Fish and Game Commission

Meeting Binder

March 6, 2018

Marine Resources Committee

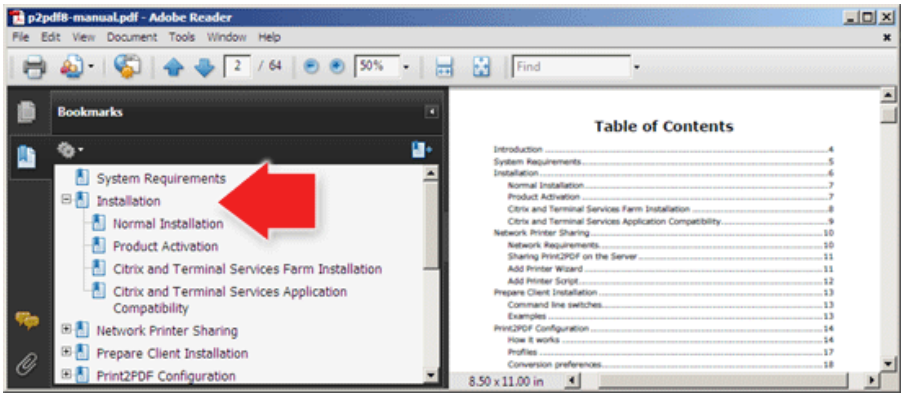
Santa Rosa

EASY GUIDE TO USING THE BINDER

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

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

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



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

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

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

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

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

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

INTRODUCTIONS FOR FISH AND GAME COMMISSION MARINE RESOURCES COMMITTEE

FISH AND GAME COMMISSIONERS

Eric Sklar	Co-Chair (Saint Helena)
Peter Silva	Co-Chair (Jamul)

COMMISSION STAFF

Valerie Termini	Executive Director
Susan Ashcraft	Marine Advisor
Rick Pimentel	Analyst

DEPARTMENT OF FISH AND WILDLIFE

Bob Puccinelli	Captain, Law Enforcement Division
Craig Shuman	Regional Manager, Marine Region
Randy Lovell	Statewide Aquaculture Coordinator
Sonke Mastrup	Program Manager for Invertebrate Fisheries, Marine Region
Kirsten Ramey	Senior Environmental Scientist, Supervisor, Marine Region
Cynthia Catton	Environmental Scientist, Marine Region
Rebecca Flores-Miller	Environmental Scientist, Marine Region

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

STATE OF CALIFORNIA
Edmund G. Brown Jr., Governor

Fish and Game Commission

Wildlife Heritage and Conservation
Since 1870

Valerie Termini, Executive Director
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MARINE RESOURCES COMMITTEE

Committee Co-Chairs: Commissioner Sklar and Commissioner Silva

REVISED* Meeting Agenda
March 6, 2018, 8:30 a.m.

Justice A. Rattigan State Building, Conference Room 410
50 D Street, Fourth Floor, Santa Rosa 95404

This meeting may be audio-recorded

* The meeting start time has been moved to 8:30 a.m. from the originally-noticed time. Item 4 of this agenda was previously revised.

NOTE: Please see important meeting procedures and information at the end of the agenda. 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. Public forum for items not on the agenda
   The Committee may not discuss or take action on any matter raised during this item, except to consider whether to recommend that the matter be added to the agenda of a future meeting. [Sections 11125, 11125.7(a), Government Code]

3. Staff and agency updates

   (A) California Ocean Protection Council
      I. Update on draft California Ocean Litter Prevention Strategy, implementation priorities, and action items
   (B) California Department of Fish and Wildlife
   (C) Other

4. Department presentation of proposed collaborative strategy for purple sea urchin removal to support kelp recovery, and possible recommendation.

5. Update on kelp and algae harvest management review

6. Identify and discuss initial recommendations for 2019-20 sport fishing regulations

7. Update on Pacific Herring Fishery Management Plan development

8. Aquaculture conducted on state water bottom leases issued by the Commission

    (A) Overview of current leases
    (B) Current management efforts
    (C) Future planning

9. Staff update on California coastal fishing communities project

10. Future Committee agenda topics

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

Adjourn

CALIFORNIA FISH AND GAME COMMISSION
2018 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	Other Meetings
March 15	Teleconference ***CANCELED***		
April 12	Teleconference — Arcata, Napa, Sacramento, Los Alamitos and San Diego		
April 18-19	Four Points by Sheraton Ventura Harbor Resort 1050 Schooner Drive Ventura, CA 93001		
May 17		**Wildlife Resources** WestEd Building- Edwin C. Myers Classroom 4665 Lampson Ave. Los Alamitos, CA 90720	
June 19		**Tribal** Resources Building Auditorium, First Floor 1416 Ninth Street Sacramento, CA 95814	
June 20-21	Resources Building Auditorium, First Floor 1416 Ninth Street Sacramento, CA 95814		
July 17		**Marine Resources** California Department of Parks and Recreation Orange Coast District Office Training Room 3030 Avenida del Presidente San Clemente, CA 92672	
August 22-23	River Lodge Conference Center 1800 Riverwalk Drive Fortuna, CA 95540		
September 20		**Wildlife Resources** Resources Building Auditorium, First Floor 1416 Ninth Street Sacramento, CA 95814	
October 16		**Tribal** Radisson Fresno Conference Center 1055 Van Ness Avenue Fresno, CA 93721	

Meeting Date	Commission Meeting	Committee Meeting	Other Meetings
October 17-18	Radisson Fresno Conference Center 1055 Van Ness Avenue Fresno, CA 93721		
November 14		**Marine Resources** Resources Building Auditorium, First Floor 1416 Ninth Street Sacramento, CA 95814	
December 12-13	QLN Conference Center 1938 Avenida del Oro Oceanside, CA 92056		

OTHER 2018 MEETINGS OF INTEREST

Association of Fish and Wildlife Agencies

- September 9-12, Tampa, FL

Pacific Fishery Management Council

- March 8-14, Rohnert Park, CA
- April 5-11, Portland, OR
- June 6-14, Spokane, WA
- September 5-12, Seattle, WA
- November 1-8, San Diego, CA

Pacific Flyway Council

- March 27, Norfolk, VA
- September, TBD

Western Association of Fish and Wildlife Agencies

- July 12-17, Eugene, OR

Wildlife Conservation Board

- March 22, Sacramento, CA (special meeting)
- May 24, Sacramento, CA
- August 30, Sacramento, CA
- November 15, Sacramento, CA

IMPORTANT COMMITTEE MEETING PROCEDURES INFORMATION

Welcome to a meeting of the California Fish and Game Commission's Wildlife Resources Committee. The Committee is 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**; deliver** to California Fish and Game Commission, 1416 Ninth Street, Room 1320, Sacramento, CA 95814**;** or **hand-deliver to a Committee meeting.**

COMMENT DEADLINES:
The **Written Comment Deadline** for this meeting is **5:00 p.m. on February 21, 2018.** Written comments received at the Commission office by this deadline will be made available to Commissioners prior to the meeting.

The **Late Comment Deadline** for this meeting is **noon on March 1, 2018**. Comments received by this deadline will be marked "late" and made available to Commissioners at the meeting.

After these deadlines, written comments may be delivered in person to the meeting – please bring five (5) copies of written comments to the meeting.

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

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

REGULATION CHANGE PETITIONS
As a general rule, requests for regulatory change 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.

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

1. Raise your hand and wait to be recognized by the Committee co-chair(s).
2. Once recognized, please begin by giving your name and affiliation (if any) and the number of people you represent.
3. Time is limited; please keep your comments concise so that everyone has an opportunity to speak.
4. If there are several speakers with the same concerns, please try to appoint a spokesperson and avoid repetitive comments.
5. If you would like to present handouts or written materials to the Committee, please provide five copies to the designated staff member just prior to speaking.
6. If speaking during public forum, the subject matter you present should not be related to any item on the current agenda (public comment on agenda items will be taken at the time the Committee members discuss that item). As a general rule, public forum 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 **Late Comment Deadline** and approved by the Commission executive director before the meeting.

1. Electronic presentations must be provided by email or delivered to the Commission on a USB flash drive by the deadline.
2. All electronic formats must be Windows PC compatible.
3. It is recommended that a print copy of any electronic presentation be submitted in case of technical difficulties.
4. A data projector, laptop and presentation mouse will be available.

LASER POINTERS may only be used by a speaker during a presentation.

COMMITTEE STAFF SUMMARY FOR MARCH 6, 2018

2. PUBLIC FORUM

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

Receive public comments for items not on the agenda.

Summary of Previous/Future Actions (N/A)

Background

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

Significant Public Comments (N/A)

Recommendation

If the Committee wants to recommend any new future agenda items based on issues raised and within FGC's authority, staff recommends holding for discussion under today's Agenda Item 10, *Future Committee agenda topics*.

Exhibits (N/A)

Committee Direction/Recommendation (N/A)

COMMITTEE STAFF SUMMARY FOR MARCH 6, 2018

3. STAFF AND AGENCY UPDATES

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

Receive updates from agency staff, including California Ocean Protection Council (OPC) and DFW

Summary of Previous/Future Actions

(A)

- Received update on draft OPC ocean litter strategy Nov 17, 2017; MRC, Marina
- Today's update on revised draft strategy Mar 6, 2018; MRC, Santa Rosa

(B) N/A

Background

This is a standing item for DFW and other government agencies to provide an update on marine-related activities of interest. FGC staff may also provide an update.

(A) *OPC*: At the Nov 2017 MRC meeting, OPC staff gave a presentation (Exhibit 1) on progress in updating the OPC *2008 Implementation Strategy to Reduce and Prevent Ocean Litter*. The purpose of an update to the 2008 strategy, being prepared in partnership with the National Oceanic and Atmospheric Administration Marine Debris Program, is to identify priorities to address ocean litter and to coordinate the activities of a broad range of stakeholders to effectively reduce ocean litter. A revised draft version of the *California Ocean Litter Prevention Strategy: Addressing Marine Debris from Source to Sea* was released for a public review period from Jan 22 to Feb 23, 2018 (exhibits 2 and 3).

OPC staff has asked to clarify if FGC would like to be identified as lead or partner on implementing two actions in the document related to (1) aquaculture debris, specifically development of best management practices (BMP) and a BMP rulemaking, a DFW/FGC project currently underway; and (2) helping plan for collaborative clean-up of legacy aquaculture debris.

For this meeting, OPC staff has provided an update on progress and the timeline for OPC approval of the 2018 strategy, scheduled for OPC approval in Apr 2018, which will be received at the meeting.

(B) DFW

I. Marine Region: Dr. Craig Shuman, regional manager, will provide an update.
II. Law Enforcement Division: Captain Bob Puccinelli will provide a marine enforcement update.

(C) *Other*: This is a placeholder for possible additional agency and FGC staff updates.

Significant Public Comments

An industry consultant forwarded comments he submitted to OPC on the draft strategy, highlighting that estimates of the percent of marine debris coming from commercial fishing gear and aquaculture gear are lumped together, based on nationwide estimates. He recommends that the two sources be partitioned as the two sources of ocean litter are orders of magnitude apart, and West Coast-specific estimates be identified.

Recommendation

(A) Confirm FGC staff role in action items identified in the revised draft 2018 strategy related to aquaculture BMPs and a BMPs rulemaking, and recommend FGC staff's role in planning for collaborative clean-up of legacy aquaculture debris.
(B) N/A

Exhibits

A.1 Presentation from OPC staff to MRC on Nov 9, 2017
A.2 Overview of revised draft ocean litter strategy on OPC website, extracted Feb 22, 2018
A.3 OPC's revised draft *California Ocean Litter Prevention Strategy*, dated Jan 22, 2018

Committee Direction/Recommendation

The Marine Resources Committee recommends that, within the Ocean Protection Council revised draft ocean litter strategy, the Commission _____[*be/not be*] identified as a co-lead in developing aquaculture best management practices and a best management practices rulemaking, and _____[*be/not be*] identified as a partner in planning for collaborative clean-up of legacy aquaculture debris.

COMMITTEE STAFF SUMMARY FOR MARCH 6, 2018

4. PURPLE SEA URCHIN

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

Receive DFW-proposed collaborative strategy for purple sea urchin removal to support kelp recovery.

Summary of Previous/Future Actions

- **Today's discussion** **Mar 6, 2018; MRC, Santa Rosa**
- Receive/adopt proposed emergency regulation Apr 18-19, 2018; Ventura

Background

Since 2015, FGC and MRC have been tracking a combination of environmental and biological stressors in northern California, including extreme warm water, an unprecedented increase in herbivorous purple sea urchin populations, and loss of bull kelp and other algal food sources, resulting in severe declines in abalone densities and fitness of both abalone and urchin due to scarce food sources. DFW has identified that the large number of purple urchins is likely keeping kelp recovery confined to very limited areas, thus preventing widespread kelp recovery, exacerbating starvation of herbivores, and impacting both the abalone recreational fishery and commercial red urchin fishery.

In Dec 2017, FGC received a petition for regulation change (Petition #2017-014, available at http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=151921&inline, page 2) to remove the take restrictions on recreational purple urchin harvest, with a goal of supporting possible restoration of naturally occurring kelp along the environmentally impacted areas. In Feb 2018, FGC granted this petition *in part* for consideration, and approved DFW's request to bring a draft proposal to FGC in Apr 2018 for possible emergency rulemaking.

Today, DFW will present an overview of its efforts to explore various approaches to support kelp restoration, and building of a broad coalition of partners (e.g., researchers, commercial urchin divers). DFW will present its recommended proposal to temporarily increase the recreational harvest allowance for purple sea urchins, and to facilitate and mobilize citizen science through recreational harvest as part of a multi-pronged and coordinated approach toward kelp recovery on the north coast. At this meeting, MRC will solicit stakeholder input on the proposed changes in DFW's recommendation for possible recommendation prior to FGC's scheduled emergency action in Apr.

Significant Public Comments (N/A)

Recommendation

***FGC staff*:** Solicit stakeholder input, and provide a recommendation on the DFW proposal to temporarily increase recreational harvest of purple sea urchin, scheduled for emergency action in Apr.

***DFW*:** Amend recreational sea urchin regulations as proposed.

Exhibits (N/A)

Committee Direction/Recommendation

The Marine Resources Committee recommends that the Commission support the proposed regulation change to temporarily increase recreational harvest of purple sea urchin through emergency action, as recommended by the Department.

COMMITTEE STAFF SUMMARY FOR MARCH 6, 2018

6. SPORT FISHING REGULATIONS

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

Identify and discuss initial recommendations for 2019-20 sport fishing regulations.

Summary of Previous/Future Actions

- Adoption of sport fishing changes for 2018-19 — Dec 6-7, 2017; San Diego
- **Today's discussion** — **Mar 6, 2018; MRC, Santa Rosa**
- Next MRC meeting — Jul 17, 2018; MRC, San Clemente
- FGC notice hearing for 2019-20 season changes — Aug 22-23, 2018; Fortuna

Background

This item is to provide the public an opportunity to identify and discuss potential marine sport fishing changes to include in the upcoming rulemaking for sport fishing regulations for the 2019-20 season.

Proposed change

DFW has identified one proposed change regarding sport fishing report card requirements defined in Section 1.74, Title 14, CCR for sport fisheries with mandatory report cards. The proposal would establish a mechanism for confirmation that data from a report card has been reported, and would update procedures regarding lost report cards.

The proposed change to Section 1.74 was originally scheduled for adoption in Dec 2017 as part of the 2018-19 fresh water sport fish rulemaking. However, adoption was deferred to the 2019-20 cycle due to concerns that the change would apply to two marine fisheries (lobster and red abalone) but was not vetted with marine stakeholders. FGC directed staff to add the item for consideration in this year's sport fishing rulemaking to allow for proper vetting with marine stakeholders. An overview, rationale, and draft regulatory language as presented in the 2017 initial statement of reasons for regulatory change (ISOR), is provided in Exhibit 1.

Today provides an opportunity for public input on the proposed change, and any additional suggestions for the sport fishing regulations for the 2019-20 season.

Significant Public Comments (N/A)

Recommendation (N/A)

Exhibits

1. Overview of proposed change to Section 1.74, extracted from 2017 ISOR

Committee Direction/Recommendation (N/A)

COMMITTEE STAFF SUMMARY FOR MARCH 6, 2018

7. HERRING FISHERY MANAGEMENT PLAN

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

Receive update on progress in developing a Pacific herring fishery management plan (FMP).

Summary of Previous/Future Actions

- DFW updates on FMP progress — 2016-2017; MRC meetings
- Most recent update on FMP progress — Jul 20, 2017; MRC, Santa Rosa
- **Today's update** — **Mar 6, 2018; MRC, Santa Rosa**

Background

This is a standing agenda item to receive DFW updates on development of an FMP for Pacific herring, an important forage species in California and along the West Coast. The commercial roe herring fishery is managed through FGC regulations to establish fishing quotas, pursuant to Section 163, Title 14, California Code of Regulations, based on herring spawning population size estimates from DFW surveys.

FGC and DFW identified Pacific herring as a priority fishery for developing an FMP as mandated in the Marine Life Management Act. The goal of the FMP is to overhaul the existing commercial fishing permit system and modernize existing herring regulations, as well as to develop regulations for the recreational herring fishery.

A collaborative working group of herring fleet leaders, staff from conservation non-governmental organizations, and DFW staff, has functioned as a steering committee throughout FMP development; since 2016, DFW and the contracted FMP project manager have provided MRC with regular updates on progress. In Jul 2017, the FMP project manager presented an overview of analyses conducted to evaluate current and future management—including harvest control rules, ecosystem analysis, and collaborative research protocols—as informed by a survey of the commercial fleet.

Today the FMP project manager will provide an update on the ongoing development of the Pacific herring FMP; Exhibit 1 is a detailed version of the presentation that includes additional background, details of scientific analyses, the proposed management strategy, and proposed regulatory changes.

Significant Public Comments

Some commercial fishermen have expressed an interest in authorizing new gear types (e.g., throw nets) for purposes of a small-scale fresh fish market.

Recommendation (N/A)

Exhibits

1. DFW presentation with additional background

Committee Direction/Recommendation (N/A)

COMMITTEE STAFF SUMMARY FOR MARCH 6, 2018

8. STATE WATER BOTTOM LEASES FOR AQUACULTURE

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

(A) Receive overview of current State aquaculture leases;
(B) discuss current management efforts, including best management practices (BMPs); and
(C) discuss future planning.

Summary of Previous/Future Actions

(A) N/A

(B)

- FGC discussed possible BMPs — Feb 10-11, 2016; FGC, Sacramento
- FGC supported BMP rulemaking approach — Jun 22-23, 2016; FGC, Bakersfield
- MRC discussed aquaculture debris — July 21, 2016; MRC, Petaluma
- MRC update on BMP development — Jul 20, 2017; MRC, Santa Rosa
- **Today's update on management activities** — **Mar 6, 2018; MRC, Santa Rosa**

(C)

- FGC referred topic to MRC — Jun 21-22, 2017; Smith River
- MRC discussed future lease planning — Jul 20, 2017; MRC, Santa Rosa
- **Today's update on future planning** — **Mar 6, 2018; MRC, Santa Rosa**

Background

FGC has the authority to lease state water bottoms to any person for the purpose of conducting aquaculture in marine waters of the state, with the exception of Humboldt Bay, under terms agreed upon between FGC and the lessee pursuant to Sections 15400 and 15405 of the California Fish and Game Code. Leases in Humboldt Bay are granted by the Humboldt Bay Harbor, Recreation and Conservation District. While general regulations in Section 237, Title 14, California Code of Regulations govern all aquaculture leases, terms are established for individual state water bottom lease areas in a lease agreement.

Statewide there are currently 17 active FGC-issued state water bottom leases for aquaculture (12 estuarine leases in Tomales Bay held by six growers, 2 estuarine leases in Morro Bay held by two growers, and 2 open coast leases near Santa Barbara, held by two growers).

In recent years, there has been an increase in public attention focused on: (1) current shellfish aquaculture practices and stewardship, particularly related to marine debris, compliance with lease terms and permitting requirements, and certain other practices associated with aquaculture leases within state waters; and (2) lease siting considerations (e.g., environmental and other human uses) for expanding current or adding new lease areas. MRC had discussions in Jul 2016 and Jul 2017 on the aquaculture and lease topics (see Exhibit 1 for more background).

Today, DFW staff will present on the status of current State aquaculture leases, current management activities, and considerations for future management.

(A) Current State aquaculture leases. DFW will present a more detailed overview of the current FGC-issued leases in State waters of California.

(B) Current management efforts. This category encompasses several DFW efforts underway, including:

- site inspections,
- infrastructure mapping, and
- shellfish aquaculture BMPs information-gathering for a future rulemaking to define requirements for BMP plans, building on the BMPs public meetings held in Aug 2015 and Jul 2017 in Marshall (see Exhibit 2) and a future public meeting in southern California (spring/summer 2018).

(C) Future planning. Several focal points have been identified for discussing planned and potential efforts to support enhanced management of the State aquaculture lease progam. Possible topics include the application of outcomes from current management efforts, agency efforts and academic research and partnerships, and possible approaches to planning for siting and consideration of new or expanded shellfish farms, either individually or regionally.

Significant Public Comments

BMPs. Three comments requested that the delayed process to formalize aquaculture BMPs through a rulemaking be resumed and completed, with an emphasis on Tomales Bay (Exhibits 3-6). Each commenter identified specific, recommended BMPs or BMP topics as mandatory practices for each lease area, covering:

- buffers for wildlife and eelgrass (Exhibit 3);
- recreational and navigational access on and around leases, including conflicts with floating culture techniques (Exhibit 4); and
- marine debris management (Exhibit 5 offers a list of 11 BMPs with photo-documented rationale, and Exhibit 6 offers comments and 16 proposed BMPs developed in collaboration between an environmental NGO and a Tomales Bay grower).

Escrow accounts. A commenter expressed concern that escrow levels for clean-up are inadequate, based on DFW escrow accounts data, lessons from Drakes Estero, and photo documentation (Exhibit 5).

New lease applications. A commenter who recently went through the new lease application process with FGC, questioned why such rigorous environmental scrutiny is being placed on his small sustainable shellfish aquaculture farm when impacts from other larger-scale sources—such as terrestrial farming, global shipping, and importation of seafood—are arguably higher, and pointed out that this scrutiny is posing a barrier to new contributions to local shellfish production (Exhibit 7).

Recommendation

FGC staff: Support advancing the information-gathering and public engagement efforts needed to define requirements for BMP plans in regulation, and request that DFW return to MRC with options for action based on site surveys and infrastructure mapping. Given the range of potential aquaculture-related projects and limited staff capacity, prioritize where to focus staff time.

Exhibits

1. Staff summary from Jul 2017 MRC meeting (for background purposes)
2. Meeting summary, BMP public meeting, Jul 17, 2017
3. Email from The River Otter Ecology Project, received Feb 20, 2018
4. Email from Tom Baty, received Feb 21, 2018
5. Email and attachments from Richard James, received Feb 21, 2018
6. Joint email from West Marin Environmental Action Committee and Hog Island Oyster Company, received Feb 21, 2018
7. Letter from Bernard Friedman, received Feb 6, 2018

Committee Direction/Recommendation

MRC recommends that FGC support DFW in advancing information-gathering and public engagement efforts needed to define requirements for BMP plans in regulation, staff give highest priority to [*insert which aquaculture-related projects*], and schedule follow-up discussion at July MRC meeting.

COMMITTEE STAFF SUMMARY FOR MARCH 6, 2018

9. COASTAL FISHING COMMUNITIES PROJECT

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

Receive staff update on California coastal fishing communities project.

Summary of Previous/Future Actions

- MRC discussions, planning, and public meetings — 2015 - 2017; various
- Presentation on project to Tribal Committee — Feb 5, 2018; TC, Sacramento
- **Today's discussion** — **Mar 6, 2018; MRC, Santa Rosa**
- Next MRC meeting — Jul 17, 2018; MRC, San Clemente

Background

MRC's coastal fishing communities project continues with a series of locally-focused coastal fishing community meetings (see Exhibit 1 for background). Five of seven public meetings were held in 2017; due to staffing changes, the final two meetings will be scheduled in late spring this year (Exhibit 2).

At its Nov 2017 meeting, MRC requested that once the final meetings are held, staff explore the ideas generated from the public meetings to develop a broad list of possible actions that could be considered for near-, mid-, and long-term support of coastal fishing communities. Since the last MRC update in Nov 2017, staff has begun synthesizing input from the various public meetings to identify common themes, port-specific issues, and ideas; input and comments will be summarized in a staff recommendations report to the MRC. Today provides an opportunity for additional public input, beginning with a staff update (Exhibit 3).

