216	114
Minor Amendment	--	2
Major Amendment	--	4

* Estimated hrs for permit review & annual management for Marine Region & Enforcement staff

EFP PRELIMINARY COST ESTIMATES, CONT.

- EFP Fees by Cost Recovery Level*

EFP Fee Item	Full (hr)	Minimum (hr)
Application	\$230 (3)	\$153 (2)
Initial Issuance	\$1,530 (17.5)	\$764 (7.5)
EFP Tier 1	11 (\$853)	\$393 (5)
EFP Tier 2	25 (\$1,926)	\$1,006 (13)
EFP Tier 3	90 (\$10,437)	\$4,405 (42)
EFP Tier 4	216 (\$20,091)	\$9,922 (114)
Minor Amendment	--	\$211 (2)
Major Amendment	--	\$364 (4)

* Fee estimates based on the most current pay scale information available (updated 5/5/20)

EFP PRELIMINARY COST ESTIMATES, CONT..

- **Cost-sharing mechanisms:**
 - Recommend minimum-hr estimates as a reasonable approach for cost recovery
 - Evaluate opportunities for enhancing collaboration (e.g., cost adjustment for high priority research needs)



Photo Credit: D. Stein, CDFW

NEXT STEPS

- Continue development of EFP Program Phase II while rulemaking schedule is on hold
- Evaluate feasibility of collaborative cost-sharing and setting priority research areas



Photo Credit: D. Stein, CDFW



THANK YOU



QUESTIONS AND COMMENTS

Tom Mason

**Senior Environmental Scientist – Supervisor
California Department of Fish and Wildlife**

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Marine Life Management Act Master Plan: Implementation Work Plan

February 7, 2020

Background

The Marine Life Management Act Master Plan (2018 Master Plan) was adopted by the Fish and Game Commission (FGC) in June 2018. The 2018 Master Plan, which updates the original 2001 Master Plan, provides guidance and a toolbox for implementing the Marine Life Management Act (MLMA) goals and objectives. To help ensure that the 2018 Master Plan is implemented effectively, it specifies the development of an Implementation Work Plan (Work Plan).

Structure and Content

To aid in the successful implementation of the 2018 Master Plan, the Work Plan incorporates the following two characteristics:

1. The Work Plan must clearly capture the range of activities that are required to implement MLMA-based management over the next several years. These include fishery prioritization and scaling components from the 2018 Master Plan as well as routine ongoing activities and new statutory mandates.
2. The Work Plan must be adaptable to reflect change as specific tasks reach completion and others are initiated. In many cases, the results from completed tasks will inform the development of new tasks. For instance, the prioritization and scaling tasks within the MLMA-based management “Framework” will inform the decision (and resulting tasks) regarding which species currently need more focused management.

The Work Plan incorporates these two characteristics through nine key elements. The tasks listed under these elements within the Work Plan table below reflect current or soon-to-be implemented work. Some completed tasks are listed to provide context for current work; other completed tasks are listed in Appendix A. Planned next steps, those that are expected to be addressed at within the next several years, are provided in Appendix B.

Stakeholder engagement and peer review, as described in the 2018 Master Plan, are crucial to the successful implementation of the MLMA across most of the elements listed below. A variety of partners assist the Department with the implementation of these tasks including: members of the fishing industry; commercial and recreational fishing associations; academics; federal, state and local agencies; and non-government organizations.

Plan Updates

This is an update to the Work Plan provided to the FGC at their June 2019 meeting. Verbal updates of the MLMA Master Plan implementation will be provided to the MRC and, as needed or requested, to the FGC Tribal Committee and FGC at their scheduled 2020 meetings.

Work Plan

Time Frame: Completed, Annual, Ongoing, EC (Estimated Completion, Month and Year), In Progress (no estimated completion date), TBD (To Be Determined), or specifically described

I. MLMA Framework - Prioritization

Topic	Tasks	Time Frame
Fisheries Set #1: Key finfish plus Bay Shrimp, CA Spiny Lobster, and Market Squid	Present prioritized list to FGC	Completed - FGC Dec 2019
Fisheries Set #2: Remaining key invertebrate fisheries	Conduct Bycatch ERA and Habitat ERA; conduct Target ERA and combine with PSA; combine Bycatch, Habitat, and PSA + Target results	In progress
Fisheries Set #2	Present prioritized list to FGC	TBD

II. MLMA Framework - Scaling

Topic	Tasks	Time Frame
Prioritized Fisheries (Set #1)	Conduct evaluation (degree of management change needed; fishery complexity) to determine appropriate management scale; as possible, include socioeconomic and climate considerations (See Appendix C)	Completed Feb 2020
Prioritized Fisheries (Set #2)	Conduct evaluation (degree of management change needed; fishery complexity) to determine appropriate management scale; as possible, include socioeconomic and climate considerations	TBD