Significant Public Comments

California Sea Grant notified FGC staff of a new program—the Commercial Fishermen Apprenticeship Program—launched to link interested individuals with experienced fishermen to teach the skills necessary for a career as a fisherman in California. An introductory meeting is scheduled for Mar 5, 2018 in San Diego (Exhibit 4).

Recommendation (N/A)

Exhibits

1. Staff summary from Nov 9, 2017 MRC meeting (for background purposes only)
2. Map of coastal fishing community public meeting locations
3. Staff presentation on fishing communities project, Mar 6, 2018 2018
4. Commercial Fishermen Apprenticeship Program introductory meeting flyer for Mar 5, 2018

Committee Direction/Recommendation (N/A)

COMMITTEE STAFF SUMMARY FOR MARCH 6, 2018

10. FUTURE AGENDA ITEMS

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

Review upcoming agenda items scheduled for the next and future MRC meetings, hear requests from DFW and interested stakeholders for future agenda items, and identify new items for consideration.

Summary of Previous/Future Actions

- **Today's discussion** **Mar 6, 2018; MRC, Santa Rosa**
- FGC approves MRC recommendations Apr 18-19, 2018; Ventura
- Next MRC meeting Jul 17, 2018; MRC, San Clemente

Background

Committee topics are referred by FGC and scheduled as appropriate. FGC-referred topics and the draft schedule are shown in Exhibit 1. MRC agendas currently include several complex and time-intensive topics under development. The committee has placed emphasis on issues of imminent regulatory or management importance, and thus consideration of new topics will require planning relative to existing committee workload.

MRC Work Plan and Draft Timeline

Agenda topics identified for the Jul 2018 MRC meeting include:

1. Agency updates
2. Herring fishery management plan update
3. Kelp and algae harvest review update
4. Aquaculture leases
    a. Best management practices
    b. Update on current management efforts and future planning
5. California's fishing communities project

Discuss and Recommend New MRC Topics

Today provides an opportunity to confirm timing for any additional referred topics, and to identify any potential new agenda topics to recommend to FGC for referral to MRC.

Significant Public Comments (N/A)

Recommendation

FGC staff: Review draft MRC schedule (Exhibit 1) and current rulemaking timetable (Exhibit 2), consider updates to project scheduling, and consider any potential new topics to recommend for FGC referral to MRC for evaluation.

Exhibits

1. MRC 2018 draft work plan, updated Feb 2018
2. *Perpetual Timetable for California Fish and Game Commission Anticipated Regulatory Actions*, updated Feb 9, 2018

Committee Direction/Recommendation (N/A)

California Ocean Litter Strategy Update

Paige Berube, Ocean Protection Council

November 9, 2017 | Marine Resources Committee Meeting | Marina

CALIFORNIA natural resources AGENCY

OCEAN PROTECTION COUNCIL

Ocean Litter Strategy Update – Purpose

Purpose:

To identify priorities to address ocean litter and to coordinate the activities of a broad range of stakeholders to effectively reduce ocean litter


Photo: NOAA Photo Library

Ocean Litter Strategy Update - Timeline

- **January 2017:** Ocean Litter Strategy Update process began
- **May 2017:** 1st workshop in Oakland to solicit stakeholder development of action items
- **September 2017:** Draft Strategy released for public review and comment
- **November 2017:** 2nd Workshop scheduled in La Jolla
- **January 2018:** Final Strategy to be considered by the Ocean Protection Council


Photo: NOAA Photo Library

Action Items for Fishing and Aquaculture Gear

Prevention:

- **Changing fishing gear design** to prevent repetitive gear loss
- **Leveraging industry knowledge** to increase education and prevent gear loss
- **Developing and implementing best management practices** for aquaculture

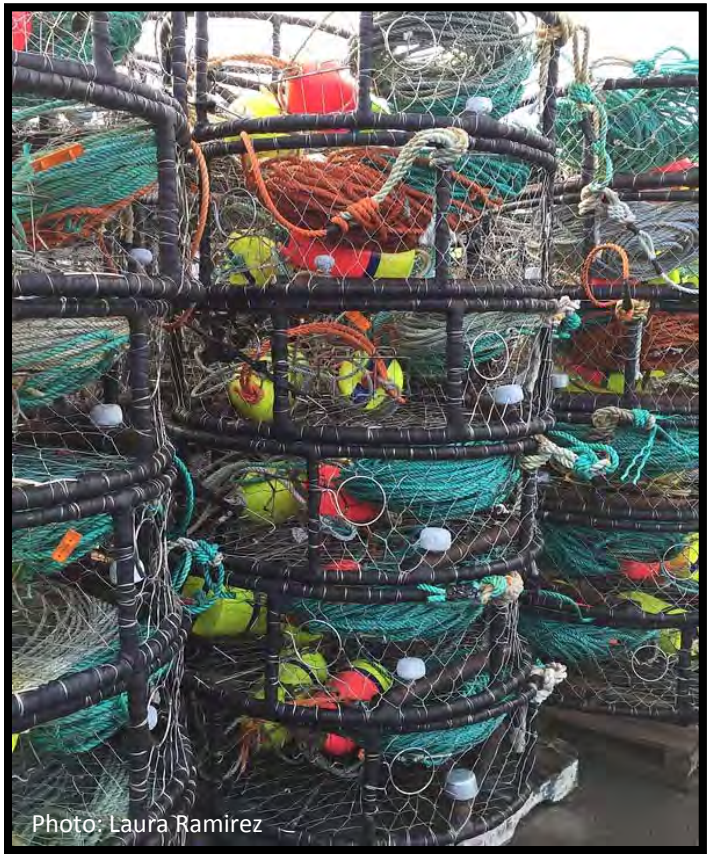
Photo: Laura Ramirez

Action Items for Fishing and Aquaculture Gear

Clean-up:

- **Improving tracking** for lost fishing and aquaculture gear
- **Removing lost** fishing gear and legacy aquaculture gear
- **Researching policy barriers** to lost gear removal and cleanup

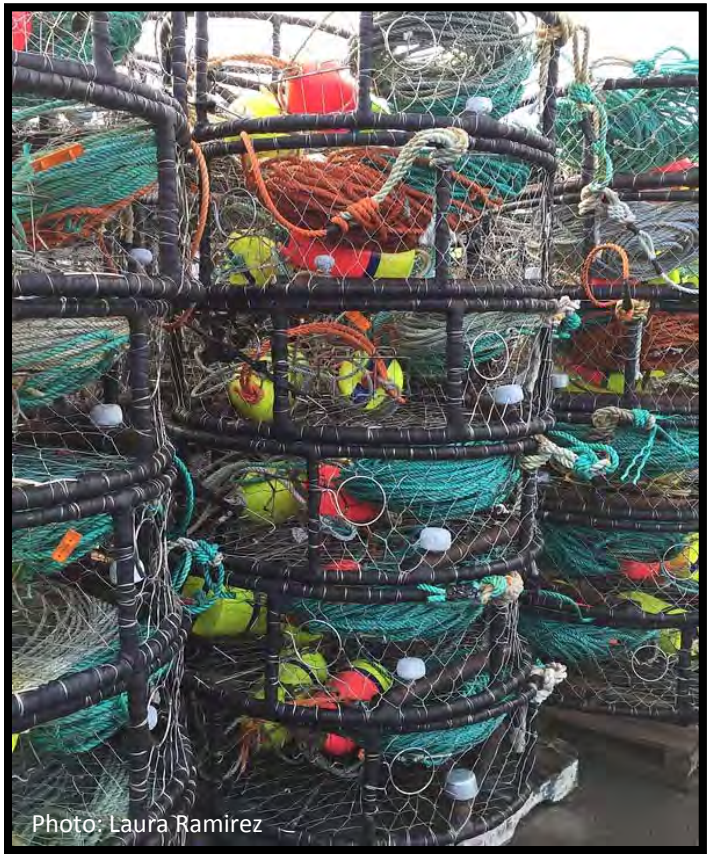
Photo: Laura Ramirez

Thank You

- Updates are available on the OPC website: http://www.opc.ca.gov/2017/09/litter-strategy-update/

State of California
Ocean Protection Council

Ocean Litter Strategy Update

The Ocean Protection Council (OPC) is updating its 2008 Implementation Strategy to Reduce and Prevent Ocean Litter (Strategy) (http://www.opc.ca.gov/webmaster/ftp/pdf/opc_ocean_litter_final_strategy.pdf), in partnership with the National Oceanic and Atmospheric Administration (NOAA) Marine Debris Program (https://marinedebris.noaa.gov/california).

Why is a Strategy update needed?

Since the original Strategy was developed, many of the actions described in the document have either been accomplished or are in progress. In addition, new forms of ocean litter, such as microfibers, have been identified since 2008, and are not covered in the Strategy. In essence, the Strategy is due for an update. The update process will expand the Strategy to include projects of a variety of scales and scopes so that entities including government agencies, industry, and nonprofits can make a meaningful contribution towards reducing ocean litter in California.

How can stakeholders and other interested parties engage?

The Revised Draft Strategy (http://www.opc.ca.gov/webmaster/_media_library/2018/01/OceanLitterStrategyRevisedDraft1.22.18.pdf) is now available for review and public comment. Public comments on the document will be accepted through February 23, 2018. Comments should be submitted via email to: oceanlitterstrategy@resources.ca.gov (mailto:oceanlitterstrategy@resources.ca.gov). The Revised Draft Strategy includes a section on OPC priorities to address ocean litter, as well as stakeholder goals, objectives, and actions to address ocean litter in California. To focus public review of the Revised Draft Strategy the planning team has prepared a reviewer memo (http://www.opc.ca.gov/webmaster/_media_library/2018/01/OceanLitterStrategy_RevisedReviewerMemo.pdf) with specific questions for reviewers to consider as they develop their comments. The planning team will consider the comments made during this comment period, and the final Strategy will be circulated in early- to mid-April. We anticipate adoption of the final OPC priorities by OPC at their April 2018 meeting.

The Revised Draft Strategy is derived from ideas generated at the first and second ocean litter workshops held in May 2017, and November, 2017, respectively. Additional resources from the Strategy update process are included below:

- Agenda from Workshop 1 (http://www.opc.ca.gov/webmaster/_media_library/2018/01/OceanLitterStrategy_Workshop1Agenda.pdf)
- Agenda from Workshop 2 (http://www.opc.ca.gov/webmaster/_media_library/2018/01/OceanLitterStrategy_Workshop2Agenda.pdf)
- Compiled List of Solution Ideas from Workshop 1 (http://www.opc.ca.gov/webmaster/_media_library/2018/01/OceanLitterStrategy_Workshop1_all_ideas.pdf)
- Participants at Stakeholder Workshops (http://www.opc.ca.gov/webmaster/_media_library/2018/01/OceanLitterStrategy_WorkshopParticipants.pdf)
- Compiled and summarized comments on the first draft of the Strategy (http://www.opc.ca.gov/webmaster/_media_library/2017/11/Draft_Strategy_PublicComment.pdf)
- Compiled and summarized comments on the OPC Priorities Outline (http://www.opc.ca.gov/webmaster/_media_library/2018/01/Litter_Priorities_Comments_Summary.pdf)

If you are interested in receiving email updates about the Ocean Litter Strategy Update process, please contact Holly Wyer at Holly.Wyer@resources.ca.gov (mailto:Holly.Wyer@resources.ca.gov) to be added to the email list.

Funding

The OPC provided $20,000 from the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006 Proposition 84 to fund this project.

Project Grantee

California Sea Grant
University of California, San Diego
Miho Ligare
(858) 534-1160
mligare@ucsd.edu (mailto:mligare@ucsd.edu)

(http://www.opc.ca.gov/webmaster/_media_library/2017/02/Ballona_Creek.jpg)

OPC Staff Contact
Holly Wyer, Program Manager
holly.wyer@resources.ca.gov (mailto:holly.wyer@resources.ca.gov)

California Ocean Litter Prevention Strategy: Addressing Marine Debris from Source to Sea

REVISED DRAFT

January 22, 2018

PLEASE NOTE*

Thank you for taking the time to review the draft *California Ocean Litter Prevention Strategy: Addressing Marine Debris from Source to Sea (Strategy).* The draft Strategy was developed based on a wide range of stakeholder input and identifies Goals, Objectives, and a list of Action Items for stakeholders to collaboratively implement to prevent and reduce ocean litter; it has been revised significantly based on input received during the first public comment period (September to October 2017), and the second Workshop that took place in November 2017.

Please note that this document is not meant to be a "consensus document" (i.e., not every organization will agree with the inclusion of all Action Items in the Strategy), but rather, is meant to provide an opportunity and a framework for many different organizations, with different mandates, to contribute to addressing the problem of ocean litter in California over the next six years. We encourage reviewers to focus on those Action Items that align with existing organizational priorities.

During this public comment period, we are soliciting feedback on the following:

1. Action Item sign-ups: Please identify any Action Items that you (and your organization) are interested in taking a lead or partnership role in implementing. Lead Organizations are committed to implementing an Action Item, given organizational and funding constraints; they will serve as the point of contact for NOAA and OPC for progress reports and check-ins throughout the Strategy's six-year timeframe, and will take a leadership role in communicating and coordinating with other collaborators/Partner Organizations on the Action Item. Partner Organizations will serve a supporting role in implementing an Action Item, in collaboration with Lead and other Partner Organizations.
    a) For those organizations that are already listed next to Action Items in the draft Strategy, please review where your organization is listed and let the planning team know if you would like your organization's status to be changed (i.e., if you would like to become a Lead Organization rather than a Partner Organization, or vice versa, or if you would like to be removed from the Action Item entirely).
    b) Note: Please be sure to specify how you would like your or your organization's name to appear in the Strategy. Additionally, please specify who from your organization should be added to our listserv, so that we know who to reach out to when the time comes to start contacting Lead and Partner Organizations.

2. OPC priorities: Please review and provide comments on OPC priorities that are outlined in this draft. In particular, please pay attention to the proposed timelines associated with the priorities, and the feasibility of achieving the priorities in the next six years.

3. Action Item language: If you would like significant changes made to the language of specific Action Items, please accompany your suggested edits with justifications.

4. **Strategy implementation scheme:** Do you think that conducting check-ins every six months will be too frequent, too infrequent?

Please send comments, edits, and questions regarding the draft Strategy to oceanlitterstrategy@resources.ca.gov **by** Friday, February 23, 2018. When sending your comments, please include your thoughts on the above four questions. We anticipate that a final draft of the Strategy will be circulated early- to mid-April.

Thanks again and we look forward to hearing from you.

Sincerely,

The Planning Team

Angela Howe, Surfrider Foundation
Miho Ligare, CA Sea Grant
Sherry Lippiatt, NOAA Marine Debris Program
Eben Schwartz, CA Coastal Commission
Nina Venuti, CA Sea Grant
Holly Wyer, Ocean Protection Council

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EXECUTIVE SUMMARY

Ocean litter is a pervasive problem at local, regional, and global scales with a wide range of consequences to human health, the environment, and the economy. Immediate, collaborative action to reduce and prevent ocean litter will ensure that California communities, environments, and economies remain productive and vibrant. The Ocean Protection Council (OPC) and the National Oceanic and Atmospheric Administration's Marine Debris Program (NOAA MDP) present this update to OPC's 2008 *An Implementation Strategy for the California Ocean Protection Council Resolution to Reduce and Prevent Ocean Litter*. The 2018 *California Ocean Litter Prevention Strategy: Addressing Marine Debris from Source to Sea* (Strategy) will provide structure and guidance for California stakeholders to efficiently address this pressing issue.

The 2008 Strategy served as a powerful and effective document to promote action on addressing ocean litter. Since 2008, many of the actions described in the document have either been accomplished or are in progress. For example, the statewide plastic bag ban was ratified by voters in 2016, and the State Water Resources Control Board's Trash Amendments were adopted in 2015. While we have made great strides in addressing ocean litter in California, our understanding of the issue has changed considerably in the last decade. For example, the investigation of microplastics' presence in aquatic ecosystems and impacts on marine life has increased dramatically over the last ten years. This 2018 update expands the previous Strategy to include projects of a variety of scales and scopes so that entities including government agencies, industry, academia, nonprofits, and tribes can collaborate on meaningful contributions to reducing ocean litter in California.

A wide range of stakeholder input was gathered during two Workshops and two rounds of public comment. The resulting Strategy is organized into Goals, Objectives, and specific Action Items. Contributors to this document developed Action Items that are politically, socially, and economically feasible for California to accomplish within the next six years. The Strategy prioritizes source reduction Goals and Action Items, as agencies and experts agree that source reduction is the most effective tactic to address ocean litter.

Most Action Items are accompanied by a list of Lead and/or Partner Organizations. Given the many dynamic and influential ocean litter stakeholders in California, the Strategy provides an opportunity for organizations to take a leadership role on Action Items that align with their respective goals and mandates. OPC and NOAA MDP are committed to providing overall leadership and coordination on tracking progress on Strategy implementation, facilitating communication between partner organizations, and sharing updates among interested stakeholders.

Throughout the process of developing the 2018 Strategy, stakeholders expressed interest in OPC articulating its priorities for ocean litter. OPC's proposed priorities to address ocean litter are laid out in the "California Ocean Protection Council Priorities to Address Ocean Litter" section of the Strategy. Implementation of OPC Priorities will occur over the next six years, and stakeholders

will receive updates on OPC staff's progress on implementing these priorities at least annually as part of the California Ocean Litter Strategy implementation process. OPC's priorities can be divided into three broad categories, land-based sources of ocean litter, microplastics and microfibers, and fishing and aquaculture gear.

In summary, this document provides a holistic, collaborative strategy for addressing ocean litter in California, with a focus on reducing land-based litter at its source. It focuses on high impact Action Items that entities can commit to working on over the next six years. The document provides both guidance and flexibility so that Lead and Partner Organizations can work collaboratively to pursue funding (where needed) and implement these Action Items. Partnership across sectors is necessary to reduce and prevent ocean litter and ensure a healthy coast and ocean for current and future generations of Californians.

LIST OF ACRONYMS

AB	Assembly Bill
ACC	American Chemistry Council
BACWA	Bay Area Clean Water Agencies
BMP(s)	Best Management Practice(s)
CalRecycle	California Department of Resources Recycling and Recovery
CASA	California Association of Sanitation Agencies
CDFW	California Department of Fish and Wildlife
CSU	California State University
CSUCI	California State University, Channel Islands
CSULB	California State University, Long Beach
DTSC	California Department of Toxic Substances Control
EPA	Environmental Protection Agency
EPR	Extended Producer Responsibility
ESRM	Environmental Science and Resource Management
FGC	California Fish and Game Commission
FTIR	Fourier Transform Infrared
GPS	Global Positioning System
IGISc	Institute for Geographic Information Science
NOAA	National Oceanic and Atmospheric Administration
NOAA MDP	National Oceanic and Atmospheric Administration Marine Debris Program
OPC	California Ocean Protection Council
PRCC	Plastic Recycling Corporation of California
SB	Senate Bill
SCAP	Southern California Alliance of Publicly Owned Treatment Works
SCCWRP	Southern California Coastal Water Research Project
SDSU	San Diego State University
SFEI	San Francisco Estuary Institute
SFSU	San Francisco State University
UC	University of California
UNEP	United Nations Environment Programme
WTO	World Trade Organization

GLOSSARY OF COMMONLY USED TERMS

Common Ocean Litter Items: Items that are most prevalent in ocean litter found in or on California's waterways, coastlines, or ocean, as defined by relevant datasets (e.g., Coastal Cleanup Day data). Currently, based on Coastal Cleanup Day data (California Coastal Commission 2017), common ocean litter items in California are primarily plastic, single-use items, items which are conventionally disposed of after one use and persist in aquatic environments.

Land-Based Ocean Litter: Items that became litter on land (via land-based activities) and subsequently entered the aquatic environment.

Lead Organization: Lead organizations are committed to implementing an Action Item, given organizational and funding constraints. Lead organizations will serve as the point of contact for NOAA and OPC for progress reports and check-ins throughout the Strategy's six-year timeframe, and will take a leadership role in communicating and coordinating with other collaborators/partner organizations on the Action Item.

Marine Debris: any persistent solid material that is manufactured or processed and directly or indirectly, intentionally or unintentionally, disposed of or abandoned into the marine environment or the Great Lakes (15 C.F.R. Part 909 Section 909.1).

Ocean-Based Debris: Litter or other debris (e.g., lost fishing gear) that entered the marine environment via activities that occurred at sea.

Partner Organization: Partner organizations will serve a supporting role in implementing an Action Item, in collaboration with Lead and other Partner Organizations.

BACKGROUND

The Global Problem of Ocean Litter

Ocean litter, or marine debris, is a persistent, well-documented problem of global scale. Anthropogenic litter has been observed on seafloors and in submarine canyons (Pham et al. 2014, Lee et al. 2006), in sediments (Claessens et al. 2011, Mistri et al. 2017), surface waters (Isobe et al. 2017, Suaria et al. 2016, Law et al. 2010), and the water column (Lattin et al. 2004), and on beaches and shorelines worldwide (Ocean Conservancy 2017, Browne et al. 2011). While there are many ways to classify ocean litter, it is common to characterize it as either land-based or ocean-based, depending on how it enters the marine environment (Galgani et al. 2015). Land-based litter can enter the ocean through poor or inefficient waste management systems, or intentional or unintentional littering by individuals and industries (UNEP and GRID-Arendal 2016, Galgani et al. 2015). Furthermore, land-based litter may be discharged directly onto coastlines (through coastal tourism or recreation, for instance), or it may make its way to the marine environment through water treatment systems (especially in the case of microplastics), storm drains, rivers, or by wind (UNEP and GRID-Arendal 2016, Galgani et al. 2015, Rech et al. 2014). Ocean-based litter, on the other hand, is generated by the intentional or unintentional discharge of debris directly into the ocean. Marine activities that generate ocean-based litter include commercial shipping, recreational and commercial fishing, aquaculture, research and military endeavors, and offshore drilling (UNEP and GRID-Arendal 2016, Galgani et al. 2015).

The majority of marine debris comes from land-based sources, though ocean-based debris can be significant in some areas (e.g., Jang et al. 2014). Debris sources are dependent on nearby human activity (recreational beach use, shipping, fishing), proximity to population centers, and the efficiency of waste management systems (Jambeck et al. 2015, UNEP and GRID-Arendal 2016, Galgani et al. 2015). Whether land-based or ocean-based, most of the litter found in the world's oceans is plastic (Galgani et al. 2015, Derraik 2002). Between 1950 and 2015, 6300 million metric tons of primary and secondary (or recycled) plastic waste was produced worldwide (Geyer et al. 2017). Approximately 12% of this plastic waste was incinerated, and 9% was recycled, while 79% was discarded and is currently sitting in landfills or the environment (see Fig. 1 for historical and projected levels of plastic waste production and disposal) (Geyer et al. 2017). Currently, most (42%) of the primary non-fiber plastic produced comes in the form of packaging, most of which is used and disposed of within the same year it is produced (Geyer et al. 2017). Globally, it is estimated that between 4.8 and 12.7 million metric tons of plastic enter the ocean from land every year (Jambeck et al. 2015).

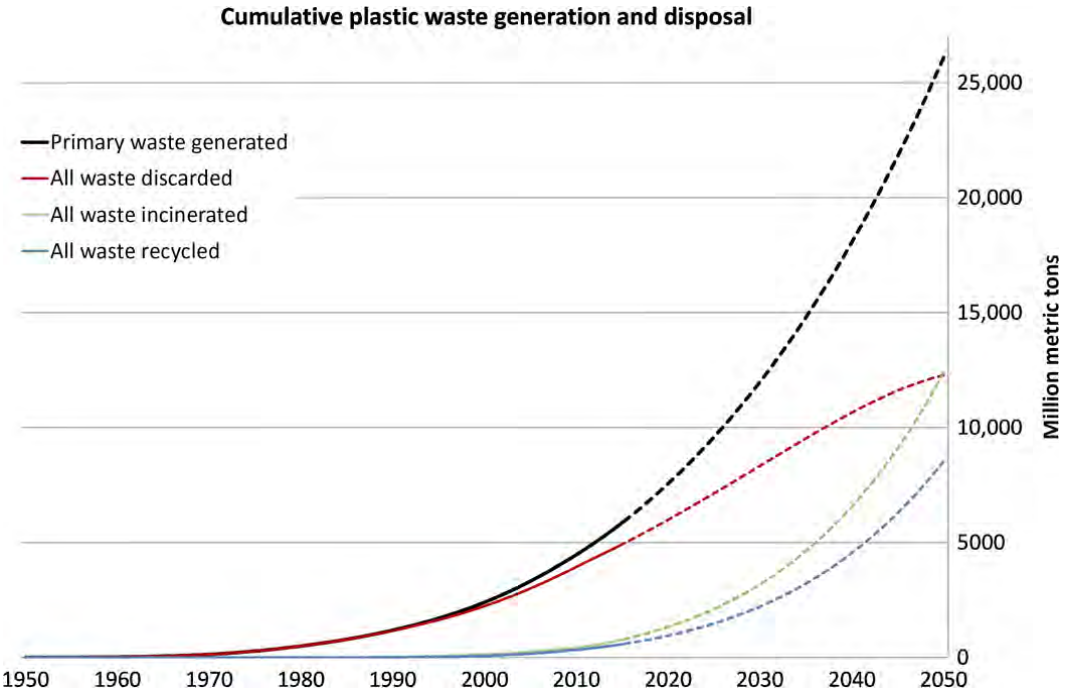


Fig.1. Historical and projected global cumulative plastic waste generation and disposal (here, disposal refers to how plastic waste is managed – either through incineration, recycling, or discard into landfills or the environment). Solid lines show historical data from 1950 to 2015, dotted lines show projections of historical trends to 2050. It is estimated that by 2050, 26,000 million metric tons of primary plastic waste will have been generated, 9,000 million metric tons of plastic waste will have been recycled, 12,000 million metric tons will have been incinerated, and another 12,000 million metric tons will have been discarded in landfills or the environment. Figure from Geyer et al. 2017.

Ocean litter has detrimental ecological, economic, and social impacts. Marine species, including seals, sea birds, sea turtles, whales, and dolphins, are entangled in debris, resulting in hindered movement, decreased feeding ability, injury, and death (NOAA MDP 2014, Kühn et al. 2015). Marine debris smothers and shades coral reefs and salt marshes, disrupting growth and surface cover (Richards and Beger 2011, Uhrin and Schellinger 2011). Fish (Boerger et al. 2010), crustaceans (Murray and Cowie 2011), shellfish (Browne et al. 2008), and zooplankton (Cole et al. 2013) ingest microplastics, and some of these organisms consume less food and have decreased energy for growth as a result (Watts et al. 2015, Cole et al. 2013). Furthermore, microplastics adsorb organic contaminants (e.g., polycyclic aromatic hydrocarbons and polychlorinated biphenyls) (Rochman et al. 2013a) and trace metals (Holmes et al. 2012) from their surrounding environments, and, depending on concentration gradients, may transfer contaminants to marine organisms, inducing harmful health effects (Browne et al. 2013, Rochman et al. 2013b). Plastics have recently been found in the digestive tracts of fish and shellfish and the soft tissues of shellfish sold at markets for human consumption (Rochman et al. 2015, Li et al. 2015, Van Cauwenberghe and Janssen 2014). A serving of six oysters grown off the coast of France could contain as many as 50 plastic particles (Van Cauwenberghe and Janssen 2014), indicating that plastic litter that we produce and allow to leak into the environment may end up back on our plates.

The economic impacts of ocean litter include costs associated with beach and harbor cleanup, loss of coastal tourism and recreation, impacts to the fishing and aquaculture industries – including costs associated with repairing damaged vessels, repairing or replacing fishing gear lost or damaged as a result of encountering marine debris, loss of catch due to ghost fishing[1] or gear encounters with marine debris, and loss of earnings due to time spent dealing with litter – and other impacts to human welfare and ecosystem services (Newman et al. 2015). The United Nations Environment Programme (UNEP) estimates that the impacts of plastic pollution, specifically, on the world's oceans amount to about $13 billion a year, accounting for time spent on cleanup, as well as revenue lost by the fisheries and tourism sectors (UNEP 2014). Ghost fishing, one consequence of lost fishing gear, can be extremely costly – both ecologically and for the fishing industry. For example, it is estimated that each year, the approximately 145,000 derelict blue crab pots in Chesapeake Bay catch more than 6 million blue crabs, killing over 3.3 million of them (4.5% of the 73 million blue crabs harvested commercially in 2014) (Bilkovic et al. 2016). These derelict pots also catch approximately 3.5 million white perch and 3.6 million Atlantic croaker every year (Bilkovic et al. 2016). The removal of ~44,000 derelict pots from Chesapeake Bay from 2008 to 2014 is estimated to have increased blue crab harvests by 38.17 million pounds, valued at $33.5 million, due to improved efficiency of active crab pots (Bilkovic et al. 2016). On average, removing one derelict pot increases blue crab harvest by 868 pounds (Bilkovic et al. 2016).

The social impacts of ocean litter include loss of earnings for fishermen and aquaculturists from time spent dealing with gear or vessel entanglement, and boater injury or death following vessel interaction with large debris items (Mouat et al. 2010, Cho 2005, Newman et al. 2015). Social impacts also include reductions in ecosystem services provided by marine and coastal environments, such as psychological benefits gained from coastal recreation (Wyles et al. 2016) and seafood production (e.g., loss of catch (e.g., Bilkovic et al. 2016)). Potential human health effects from ingestion of microplastics through seafood are largely unknown, though research from other fields, such as pharmaceutical delivery, suggests that micro- and nano-plastics have the potential to enter, circulate, and bioaccumulate within the body after being ingested (Galloway 2015). The extent and impact of human exposure to contaminants and additives through ingestion of microplastics in seafood is also largely unknown, though it is thought to be low in comparison to other pathways of dietary intake (Lusher et al. 2017).

Ocean Litter and Waste Generation in California

Ocean litter is prevalent in California watersheds and ocean waters. For example, 78% of Southern California river miles[2] and about one third of seafloors and seafloor sediments in the Southern California Bight contain trash (Moore et al. 2016). Plastic is the most prevalent type of debris found across all habitats in the Southern California Bight, with wrappers, bags, plastic

[1] Ghost fishing is the continued catch of marine species by lost or discarded gear.
[2] A river mile is a measure of distance in miles from the mouth of a creek or river.

pieces, and Styrofoam being the most commonly found plastic items (Moore et al. 2016). Seventy-three water bodies throughout the State of California are listed as having impaired water quality due to the presence of large amounts of trash (State Water Board 2015). The California coast and ocean are also impacted by lost fishing gear. Between May 2006 and November 2012, the California Lost Fishing Gear Recovery Project retrieved more than 60 tons of gear from California's coastal ocean, and collected more than 1,400 pounds of recreational gear from public fishing piers from Santa Cruz to Imperial Beach (SeaDoc Society 2017). From 2001 to 2006, 31.1% of the reported cases of injured California brown pelicans at five California wildlife rehabilitation centers were fishing gear-related, while 11.1% of injured gull cases and 2.9% of injured California sea lion cases were fishing gear-related (Kaplan Dau et al. 2009).

In 2016, California generated approximately 76.5 million tons of waste, 35.2 million tons (~46%) of which were disposed in landfills, and another 7.5 million tons (~10%) of which went to disposal-related activities such as beneficial reuse at solid waste landfills and waste to energy conversion (CalRecycle 2017b). This means that California had a disposal rate of 6.0 pounds of trash per resident per day in 2016 (CalRecycle 2017b). Roughly 24.5 million tons (~32%) of the total trash produced in 2016 were diverted through source reduction and recycling, and another 9.2 million tons (~12%) were diverted through composting and mulching (CalRecycle 2017b). Overall, about 56% of California's waste went to disposal or disposal-related activities and about 44% was diverted through source reduction, recycling, and composting in 2016 (CalRecycle 2017b). Though diversion has come a long way in 20 years, over the last three years, California's source reduction, composting, and recycling rate has declined, from 50% in 2014, to 47% in 2015, and now to 44% in 2016 (CalRecycle 2017b) (see Fig. 2 for statewide disposal and recycling from 2010 to 2016). Through AB 341, California has declared a goal that by 2020, 75% of the solid waste generated in the state should be source reduced, recycled, or composted (as compared to 1990-2010 waste generation levels[3]). This translates to a reduction in per capita disposal from the current 6.0 pounds per person per day to 2.7 pounds per person per day in 2020 (CalRecycle 2017b).

[3] AB 341 requires that 1990-2010 waste generation levels (10.7 pounds per person per day) be used as baseline data. The amount of total waste generated in California in a year is estimated by multiplying the State's population in that year by the 1990-2010 per person baseline. Source reduction is also calculated using these baseline data.

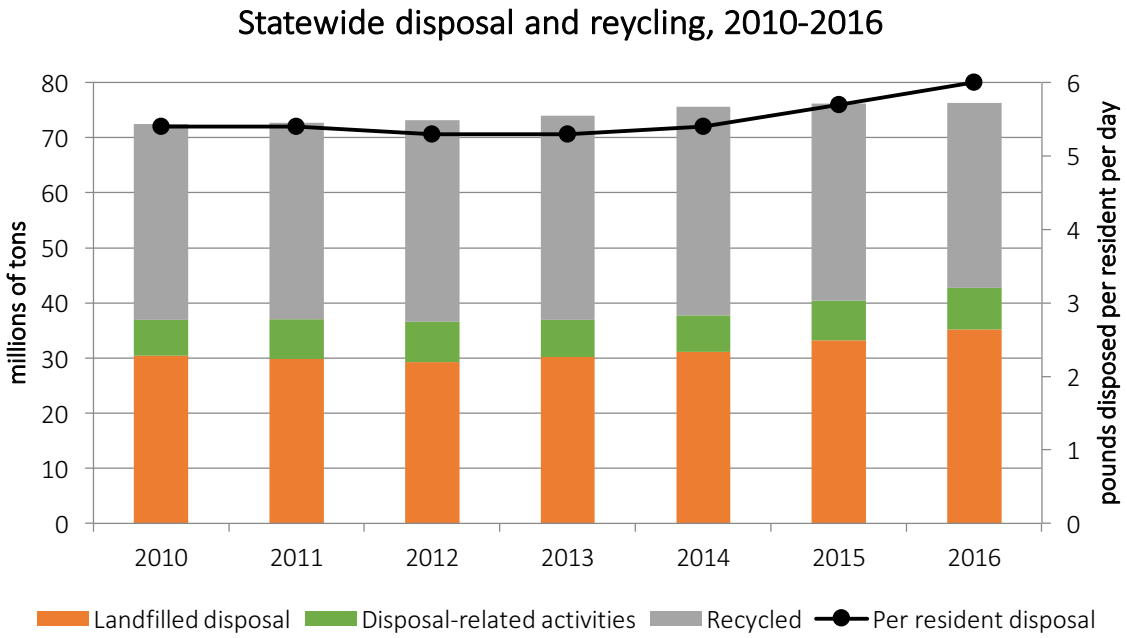


Fig.2. Amount of waste disposed and recycled in California, from 2010 to 2016. Included in this figure are estimates of the amount of waste disposed in landfills, the amount of waste managed through disposal-related activities, and the amount of waste recycled (which includes source reduction, recycling, and composting) every year in millions of tons (left axis). Also shown is the per resident disposal rate (pounds per resident per day) for each year (right axis). Figure adapted from CalRecycle's webpage "California's Statewide Recycling Rate" (CalRecycle 2017a).

California currently estimates the amount of waste that is source reduced and recycled by subtracting the quantities of waste disposed in landfills and through other disposal-related activities, and the quantities of waste that is managed through composting and mulching, from the estimated total amount of waste generated in the State (CalRecycle 2017b). This method of calculation assumes that all waste that is not disposed is source-reduced or recycled (CalRecycle 2017b). There is currently no way to know how much of California's waste ends up in the environment and becomes marine debris every year. However, Jambeck et al. (2015) estimated that in 2010, the United States had 0.25-1 million metric tons of mismanaged plastic waste available to enter the oceans, based on waste generated by populations within 50 km of the coast.

Ocean litter costs Californians money. California communities spend more than $428 million annually to cleanup and control ocean litter through waterway and beach cleanup, street sweeping, installation of stormwater capture devices, storm drain cleaning and maintenance, manual litter cleanup, and public education (Stickel et al. 2013). From July 2012 to June 2016, Adopt-A-Highway participants removed over 77,000 cubic yards of litter that may have otherwise ended up in the ocean, a service valued at $18 million annually (Caltrans 2017). Orange County, California residents go out of their way to avoid trash-littered beaches, spending extra time and money in order to visit a cleaner beach or engage in other recreational activities; it is estimated that removing 100% of the marine debris on Orange County beaches could save California residents $148 million during the three months of summer (Leggett et al. 2014). There

are no known estimates of the costs of ocean litter to California's tourism, fishing, or aquaculture industries.

2008 Strategy, *An Implementation Strategy for the California Ocean Protection Council Resolution to Reduce and Prevent Ocean Litter,* Update

Recognizing the serious threats of ocean litter to communities, the economy, and the environment, and the immediate need for decisive action in California, the California Ocean Protection Council (OPC) adopted a resolution on "Reducing and Preventing Marine Debris" in 2007. In 2008, the OPC initiated a steering committee to publish an Implementation Strategy, which outlined three Priority Actions and 13 other Actions for addressing marine debris in the State. This Strategy was designed to provide a pathway to implement the recommendations in the OPC Resolution. The three Priority Actions were as follows:

1. Implement a producer take-back (EPR) program for convenience food packaging.
2. Prohibit single-use products that pose significant ocean litter impacts where a feasible less damaging alternative is available. Products specifically called out included polystyrene food packing and plastic bags.
3. Assess fees on commonly littered items.

Since the original Strategy was developed, many of the actions described in the document have either been accomplished or are in progress (see the box below titled "Status of Actions in the 2008 OPC Strategy to Reduce and Prevent Ocean Litter"). In some cases, the State's regulatory or agency landscape has changed. For example, some items that were listed out separately in the Strategy are now being addressed under a single program, but there may be elements of those items that still need to be addressed. For instance, separate actions focused on minimizing toxics in packaging and developing sustainable alternatives are now jointly addressed by the California Department of Toxic Substances Control's (DTSC's) Safer Consumer Products Program, which is tasked with examining product-chemical combinations that may have negative impacts on human health and the environment, and requiring that manufacturers of priority products perform an alternatives analysis to determine whether such products can be made without the chemical of concern (DTSC 2013). In other cases, our understanding of the ocean litter problem has changed considerably since 2008. For example, the examination of microplastics' impacts on marine life and their interaction with persistent organic pollutants has increased dramatically over the last decade (Ryan 2015). Thus, some of the actions that were outlined in the 2008 Strategy may not cover issues of emerging concern (such as microplastics and microfibers) or may no longer be the best way to go about addressing ocean litter.

The 2018 Strategy aims to reexamine the issue of ocean litter in California, and outline action items for preventing and reducing marine debris over the next six years, in light of the needs that have been identified, the knowledge that has been gained, and the advances that have been made over the last decade.

Status of Actions in the 2008 OPC Strategy to Reduce and Prevent Ocean Litter

Below is a brief summary of the progress that has been made on the Action Items included in the 2008 Strategy. Some of these Action Items were written in an open-ended or ongoing way. This makes it somewhat difficult to determine whether an action is "complete." See the Comments column for more detail on the status of each Action.

Strategy Action	Update	Comments
Priority Action 1: Implement a producer take-back (EPR) program for convenience food packaging.	**In Progress**	CalRecycle is developing a comprehensive, statewide framework for managing all packaging that provides flexibility to apply different policy tools. Extended producer responsibility is one of those policy tools.
Priority Action 2: Prohibit Single-Use Products that pose significant ocean litter impacts where a feasible less damaging alternative is available.	**See below under each action**	See below under each action
• Polystyrene food packaging prohibition	**In Progress**	Local polystyrene bans have passed, but a statewide ban has not.
• Plastic Bag Fee	**Complete**	The voters ratified the statewide bag ban in November 2016.
Priority Action 3: Assess fees on commonly littered items	**In Progress**	Local jurisdictions have passed litter fees, but this has not been implemented on a statewide level.
Minimize Toxics in Packaging: Determine which plastic additives threaten human health and the marine environment, educate the public, and prepare a plan for a possible prohibition.	**In Progress; but continuing opportunities for further action or projects**	Initial OPC-funded project is complete. DTSC now has a Safer Consumer Products program that examines product-chemical combinations that may impact human health or the environment.
Develop Alternative Products and Promote Sustainable Alternatives	**In Progress**	This action is currently part of the Safer Consumer Products Program. The regulations require that manufacturers perform an alternatives analysis to determine whether they could make their product without the chemical of concern.
Increase Enforcement of Pre-Production Plastic Laws	**Complete**	The Water Board has trained their enforcement staff and industrial permit staff on how to correctly implement the law banning release of pre-production plastic pellets.

Strategy Action	Update	Comments
Increase Enforcement of Anti-Litter Laws	**In Progress**	This is an ongoing activity. Some local jurisdictions have increased litter fines in problem areas (like main beach in Santa Cruz).
Public Education: Coordinate an education and outreach campaign	**Complete**	The OPC has partnered with NOAA on the Thank You Ocean campaign, which includes a lot of public outreach on marine debris.
Public Education: Direct state funds for litter education to the Environmental Education Initiative	**Incomplete**	This remains incomplete, the Environment Education Initiative provides model curriculum to teachers on environmental issues.
Engaging the Public: Develop an ocean litter data card to be used by Adopt-A-Beach Volunteers through the year, and an online database to house data.	**Complete**	The West Coast Marine Debris Partnership has developed a standardized data card and database for beach cleanup efforts.
Engaging the Public: Develop an Adopt-A-Beach Advisory Committee and work with local beach managers to provide necessary support for Adopt-A-Beach efforts.	**Complete**	The Adopt-A-Beach program is supported and organized on a county-by-county basis. (You can find more information on the Coastal Commission website).
Ensure municipalities prevent litter from entering the storm drain system	**Complete, but continuing opportunities for actions with implementation.**	This action was completed through adoption of the statewide trash policy; we are now in the process of implementing the policy.
Increase lost fishing gear cleanup by creating a deposit program on fishing gear, and conduct outreach to the fishing community and publicize Sea Doc Society's hotline	**Complete, but continuing opportunities for further action or projects**	Legislative action has created a program that requires owners to pay for lost gear for some fisheries. The OPC has funded the Sea Doc Society to perform cleanups of fishing gear off the coast, and their hotline is available to report lost gear.
Work with the West Coast Governor's Agreement participants and invite the participation of Alaska, Hawaii, British Columbia, Baja California, and Baja California Sur	**Complete**	This action evolved into an Action Team under the West Coast Governor's agreement, and now into the West Coast Marine Debris Partnership, which includes British Columbia.

2018 *CALIFORNIA OCEAN LITTER PREVENTION STRATEGY: ADDRESSING MARINE DEBRIS FROM SOURCE TO SEA*

2018 Strategy Update Process

In 2016, the Ocean Protection Council and the NOAA Marine Debris Program initiated a partnership with California Sea Grant to update the 2008 Strategy. The 2018 Strategy planning team was rounded out with the participation of the California Coastal Commission and Surfrider Foundation. Representatives from organizations active in conservation, research, waste reduction, and education, as well as industry, tribes, local government, and State and Federal agencies were invited to participate in two Workshops in 2017 aimed at generating action items that would help solve the problem of ocean litter in California. All of the ideas included in this Strategy document were identified by Workshop participants.

The first of the two Workshops, held in May 2017 in Oakland, California, allowed participants to brainstorm and discuss potential solutions to the presence of (and problems associated with) ocean litter in California. One hundred and forty-eight action items to reduce and prevent ocean litter were identified during this Workshop. Following the first Workshop, duplicative and similar ideas generated by the participants were condensed and organized into a draft Strategy by the planning team, which was then circulated among the Workshop participants and posted on OPC's website for public review and comment. The second of the two Workshops, held in November 2017 in La Jolla, California, allowed for further discussion and refinement of the Strategy's Action Items, and gave organizations the opportunity to commit to taking a role in implementing proposed actions. Each Workshop was attended by approximately 50 participants. See OPC's website for links to materials from the two Workshops (agendas, participant lists) and a complete list of ideas for action items generated by Workshop #1 participants.

Following the second Workshop, the planning team revised the Strategy, and then posted it on OPC's website and circulated it to Workshop participants for a second round of public comment (January to February 2018). Final revisions to the Strategy were made based on this second round of public comment.

Throughout the process of developing the 2018 Strategy, stakeholders expressed interest in OPC articulating its priorities for ocean litter. OPC's proposed priorities to address ocean litter are laid out in the section of the document titled "California Ocean Protection Council Priorities to Address Ocean Litter."

Structure of Document

The 2018 *California Ocean Litter Prevention Strategy: Addressing Marine Debris from Source to Sea* includes a section for OPC priorities to address ocean litter and a section for stakeholder-

identified Goals, Objectives and Actions to address ocean litter. The OPC priorities section outlines the work OPC will take on over the next six years, and these priorities complement the Goals, Objectives and Actions identified by the stakeholders. OPC priorities are structured into three goals:

1. OPC Goal 1 – Land-based sources of ocean litter: Protect marine ecosystems and the communities that rely on them by promoting policies to prevent litter from reaching the ocean.
2. OPC Goal 2 – Microplastics and Microfibers: Increase understanding of the scale and impact of microplastics and microfibers on the marine environment and develop solutions to address them.
3. OPC Goal 3 – Fishing and Aquaculture Gear: Reduce fishing and aquaculture-related debris in the ocean.

The stakeholder section of the Strategy is structured around six Goals, five of which are dedicated to land-based litter, and one of which is dedicated to ocean-based debris. Nested under each of these Goals are Objectives, which outline approaches for achieving the Goals. Each Objective includes specific Action Items, concrete and measurable tasks that stakeholders can implement to contribute to an Objective and prevent or reduce ocean litter.

Broadly broken into land- and ocean-based litter categories, the six Goals of this Strategy are as follows:

Land-based Ocean Litter

1. Goal 1: Reduce the use of common ocean litter items through mandates and incentives targeting public institutions and businesses.
2. Goal 2: Reduce the prevalence of common ocean litter items through changes in product production, design, and management.
3. Goal 3: Improve waste management and interception of litter on land before it enters the ocean.
4. Goal 4: Conduct and communicate research on existing and emerging issues related to land-based ocean litter.
5. Goal 5: Generate behavior change by educating and engaging communities and individuals to reduce ocean litter.

Ocean-based Marine Debris

6. Goal 6: Reduce ocean-based debris at its source, and maximize the efficiency of control and cleanup of ocean-based debris.

The 2018 Strategy document includes the following:

- **6 Goals**: The first five Goals are dedicated to land-based ocean litter, while the last Goal is dedicated to ocean-based debris. These Goals focus on source reduction, research, behavior change, control, and cleanup.
- **17 Objectives:** Nested under each Goal, these Objectives are approaches that may be taken to achieve a Goal.
- **60 Action Items**: Listed under each Objective, Action Items are concrete and measurable tasks that stakeholders can implement to contribute to an Objective and prevent or reduce ocean litter.

Scope of Document

Data-driven Goals, Objectives, and Action Items

The Goals, Objectives, and Action Items included in this document reflect the need to base actions taken to address ocean litter in California on the most accurate available data. The term "common ocean litter items" is used frequently throughout the document to refer to the most prevalent ocean litter items found in California's waterways and ocean waters, and on its coastlines. The use of this terminology directs stakeholders to focus on the debris items that are most abundant in the environment, while also allowing for flexibility and adaptability, as the most common ocean litter items may change over time.

While the need for a comprehensive, statewide litter dataset is identified in the Action Item tables below (see Action Item 4.1.4), for now, this document relies on Coastal Cleanup Day data to define the most common ocean litter items found in the State (see Table 1 for the list of the top 10 litter items removed from California's coastlines and inland waterways on Coastal Cleanup Day from 1989-2014). Depending on the Action Item, stakeholders may also use more

Table 1. Top ten litter items removed on California Coastal Cleanup Day, 1989-2014 (California Coastal Commission 2017).

Litter Item	Count	Percentage
Cigarettes/Cigarette filters	6,992,106	37.76%
Food wrappers/Containers	1,940,013	10.48%
Caps/Lids	1,619,071	8.74%
Bags (paper and plastic)	1,462,726	7.90%
Cups/Plates/Utensils	1,014,229	5.48%
Straws/Stirrers	736,595	3.98%
Glass beverage bottles	600,871	3.24%
Plastic beverage bottles	475,799	2.57%
Beverage cans	455,433	2.46%
Construction material	330,711	1.79%

detailed, localized datasets, when available, to determine common ocean litter items in their region or to help define the scope of their work.