III. Scaled Fishery Management: Document Development

Topic	Tasks	Time Frame
Enhanced Status Reports (ESRs)	Develop 30 ESRs for 33 species	Completed
ESRs	Develop ESRs for remaining 5 species (see Section IV and V for more information on CA Halibut, Pacific Herring, and Bay Shrimp)	In progress
All ESRs	Update completed ESRs with 2019 landings and catch, research and monitoring results, and regulation changes	Dec 2020
New ESRs	Develop 4 additional ESRs (Spotfin Croaker, Yellowfin Croaker, Yellowtail, and Surf Smelt)	TBD
Fishery Management Plans (FMPs)	Complete Red Abalone FMP	EC Jan 2021
FMPs	Conduct a management strategy integration process for Red Abalone to determine the suite of indicators that provide the best management strategies for reopening a fishery and for managing an open fishery	EC Apr 2020

IV. Scaled Fishery Management: Key Actions for Priority Species without FMP^a

Topic	Tasks	Time Frame
CA Halibut	Develop CA Halibut stock assessment	EC Jun 2020
CA Halibut	Conduct formal peer view of CA Halibut stock assessment	EC Jul 2020
CA Halibut	Conduct outreach meetings	EC Jul 2020
CA Halibut	Complete ESR	EC Dec 2020
CA Halibut	Evaluate bycatch in commercial fishery	TBD
CA Halibut	Explore development of FMP	TBD
CA Halibut	Explore incorporation of Management Strategy Evaluation (MSE) Data Limited Methods toolkit (toolkit) results into management	TBD
Grunion	Develop ESR	EC Apr 2020

Topic	Tasks	Time Frame
Grunion	Develop regulation package for recreational fishery	EC Feb 2021
Kelp (Giant and Bull Kelp)	Develop ESR	EC Apr 2021
Kelp and Marine Algae	Commercial kelp and marine algae regulatory overhaul	Phase II EC Aug 2020
Kelp	Implement a statewide Kelp Management Plan	EC Apr 2022
Kelp	Develop a suite of priority projects (Statewide Kelp Restoration Toolkit) for kelp recovery and restoration	EC Apr 2022
Barred Sand Bass	Develop stock assessment	TBD
Barred Sand Bass	Evaluate immediate management needs	TBD
Barred Sand Bass	Explore incorporation of MSE toolkit results into management	TBD
Kelp Bass	Develop stock assessment	TBD
Kelp Bass	Explore incorporation of MSE toolkit results into management	TBD
Barred Surfperch	Conduct MSE using toolkit	TBD
Barred Surfperch	Identify most accurate ageing techniques using an age validation analysis	EC Dec 2020
Barred Surfperch	Conduct a latitudinal analysis of fecundity and parturition timing	EC Jun 2021
CA Barracuda	Conduct MSE using toolkit	TBD
CA Barracuda	Evaluate bycatch in commercial fishery	TBD
Bay Shrimp	Complete ESR	EC Dec 2020
Bay Shrimp	Evaluate bycatch in commercial fishery	TBD
Pacific Angel Shark	Evaluate bycatch in commercial fishery	TBD
Brown Smoothhound Shark	Monitor stock status as outlined in the ESR	Ongoing

^a Information on how these species fit within Scaled Fishery Management is provided in Appendix D.

V. Scaled Fishery Management: Key Actions for Priority Species with FMP

Topic	Tasks	Time Frame
White Seabass	Complete maturity study	EC Feb 2021
White Seabass	Evaluate bycatch in commercial fishery	TBD
Pacific Herring	Implement FMP	Effective Mar 2020
Pacific Herring	Complete ESR	EC Dec 2020
Pacific Herring	Herring Eggs on Kelp Rulemaking	EC June 2020
CA Sheephead	Evaluate bycatch in commercial fishery	TBD
Market Squid	Reconvene Fishery Advisory Committee	TBD
Market Squid	Evaluate need for short and long-term regulatory changes	TBD

VI. Managing Fisheries

Topic	Tasks	Time Frame
Monitoring/Research	Long-term fishery–dependent and –independent data collection	Ongoing
Monitoring/Research	Collaborative study investigating climate change impacts on the sustainability of CA Spiny Lobster, Market Squid, and Pacific Sardine within the CA Current System	EC 2020
Monitoring/Research	Socioeconomics of recreational fishery including target species choices	TBD
Data Analysis and Stock Assessments	Conduct Management Strategy Evaluation (MSE) through the Data-Limited Methods (DLM) Toolkit on eight state-managed species/species groups (Barred Sand Bass, CA Halibut, Kelp Bass, Redtail Surfperch, CA Spiny Lobster, Red Sea Urchin, Rock Crab [3 species], and Warty Sea Cucumber)	EC Jun 2020