Focus on Land-based Litter and Lost Fishing and Aquaculture Gear

Five out of six of the Strategy's stakeholder Goals (as well as the first OPC Goal) focus on land-based litter, while the final Goal in the Strategy focuses on ocean-based debris, specifically lost fishing and aquaculture gear. Land-based litter receives the most attention in the 2018 Strategy because most of the debris found in the ocean is thought to be land-based, and a large portion of the marine debris community in California focuses on land-based litter. The Goal dedicated to ocean-based debris focuses almost entirely on lost fishing and aquaculture gear due to the fact that the participating stakeholders were mainly from the fishing and aquaculture industries. Furthermore, it was agreed that because of the large scope of ocean-based debris and the complexities involved in international regulations[4], a more significant impact could be made by narrowing the scope to lost fishing and aquaculture gear.

Emphasis on Source Reduction and Prevention

This document prioritizes source reduction Goals and Action Items, as agencies and experts agree that source reduction is the most effective tactic to address ocean litter. Source reduction, or waste prevention, refers to practices that reduce the amount of materials entering the waste stream, including changes in the design, manufacture, purchase or use of materials (EPA 2016). Preventing waste in the first place through initiatives such as product redesign, minimizing the use of single use items[5], and reusing materials is a better method for reducing waste as it decreases the amount of litter to control, capture, and dispose. This method is considered by the US EPA to be the most preferred method for dealing with waste (EPA 2017).

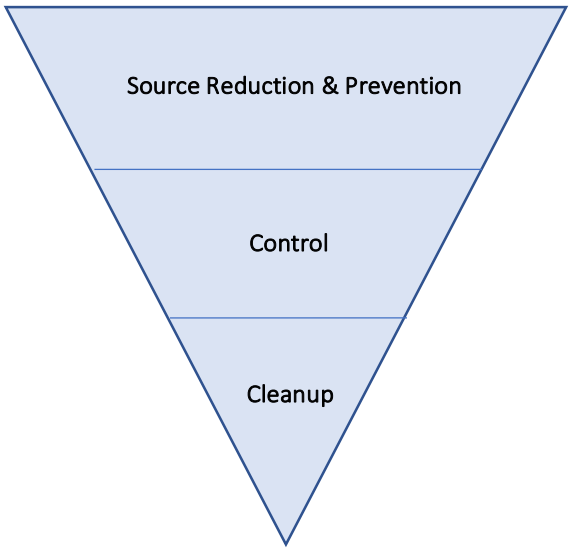
Furthermore, source reduction creates significant opportunities for industry to take initiative and responsibility for the products they produce. By altering their production, operation, and raw material use, industries can prevent litter at the source. Institutions, businesses, and consumers can play a role in source reduction too. For example, the State is the single largest purchasing entity in California, purchasing billions of dollars of products each year (Suh et al. 2017). As a result, the State can have a significant impact on, and set a good example for, preventing and reducing waste at the source through procurement policies that prioritize reusable items. Institutions and businesses can also benefit from these procurement changes, as they often lead to reduced costs associated with the purchase of disposable items, and the transportation, disposal, or recycling of waste (Maryland Department of the Environment 2017, Clean Water Action 2017). Consumers can contribute to source reduction by making changes in their own purchasing habits and supporting businesses that exhibit sustainable purchasing practices.

[4] One example of an international regulation that deals with ocean-based debris is the International Convention for the Prevention of Pollution from Ships, MARPOL, adopted in 1973, the main international convention covering pollution of the marine environment from operational or accidental discharge from ships.

[5] The term "single use items" is used here to mean items that are conventionally disposed of after a single use and that persist in the environment.

Waste management and ocean litter are inextricably linked. This Strategy is intended to be a complementary document to other waste prevention and management strategies, with a focus on the issue of ocean litter.

Fig. 3. Hierarchy of Efforts to Address Ocean Litter



Control and Cleanup

Controlling and cleaning up litter in the environment is important, but less efficient and effective in the longer term compared to source reduction and prevention. Examples of control and cleanup methods include: beach and waterway cleanups, street sweeping, stormwater capture devices, storm drain cleaning and maintenance, manual litter cleanup, and outreach and education to prevent littering. The public cost burden of these efforts makes a compelling argument for accelerating the search for effective strategies to reduce and prevent trash streams that enter our waterways and contribute to ocean litter.

In 2015, the State Water Resources Control Board (State Water Board) adopted a statewide water quality objective aimed at reducing the amount of trash that finds its way into rivers, lakes, and the ocean by prohibiting the discharge of trash into state surface waters; the water quality objective is commonly referred to as the "Trash Amendments." These Trash Amendments provide statewide consistency in efforts to reduce trash in state waters, and use a land use-based compliance approach that targets high trash generating areas such as high density residential, industrial, commercial, mixed urban and public transportation land uses. This program allows flexibility for local governments to come up with compliance approaches that work best for them to effectively eliminate trash discharge from their stormwater systems. Local governments may choose to increase trash capture in stormwater runoff, or a use combination of source reduction approaches that are equivalent to full trash capture. This Strategy provides a suite of source reduction approaches that may be cost-effective and useful to local governments as they develop their compliance approach for the Trash Amendments.

California also has a robust and successful network for implementing cleanups. From local nonprofits to municipalities, beach cleanups are held on a regular basis throughout the state. California Coastal Cleanup Day is a notable program held once a year, where approximately 60,000 volunteers pick up hundreds of thousands of pounds of trash and recyclables from beaches, lakes, and waterways. In 2016, 59,154 volunteers participated in California Coastal Cleanup Day and collected 710,781 pounds of litter (California Coastal Commission 2016). California Coastal Cleanup Day is a part of International Coastal Cleanup Day, the world's biggest effort to clean up ocean litter. Annually, nearly 12 million people volunteer to pick up litter in their communities (Ocean Conservancy 2017).

California organizations also coordinate lost fishing gear cleanups on and off the water. For example, the California Lost Fishing Gear Recovery Project, administered by the University of California, Davis' School of Veterinary Medicine and the Wildlife Health Center, encourages ocean users to report the presence of lost gear, and hires fishermen and experienced commercial SCUBA divers (depending on the gear type) to remove gear from nearshore waters in a safe and environmentally sensitive manner. Between 2006 and 2012, this program has retrieved more than 60 tons of gear from California's coastal ocean, primarily in Southern California, including around the California Channel Islands (Santa Rosa, Santa Cruz, Anacapa and Santa Catalina) (SeaDoc Society 2017).

Strategy Implementation

As described above, the scope and focus of this document were largely determined by the stakeholders involved in the two Workshops held in 2017. Attendees of the second Workshop devised the following Strategy implementation scheme:

Six-year timeframe: The operational cycle of this document is six years (2018-2024). Stakeholders believed six years was an appropriate timeframe for the Strategy, as it provides ample time for Action Item implementation, while also allowing for evaluation of progress and reevaluation of Strategy Goals and Objectives, if needed, throughout the process.

In-person check-ins every two years: Every two years, OPC and the NOAA MDP will help to organize in-person meetings amongst stakeholders to discuss progress made on Strategy implementation, and to reevaluate the Strategy's Goals and Objectives, if necessary.

Conference calls/webinars and newsletters every six months: Every six months, OPC and the NOAA MDP will organize and facilitate a webinar to allow stakeholders to discuss and share lessons learned from the Strategy implementation process. OPC and NOAA MDP will also create a newsletter to share updates on Action Item progress with stakeholders and the public; this newsletter will be populated by information provided by the organizations involved in Action Item implementation. OPC will also provide updates on its progress with implementing OPC Priorities via these webinars and newsletters annually. The form that these six-month check-ins take may change over the course of the document's six-year timeframe, depending on what stakeholders feel is most useful to facilitate communication and collaboration.

Action Item timelines and metrics: Stakeholders will form working groups around each Action Item, and will be responsible for devising implementation plans with rough timelines and metrics for each Action Item by the first six-month check-in webinar (which will be held in late 2018). OPC and NOAA MDP will provide some guidance and some ideas on how to set metrics and timelines for Action Items.

CALIFORNIA OCEAN PROTECTION COUNCIL PRIORITIES TO ADDRESS OCEAN LITTER

The ocean is an important part of California's economy, culture, and quality of life. California's ocean economy accounts for $41.9 billion in gross domestic product (NOAA ENOW 2014), and provides over 500,000 jobs. Sixty-eight percent of Californians live in a coastal county (NOAA OCM 2015), and the State's beaches are iconic for both tourism and recreation. Despite the large scale of the ocean, human impacts, through changes in land use and pollution, may reduce the benefits the ocean provides. Many ocean pollution problems originate on land, and in some cases, far inland from the coast. These pollution problems can range from nutrients, to contaminants of emerging concern, to ocean litter.

Ocean litter, like many other forms of pollution, is primarily land-based. Unlike other forms of pollution, ocean litter is very visible and its impacts are evident to stakeholders and the public. Ocean litter pollutes beaches and waterways, entangles marine life, smothers sensitive habitat, and is ingested by marine organisms. For more information on the impacts of ocean litter, please see "The Global Problem of Ocean Litter" and "Ocean Litter and Waste Generation" in the Background section.

Recognizing the many benefits the ocean provides to Californians and the need to protect California's coastal and ocean resources, the state legislature passed the California Ocean Protection Act (COPA) in 2004. COPA acknowledges the interconnectedness of the land and sea, and tasks OPC with ensuring that California maintains a healthy, resilient and productive ocean and coastal ecosystem for the benefit of current and future generations. OPC works in four ways to protect ocean and coastal ecosystems, as mandated by COPA. OPC recommends and implements policy, leads and promotes coordination among state agencies, seeks and leverages funding for catalytic and innovative projects, and informs government decision making with the best available science.

OPC has maintained a long-standing commitment to protecting ocean health through addressing ocean litter. In 2007, OPC adopted a resolution called "Reducing and Preventing Marine Debris" which outlined 13 top priority solutions to address marine debris. In 2008, OPC initiated a steering committee to publish an Implementation Strategy, which outlined three Priority Actions and 13 other Actions for addressing marine debris in the State. The 2008 Strategy was designed to provide a pathway to implement the recommendations in OPC Resolution. The three Priority Actions from 2008 were:

1. Implement a producer take-back (EPR) program for convenience food packaging.
2. Prohibit single-use products that pose significant ocean litter impacts where a feasible less damaging alternative is available. Products specifically called out included polystyrene food packaging and plastic bags.
3. Assess fees on commonly littered items.

As mentioned in the Background section, since the original Strategy was developed, many of the actions described in the document have either been accomplished or are in progress. For example, in 2016 state voters ratified the plastic bag ban, and numerous local municipalities have passed ordinances restricting the use of expanded polystyrene in foodware. Throughout the process of developing the 2018 Strategy, stakeholders expressed interest in having OPC articulate its priorities for ocean litter. OPC's proposed priorities to address ocean litter are laid out in this section. OPC's priorities can be divided into three broad categories: land-based sources of ocean litter, microplastics and microfibers, and fishing and aquaculture gear.

- Land-based sources of ocean litter: Land-based ocean litter makes up 80% of the litter found in the ocean. Land-based ocean litter goes on to entangle marine wildlife and pollute California's coastline. California communities spend more than $428 million annually to cleanup and control ocean litter (Stickel et al. 2013).
- Microplastics and Microfibers: Microplastics and microfibers are increasingly found in the marine environment and are ingested by marine organisms, including seafood species. These plastics are emerging as a concern for ocean health because they can physically block the digestive tracts of marine organisms, and chemicals associated with the plastic may be absorbed by marine organisms through ingestion.
- Fishing and Aquaculture Gear: Fishing and aquaculture gear, along with other ocean-based sources of litter, make up 20% of the litter found in the ocean. These types of ocean litter are particularly harmful to marine life, and prevention and removal of lost gear will benefit coastal communities and the ocean economy.

As a state agency, OPC works to advance and protect the interests of the public when addressing ocean litter. This means developing and recommending policy that reduces the negative costs associated with ocean litter. Most of these costs are currently borne by the public through funding cleanup and capture. OPC prioritizes source reduction to prevent ocean litter because it is cost-effective and reduces cost burdens on the public. Many policies can be used to address common ocean litter items, ranging from voluntary to mandatory. OPC is open to using all the policy options available, as long as they are shown to effectively and substantially reduce ocean litter. The state has a number of initiatives and programs that will complement OPC's California Ocean Litter Strategy. OPC has coordinated with our agency partners throughout the development of this Strategy and the OPC's priorities. A brief list summarizing these agencies' programs and initiatives is below:

- State Water Resources Control Board: Trash Amendments Implementation
- CalRecycle: Packaging Reform Process
- California Department to Toxic Substances Control: Safer Consumer Products Program
- California Coastal Commission: Energy, Ocean Resources, and Federal Consistency Program, and Public Education Program

- Fish and Game Commission
- California Department of Fish and Wildlife: Aquaculture Program

Implementation of OPC priorities will occur over the next six years. Stakeholders will receive updates on OPC's progress to implement these priorities at least annually as part of the California Ocean Litter Strategy Implementation process. Please see the Strategy Implementation section for more details on the implementation process. Some of the priority actions outlined below are particularly timely, and OPC staff has assigned timelines to them. Other priority actions are written in a broad way to allow for adaptation over the next six years, and do not have specific timelines called out at this time.

OPC GOAL 1 – LAND-BASED SOURCES OF OCEAN LITTER: Protect marine ecosystems and the communities that rely on them by promoting policies to prevent litter from reaching the ocean.

Priority Objective: Advance source reduction efforts through policy, research, and funding to prevent the production and consumption of common ocean litter items by supporting the following actions:

Policy Implementation: Develop and recommend a variety of policy tools to prevent the production and consumption of common ocean litter items at their source, including single-use food and beverage packaging and cigarette filters. Examples of actions to support policy implementation include, but are not limited to:

1. Promote changes by 2020 in state purchasing and service contracts, to reduce the state's reliance on single-use foodware that typically becomes ocean litter.
2. Recommend state and local policies that encourage consumers to bring their own reusable food and beverage containers by charging for disposable packaging use for "to go" food service by 2024.
3. Promote comprehensive waste management approaches to prevent the production of common ocean litter items through CalRecycle's packaging reform efforts, and explore methods to share responsibility between producers and the public to fund the cleanup of beaches and inland waterways that are littered with these products.
4. Support policies that reduce expanded polystyrene litter. OPC will support CalRecycle's inclusion of expanded polystyrene as a priority product to be addressed in the packaging reform framework and recommend the prohibition of expanded polystyrene[6] in foodware.

[6] OPC previously prioritized a polystyrene food packaging ban in 2008. Expanded polystyrene in food packaging should be addressed for a number of reasons: Expanded polystyrene breaks apart into tiny pieces quickly once it reaches the environment, it is easily carried by wind, and mixes into beach sand and sediment. Although expanded polystyrene is technically recyclable expanded polystyrene in use as food service ware is often too contaminated for the recycling stream.

5. Convene and foster innovative partnerships, use funding mechanisms, and recommend policies to redesign common ocean litter items such as connecting bottle caps to bottles.
6. Convene a working group to evaluate a ban on cigarette filters in California by 2020. The working group will investigate research and reports on cigarette filters, and the extent to which they impact human health. If the working group finds that cigarette filters provide no health protections to smokers, then OPC may make recommendations to the legislature to ban cigarette filters.

Research and Funding: Use research and funding to address knowledge gaps and better target policy efforts; examples of actions under this category include, but are not limited to:

1. Fund assessments of policy effectiveness to determine whether the policies are acting as intended and what, if any, changes need to be made to increase effectiveness. If local policies or ordinances are demonstrated to be effective, consider recommending for statewide implementation.
2. Fund a report synthesizing lessons learned from waste management policies and tools implementation in other countries, including policy recommendations for California, with a focus on source reduction by 2020.
3. Fund research and partner with the Department of Toxic Substances Control to address chemical additives that are commonly associated with products found in ocean litter to determine their environmental impacts. Chemical additives may include, but will not be limited to fluorinated compounds, plasticizers, and antimicrobials.
4. Fund a report compiling and synthesizing the use of plastics in agricultural practices, and the extent to which this use of plastics may contribute to ocean litter by 2023.
5. Fund innovative projects and programs that reduce the production and consumption of common ocean litter items, such as a piloting the use of a reusable “to go” container exchange at food service providers.

OPC GOAL 2 – MICROPLASTICS AND MICROFIBERS: Increase understanding of the scale and impact of microplastics and microfibers on the marine environment and develop solutions to address them.

Priority Objective: Advance research on the extent and impact of microplastics and microfibers in source waters and the ocean, and assist in the development of technological solutions to reduce their prevalence in aquatic environments through the following actions:

1. Fund the development and validation of standardized monitoring methods in California to assess the concentration and flux of microplastics by 2021. Methods are needed for

several different environments where microplastics are found, including: wastewater effluent, ambient waters, stormwater, marine sediments, and tissues of fish and bivalves.

2. Once reliable monitoring methods have been established, convene scientists and experts to develop a comprehensive research plan by 2024 to characterize microplastics' sources, pathways, ambient concentrations, risk assessments, and impacts. Research efforts may include the following:
    a. Quantify the concentration at which microplastics cause ecological impacts to marine life and ocean health at the population and community levels, as well as impacts to individual organisms' biology;
    b. Improve the understanding of the sources and pathways associated with microplastic pollution, including polymer identification;
    c. Determine whether additives associated with microfibers may cause impacts to the marine environment, research will be based on best available data and the development of studies will include relevant stakeholders;
    d. Determine whether there is a need to address textiles as a source of microplastics, and if so determine whether reformulated textiles can significantly reduce the loading of microplastics into the environment; research will be based on best available data and the development of studies will include relevant stakeholders.
    e. If wastewater treatment plant loadings of microplastics are found to have a significant impact on the environment, research the feasibility and effectiveness of technical solutions for microfibers in wastewater treatment plants, washing machines, and other points in the wastewater management system, including source control.

OPC GOAL 3 – FISHING AND AQUACULTURE GEAR: Reduce fishing and aquaculture-related debris in the ocean[7].

Priority Objective: Promote improved fishing and aquaculture gear management and sustainable innovation to reduce the potential for lost gear; remove lost gear and legacy infrastructure from the ocean by pursuing the following actions:

1. Provide best-available science and information to the California Department of Fish and Wildlife (CDFW) and the California Fish and Game Commission (FGC) as they work to develop improved fishing and aquaculture gear management, and maintain two-way

[7] Although there are many ocean-based sources of debris in the ocean, the scope of the California Ocean Litter Strategy focuses on fishing and aquaculture gear, and OPC Priorities reflect this scope.

information exchange between the CDFW, FGC, and OPC for data sharing and interagency staff coordination.

2. Promote fixed-gear best practices, including how to minimize losing traps.
3. Promote the development and implementation of regulations requiring best management practice plans for shellfish aquaculture in California by 2020, in partnership with CDFW, FGC, and the California Coastal Commission. The best management practice plans should reduce the potential for loss of aquaculture gear and require the cleanup and recovery of lost gear.
4. Develop fishery-funded gear retrieval programs through industry education and collaborations with non-governmental organizations, port and harbor districts and associations, and other partners to effectively implement existing and developing gear retrieval programs.
5. Fund sustainable innovation in fishing and aquaculture gear to reduce the potential for lost gear, including new technologies, and ensure that any new and effective fishing and aquaculture gear innovation is an allowable technology in legislation and regulations.
6. Recommend the development and implementation of regulatory tools to allow for retrieval of lost gear or traps that belong to other fishermen.
7. Fund removal of fishing gear and abandoned aquaculture materials, disused creosote pilings, and illegal artificial reefs, where liable owners and responsible parties cannot be identified.

STAKEHOLDER GOALS, OBJECTIVES, AND ACTION ITEMS

In the tables below, Action Items to prevent and reduce ocean litter are grouped under broader Goals and Objectives. Definitions of the information in each column are as follows:

- Action Items: Outlines the task that will be implemented in order to prevent or reduce ocean litter.
- Lead & Partner Organizations: Identifies the organization(s) or individual(s) that will implement the Action Item.
    - Lead Organizations are bolded and listed alphabetically, before Partner Organizations, next to each Action Item. Lead Organizations are committed to implementing an Action Item, given organizational and funding constraints. Lead Organizations will serve as the point of contact for NOAA and OPC for progress reports and check-ins throughout the Strategy's six-year timeframe, and will take a leadership role in communicating and coordinating with other collaborators/Partner Organizations on the Action Item.

- **Partner Organizations** are unbolded and listed alphabetically, after Lead Organizations, next to each Action Item. Partner Organizations will serve a supporting role in implementing an Action Item, in collaboration with Lead and other Partner Organizations.

LAND-BASED OCEAN LITTER

GOAL 1. Reduce the use of common ocean litter items through mandates and incentives targeting public institutions and businesses.

Objective 1.1. Prohibit or discourage common ocean litter items in public institutions, retail, and food service establishments through government policies or mandates.	
Action Items	**Lead & Partner Organizations**
1.1.1. Pass and implement policies that prohibit or discourage common ocean litter items at the local level[8] and consider these policies for effectiveness assessment as described under Objective 4.4.	Californians Against Waste, Clean Water Action/Clean Water Fund, Plastic Recycling Corporation of California (PRCC), Surfrider Foundation, UPSTREAM
1.1.2. Pass and implement legislation that prohibits or discourages common ocean litter items at the state level and consider these policies for effectiveness assessment as described under Objective 4.4.	Californians Against Waste, Clean Water Action/Clean Water Fund, Plastic Recycling Corporation of California (PRCC), Surfrider Foundation, UPSTREAM
1.1.3. Expand the statewide bag ban to apply to retail stores, restaurants, and food delivery, and amend the State's criteria for reusable bags to exclude bags made from plastic film[9].	Californians Against Waste, Plastic Recycling Corporation of California (PRCC), Surfrider Foundation
1.1.4. Promote reusable and refillable food and beverage packaging in the state bottle bill, and state and local packaging policies.	
1.1.5. Change procurement of common ocean litter items on UC and CSU campuses, and share lessons learned with other learning institutions (e.g., community colleges, K-12).	Clean Water Action/Clean Water Fund, Surfrider Foundation

[8] Examples of local policies include excess litter fee programs such as that implemented in Oakland, California (City of Oakland 2018), and local polystyrene food ware bans such as that implemented in San Francisco, California (San Francisco Department of the Environment 2016).

[9] Currently, the State allows reusable grocery bags, as defined in SB 270 Chapter 5.3 Article 2, to be made from plastic film, as long as the bags meet a number of requirements, including being "capable of carrying 22 pounds over a distance of 175 feet for a minimum of 125 uses and be[ing] at least 2.25 mils thick, measured according to the American Society of Testing and Materials (ASTM) Standard D6988-13." This Action Item follows the example set by the City and County of Honolulu, Hawai'i, which, in 2017, amended Oahu's plastic bag ban so that by January 1, 2020, plastic film bags will no longer be considered reusable bags (Mattison 2017).

1.1.6. Change procurement to minimize the use of common ocean litter items in local and state government buildings and events, and share lessons learned with other public institutions (e.g., federal facilities, jails, hospitals).	**Ocean Protection Council (OPC),** Californians Against Waste, Clean Water Action/Clean Water Fund, Surfrider Foundation, UPSTREAM
1.1.7. Require permits for new construction of dine-in restaurants to include dishwashing facilities on-site to accommodate reusable food ware.	Californians Against Waste, Clean Water Action/Clean Water Fund, UPSTREAM
1.1.8. Develop a toolkit with materials and strategies to share with local and out-of-state advocates to a) aid in the process of banning common ocean litter items, and b) to aid in the process of switching local governments and communities to reusable items.	**Plastic Pollution Coalition, UPSTREAM,** Institute for Geographic Information Science (IGISc) at SFSU
Objective 1.2. Incentivize institutions, businesses, and events to transition away from common ocean litter items.	
Action Items	Lead & Partner Organizations
1.2.1. Perform audits before and after institutions implement efforts to minimize the use of common ocean litter items.	Clean Water Action/Clean Water Fund
1.2.2. Incentivize businesses and corporations to transition to reusables (e.g., film industry craft services, corporate dining, water refill stations) through sharing case studies and demonstrating cost-savings.	Amcor Limited, Clean Water Action/Clean Water Fund, Surfrider Foundation, UPSTREAM
1.2.3. Promote certification for events (e.g., music festivals, concerts, sports competitions, film production) that achieve zero waste principles.	Clean Water Action/Clean Water Fund
1.2.4. Engage with companies that are already using alternative products and materials to help advocate for transition away from common ocean litter items.	Plastic Recycling Corporation of California (PRCC), Surfrider Foundation

GOAL 2. Reduce the prevalence of common ocean litter items through changes in product production, design, and management.