Topic	Tasks	Time Frame
Review Analytical Results and Develop Management Options	White Seabass, Pacific Herring, and CA Spiny Lobster status as determined through process outlined in FMPs	Annual
Review Analytical Results and Develop Management Options	Market Squid status as determined through egg escapement evaluation	Ongoing
Review Analytical Results and Develop Management Options	Cabazon, Greenlings, CA Sheephead, Kellet's Whelk and Sheep Crab landings against TACs	Annual
Review Analytical Results and Develop Management Options	Northern CA Red Abalone status	Ongoing
Review Analytical Results and Develop Management Options	Dungeness Crab meat quality evaluation	Annual
Review Analytical Results and Develop Management Options	Dungeness Crab, Rock Crab, Razor Clam, and CA Spiny Lobster domoic acid level evaluation	Ongoing
Identification of Management Measures and Development of Regulations	Recreational crab trap bycatch of whales and turtles	Proposed adoption Nov 2020
Identification of Management Measures and Development of Regulations	Hydraulic pump use for taking clams	TBD
Identification of Management Measures and Development of Regulations	Purple Urchin emergency rulemaking	Proposed Adoption Feb 2020

VII. Outreach

Topic	Tasks	Time Frame
ESR Accessibility	Upload 30 final ESRs onto Marine Region website until imported into CA Fisheries Portal	EC Feb 2020
CA Fisheries Portal Phase 2	Build website for CA Fisheries Portal and add ESR text	EC July 2020
Marine Region Website	Renovate website	In progress
FGC Updates	Provide regular updates at FGC Marine Resource Committee and Tribal Committee meetings	Ongoing

Topic	Tasks	Time Frame
Partnerships and Stakeholder Engagement	Participate on formal and informal fishery task forces and workgroups	Ongoing
Partnerships and Stakeholder Engagement	Outreach to fishermen through port discussions	Ongoing
Partnerships and Stakeholder Engagement	Build partnerships to support implementation	Ongoing

VIII. Implementing New Programs

Topic	Tasks	Time Frame
California Fisheries Innovation Act of 2018 (AB 1573)	Implement Experimental Fishing Permit Program	EC Dec 2020
SB 1309	Implement Risk Assessment and Mitigation Program (RAMP)	EC Nov 2020
SB 1309	Implement Gear Retrieval Program for Dungeness Crab Traps	Completed Sept 2019
SB 1309	Implement Standardized Gear Marking Program	EC Apr 2020
Experimental Fisheries	Initiate Experimental Box Crab fishery	Started April 2019
Experimental Fisheries	Collect Box Crab catch information	EC for first year Mar 2020
Fisheries Disaster Relief Programs	Implement as required	Ongoing

IX. Improving MLMA Fisheries (Ecological, Social, and Management Systems)

Topic	Tasks	Time Frame
Data Modernization and Review	Review and evaluate logbooks and use of E-logs	In progress
New Data Collection Methods	Evaluate use of electronic monitoring for vessels participating in Box Crab experimental fishing program	EC Mar 2022
New Fishery Management Protocols and Tools	Develop criteria and protocols to evaluate and respond to potential risk of marine life entanglement (SB 1309)	Ongoing
FMP Planning	Lessons learned evaluation for FMP planning	In progress

Topic	Tasks	Time Frame
Restricted Access	Provide information for review of restricted access programs for Market Squid, Pink Shrimp, Spot Prawn, and CA Halibut	EC Dec 2020
Ocean Resources Enhancement	Administer Ocean Resources Enhancement and Hatchery Program (OREHP)	Ongoing
Fisheries Adaptive Capacity	Investigate ways for improving fisheries management responsiveness and fishing communities' resilience to changing ocean conditions	Ongoing
Fisheries Adaptive Capacity	Support development of port profile descriptions and socioeconomic tools	EC Sep 2020

Appendix A: Completed Tasks

A-I. MLMA Framework – Prioritization

Topic	Tasks
Fisheries Set #1: Key finfish plus Bay Shrimp, CA Spiny Lobster, and Market Squid	Bycatch Ecological Risk Assessment (ERA) and Habitat ERA, Target ERA conducted and combined with Productivity & Susceptibility Analysis (PSA); Bycatch, Habitat, and PSA + Target results combined
Fisheries Set #1	Update on production of prioritized list presented to MRC
Fisheries Set #1	ERA + PSA prioritization results presented to stakeholders

A-II. MLMA Framework - Scaling

See II. MLMA Framework – Scaling for current status of tasks.

A-III. Scaled Fishery Management: Document Development

See III. Scaled Fishery Management: Document Development for current status of tasks.

A-IV. Scaled Fishery Management: Key Actions for Priority Species without FMP

See IV. Scaled Fishery Management: Key Actions for Priority Species without FMP for current status of tasks.