Objective 2.1. Support and promote extended producer responsibility (EPR) and other waste management strategies to reduce the generation of common ocean litter items, and create a mechanism for producers to fund common ocean litter item capture, cleanup, and recycling infrastructure.

Action Items	Lead & Partner Organizations
2.1.1. The Ocean Protection Council and other stakeholders will promote EPR as a policy to consider as part of CalRecycle's Packaging Reform Effort, and support giving CalRecycle legislative authority to create mandatory packaging reform policies.	**Ocean Protection Council (OPC),** Californians Against Waste, Plastic Recycling Corporation of California (PRCC), Save Our Shores, UPSTREAM
2.1.2. Create a report synthesizing lessons learned from waste management policy and tool implementation in other countries, including recommendations for California with a focus on source reduction.	UPSTREAM
2.1.3. Include performance measures in EPR programs for both prevention and recycling of common ocean litter items, with prevention being a higher priority.	Californians Against Waste, Plastic Recycling Corporation of California (PRCC), Save Our Shores, UPSTREAM
2.1.4. Ensure that all film and wrap plastics eligible for recycling (plasticfilmrecycling.org) are accepted at all drop-off locations (e.g., grocery stores), and enforce the recycling requirements that are part of the statewide bag ban[10].	
Objective 2.2. Support product redesign with the aim of preventing ocean litter through design changes and avoiding harmful substitutions[11].	
Action Items	**Lead & Partner Organizations**
2.2.1. Engage corporations in common ocean litter item redesign by implementing design challenges, and creating a venue for sharing innovative designs with brands and corporations.	**Think Beyond Plastic,** Amcor Limited, American Chemistry Council (ACC), Plastic Recycling Corporation of California (PRCC), UPSTREAM
2.2.2. Redesign and produce bottles with caps attached ("connect the cap"), and ensure that all components of these products are recyclable at all facilities in California.	American Chemistry Council (ACC), Californians Against Waste, Plastic Recycling Corporation of California (PRCC), Surfrider Foundation, Think Beyond Plastic, UPSTREAM

[10] The statewide bag ban, SB 270 (Sections 42250-42257), requires stores that make plastic carryout bags available to their customers to establish at-store recycling programs that allow customers to return clean plastic carryout bags to stores to be recycled. This Action Item calls for the enforcement of the recycling requirements outlined in SB 270, as well as an expansion of the recycling programs established at stores to accept all film and wrap plastics eligible for recycling, as defined by plasticfilmrecycling.org (including bags used for produce, bulk goods, and other products, which, while not covered under SB 270, are often single-use plastic and end up in the environment).

[11] The term "harmful substitutions" is used here to mean: 1) products that may take the place of common ocean litter items and continue to contribute to the problem of ocean litter, rather than reduce ocean litter, and 2) products that may take the place of common ocean litter items, and contain components, additives, or contaminants that are detrimental to human health and/or the environment.

2.2.3. Redesign plastic products to be circular and entirely recyclable in California, through voluntary or legislative action[12].	

GOAL 3. Improve waste management and interception of litter on land before it enters the ocean.

Objective 3.1. Support the State Water Resources Control Board's Trash Amendments.	
Action Items	**Lead & Partner Organizations**
3.1.1. Create a mechanism for local governments to fund stormwater trash programs through public or private sources.	American Chemistry Council (ACC), Clean Water Action/Clean Water Fund, Ocean Protection Council (OPC), Plastic Recycling Corporation of California (PRCC), Save Our Shores, UPSTREAM
3.1.2. Implement a statewide Adopt-A-Storm Drain program.	Plastic Recycling Corporation of California (PRCC), Save Our Shores
3.1.3. Educate the public about the Trash Amendments.	
Objective 3.2. Improve waste management in public places.	
Action Items	**Lead & Partner Organizations**
3.2.1. Establish and improve management of trash, recycling, and compost receptacles in high use areas.	Amcor Limited, American Chemistry Council (ACC), California Coastal Commission, Ocean Protection Council (OPC), Plastic Recycling Corporation of California (PRCC), Save Our Shores
3.2.2. Increase industry investment in infrastructure improvements to address waste management at schools and other public areas.	American Chemistry Council (ACC)
3.2.3. Support packaging policies that develop and expand infrastructure for recycling in California.	
3.2.4. Engage with municipalities and social programs to assess how to reduce ocean litter from	

[12] In July 2017, China informed the World Trade Organization (WTO) that by the end of 2017, it would ban the import of 24 types of waste, including "plastics waste from living sources" (Reuters 2017). China's new policy has put pressure on California's recycling infrastructure (which currently relies on the export of about one-third of the recyclable materials generated in the state to other countries), as in 2016, 62% of the 15 million tons of recyclable materials exported by California went to China (CalRecycle 2018). China's policy change has emphasized the need to promote waste prevention in California, as well as expand California's own recycling infrastructure, to reduce the amount of recyclable waste that is exported each year (CalRecycle 2018).

encampments, as one strategy to improve the health, wellbeing, and safety of homeless communities.	

GOAL 4. Conduct and communicate research on existing and emerging issues related to land-based ocean litter.

Objective 4.1. Conduct a comprehensive characterization of microplastics and macro-debris.	
Action Items	Lead & Partner Organizations
4.1.1. Convene an expert workgroup to develop a matrix of standard sample collection, processing, and characterization methods for measuring temporal changes in microplastics and macro-debris in different environments.	**San Francisco Estuary Institute (SFEI)**, **Southern California Coastal Water Research Project (SCCWRP)**, 5 Gyres Institute, American Chemistry Council (ACC), California Association of Sanitation Agencies (CASA), Clean Water Action/Clean Water Fund, Dr. Andrew Gray at UC Riverside, Dr. Erika Holland at CSULB, Environmental Science and Resource Management (ESRM) Program at CSUCI (including Dr. Clare Steele), NOAA Marine Debris Program (NOAA MDP), Plastic Recycling Corporation of California (PRCC), Surfrider Foundation
4.1.2. Develop and test laboratory methods to identify the most common macro- and micro-plastic debris polymer types through molecular techniques (e.g., FTIR, Raman, forensics).	**Environmental Science and Resource Management (ESRM) Program at CSUCI (including Dr. Clare Steele),** American Chemistry Council (ACC), Bay Area Clean Water Agencies (BACWA), Dr. Andrew Gray at UC Riverside, Dr. Erika Holland at CSULB, Southern California Alliance of Publicly Owned Treatment Works (SCAP)
4.1.3. Develop a watershed-scale program to model and monitor microplastics and macro-debris flux, transport, degradation, and fate according to a variety of endpoints (e.g., street litter, stormwater, wastewater, and direct discharges).	**San Francisco Estuary Institute (SFEI),** 5 Gyres Institute, American Chemistry Council (ACC), California Association of Sanitation Agencies (CASA), California Coastkeeper Alliance, Dr. Andrew Gray at UC Riverside, Dr. Natalie Mladenov at SDSU
4.1.4. Create a comprehensive litter dataset to identify the most common item types according to material, product, brand, and source.	**Dr. Andrew Gray at UC Riverside,** Surfrider Foundation
Objective 4.2. Quantify microplastics pathways within watersheds and develop technological solutions.	
Action Items	Lead & Partner Organizations

4.2.1. Identify and quantify microfibers and microplastics from wastewater, stormwater, airborne, and agricultural sources.	**San Francisco Estuary Institute (SFEI)**, **Southern California Coastal Water Research Project (SCCWRP),** 5 Gyres Institute, Bay Area Clean Water Agencies (BACWA), Dr. Andrew Gray at UC Riverside, Dr. Natalie Mladenov at SDSU, Environmental Science and Resource Management (ESRM) Program at CSUCI, Southern California Alliance of Publicly Owned Treatment Works (SCAP)
4.2.2. Research innovative solutions to address microfibers in textiles and apparel.	Dr. Andrew Gray at UC Riverside, Southern California Alliance of Publicly Owned Treatment Works (SCAP)
4.2.3. Research technological solutions to address microfibers at wastewater treatment plants or in washing machines.	Dr. Andrew Gray at UC Riverside, Southern California Alliance of Publicly Owned Treatment Works (SCAP)
Objective 4.3. Research ecological and toxicological impacts of commonly found ocean litter on marine resources and human health.	
Action Items	**Lead & Partner Organizations**
4.3.1. Advance research on the chemical components of common ocean litter items (by resin type) and the potential for pollutants to migrate into the environment and aquatic organisms via ocean litter.	**Ocean Protection Council (OPC),** American Chemistry Council (ACC), California Department of Toxic Substances Control (DTSC), California Lost Fishing Gear Recovery Project at UC Davis, Dr. Erika Holland at CSULB, Environmental Science and Resource Management (ESRM) Program at CSUCI (including Dr. Clare Steele), Graduate School of Public Health at SDSU, UPSTREAM
4.3.2. Assess population and community-level impacts to economically important and/or especially vulnerable species from exposure to plastics and adsorbed pollutants.	
4.3.3. Research impacts to human health via direct consumption of microplastics and seafood exposed to plastic debris.	American Chemistry Council (ACC), California Lost Fishing Gear Recovery Project at UC Davis, UPSTREAM
Objective 4.4. Assess the effectiveness of existing bans, policies, and programs.	
Action Items	**Lead & Partner Organizations**
4.4.1. Conduct cost-benefit analyses for implementation of different common ocean litter item reduction policies/strategies and provide them to cities and businesses (i.e., local ordinances to ban expanded polystyrene, deposit schemes, packaging redesign).	Dr. Andrew Gray at UC Riverside

4.4.2. Analyze the impact of the statewide plastic bag ban on reducing disposable bag use, preventing ocean litter, and reducing government costs.	American Chemistry Council (ACC), California Coastal Commission, Dr. Andrew Gray at UC Riverside
4.4.3. Conduct research into consumer behavior to assess attitudes toward reusable and disposable items, convenience, willingness to pay, and incentives to avoid commonly littered items (e.g., cigarette filters).	Clean Water Action/Clean Water Fund, Dr. Sean Anderson at CSUCI, Plastic Recycling Corporation of California (PRCC), Save Our Shores

Objective 4.5. Improve coordination among California organizations conducting ocean litter research.	
Action Items	Lead & Partner Organizations
4.5.1. Improve communication among ocean litter research entities in California through participation in the Ocean Litter Strategy implementation process.	NOAA Marine Debris Program (NOAA MDP), Ocean Protection Council (OPC)
4.5.2. Increase dissemination of research results to the public and management agencies (e.g., California Department of Fish and Wildlife).	Ocean Protection Council (OPC)

GOAL 5. Generate behavior change by educating and engaging communities and individuals to reduce ocean litter.

Objective 5.1. Increase formal and informal science-based education to raise awareness of ocean litter.	
Action Items	Lead & Partner Organizations
5.1.1. Compile and share a database of existing resources and curriculum for formal education on ocean litter.	NOAA Marine Debris Program (NOAA MDP)
5.1.2. Integrate standards-based ocean litter curriculum into school programs.	5 Gyres Institute, California Coastal Commission, Institute for Geographic Information Science (IGISc) at SFSU, Monterey Bay Aquarium, NOAA Marine Debris Program (NOAA MDP), Plastic Recycling Corporation of California (PRCC), Save Our Shores
5.1.3. Develop and distribute toolkits to empower high school and college students to educate people on their campuses and in their communities.	Monterey Bay Aquarium, NOAA Marine Debris Program, Plastic Recycling Corporation of California (PRCC)
Objective 5.2. Educate consumers about the sources of ocean litter, to drive behavior change in purchasing.	

Action Items	Lead & Partner Organizations
5.2.1. Implement coastal and inland public education campaigns about common ocean litter items, to drive changes in purchasing.	California Coastal Commission, Californians Against Waste, Environmental Science and Resource Management (ESRM) Program at CSUCI, Plastic Recycling Corporation of California (PRCC), Save Our Shores, Surfrider Foundation
5.2.2. Develop messaging for consumers and producers on microfibers given our current state of knowledge on this emerging issue.	Bay Area Clean Water Agencies (BACWA), California Association of Sanitation Agencies (CASA), Californians Against Waste, Environmental Science and Resource Management (ESRM) Program at CSUCI
5.2.3. Implement a public education campaign about cigarette filters.	California Coastal Commission, Californians Against Waste, Save Our Shores, UPSTREAM

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GOAL 6. Reduce ocean-based debris at its source, and maximize the efficiency of control and cleanup of ocean-based debris.

Objective 6.1. Leverage industry knowledge to prevent lost fishing gear.	
Action Items	Lead & Partner Organizations
6.1.1. Leverage veteran fishermen's knowledge about gear loss prevention and share strategies with the commercial and recreational fishing industries.	California Lost Fishing Gear Recovery Project at UC Davis, Channel Islands National Marine Sanctuary, NOAA Marine Debris Program (NOAA MDP)
6.1.2. Share lessons learned from the fishing industry with management agencies and other stakeholders to focus policy and funding on prevention and recovery of lost gear.	California Lost Fishing Gear Recovery Project at UC Davis, Channel Islands National Marine Sanctuary
6.1.3. Work with the fishing community to design gear to be more durable, less likely to be lost, and less harmful to the environment once lost.	
Objective 6.2. Implement Best Management Practice (BMP) Plans for reducing lost gear within the aquaculture industry.	
Action Items	Lead & Partner Organizations

6.2.1. Compile key outcomes desired for effective BMP Plans for the aquaculture industry through a collaborative process with, and between, growers.	**California Department of Fish and Wildlife (CDFW)**
6.2.2. Update Fish and Game Commission policies to include BMPs in permitting considerations such as the issuance of aquaculture leases, and educate growers and stakeholders about BMPs to help in the implementation process.	**California Department of Fish and Wildlife (CDFW),** Channel Islands National Marine Sanctuary
6.2.3. Include aquaculture BMP Plan implementation requirements in coastal development permits, where appropriate.	

Objective 6.3. Improve tracking of lost fishing and aquaculture gear in order to better understand lost gear patterns and impacts, and to facilitate removal.

Action Items	Lead & Partner Organizations
6.3.1. Improve the reporting system for lost fishing gear by developing and identifying manager(s) of a centralized database for reporting GPS locations of lost commercial and recreational gear without penalty to fishermen.	California Lost Fishing Gear Recovery Project at UC Davis, Channel Islands National Marine Sanctuary, Dr. Andrew Gray at UC Riverside
6.3.2. Implement a pilot project to assess the effectiveness of different tagging and marking methods for aquaculture gear.	NOAA Marine Debris Program (NOAA MDP)
6.3.3. Include aquaculture gear marking and debris collection reporting requirements in coastal development permits, where appropriate.	

Objective 6.4. Increase the removal of ocean-based debris.

Action Items	Lead & Partner Organizations
6.4.1. Research and provide recommendations to overcome policy barriers to lost gear removal and ocean-based marine debris cleanup.	California Lost Fishing Gear Recovery Project at UC Davis, Channel Islands National Marine Sanctuary
6.4.2. Support and expand existing programs for the prevention and removal of abandoned or derelict vessels (e.g., funding for removal of commercial vessels).	
6.4.3. Implement a buyback, return, and/or recycling program for old and/or unused fishing gear.	California Lost Fishing Gear Recovery Project at UC Davis

6.4.4. Identify and remove, when deemed appropriate based on potential impacts of removal, legacy aquaculture debris from historic aquaculture lease operations (e.g., Tomales Bay).	California Lost Fishing Gear Recovery Project at UC Davis
6.4.5. Engage and partner with boaters, fishermen, divers, growers, local communities, and other ocean stakeholders to implement regional cleanup programs (e.g., in bays, ports, or harbors).	Channel Islands National Marine Sanctuary (Coastal Cleanup Day and Get Into Your Sanctuary Day), California State Parks Division of Boating & Waterways and California Coastal Commission, Environmental Science and Resource Management (ESRM) Program at CSUCI
6.4.6. Place large receptacles at ports and harbors for fishermen to dispose of trash that has been collected while fishing.	

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State of California
Department of Fish and Game

Flex your POWER

Memorandum

Date: ~~May 15~~ June 1, 2012

To: Sonke Mastrup
Executive Director
Fish and Game Commission

From: Charlton H. Bonham
Director

Subject: Agenda Item for June 20-21, 2012, Fish and Game Commission Meeting Re: Recommendation to Amend Regulations for the Commercial Take of Kelp and Other Aquatic Plants (Sections 165 and 165.5, Title 14, CCR)

On February 2, 2012, the Fish and Game Commission (Commission) directed the Department of Fish and Game (Department) to provide an approach and time line to revise antiquated kelp and other aquatic plant regulations (Sections 165 and 165.5, Title 14, CCR). The purpose of this informational item is to begin a formal discussion to improve management of marine algae. The Department recommends a three-phase reconstruction approach over several years to improve management and enforceability of the regulations.

Phase 1. Boundaries and Improved Guidelines

Request notice authorization at the Commission's October 3-4, 2012 meeting to consider these amendments to the existing regulations:

- Enhance descriptions of Administrative Kelp Bed (Kelp Bed) boundaries with spatially explicit latitude and longitude coordinates.
- Improve management of the mechanical harvest of giant kelp (*Macrocystis pyrifera*) by requiring a Commission-approved kelp harvest plan for all kelp beds.
- Improve spatial reporting requirements for kelp harvest.

Phase 2. Fees

Conduct public scoping meetings in 2012-2013, with assistance from the Commission, to explore options for increasing existing commercial license fees and royalty rates for harvesting giant kelp and bull kelp (*Nereocystis luetkeana*), edible seaweed, and agarweed to cover the long-term costs of managing these algae. By October 2013, the Department intends to have collected the necessary information to have had detailed discussions with the Commission's Marine Resources Committee.

After discussion in the Commission venue late in 2013, the Department will be prepared to ask the Commission to authorize notice of its intent to amend existing regulations concerning commercial license fees and royalty rates for the aforementioned resources.

Phase 3. Kelp Management and Harvest

Over the next three years (2013-2016), conduct a full review and potential rewrite of existing regulations to address management and harvest concerns identified by the Commission, kelp harvesters, and the public. This phase would include the following elements:

- Identify management and harvest issues and challenges by consulting and collaborating with kelp harvesters, the scientific community, and the public.
- Conduct public scoping meetings on a proposed project.
- Provide options for the Commission to consider revising the regulations.
- Draft an Initial Statement of Reasons for kelp regulations.
- Draft an Environmental Impact Report.

The Department looks forward to receiving input and guidance on this concept and to providing more detail and opportunity for discussion at future Commission and Marine Resource Committee meetings.

If you have questions or need additional information, please contact Ms. Marija Vojkovich, Regional Manager in the Department's Marine Region, by telephone at (805) 568-1246.

ec: Marija Vojkovich, Regional Manager
Marine Region
mvojkovich@dfg.ca.gov

California Fish and Game Commission

Sport Fishing Report Card Regulation Change Originally Proposed in the 2017 Initial Statement of Reasons for Sport Fishing

Sport Fishing Report Card Requirements

Section 1.74 establishes guidelines for report card regulations including reporting harvest authorized by a report card; however, this section does not include a mechanism for confirmation that data from a report card has been reported. This proposal requires report card holders who submit data online to write the provided confirmation number on their report card and retain the report card until for 90 days after the reporting deadline.

When a report card is lost, a licensee may wish to obtain a duplicate, or may simply need to fulfill the harvest reporting requirement before the reporting deadline. Section 1.74 does not currently provide guidelines for licensees who have lost their report card and need to report their harvest, but do not need to obtain a duplicate report card. This proposal updates procedures regarding lost report cards to provide guidelines for obtaining a duplicate report card, and also for reporting harvest from a lost report card without obtaining a duplicate report card.

Proposed Amendments to Section 1.74, Title 14, California Code of Regulations

Note that underlined text is newly proposed and text in strikeout is proposed for deletion.

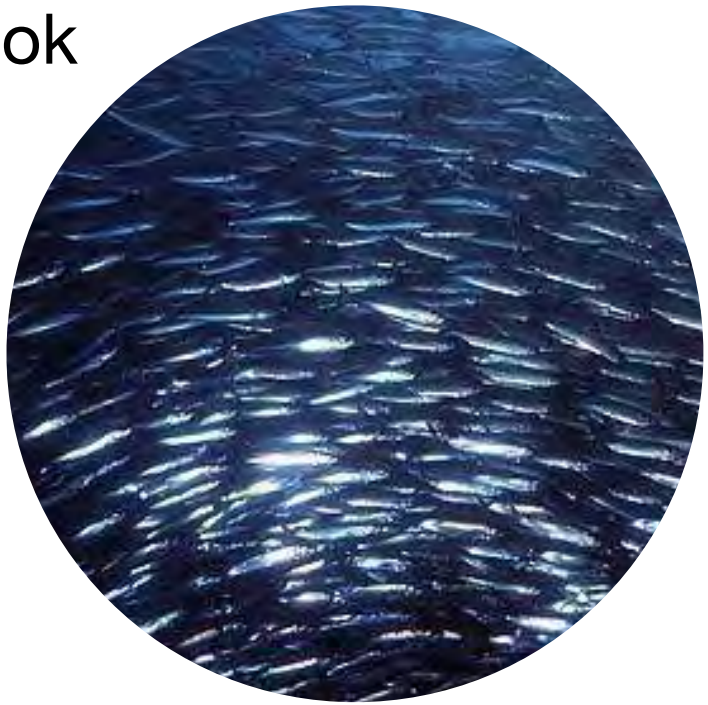
§1.74. Sport Fishing Report Card Requirements.
(a) Purpose. These regulations are designed to improve recreational fishing effort and catch information in some or all areas where the fisheries operate. Many of these species are of high commercial value, and therefore, additional enforcement mechanisms are needed to improve compliance with existing bag limits and other regulations, and to reduce the potential for poaching.
(b) Report card requirements apply to any person fishing for or taking the following species regardless of whether a sport fishing license is required:
(1) Salmon, in the anadromous waters of the Klamath, Trinity, and Smith river basins. Anadromous waters are defined in Section 1.04 ~~of these regulations~~.
(2) Steelhead trout.
(3) White sturgeon.
(4) Red abalone.
(5) California spiny lobster.
(c) General Report Card Requirements.
(1) Any person fishing for or taking any of the species identified in this Section shall have in his immediate possession a valid non-transferable report card issued by the department for the particular species. See special exemption regarding possession of report cards for lobster divers in Section 29.91 of these regulations.
(2) All entries made on any report card or tag shall be legible and in indelible ink.
(3) A report card holder fishing with a one, two, or ten-day sport fishing license, may replace the expired fishing license without purchasing a new report card so long as the report card is still valid.