A-V. Scaled Fishery Management: Key Actions for Priority Species with FMP

Topic	Tasks
Pacific Herring	FMP completed

A-VI. Managing Fisheries

Topic	Tasks
Monitoring/Research	Collaborative research on habitat use and population monitoring of the Warty Sea Cucumber completed
Identification of Management Measures and Development of Regulations	Regulations for Pacific Hagfish traps permitted on single vessel adopted

A-VII. Outreach

Topic	Tasks
CA Fisheries Portal Phase 1	Design for CA Fisheries Portal developed; includes layout for ESR text

A-VIII. Implementing New Programs

Topic	Tasks
Fisheries Disaster Relief Programs	Program for Dungeness Crab fisheries disaster payout developed

A-IX. Improving MLMA Fisheries (Ecological, Social, and Management Systems)

Topic	Tasks
Data Modernization and Review	Transition from paper commercial landing receipts to electronic receipts
New Data Collection Methods	Evaluation of use of remote operating vehicles for collecting sea cucumber data inside and outside of MPAs
New Fishery Management Protocols and Tools	Scoping regarding types of analyses to support review of CA restricted access programs

Appendix B: Longer-term Tasks

B-I. MLMA Framework – Prioritization

Topic	Tasks
Future Prioritization Process	Develop socioeconomic assessment tool for use in prioritization process as noted in MLMA-based Management Framework
Future Prioritization Process	Develop oceanographic and climate assessment tool to include in the prioritization process

B-II. MLMA Framework – Scaling

No new tasks identified at this time.

B-III. Scaled Fishery Management: Document Development

Topic	Tasks
Update ESRs	Enhance sections of management documents for priority fisheries including socioeconomic and climate
Prioritized Fisheries (Set #2)	Address target species of priority fisheries at appropriate scale identified in Section II

B-IV. Scaled Fishery Management: Key Actions for Priority Species without FMP

Topic	Tasks
Prioritized Target Species (Set #2)	Identify key actions for target species of priority fisheries identified in Section II that are not currently covered under an FMP

B-V. Scaled Fishery Management: Key Actions for Priority Species with FMP

Topic	Tasks
Prioritized Target Species (Set #2)	Identify key actions for target species of priority fisheries identified in Section II that are currently covered under an FMP

B-VI. Managing Fisheries

Topic	Tasks
Monitoring/Research	Conduct research to address the use of marine protected areas in MLMA-based management
Monitoring/Research	Conduct research to address socioeconomic information gaps
Monitoring/Research	Conduct research to address climate-related information gaps
Review Analytical Results and Develop Management Options	Identify management options to address fisheries concerns (e.g., ecological and socioeconomic) highlighted through monitoring/research and assessments
Review Analytical Results and Develop Management Options	Identify management options for addressing risks to fish stocks and fishing communities from climate change

B-VII. Outreach

Topic	Tasks
CA Fisheries Portal Phase 3	Implement enhancements for CA Fisheries Portal

B-VIII. Implementing New Programs

Topic	Tasks
New Mandated Programs	Implement any new marine fisheries programs as mandated through new legislation

Topic	Tasks
Experimental Fisheries	Identify emerging fisheries that might benefit from inclusion in an experimental gear program

B-IX. Improving MLMA Fisheries (Ecological, Social, and Management Systems)

Topic	Tasks
Data Modernization and Review	Develop and implement public fisheries data query tool for the Marine Landings Data System
Data Modernization and Review	Centralize fisheries independent data sets
New Fishery Management Protocols and Tools	Test methods for reducing bycatch
Fisheries Adaptive Capacity	Identify management approaches that increase adaptive capacity for responding to climate change

Appendix C: Fisheries Prioritization Set #1

Commercial Fisheries

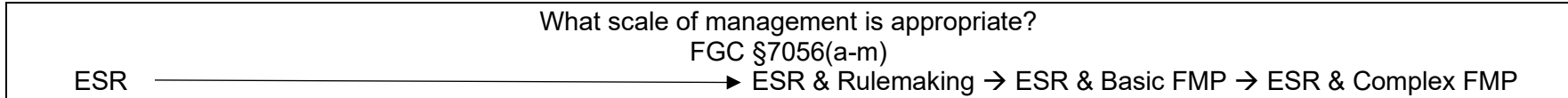
Species	Gear	Total	PSA Rank	Bycatch Rank	Habitat Rank
Pacific Angel Shark	Gill Net	4	1	1	2
CA Halibut	Trawl	5	2	2	1
CA Halibut	Gill Net	5	2	1	2
White Seabass	Gill Net	6	3	1	2
CA Bay Shrimp	Trawl	7	3	3	1
Spiny Lobster	Trap	7	2	3	2
Pacific Herring	Gill Net	8	3	3	2
CA Sheephead	Trap	8	2	4	2
CA Barracuda	Gill Net	10	3	2	5
Pacific Hagfish	Trap	11	4	4	3
Shiner Perch	Trap	11	4	4	3
Market Squid	Purse Seine	11	4	3	4
CA Halibut	Hook-and-Line	12	3	4	5
Pacific Bonito	Purse Seine	13	4	4	5
Redtail Surfperch	Hook-and-Line	13	4	4	5
Night Smelt	A Frame	13	4	4	5
Jacksmelt	Hook-and-Line	13	4	4	5

Recreational Fisheries

Species	Gear	Total	PSA Rank	Bycatch Rank	Habitat Rank
Brown Smoothhound	Hook-and-Line	9	1	4	4
CA Sheephead	Hook-and-Line	9	2	4	3
Kelp Bass	Hook-and-Line	9	2	4	3
Ocean Whitefish	Hook-and-Line	9	2	4	3
Spiny Lobster	Hoop Net	9	3	4	2
Spotted Sand Bass	Hook-and-Line	10	2	4	4
Barred Sand Bass	Hook-and-Line	10	2	4	4
CA Halibut	Hook-and-Line	11	3	4	4
Barred Surfperch	Hook-and-Line	11	3	4	4
White Seabass	Hook-and-Line	12	4	4	4
CA Barracuda	Hook-and-Line	12	3	4	5
CA Corbina	Hook-and-Line	12	4	4	4
White Croaker	Hook-and-Line	12	4	4	4
Pacific Bonito	Hook-and-Line	13	4	4	5

Appendix D: Scaled Fishery Management

Scaled Fishery Management along a continuum from Enhanced Status report (ESR) to a complex Fishery Management Plan (FMP)
[Adapted from the 2018 MLMA Master Plan, Figure 2]



ESR	ESR & Data/Scoping	ESR & Rulemaking	ESR & Basic/Complex FMP
Spotfin Croaker*	Barred Sand Bass	Grunion**	California Halibut
Yellowfin Croaker*	Kelp Bass	Kelp**	Red Abalone***
Yellowtail*	Barred Surfperch		
Surf smelt*	California Barracuda		
	Bay Shrimp		
	Pacific Angel Shark		
	Brown Smoothhound Shark		

* Species not included in prioritization process, but identified as needing ESR

** Species not included in prioritization process, but identified as needing ESR and rulemaking in accordance with criteria listed in the MLMA Master Plan, Chapter 2, regarding emerging issues

*** FMP currently being developed



Marine Species Portal Home Page

- <https://marinespecies.wildlife.ca.gov>

The screenshot shows the Marine Species Portal website. At the top, there is a navigation bar with the CA.GOV logo, a home icon, and links for Translate and Settings. Below this is a secondary navigation bar with icons for Portal Home, Overview, and Resources. The main heading is "Marine Species Portal". A paragraph below the heading states: "The California Fisheries Portal provides searchable access to **Enhanced Status Reports (ESRs)** for state-managed fisheries. The Portal may be expanded to include other types of fisheries information and data in the future." On the left side, there is a search bar and three filter sections: "Category" with checkboxes for "Finfish" and "Invertebrate"; "Fishery" with checkboxes for "Commercial" and "Recreational"; and "Region" with checkboxes for "North Coast", "Central Coast", and "South Coast". Below the filters is a "Gear Type" section with checkboxes for "Gill Net", "Hand", and "Hand Tool". The main content area displays six species cards, each with an illustration, a title, a scientific name, and a list of other common names. The species shown are: Barred Sand Bass (*Paralabrax nebulifer*), Barred Surfperch and Redtail Surfperch (*Amphistichus argenteus* and *Amphistichus rhodoterus*), Brown Smoothhound Shark (*Mustelus henlei*), California Corbina (*Menticirrhus undulatus*), California Sheephead (*Semicossyphus pulcher*), and California Spiny Lobster (*Panulirus interruptus*).

Update on California Grunion
MRC Meeting July 29, 2020

- A petition was submitted by Dr. Karen Martin to the California Fish and Game Commission (Commission) in June 2019 proposing to establish a bag limit and increase the seasonal closure regulations for California Grunion (Tracking number: 2019-14).
- The California Department of Fish and Wildlife (Department) reviewed the petition and agreed that a change in regulations may be needed due to observed declines of Grunion spawning on beaches over the past decade. In February 2020, the Commission granted the petition in concept for consideration in a future rulemaking and the Department was asked to develop a regulatory package for the Commission's consideration.
- At the February 2020 Commission meeting, the Department proposed to prepare an Enhanced Status Report (ESR) on California Grunion as outlined in the 2018 Master Plan for Fisheries scaled-management framework to help address the petition.
- The Department completed an ESR for Grunion in May 2020. The ESR presents available information on the species, fishery, current management, and monitoring efforts. The Department agrees the existing management measures for the Grunion fishery may need to be adjusted to address declines in the population and habitat loss concerns. The Department will provide specific possible regulatory amendments to the Marine Resources Committee in November 2020.
- In June 2020, the Department received the most recently collected data on Grunion abundance from Dr. Karen Martin, who is the executive director of the Grunion Greeters, a citizen-science organization. Numbers of Grunion spawning on beaches remains low based on the qualitative data collected.
- In June 2020, letters were sent to 95 representatives of California Native American Tribes notifying them about potential regulation changes for California Grunion harvest and requested their input.
- Further outreach is being conducted by the Department. A questionnaire regarding the California Grunion fishery was developed in July 2020 and is available for the public on the Department website at (<https://wildlife.ca.gov/fishing/ocean/grunion>).

From: [REDACTED]
Sent: Sunday, July 12, 2020 08:48 PM
To: FGC <FGC@fgc.ca.gov>
Subject: Public Comment - California Grunion Fishery Regulations (July 29 Agenda #5)

Warning: This email originated from outside of CDFW and should be treated with extra caution.