(4) Report cards are not transferable and shall not be transferred to another person. No person shall possess any report card other than his own.
(5) A person may only obtain one abalone report card and one sturgeon report card per report card period.
(6) Any report card holder who fills in all available lines on his steelhead, salmon or lobster report card shall return or report the card to the department pursuant to subsection 1.74(e) prior to purchasing a second card.
(7) Data recording and tagging procedures vary between report cards and species. See specific regulations in sections 5.79, 5.87, 5.88, 27.92, 29.16, and 29.91 that apply in addition to the regulations of this Section.
(d) Report Card Return and Reporting Requirements
(1) Report card holders shall return or report their salmon, steelhead, sturgeon, or abalone report cards to the department pursuant to subsection 1.74(e) by January 31 of the following year.
(A) Any report card holder who fails to return or report his salmon, steelhead, sturgeon, or abalone report card to the department by the deadline may be restricted from obtaining the same card in a subsequent license year or may be subject to an additional fee for the issuance of the same card in a subsequent license year.
(2) Report card holders shall return or report their lobster report cards pursuant to subsection 1.74(e) by April 30 following the close of the lobster season for which the card was issued.
(A) Any report card holder who fails to return or report his or her lobster report card by April 30 following the close of the lobster season specified on the card shall be subject to a nonrefundable non-return fee specified in Section 701, in addition to the annual report card fee, for the issuance of a lobster report card in the subsequent fishing season.
(e) Report Card Return and Reporting Mechanisms:
(1) By mail or in person at the address specified on the card. A report card returned by mail shall be postmarked by the date applicable to that card as specified in subsection 1.74(d)(1), or 1.74(d)(2).
(2) Online through the department's license sales service website by the date applicable to that card as specified in subsection 1.74(d)(1) or 1.74(d)(2).
Report card holders reporting online will be provided a confirmation number upon successful submission. The report card holder must record the provided confirmation number in the space provided on the report card and retain the report card for 90 days after the reporting deadline. Report cards submitted online must be surrendered to the department upon demand.
(3) If a report card is submitted by mail and not received by the department, it is considered not returned unless the report card holder reports his or her report card as lost pursuant to subsection 1.74(f).
~~(f) Lost report cards.~~
~~(1) Any report card holder who loses his report card shall submit an affidavit, signed under penalty of perjury, in person to a department license sales office containing all of the following information:~~
~~(A) A statement containing the report card holder's full name confirming that the originally issued report card cannot be recovered.~~
~~(B) A statement containing the report card holder's best recollection of the prior catch records that were entered on the report card that was lost.~~
~~(C) A statement describing the factual circumstances surrounding the loss of the card.~~
~~(2) An affidavit for a lost report card shall be presented at a department license sales office, by the date applicable to that card specified in subsection 1.74(d)(1) or 1.74(d)(2) to be considered returned.~~

~~(3) Notwithstanding subsection 1.74(c)(5), any report card holder who loses his report card during the period for which it is valid may replace the lost report card by submitting an affidavit as described in subsection 1.74(f)(1) and payment of the report card fee and replacement processing fee specified in Section 701.~~
~~(A) Based on the information provided in the written affidavit for abalone and sturgeon report cards, the department shall issue only the number of tags that were reported unused on the previously issued report card.~~
(f) Lost report cards.
(1) Any report card holder who loses his report card shall submit an affidavit, signed under penalty of perjury, to a department license sales office containing all of the following information:
(A) The report card holder's full name and a statement confirming that the originally issued report card is lost and cannot be recovered.
(B) A statement containing the report card holder's best recollection of the prior catch that were entered on the report card that was lost.
(C) A statement describing the factual circumstances surrounding the loss of the report card.
(2) No Duplicate Requested or Available. Any report card holder who lost his or her report card and is not obtaining a duplicate report card shall ensure that the steps are completed:
(A) The report card holder shall submit an affidavit as described in subsection 1.74(f)(1). If the report card holder previously submitted the harvest report card data online, the report card holder must include the confirmation number for the harvest report on the affidavit.
(B) If the report card holder has not reported the data from the lost report card via the online site, department staff shall enter the harvest information from the affidavit.
(C) An affidavit for a lost report card shall be submitted to a department license sales office, by the harvest report submission deadline date applicable to that report card specified in subsection 1.74(d)(1) or 1.74(d)(2) to be considered returned.
(3) Duplicate Report Card Requested. Notwithstanding subsection 1.74(c)(5), any report card holder who loses his or her report card during the period for which it is valid may replace the lost original report card by completion of the following:
(A) Submitting an affidavit as described in subsection 1.74(f)(1).
(B) Submitting payment of the report card fee and the nonrefundable replacement processing fee specified in Section 701.
(C) Department staff shall enter the harvest information from the affidavit to the duplicate report card. Note: the original report card should not be reported. Instead, the data from the original will be reported on the duplicate report card.
(D) Based on the information provided on the affidavit for abalone and sturgeon report cards, department staff shall remove tags reported as used and issue only the number of tags that were reported unused on the lost original report card.
(E) Report card holders shall verify that the harvest information has been accurately transferred from the affidavit to his or her duplicate report card.
(F) The duplicate report card shall be reported pursuant to the requirements for the original report card as specified in subsection 1.74(d).
Note: Authority cited: Sections 200, 205, 1050, 1053.1, 1055.1 and 7380, Fish and Game Code. Reference: Sections 200, 205, ~~206,~~ 713, 1050, 1053.1, 1055.1, 7149.8, 7380, 7381 and 7382, Fish and Game Code.

A Management Plan for California's Pacific Herring Fishery

Marine Resources Committee Meeting
March 2018 Briefing Book



Marine Life Management Act

- Marine Life Management Act (MLMA) requires that California's fisheries be managed in a way that promotes:
  - Stock sustainability
  - Stakeholder Engagement
  - A holistic ecosystem-based approach
- Fishery Management Plans (FMP) should be primary tool for CA's most important commercial and recreational fisheries

What is an FMP?

- A document that provides a comprehensive overview of:

  1. What we know about the fishery

  2. Where the major uncertainties lie

  3. Describes a comprehensive management procedure that must be followed each year

- Provides guidance on the tools appropriate for management

- Paired with a regulatory package to implement the FMP

Overview

- Provide background on FMP development process
- Describe the scientific analyses and their results
- Describe the proposed management strategy for Pacific herring
  - San Francisco Bay
  - Other Embayments
- Describe proposed regulatory changes
- Next Steps

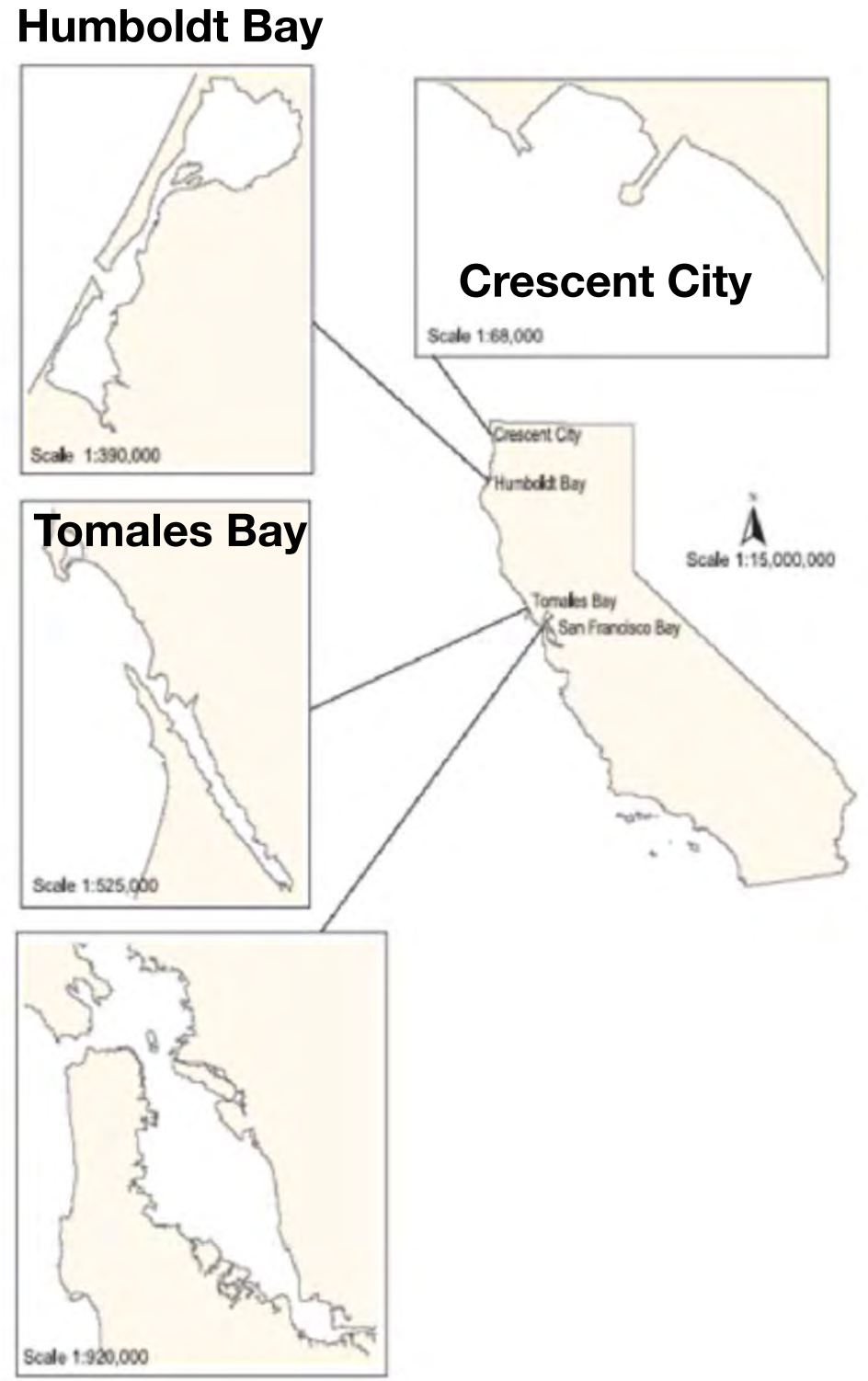
Background and Development Process

Pacific Herring Fishery

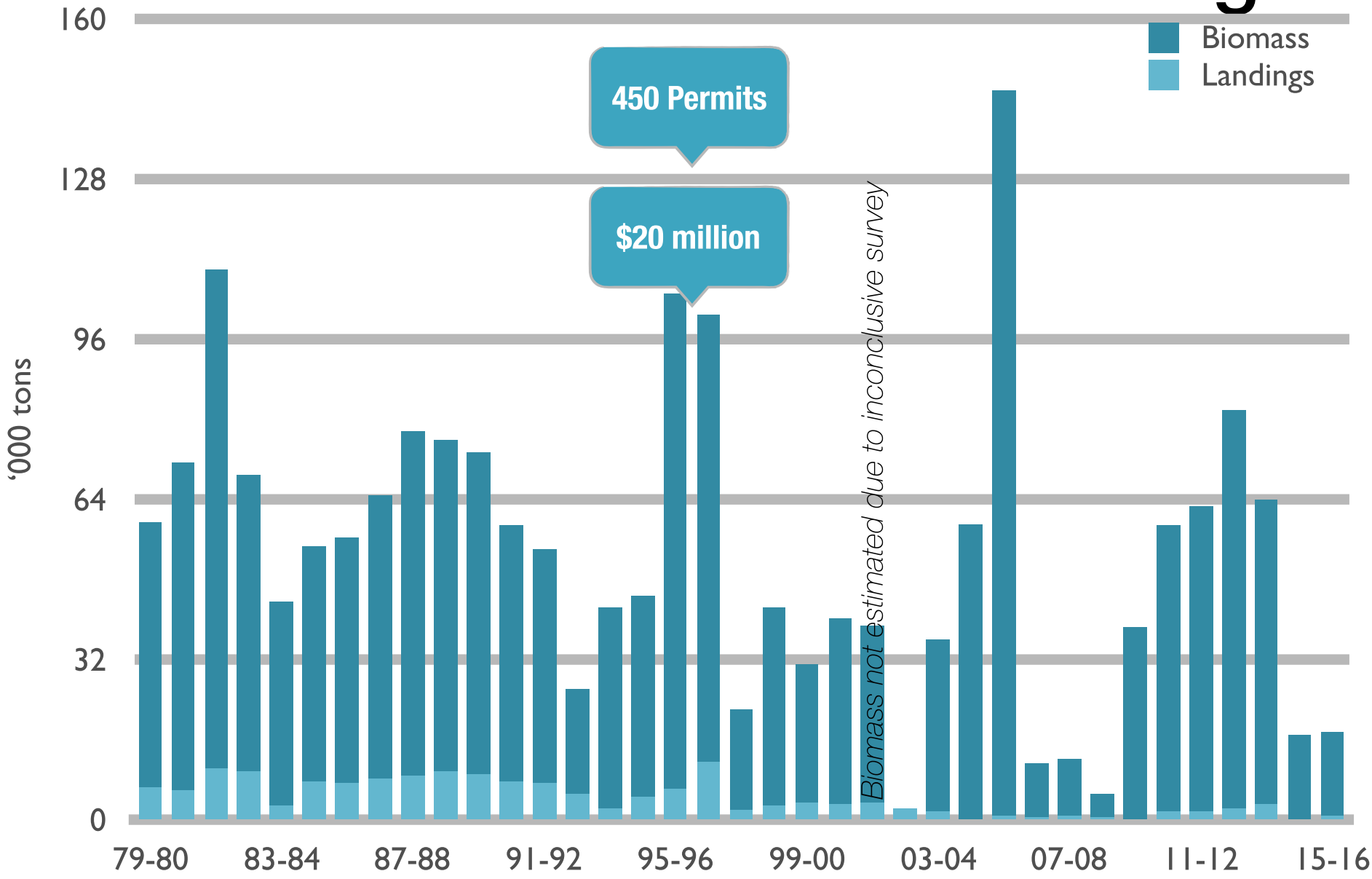
Herring live in schools in the Pacific Ocean,
but come into bays each winter to lay eggs

Herring spawning aggregations are
targeted by the gill net fleet for their roe,
which is considered a delicacy in Japan.
Herring are also prey for fish, birds,
and mammals in the California Current Ecosystem

Pacific Herring Fishery Areas in California



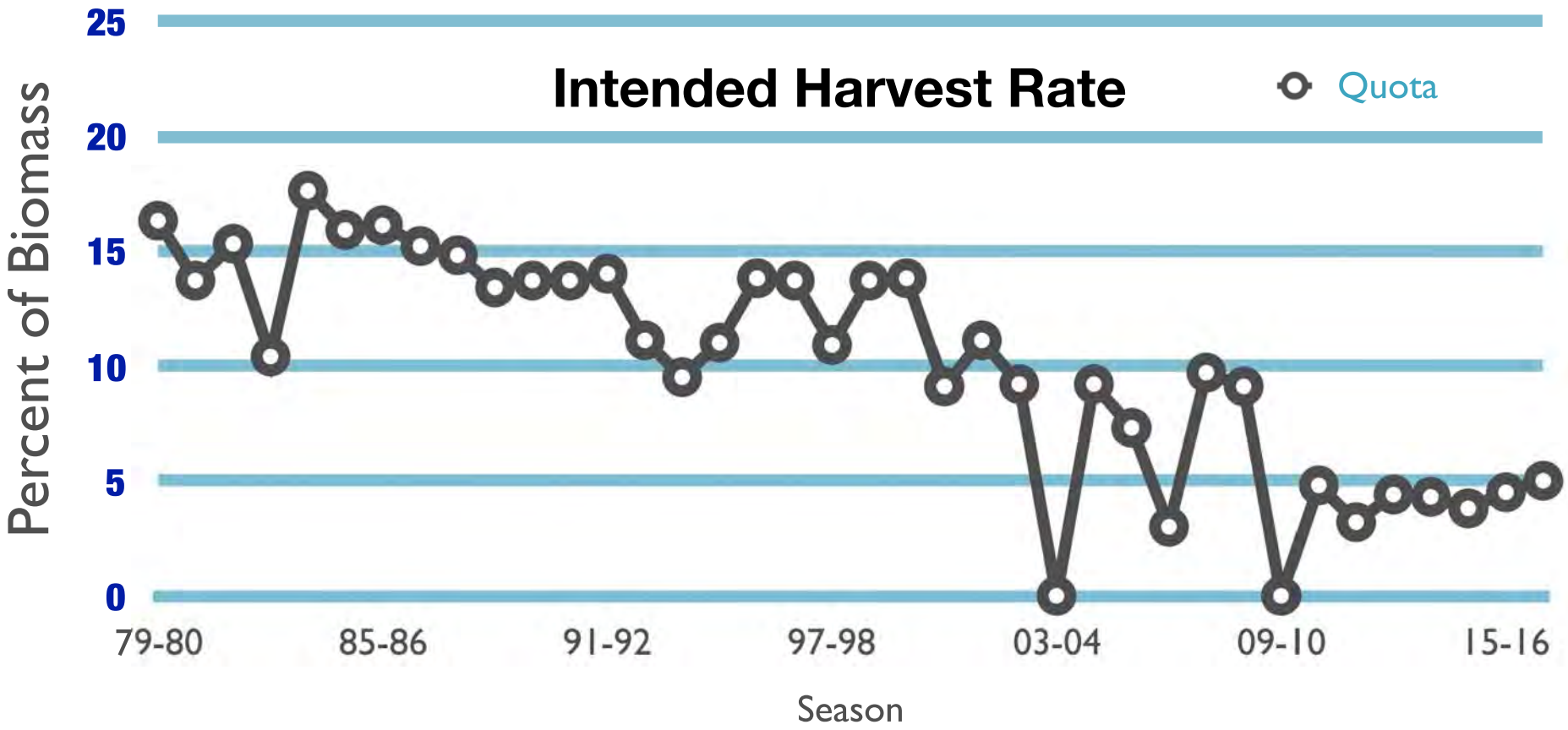
Historic Biomass and Landings



Over 90% of all landings have come from San Francisco Bay. Historically, the herring fishery was one of CA's most valuable.

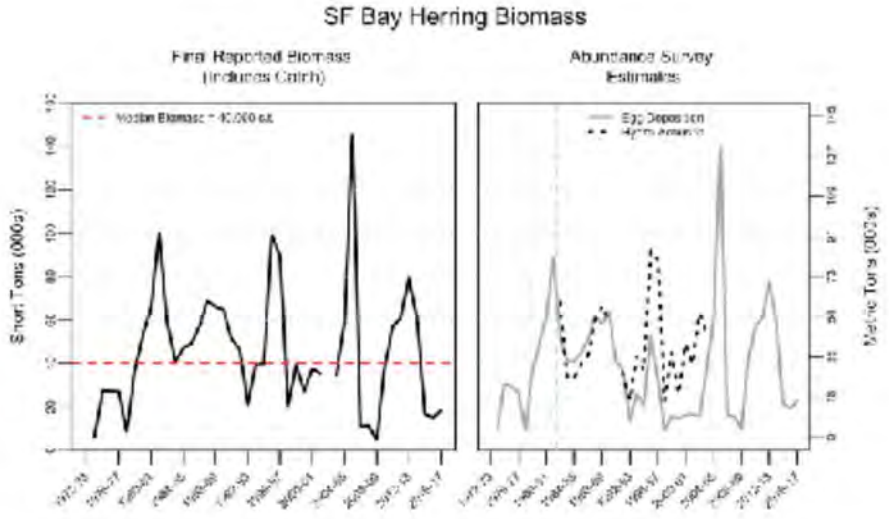
Management History

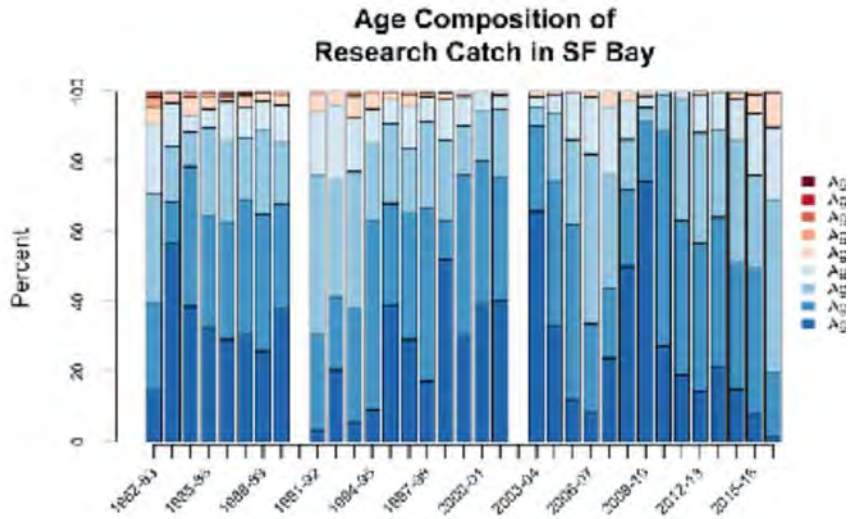
Since the 1970s the fishery has been primarily managed using a yearly quota. Quotas are calculated by applying an intended harvest rate to the previous year's spawning biomass estimate.



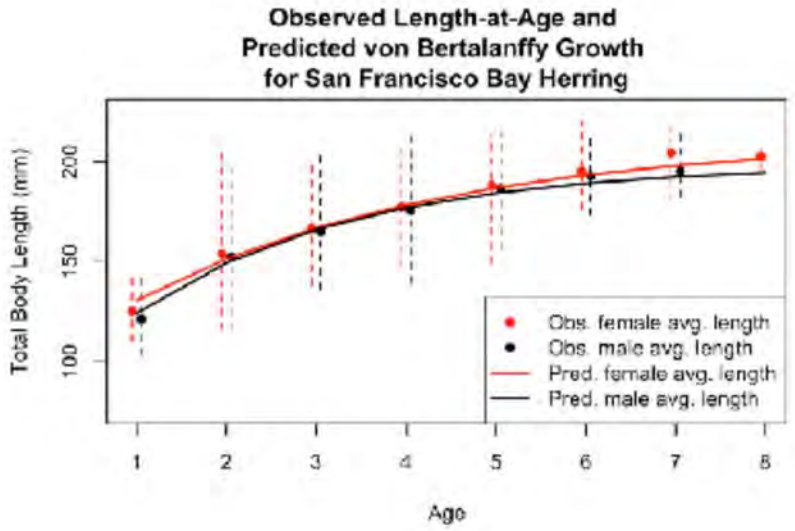
Over time, harvest rates have become more precautionary, with recent quotas set at a 10% harvest rate or lower.

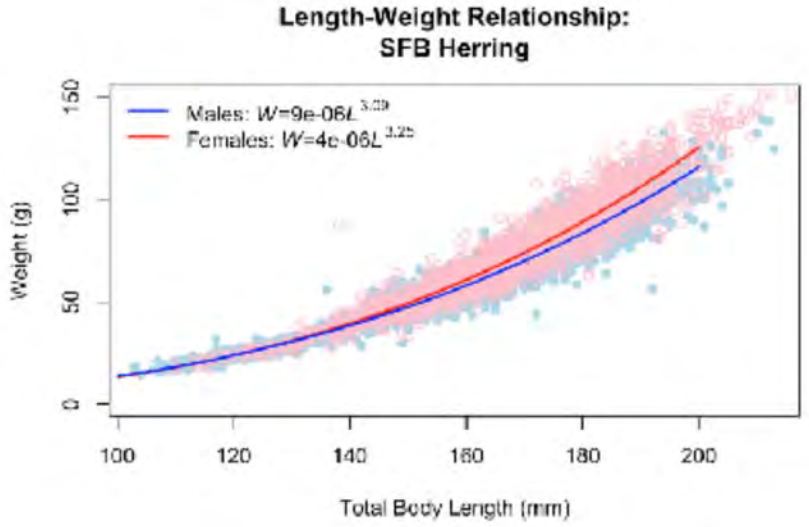
Data Rich Fishery





CDFW has conducted an intensive monitoring program in San Francisco Bay since the 1970s, resulting in valuable time series of data





Background to the FMP Process

- Primary goal is to continue the precautionary management approach from the last 10-15 years

- Began with a discussion group composed of representatives from industry, conservation community, and CDFW, which led to creation of Steering Committee to provide oversight

- Contracted with Project Management Team, composed of outside experts, to oversee and carryout FMP without placing additional burden on CDFW staff

Goals of Herring FMP

Develop a comprehensive management strategy for Pacific Herring that:

- Maintains the sustainability of the stock
- Establishes a formal decision making process to set yearly quotas
- Is responsive to environmental and socio-economic changes
- Considers the role of herring as a forage fish within the wider ecosystem

Management Plan Development

- Plan based on best available science and stakeholder input

- Conducted a number of scientific analyses to determine what information was available for herring, and where there were areas of uncertainty.

- Analyses completed by Project Management Team or other contractors, with oversight by Steering Committee to provide iterative stakeholder input

Overview of Scientific Analyses

Summary of Analyses

Three primary analyses under-pinning proposed management strategy:

1. Analysis of historical data sets to look for environmental correlations

2. Management Strategy Evaluation (MSE) to develop and test a Harvest Control Rule

3. Analysis of Trophic Interactions to understand how to account for ecosystem needs in management

The following slides provide a summary of each analysis.

1. Analysis of Historical Data

- Examined time series of all available herring data sets, and looked for correlation with environmental indices in SF Bay
- Discovered strong correlations between herring egg deposition and environmental indicators
- Used correlations to create a predictive model to estimate next year's stock size
- Important opportunity for herring management because it allows for proactive rather than reactive management

Current Method for Estimating Biomass

1. Use CDFW spawn deposition surveys to get an estimate of the number of herring eggs laid in a season.

2. Convert egg count to herring biomass using information on eggs per gram of body weight and sex ratio,

3. Add observed herring biomass to catch weight to get an estimate of total Spawning Stock Biomass.

4.Set following year's quota as a percentage of observed Spawning Stock Biomass

Has maintained sustainability of the stock over 40+ years, but due to biomass fluctuations from year to year this method can result in higher than intended harvest rates.

New Method for Estimating Biomass

1. Predictive Model used three indicators to produce an estimate of the coming season's biomass:
   - Spawn deposition estimate from previous year
   - Young of the Year (YOY) data from 3 years prior
   - Summer Sea Surface Temperature data

2. Model output is an estimate of next season's Spawning Stock Biomass

3. Quota is then set as a percentage of Spawning Stock Biomass prediction

Statistical analysis shows that this model performs better than current method

Both Methods Are Viable Options for Future Estimates

- Predictive Model is undergoing peer review, but CDFW scientists find it a promising option for setting future quotas in San Francisco Bay

- Will run predictive model and current method concurrently for first three years to phase it in

- Current method (based on last year's Egg deposition + Catch) will also be included in the FMP as an alternative method to estimate stock status should predictive model correlations break down

2. Developing and Testing a Harvest Control Rule

- Major FMP Goal: Create a pre-determined mechanism for setting yearly quotas
- Desire to both increase transparency and move quota setting under the purview of CDFW
- Examined performance of large number of Harvest Control Rules using a procedure called “Management Strategy Evaluation”
- Evaluated their ability to meet management objectives in the short and long term

What is a Management Strategy?