Dear commissioners,

As a resident of California, I support extending the closed season and setting a bag limit for California grunion as requested in Petition #2019-014. The likelihood that recreational fishing is causing the population to decline is alarming, and I am concerned about the suffering necessarily caused to grunion by being harassed and killed during the run. I look forward to "observing and conserving" some future grunion runs in the Los Angeles area!

Best,

Silvio Curtis

Ocean Protection Council (OPC) Agency Update **Received from OPC staff on July 16, 2020**

Marine Aquaculture Update

CDFW, OPC and FGC staff are continuing to coordinate on marine aquaculture following the FGC's receipt of the Aquaculture Information Report at the FGC's June 24th meeting. OPC will convene state agency leadership including but not limited to leaders from CDFW, FGC, California Coastal Commission, State Water Resources Control Board, California Department of Public Health, and California Department of Food and Agriculture between July and September 2020 to develop Aquaculture Principles for aligned state agency principles on marine aquaculture. These Aquaculture Principles will inform the more comprehensive statewide Aquaculture Action Plan, which will be recommended for funding by the OPC and developed in alignment with Target 4.2.1 of OPC's [Strategic Plan](#): "With the California Department of Fish and Wildlife and others, develop a statewide aquaculture action plan focused on marine algae and shellfish and land-based/recirculating tank operations of marine algae, shellfish, and finfish by 2023. The plan should identify areas of opportunity and avoidance to minimize impacts to habitat, biodiversity, and wild fisheries and should include minimum project criteria, including best practices for eliminating detrimental environmental impacts."

OPC June 19th Public Meeting Update

[OPC's public meeting on June 19th](#) included approved funding for various projects that advance OPC's [Strategic Plan](#) goals.

Statewide Kelp Recovery Research Program: Of particular note in connection with FGC priorities, OPC approved the disbursement of \$600,000 to California Sea Grant to create a [statewide kelp recovery research program](#). Together with \$1,200,000 in match funding from California Sea Grant, OPC funding will support solutions-oriented research projects aimed at restoring and protecting kelp ecosystems statewide, selected via a competitive call. A summary of the six individual projects recommended for approval as part of the Kelp Recovery Research Program is available [here](#).

Reducing the Risk of Entanglement in Fishing Gear and Gear Innovation Testing:

OPC also approved a total of \$2,900,000 across four projects that support [reducing the risk of whale and sea turtle entanglement in fishing gear](#). One project will initiate a competitive grant program, administered by Pacific States Marine Fisheries Commission in close partnership with OPC, to implement scientific research projects and collaborative partnerships that directly support OPC's [Strategy](#) for reducing the risk of entanglement. This project would aim to initiate the competitive process in fall 2020 and aim to support individual projects after selection in spring 2021. Individual projects could be supported until around January 2024 (allowing for projects of up to ~2.5 years). The second project will provide up to \$500,000 to the National Marine Sanctuary Foundation to support both pop-up and non-pop-up [gear innovations testing](#) within the Dungeness crab fishery during the 2020-2021 fishing season. The scientific project design will be refined before the start of the fishing season, with input solicited from the Dungeness Crab Fishing Gear Working Group.

COMMITTEE STAFF SUMMARY FOR NOVEMBER 5, 2019 MRC

For background purposes only

10. COASTAL FISHING COMMUNITIES PROJECT

Today's Item

Information

Action

Receive staff update on FGC's Coastal Fishing Communities Project, potentially recommend adopting the draft final staff synthesis report as final, and discuss next steps.

Summary of Previous/Future Actions

- | | |
|---|-------------------------------------|
| • FGC referred topic to MRC | Feb 11, 2015; Sacramento |
| • MRC discussions, planning, and public meetings | 2015 – 2017; various |
| • MRC received and discussed staff report | Jul 17, 2018; MRC, San Clemente |
| • Most recent MRC update | Jul 11, 2019; MRC, San Clemente |
| • Today's update and adoption of report and definition | Nov 5, 2019; MRC, Sacramento |

Background

An MRC project under FGC direction, the Coastal Fishing Communities Project has been underway since 2015. FGC staff held a series of eight stakeholder conversations (2016-2018) in coastal communities across the state, which were designed to inform MRC on the issues facing coastal fishing communities (visit <https://fgc.ca.gov/Committees/Marine/Coastal-Fishing-Communities-Project> for details.).

FGC staff synthesized input from the community meetings into key themes and provided its *Staff Report on California Coastal Fishing Communities* to MRC in Jul 2018. Following a public comment period and additional discussion with MRC in Nov 2018, FGC approved an MRC recommendation for staff to incorporate stakeholder comments into a revised staff report. Exhibits 1-3 provide additional background information on the project.

In Jul 2019, FGC staff submitted a revised staff report to MRC (Exhibit 4). After in-meeting discussion, MRC requested staff to (1) post the final revised synthesis report online to allow for stakeholder review; and (2) work with stakeholders to develop a working draft definition for the term "coastal fishing community" for use within the project. The draft final revised report was posted to the FGC website and no additional comments have been received.

For the coastal fishing community definition, staff scheduled a work session with interested stakeholders on Oct 18 to develop a draft definition. Over a dozen stakeholders participated and worked together to develop a draft "coastal fishing community" definition.

Today, staff will present an overview of the Oct 18 work session, the draft coastal fishing community definition developed during the work session, and proposed revisions to the draft definition submitted by a sub-group of stakeholders for MRC discussion and possible recommendation (Exhibit 5). Staff will also highlight additional updates and possible next steps.

COMMITTEE STAFF SUMMARY FOR NOVEMBER 5, 2019 MRC*For background purposes only***Significant Public Comments**

1. A sub-group of five work session participants representing harbor and commercial fishing interests (Mike Conroy, Peter Flournoy, Steve Scheiblaue, Diane Pleschner-Steele and Bob Bertelli) proposed a revised version of the draft definition developed during the work session, and include rationale for the proposed changes (in Exhibit 5).
2. The Congressional Sportsmen's Foundation expressed opposition to the term "harvesters" as a defining term for "coastal fishing community" as it may exclude some recreational anglers (Exhibit 6).
3. Representatives of Heal the Bay, Ocean Conservancy, American Sportfishing Association, and a harbor representative sent emails to FGC staff expressing support for the definition developed in the work session and expressing concerns that the revised version submitted by a sub-group (in Exhibit 5) was overly exclusionary.
4. Seven people, including fishermen and representatives of organizations advocating for fishermen, sent emails to FGC staff in support of the revised definition submitted by a sub-group on Oct 23, 2019 (in Exhibit 5).

Recommendation

- (A) Recommend FGC adopt the *Staff Synthesis Report on California Coastal Fishing Communities Meetings* (Jul 2019) as complete and final.
- (B) Discuss draft definition(s) of coastal fishing community and make a recommendation to FGC regarding possible adoption.
- (C) Discuss prioritizing the recommendations outlined in the final staff report and provide input on where to focus staff efforts as a more in-depth analysis and reporting ensues with stakeholders and other partners.

Exhibits

1. Staff summary from Nov 4, 2015 MRC meeting (for background purposes only)
2. Staff summary from Nov 11, 2018 MRC meeting (for background purposes only)
3. Staff summary from Jul 11, 2019 MRC meeting (for background purposes only)
4. Draft final staff synthesis report on 2017-2018 California coastal community meetings, Jul 2019 (available at: <http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=174088&inline>)
5. Draft definition of "coastal fishing community" from a stakeholder work session held Oct 18, 2019, and proposed edits submitted by a stakeholder sub-group on Oct 23, 2019 and a revised version submitted on Oct 28, 2019
6. Email and attached letter from Aoibheann Cline, Western States Coordinator, Congressional Sportsmen's Foundation, received Oct 23, 2019

Committee Direction/Recommendation

Develop a committee recommendation based on the staff recommendations and discussion during the meeting.

California Fish and Game Commission
Marine Resources Committee (MRC) Work Plan
Scheduled Topics and Timeline for Items Referred to MRC
Updated July 22, 2020

Topic	Category	MAR/APR ^a 2020	JUL 2020	NOV 2020
Planning Documents & Fishery Management Plans (FMPs)				
MLMA Master Plan for Fisheries - Implementation Updates	Master Plan Implementation	X	X	X
Red Abalone FMP / ARMP Update	FMP	X/R	X/R	X
Aquaculture Program Planning (Information Report, Action Plan)	Aquaculture	X/R		X
Regulations				
Aquaculture Lease Best Management Practices (BMP) Plan Requirements (HOLD, TBD)	Aquaculture			
Experimental Fishing Permit Program, Phase II	Fisheries	X	X/R	
Kelp and Algae Commercial Harvest	Kelp	X/R		X/R
Update on and possible review of California Spiny Lobster FMP implementing regulations (added Feb 2019; timing TBD)	FMP			-
California Grunion Recreational Fishing Regulations	Fisheries		X	X/R
Emerging/Developing Management Issues				
Aquaculture State Water Bottom Leases: Existing & Future Lease Considerations	Aquaculture			
Moratorium on New Aquaculture Lease Applications	Aquaculture	X/R		X/R
Kelp Restoration and Recovery Tracking	Kelp			X
Recreational Swordfish Fishing Regulations	Fisheries	X		X/R
Maintenance of Preexisting Structures Within Marine Protected Areas (MPAs)	MPAs		X	X/R
Special Projects or Informational/External Topics of Interest				
California's Coastal Fishing Communities	MRC Special Project		X	X
Recovery of Cowcod Stock Status (South of Cape Mendocino)	Fishery Management	X		X

KEY: **X** Discussion scheduled **X/R** Recommendation developed and moved to FGC **a** The March 17 MRC meeting was continued to April 29 to hear items not completed; all items are identified in this column regardless of which day heard.