A Management Strategy should have three components:

1

Data Collection Protocol to monitor fishing impacts

2

Data Analysis Procedure to determine current stock status

3

Way to adjust catch/ effort based on stock status and management objectives (aka Harvest Control Rule)

Management Strategy Evaluation (MSE) is a simulation tool that allows us to test potential management strategies and understand their impacts

Management Strategy Evaluation (MSE)

- Probabilistic computer simulation to assess expected performance of a given management strategy
- Performance measures are based on management objectives.
- Allows us to visualize expected performance of each management strategy, as well as the tradeoffs between each candidate management strategy, under different assumptions about how the world works
- No single “best” - Steering committee helped evaluate tradeoffs and determine preferred control rule.

Management Objectives

- Promote a healthy long-term average target biomass
- Promote fast recovery when stock size is low
- To the extent possible, maximize long term average yield
- Reduce the number of years with zero/non-viable quota (especially consecutive years) to maintain access to buyers
- Maintain stability in catch from year to year

MSE Findings

- Due to natural variability in herring population dynamics, stock may dip below desired levels even without any fishing.

- However, establishing a cutoff biomass (where there is no commercial fishing when the stock size is below the cutoff) allows the herring stock to recover to healthy stock sizes more quickly.

- When we examined where to set the cutoff, we found that after a certain point (~15K) the probability of achieving a healthily stock size no longer improved, but economic impacts became more severe.

- The HCRs that ramped up harvest from 5 to 10% had slightly better outcomes than those that started at 10% right after the cutoff.

- Setting minimum and maximum quotas helped achieve more economic stability

These findings were provided to the Steering Committee and were taken into consideration when determining a preferred Harvest Control Rule

3. Analysis of Trophic Interactions

- Herring are a recognized forage fish species within the California Current Ecosystem

- We are working to comply with the Fish and Game Commission Policy on Forage Fish by including information on the impacts of herring fishing on predator populations

3. Analysis of Trophic Interactions

- Used comprehensive database on observed diet compositions for California Current predators
- Summarized data from 83 predators (58 species) known to eat herring or herring eggs
- Special emphasis on documented interactions between predators and herring from San Francisco Bay/Central California area
- Examined information on alternative forage availability
- Reviewed literature on general recommendations for managing forage fish

Recommendations for Incorporating Ecosystem Considerations into Herring Management

- Limited data on herring predation in San Francisco Bay area due to winter sampling difficulties
- Evidence suggests herring may provide a strong seasonal forage option for predators such as Chinook Salmon, harbor seals, humpback whales, common murre, and pacific hake
- Predators use prey-switching behavior, making it difficult to see immediate impacts when prey stocks are low
- Can incorporate indices on alternative prey and predator health into herring quota decision-making process to reduce ecosystem impacts when forage conditions are poor
- Recommend a cutoff at low stock sizes to protect forage base

Proposed Management Strategy

Developing a Management Strategy for Herring

- Management Procedure is a pre-defined process for making yearly management decisions.
- For Pacific Herring, this includes
  - Monitoring the fishery each year (data collection)
  - Analyzing data to estimate yearly biomass of the stock
  - Setting a quota each year via a pre-determined harvest control rule
- Use scientific analyses of available data to develop procedure that meets management objectives

Data Collection

- Data collection procedure will stay the same in San Francisco Bay
- Consistent protocol for ~35 years has resulted in valuable long term data sets
- CDFW Biologists collect: Egg deposition, Number of recruits, and age/length/weight composition and maturity data through catch monitoring and a research fishery.

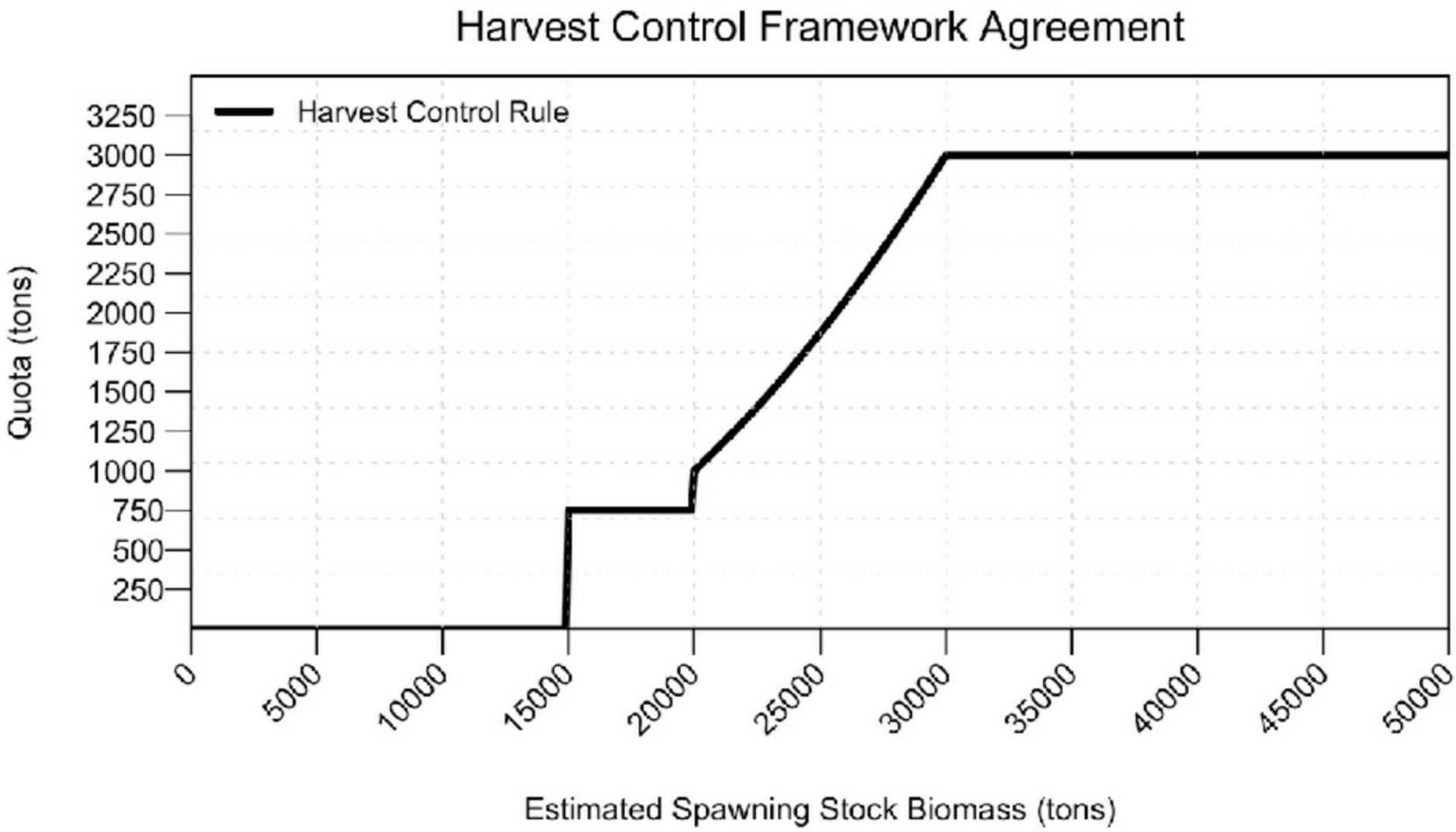
Data Analysis

- Estimating the spawning stock biomass size through one of two methods:
  - Current Method (Last year's spawn deposition)
  - New predictive model that uses last year's spawn deposition, Young of the Year data, and Sea Surface Temperature
- Note that we will phase in the predictive model to understand its performance, and build in triggers to alert staff if correlations break down

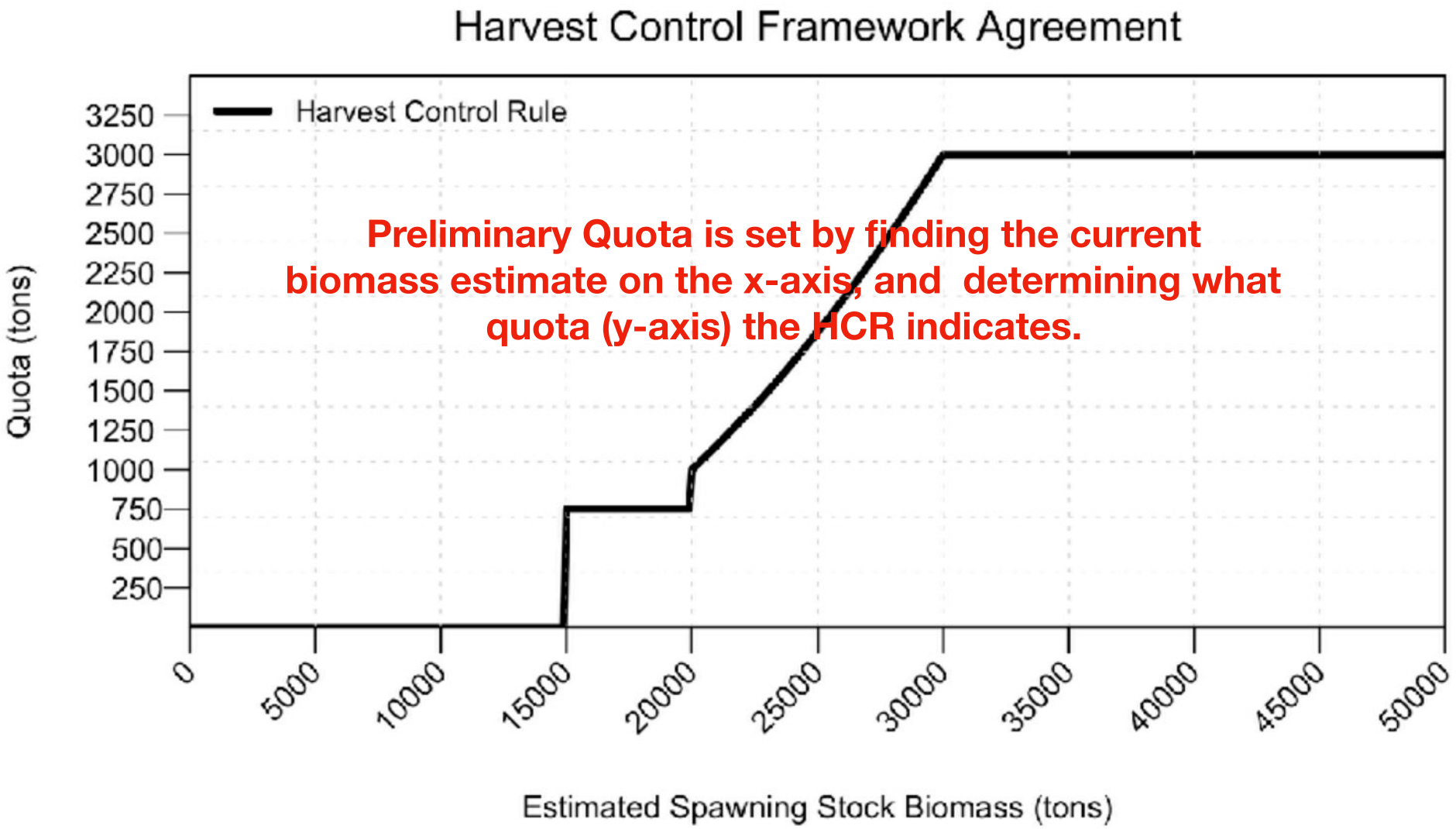
Setting Catch Limits

- Harvest Control Rules (HCR) are a pre-determined formula for setting quotas
- Meets the MLMA's requirement for adaptive management
- Desire to codify recent precautionary management. This was used as a blue print, and then extensive analysis was conducted to understand the long term implications of different HCR formulations

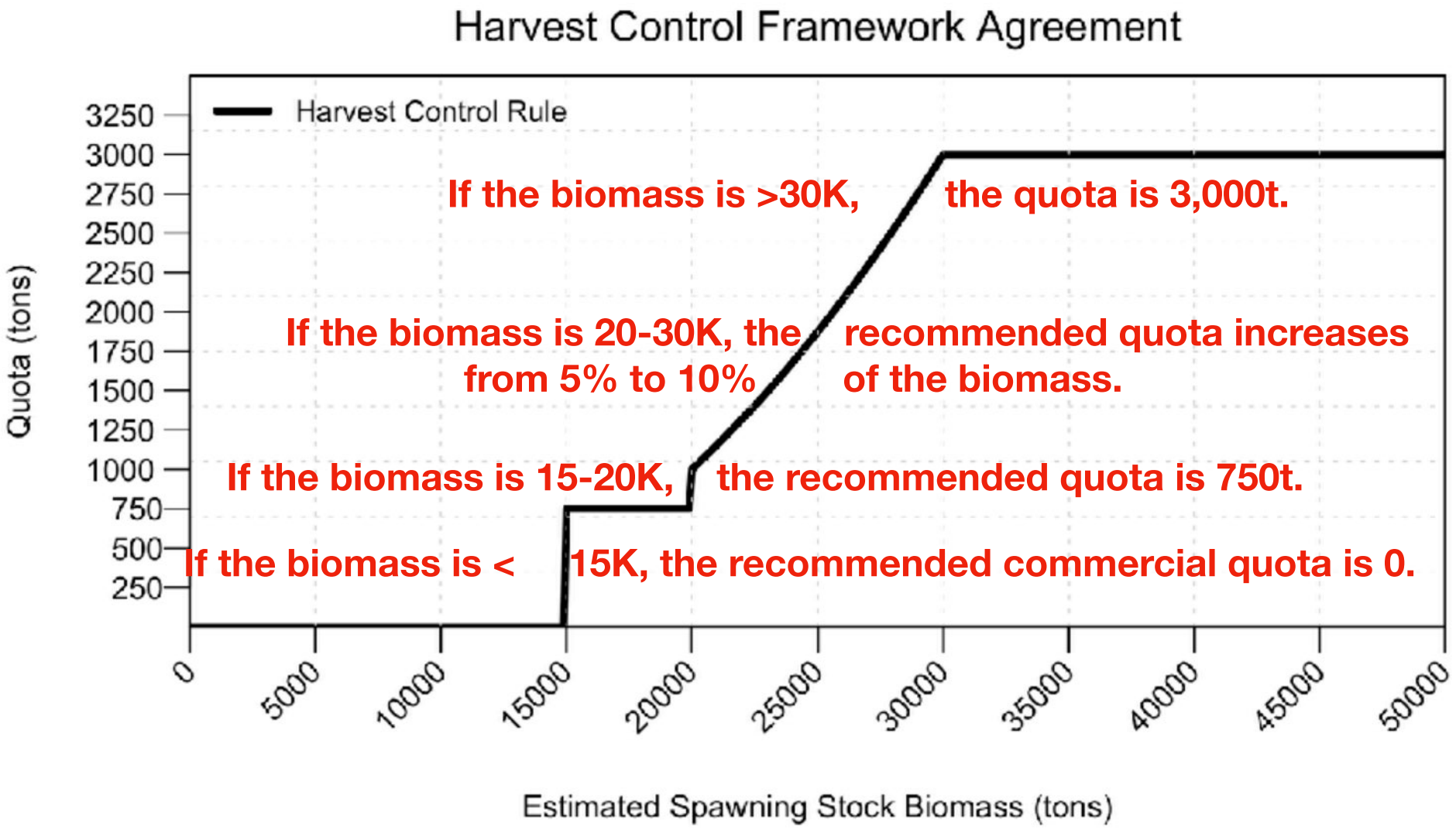
Proposed Harvest Control Rule Framework



Proposed Harvest Control Rule Framework



Proposed Harvest Control Rule Framework



Incorporating Ecosystem Considerations

- The initial quota is then adjusted based on ecosystem conditions
- Developed a decision matrix to specify what kinds of information CDFW biologists should consider when assessing ecosystem conditions and setting a final quota
- Formalized, more transparent version of the types of information CDFW biologists have previously considered when setting quotas

Process

- Under proposed plan, CDFW biologists must include descriptions of status of each indicator for herring in their formal quota notice

- The Ecosystem indicators are included in decision matrix, along with guidance on how to interpret the status of each indicator

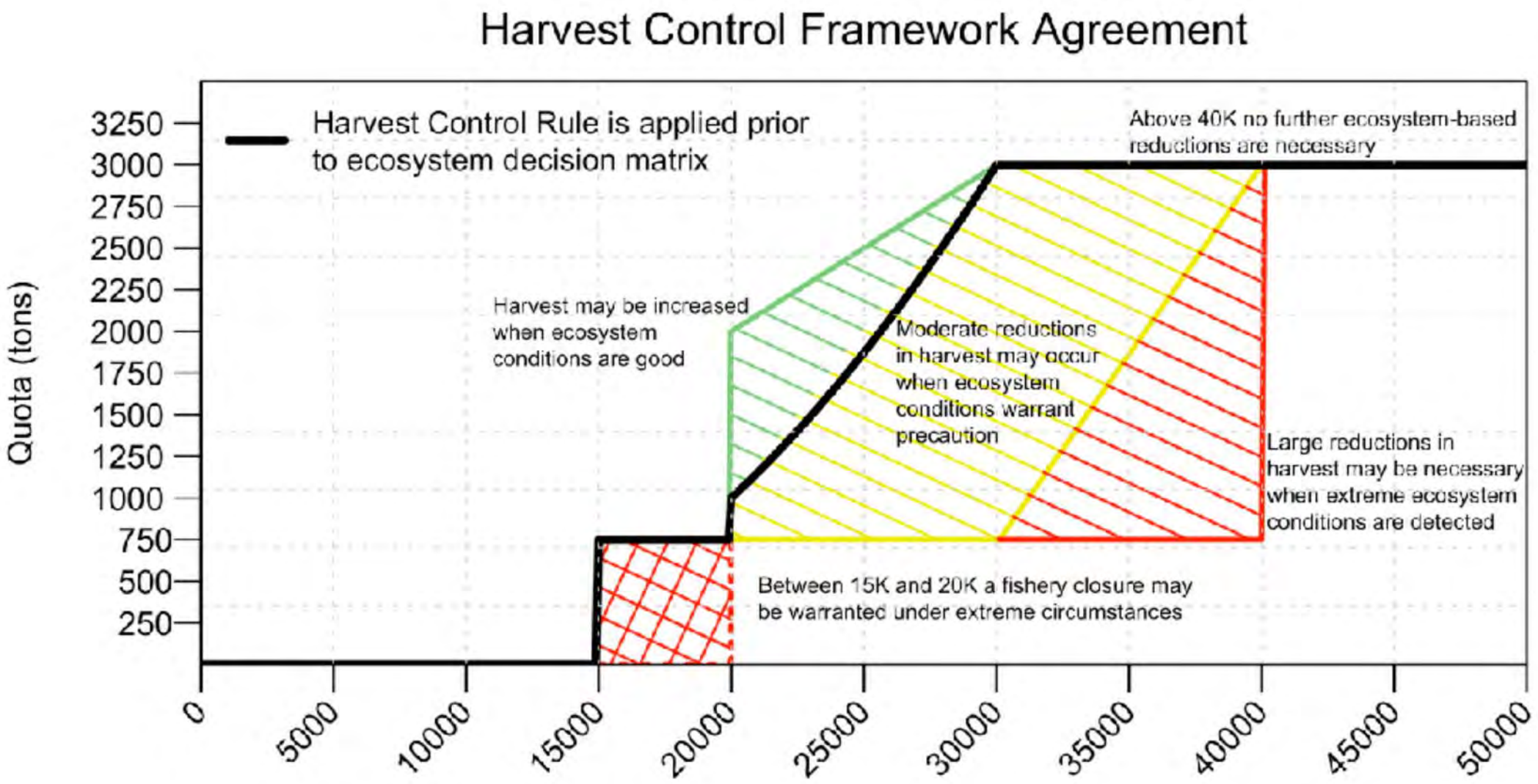
- After analyzing these indicators, CDFW biologists can adjust preliminary quota within pre-determined range to account for ecosystem conditions

- Adjustment will be based on CDFW staff judgment rather than a prescribed management action. Staff must describe how status of indicator factors into rationale.

Indicator	Analysis	Data
Prey for Herring	Is the status of krill red, green, or yellow?	NMFS Forage Report
Alternative Prey - Small Pelagics	Is the status of sardine and anchovy red, green, or yellow?	NMFS Forage Report
Alternative Prey - invertebrates	Is the status of market squid red, green, or yellow?	NMFS Forage Report
Alternative Prey - Juvenile Groundfish	Is the status of juvenile hake, rockfish, and sandals red, green, or yellow?	NMFS Forage Report
Local predator population indicator	Has an unusual mortality event been declared for SFB harbor seals?	NOAA website
	Provide for additional indices as science evolves	

NMFS = National Marine Fisheries Service *NOAA = National Oceanic & Atmospheric Administration*

Proposed Harvest Control Rule Framework



Benefits of Proposed HCR Framework

Predictive Model	Incorporates environmental (climate) and biological indicators and improves accuracy of harvest rate
15K Cutoff	Precautionary limit promotes the ability of herring stock to recover quickly, and ensures that predators have continued access to forage
750t quota between 15-20K	Minimizes the number of closure years Provides a stable quota fishermen/buyers can plan around
5-10% Harvest rate	Conservative harvest rate provides some protection for older fish, which can sustain the population during poor recruitment years
Forage Indicators	Formally incorporates ecosystem needs into management Allows CDFW to recognize poor forage conditions

Precautionary Management

- Adaptive
- Best Available Science
- Data-driven
- Transparent
- Easy to apply with readily available data
- Balances ecosystem and economic goals

Additional Protections

- Mesh size limit and additional gear restrictions (prohibition on round haul gear) selects mature fish, allowing fish the opportunity to reproduce before becoming vulnerable to fishing gear

- Season allows December spawning to occur without fishing

- Restrictions on weekend fishing allow spawns to occur without interference

- Spatial restrictions protect prime spawning habitat

Data rich management system is not appropriate to unassessed areas outside San Francisco Bay

Creating a path for sustainably managed fisheries in unassessed areas

Currently, unassessed areas have not been fished for 10+ years.

Goal:

- Develop a monitoring procedure to assess stock status in unassessed areas and adjust quotas as necessary, consistent with the Department's goal of precautionary management.

- Given limited resources, monitoring protocol will need to be less labor intensive than egg deposition surveys, and include collaboration with fishermen, NGOs, and academics.