California Fish and Game Commission: Perpetual Timetable for Anticipated Regulatory Actions
 Updated June 26, 2020

Regulatory Change Category	Title 14 Section(s)	MRC Webinar/Teleconference Jul 29, 2020	TC Webinar/Teleconference Aug 18, 2020	FGC Webinar/Teleconference Aug 19, 2020	FGC Webinar/Teleconference Aug 20, 2020	WRC Webinar/Teleconference Sep 17, 2020	FGC Webinar/Teleconference Oct 14, 2020	FGC Webinar/Teleconference Oct 15, 2020	TC Webinar/Teleconference Nov 9, 2020	MRC Webinar/Teleconference Nov 10, 2020	FGC Webinar/Teleconference Dec 9, 2020	FGC Webinar/Teleconference Dec 10, 2020	WRC TBD Jan 2021	TC TBD Jan 2021	FGC TBD Feb 2021	FGC TBD Feb 2021	MRC TBD Mar 2021	FGC TBD Apr 2021	FGC TBD Apr 2021	FGC TBD May 2021	WRC TBD May 2021	TC TBD Jun 2021	FGC TBD Jun 2021	FGC TBD Jun 2021
Central Valley Sport Fishing (Annual)	2.35, 7.00, 7.50(b)(5), (68), (124), (156.5)	E 7/16									N				D				A					
Klamath River Basin Sport Fishing (Annual) ²	5.87(f), 7.50(b)(91.1)		E 8/15								N				D				A					
Recreational Purple Sea Urchin emergency regulations (180 days)	29.06					EE 9/16																		
Recreational Purple Sea Urchin emergency regulations (90 days ext.)	29.06			EM 90 Day X		NLT 9/16					EE 12/XX													
Commercial Pacific Herring Eggs on Kelp (Fishery Management Plan Implementation)	163, 164						E 10/1																	
Groundfish	27.30, 27.35, 27.40, 27.45, 27.50, 28.27, 28.28, 28.54, 28.55, 28.65, 150.16			D			A						E 1/1											
Simplification of Statewide Inland Fishing Regulations ³	3.00, 4.00, 5.00, 5.41, 5.84, 5.86, 5.89, 7.00, 7.40, 7.50, 8.10				D			A									E 3/1							
Recreational Dungeness Crab Marine Life Protection Measures	29.80, 29.85 701			N			D				A						E 3/1							
Recreational Take of Red Abalone	29.15			N			D				A						E 3/1							

Rulemaking Schedule to be Determined	Title 14 Section(s)	MRC San Clemente Jul 29, 2020	TC Fortuna Aug 18, 2020	FGC Fortuna Aug 19, 2020	FGC Fortuna Aug 20, 2020	WRC Sacramento Sep 17, 2020	FGC Oakland Oct 14, 2020	FGC Oakland Oct 15, 2020	TC Monterey Area Nov 9, 2020	MRC Monterey Area Nov 10, 2020	FGC San Diego Dec 9, 2020	FGC San Diego Dec 10, 2020	WRC TBD Jan 2021	TC TBD Jan 2021	FGC TBD Feb 2021	FGC TBD Feb 2021	MRC TBD Mar 2021	FGC TBD Apr 2021	FGC TBD Apr 2021	FGC TBD May 2021	WRC TBD May 2021	TC TBD Jun 2021	FGC TBD Jun 2021	FGC TBD Jun 2021
Mammal Hunting	TBD																							
Waterfowl (Annual)	502																							
Commercial Kelp and Algae Harvest Management	165, 165.5, 705																							
Santa Cruz Harbor Salmon Fishing (FGC Petition #2016-018)	TBD																							
European Green Crab (FGC Petition #2017-006)	TBD																							
Wildlife Areas/Public Lands ⁴	TBD																							
Experimental Fishing Permit (EFP) Program (Phase II)	TBD																							
Possess Game / Process Into Food	TBD																							
American Zoological Association / Zoo and Aquarium Association	671.1																							
Night Hunting in Gray Wolf Range (FGC Petition #2015-010)	474																							
Shellfish Aquaculture Best Management Practices	TBD																							
Ban of Neonicotinoid Pesticides on Department Lands (FGC Petition #2017-008)	TBD																							
Commercial Pink Shrimp Trawl	120, 120.1, 120.2																							
Ridgeback Prawn Incidental Take Allowance	120(e)																							

KEY
 FGC = California Fish and Game Commission MRC = FGC Marine Resources Committee WRC = FGC Wildlife Resources Committee TC = FGC Tribal Committee
 EM = Emergency EE = Emergency Expires E = Anticipated Effective Date (RED "X" = expedited OAL review)
 N = Notice Hearing D = Discussion Hearing A = Adoption Hearing
 V = Vetting R = Committee Recommendation
 1 = FGC Petition #2018-005 2 = Includes FGC Petition 2019-020 3 = Includes FGC Petition #2018-008 4 = Includes FGC Petition #2018-003