Proposed Management Strategy for Unassessed Areas

- Conservative quotas remain in effect to retain access to fishery. Considering setting initial quotas at 50% of historical levels

- When fishing occurs, follow collaborative research protocol:

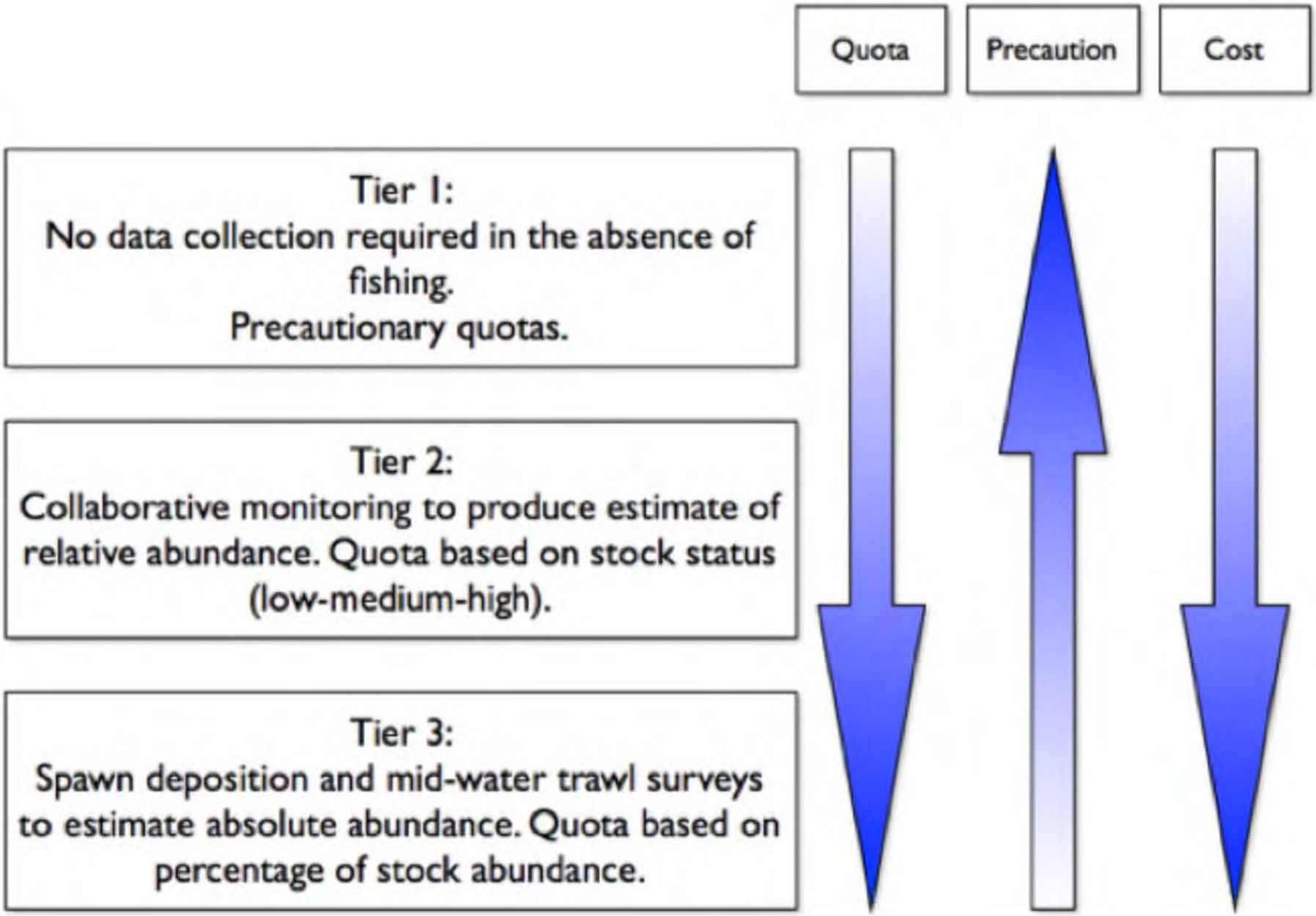
  - Logbooks to provide information on fishing effort and location. Provides an additional method to alert the CDFW to a change in fishing behavior.

  - Sampling of length/weight data from commercial catch

  - Assistance from fishermen in documenting spawns

Proposed Management Strategy for Unassessed Areas

- Working with CDFW biologists to develop semi-quantitative method to estimate relative spawn size based on Collaborative Research Protocol
    - Use approximate number, size, and density of spawns each season to estimate approximate abundance
    - Classify abundance as “High”, “Medium”, or “Low”.
    - Adjust next year’s quota accordingly. If abundance is “high”, quota is higher, and if abundance is low, quota is lower.
    - Provides an incentive for fishermen participation


Quota
Precaution
Cost
Tier 1:
No data collection required in the absence of fishing.
Precautionary quotas.
Tier 2:
Collaborative monitoring to produce estimate of relative abundance. Quota based on stock status (low-medium-high).
Tier 3:
Spawn deposition and mid-water trawl surveys to estimate absolute abundance. Quota based on percentage of stock abundance.

Proposed Regulatory Changes

Fishery Sectors

- Commercial Gill net fleet -172 permit holders
- Commercial Herring Eggs on Kelp (HEOK) fishery - 10 permit holders
- Recreational fishery - number of participants unknown but based on observations and reports take is considered significant and should be limited to a reasonable amount

Regulatory Development Process

1. Scoping Process

2. Permit Holder Surveys

3. Feedback from relevant CDFW entities

4. Draft proposed regulatory changes

5. Solicit feedback from permit holders

6. Discuss feedback with Steering Committee and DFW staff and draft final proposal and associated regulations

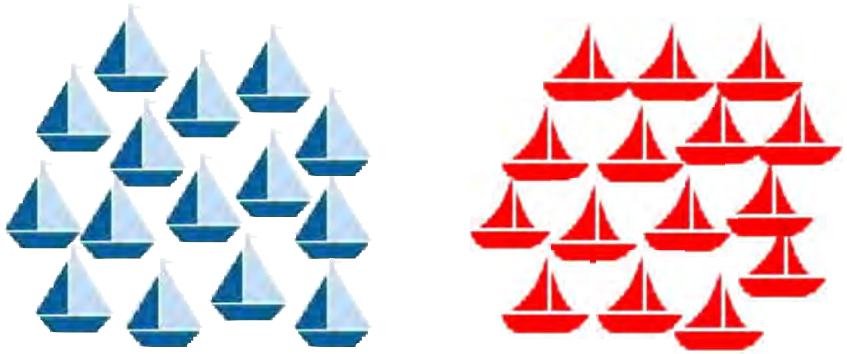
Proposed Regulatory Changes- Gill net fleet

Proposed Regulatory Changes

1. **Eliminate platoons and develop new permitting system**
2. **Develop a mechanism for permit consolidation**
3. **Establish a long term capacity goal under new system**
4. Identify nets and vessels with Fish and Game vessel number
5. Eliminate substitution paperwork
6. Additional alterations to permitting process
7. Set uniform season dates

Rationale for eliminating platoons and developing new permitting system

- Platoons developed to deal with space and gear issues when the fleet was much larger (400+ participants)



- Current System: 1 permit = 1 net in either platoon

- Boats need 4 permits to fish 2 nets (max capacity) every week of the season, but an individual can only own 3 permits.

- Resulted in need for multiple permit holders fishing on a single boat (via substitution)

Rationale for eliminating platoons and developing new permitting system

- Added level of regulatory complication for fishermen and managers — Broad support for elimination
- Proposing a system that:
  - allows permit holders to fish every week of the season while keeping the same number of nets in the fleet
  - Allows a single person to fish up to two nets on a boat
  - Institutes a long term capacity goal for the fleet (30 boats)

Proposed Regulatory Changes

1. Eliminate platoons and develop new permitting system
2. Develop a mechanism for permit consolidation
3. Establish a long term capacity goal under new system
4. **Identify nets and vessels with Fish and Game vessel number**
5. **Eliminate substitution paperwork**
6. Additional alterations to permitting process
7. Set uniform season dates

Net/Vessel ID

- Currently, nets and vessels must display herring permit number
- New permit system allows enforcement to monitor on the water activities through Fish and Game vessel number alone
- We are proposing change:
  - Fishing vessels must display their official Fish and Game Number (no permit numbers required)
  - Nets must be marked with buoys displaying the Fish and Game Number of the boat they are being fished from.

Eliminating substitution paperwork while retaining accountability

- Currently, permit holders must must be onboard assigned vessel during all fishing activities unless they designate a substitute
- Designated substitutes are currently held accountable for all violations that occur during fishing activities under that permit
- Survey results indicate that fishermen value the flexibility substitution offers, but it creates additional bureaucracy. Additionally, accountability is especially important in San Francisco Bay - high visibility urban fishery
- Goal: Eliminate the paperwork associated with substitution while retaining flexibility for fishermen and accountability for enforcement purposes

Proposed Regulatory Changes

1. Eliminate platoons and develop new permitting system
2. Develop a mechanism for permit consolidation
3. Establish a long term capacity goal under new system
4. Identify nets and vessels with vessel Fish and Game vessel number
5. Eliminate substitution paperwork
6. **Additional alterations to permitting process**
7. Set uniform season dates

Permitting Process Alterations

Desire to bring herring permitting process in line with those in other fisheries

Developed in consultation with CDFW License and Revenue Branch

Includes changes to permit renewal and issuance process, permit transfer process, and fee structure

Proposed Regulatory Changes

1. Eliminate platoons and develop new permitting system
2. Develop a mechanism for permit consolidation
3. Establish a long term capacity goal under new system
4. Identify nets and vessels with vessel Fish and Game vessel number
5. Eliminate substitution paperwork
6. Additional alterations to permitting process
7. **Set uniform season dates**

Set uniform season dates

Goal of FMP is to streamline regulations wherever possible

Area	Current Dates	Proposed Dates
SF Bay	5:00 p.m. on January 1 until noon on March 15	Herring fishing in all bays will run from noon on **Jan 2** to noon on **March 15**. The weekend closure will remain in effect in SF Bay. If Jan 2 falls on a Thursday or a weekend, the fishery in SF will open at 5pm on the first Sunday after Jan 2.
Tomales Bay	Noon on December 26 until noon on February 22	
Humboldt Bay	Noon on January 2 until noon on March 9	
Crescent City	Noon on January 14 until noon on March 23	

Rationale behind Jan 2 Start Date

- Because Jan 1 is a holiday, it is difficult for fishermen and buyers to operate on this day
- The fleet recommended a Jan 2 start date
- If Jan 2 falls on a Thursday, the fishery would only be open for only 12 hours before the weekend closure goes into effect.
- Fishing can actually cause herring to spawn, so there is concern amongst the fleet that fishermen would trigger a spawn and then not be able to fish it

HEOK Sector

- Ongoing discussions with HEOK representative, Enforcement, and License and Revenue to develop a regulatory proposal

- Exploring changes that will:

  - Review fee structure for HEOK sector

  - Modernize operational regulations

  - Facilitate participation in collaborative research

Recreational Sector

- Currently no regulations for recreational herring fishery
- Very little data on number of participants, but was historically thought to be a small percentage of the commercial catch
- Recent observations by CDFW staff suggests that recreational fishery may be growing, and there is worry about illegal commercialization
- Goals:
  - Provide for a satisfying recreational fishing experience
  - Discourage commercialization of the sport fishery

Recreational Sector

Proposed Regulatory Changes

- Set a daily bag limit of 100 pounds (~approximately two 5-gallon buckets)
- Specify lines and hand cast nets as the allowable gear type
- Explore temporal restrictions in case additional restrictions on recreation effort are needed in the future

Next Steps

Proposed Timeline for FMP

- April-June — Peer review (conducted by California Ocean Science Trust)
- April-Sept — Internal Departmental review
- October — Present plan to Commission

Thank You

COMMITTEE STAFF SUMMARY FOR JULY 20, 2017

7. STATE WATER BOTTOM LEASES FOR AQUACULTURE

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

(A) Discuss best management practices (BMPs) planning for existing lease areas and scope of future rulemaking

(B) Discuss planning for and consideration of applications for new leases

Summary of Previous/Future Actions

(A)

- Aquaculture leases/debris public meeting — Aug 2015; public meeting, Marshall
- Discussed possible BMPs — Feb 10-11, 2016; FGC, Sacramento
- FGC supported BMP rulemaking approach — Jun 22-23, 2016; FGC, Bakersfield
- MRC discussed aquaculture debris — July 21, 2016; MRC, Petaluma
- Aquaculture lease BMPs public meeting — Jul 17, 2017; public meeting, Marshall
- **Today's update on BMP development** — **Jul 20, 2017; MRC, Santa Rosa**

(B)

- FGC referred topic to MRC — Jun 21-22, 2017; Smith River
- **Today's discussion on new leases** — **Jul 20, 2017; MRC, Santa Rosa**

Background

FGC has the authority to lease state water bottoms to any person for the purpose of conducting aquaculture in marine waters of the state under terms agreed upon between FGC and the lessee pursuant to Sections 15400 and 15405, Fish and Game Code. While general regulations governing all aquaculture leases were established in Section 237, Title 14, California Code of Regulations, terms are established for individual state water bottom lease areas in a lease agreement. A lease template approved by FGC in 2011 provides a consistent set of lease terms and conditions, with a provision for special conditions to be established specific to an individual lease area. Currently, there are 15 active state water bottom leases for aquaculture in estuarine environments from Tomales Bay to Morro Bay, plus 2 open coast leases near Santa Barbara.

There has been an increase in public attention focused on (1) shellfish aquaculture practices and stewardship, particularly related to marine debris and certain other practices associated with aquaculture leases within state waters, and (2) siting considerations (e.g., environmental and other human uses) for potential new lease areas. Today provides an update on continuing efforts related to management practices on existing lease areas, and an initial discussion related to planning for possible new lease areas in the future, a topic referred to MRC by FGC in Jun.

(A) ***Existing leases and BMPs*:** In early 2015, public comments to FGC requesting greater accountability from lease holders for aquaculture-related debris led DFW and FGC to host a public meeting to explore the topic with stakeholders, regulatory agencies, and shellfish

growers. At the Feb 2016 FGC meeting, staff proposed options to establish a requirement for BMPs unique to each state water bottom lease area (see Feb staff summary in Exhibit A1). FGC ultimately gave direction to pursue a regulatory approach and DFW staff agreed to work with FGC staff, growers, and the public to cooperatively develop categories for best management practices. Today DFW staff will report out on the first public meeting held on Jul 17, 2017 in Marshall, near Tomales Bay (see Exhibit A2), and describe next steps for public engagement.

(B) ***New leases*:** Persons wishing to lease a state water bottom for aquaculture are required to make a written application to FGC (Fish and Game Code Section 15403). FGC has not approved a new lease in over 25 years. However, interest in further developing the industry continues to grow, and its value is recognized by the California State Legislature (Exhibit B1). In Feb 2017, FGC received an application for a new lease in Tomales Bay; in addition, an application for new aquaculture lease plots offshore Ventura is being developed. The public has requested to provide input on what information FGC may need to consider before making any determinations to approve new state water bottom lease applications; FGC has referred this topic to MRC for an initial discussion today.

Significant Public Comments

- Comments on item 7A supporting formal aquaculture BMPs that are mandatory, legally binding and adequately enforced, coupled with an inspection and monitoring program. Recommendation that BMPs be enacted before considering new aquaculture leases, and a list of ten proposed BMPs. See exhibits A3 and A4.

Recommendation (N/A)

Exhibits

A1. Staff summary from Feb 2016 FGC meeting
A2. Agenda, location map, and DFW background document for BMP public meeting on Jul 17, 2017
A3. Email from Ashley Eagle-Gibbs, Esq., Environmental Action Committee of West Marin, received Jul 7, 2017
A4. Email from Richard James, received Jul 7, 2017
B1. Bill text for Assembly Joint Resolution 43, adopted Aug 21, 2014

Committee Direction/Recommendation (N/A)

STATE OF CALIFORNIA
EDMUND G. BROWN JR., GOVERNOR

NATURAL RESOURCES AGENCY

California Fish and Game Commission
1416 Ninth Street, Room 1320
Sacramento, CA 95814

California Department of Fish and Wildlife
1416 Ninth Street, 12th Floor
Sacramento, CA 95814

Shellfish Aquaculture Best Management Practices
Stakeholder Discussion
July 17, 2017

Marconi Conference Center
18500 Shoreline Highway (SR 1), Marshall, CA

Meeting Summary

Meeting Goals

- Communicate intent of the rulemaking
- Understand the rulemaking process and opportunities for future public engagement
- Best management practices (BMP) categories discussion and feedback

1. **Welcome –** California Fish and Game Commission (Commission) Sea Grant Fellow Heather Benko provided a welcome, covered ground rules, and invited all staff and participants to introduce themselves. The following staff of the Commission and California Department of Fish and Wildlife (Department) were present:

Commission Staff

Susan Ashcraft	Marine Advisor
Heather Benko	Sea Grant State Fellow

Department Staff

Randy Lovell	State Aquaculture Coordinator
Kirsten Ramey	Senior Environmental Scientist Supervisor
Andrew Weltz	Environmental Scientist

2. **Overview of background and milestones –** Presented by Randy Lovell

The impetus for the jointly-led aquaculture BMP public meeting originated from community members who raised concerns to the Commission on the trash and plastic pollution produced by aquaculture leaseholders in Tomales Bay. Developing good practices in aquaculture fits into a larger picture of stewardship in general, and the purpose of this meeting is to look at the practices of aquaculture leaseholders to determine what criteria need to be considered in a BMP plan to promote greater stewardship of the public trust resource. The topic is focused on BMPs for shellfish aquaculture conducted on state water bottom leases issued by the Commission.

The Commission directed staff to begin to identify categories of BMPs that have application to California shellfish farms. The goal of this meeting is to begin to identify potential core elements or categories of BMPs for that effort.

The focus of the conversation is on leases under the jurisdiction of the Commission and how to best match the strength of regulations with responsible commitment from leaseholders to eliminate contributions to the problem of plastic pollution in the ocean, as well as other areas of responsible management.

The use and application of BMPs is a concept that strives to be nimble, effective, and achieves commitment from both leaseholders and public stakeholders through an adaptive and transparent management approach. The right solution will find a balance between social and economic importance of shellfish aquaculture (i.e., locally grown seafood, working waterfronts, and economic stimulus) and protecting the public trust resource.

3. Staff overview of the State rulemaking process – Presented by Susan Ashcraft

The authority of the Commission extends to issuing leases for the purpose of aquaculture on all state lands in California, except in Humboldt Bay. The terms of each lease are mandated by the Commission before the lease is executed.

The Commission decided to incorporate BMP language into a regulation instead of into the language of the leases themselves in order to allow for flexibility in the implementation and enforcement of the requirements. If BMP language was inserted into the lease, it would only be reviewed by the Commission when the lease was up for renewal (in the case of current leases, only once every 20-25 years). If a new regulation is adopted around the implementation of BMPs, there could be more regular reviews by the Commission on the BMP requirements.

A brief outline of the Commission's rulemaking process was provided, including opportunities for public input

4. Best management practices (BMPs)

(A) Regulatory approach **–** Presented by Susan Ashcraft

The Commission recognized that while some BMPs may broadly apply to all growers, in some instances BMPs would need to be individualized based on the unique conditions on each lease. Therefore, rather than define a standardized set of BMPs, a regulation would specify what categories of BMPs must be included in BMP plans. The regulation would require that growers develop individual BMP plans specialized for their individual lease area(s) that address all BMP categories defined in regulation for approval by the Commission.

(B) Developing BMP categories Presented by Kirsten Ramey

Goals: The overarching goal is to limit the risk of undesirable ecological effects to an acceptable level while allowing for sustainable shellfish production. More specifically, the goals for BMPs are to (1) minimize pollution and/or environmental impacts of shellfish aquaculture, (2) provide guidance for sustainable shellfish production while safeguarding the environment, (3) support adaptive management within acceptable bounds, and (4) promote safe and productive uses for state waters.

Considerations: Ecological impacts that we are guarding against, acceptable and unacceptable levels of impact, achievability of desired end results, BMPs versus performance standards – should the "standard" set objectives that are not achievable with current technology or practices?

Current Categories of BMPs under Consideration:

- Site selection and access
- Materials/operations/maintenance
  - robust designs
  - operational discipline
- Maintenance of environmental quality
  - habitat
  - water quality
  - species impacts/considerations
- Disease prevention
  - biosecurity

(C) Group discussion about BMP categories

A variety of ideas were brainstormed by stakeholders, reflecting concerns or suggested areas of focus for BMPs, including:

Site Selection/Access

- Ensuring recreational, navigational access
- Buffer zones to limit spillover effects into potentially sensitive habitats, impacts on navigation, etc.
- Clear boundary marking

Materials, Operations, and Maintenance

- Education/training for aquaculture workers on environmental responsibility/stewardship
- Solid waste management plan
- Separate ecological impacts from human use impacts

Maintaining Environmental Quality

- Ensure BMPs are consistent with established standards to avoid duplication
- Set minimum acceptable levels of impact
- Prioritize essential fish habitat and other sensitive habitats
- Prioritize special status and keystone species
- Incorporate adaptive management component

Disease Prevention

- Require use of triploid (sterile) oyster seed for some non-natives
- Managing risk of naturalization of non-native cultivars

General

- Specific BMPs for areas of specialization
- Set benchmarks - measurable and enforceable standards

- Measure cumulative impacts, including off lease areas
- Lessons from Humboldt Bay on site selection around eel grass, debris, etc.
- Consider carrying capacity of areas sited for aquaculture leasing
- Suggest regional plans that help define appropriate siting
- Define outcomes being targeted with BMPs

Parking Lot Items

- Financial surety
- Lease renewals and new lease applications
- Define native versus non-native versus invasive
- Legacy debris removal
- Interagency disclosure and collaboration for easier public review of necessary documents
- Enforcement and consequences
- Role of permitting process (including the California Environmental Quality Act and the National Environmental Protection Act) versus BMPs
- Value of outreach and education for the general public
- Performance-based planning

Adjourn – The meeting adjourned at approximately 4:00 p.m.

February 20, 2018

Fish and Game Commission
1416 Ninth Street, Room 1320
Sacramento, CA 95814

Via Electronic mail: fgc@fgc.ca.gov

Re: Marine Resources Committee March 6, 2018 Meeting Agenda Item 8, Aquaculture Conducted on State Water Bottom Leases Issued by The Commission

Dear Commissioners:

The River Otter Ecology Project, based in Marin County, is an organization dedicated to supporting watershed conservation and restoration through research, education, and community science. As apex predators who use a variety of terrestrial and aquatic habitat types, river otters are sentinel indicators of watershed health, and understanding their ecology and status is a critical element of ecosystem management. Tomales Bay is a focal area in our long-term field study of recovering populations of river otters in the San Francisco Bay Area.

We are greatly concerned with the slow pace of your Commission's work to adopt best management practices (BMPs) for aquaculture on state water bottom leases. Over three years, only the most preliminary steps in the formal rulemaking process have been undertaken. We strongly urge you to direct Department of Fish and Wildlife staff to complete promptly the preliminary work needed for the issuance of an Initial Statement of Reasons for a regulation change so that the formal rulemaking process can begin. Considering the intensification of use of Tomales Bay's public trust resources, both for recreational and commercial use, along with the intensification of climate change, time is absolutely of the essence.

In regard to specific BMPs, we believe that buffers for avoidance of adverse impacts to wildlife and eelgrass are of prime importance. The methods by which these buffers are maintained should be both measurable and enforceable. Employees of growers should be trained in the importance of maintaining these buffers. We also note that avoidance of impacts to wildlife and eelgrass

necessarily includes an imperative for operational discipline on the part of the growers, and the elimination of single-use materials.

We appreciate your Commission's sustained attention to these important issues. At the same time, we remind you of your fundamental responsibility to protect California's public trust resources.

Thank you for the opportunity to comment.

Respectfully,

Megan Isadore, Executive Director, River Otter Ecology Project
Deputy North American Coordinator, IUCN/SSC Otter Specialist Group
Megan@riverotterecology.org
PO Box 103, Forest Knolls, CA 94933

Cc: Susan Ashcraft - Susan.Ashcraft@fgc.ca.gov

February 21, 2018

TO: Marine Resource Committee

RE: Shellfish Aquaculture BMPs---consideration of access issues

I would ask the committee to consider the affects of shellfish aquaculture on both general navigational access as well as recreational access on and around many of the lease areas. I am particularly concerned that the expanded use of floating cultures will continue to elevate these access issues. Since many if not most of the leases were written prior to the widespread use of floating culture techniques, it seems that much of the aquaculture lease siting did not adequately consider how these techniques could impede access.

These access issues include open water access (for example, sail boat races), added congestion to certain high use areas (county parks beaches and boat ramps) and fundamental navigational issues such as locations over narrow, deep-water channels. To date, my experiences with the Tomales Bay growers have been great; for instance, growers have been universally accommodating at boat ramps. But I have heard from others in the bay community that there have been user conflicts and it would seem that the generation of access BMPs could be useful in addressing these conflicts.

BMPs might include recognition of access issues and directives to accommodate (to the degree possible) navigational and recreational access. There could be a clear directive that mariculture gear should not be sited directly in, on, or across navigational channels. There could be a broader directive, requesting that both growers and regulators consider access in siting new or modified cultures in the hopes of minimizing potential conflicts. This could include recognition of frequently used park beaches, boat ramps, and maritime infrastructures. Finally, the BMPs (or an attachment) might include the rights of the general public and mariculture leaseholders as to the general concept of access. Is there a clear legal delineation of access across these waters?

Respectfully,

Tom Baty

From: Richard James <Richard@coastodian.org>
Sent: Wednesday, February 21, 2018 2:56 PM
To: FGC; Ashcraft, Susan@FGC
Subject: Comments submitted for item 8 on agenda for MRC meeting in Santa Rosa on 6 March, 2018
Attachments: MRC 2018.03.06 RJames proposed BMP-ver.1.5.pdf; MRC 2018.03.06 RJames escrow issues.pdf

Hello Fish & Game Commission staff,

Thank you for the opportunity to submit these comments concerning aquaculture practice in CA waters for the upcoming MRC meeting on 6 March in Santa Rosa..

Attached are two PDF documents, both of which are somewhat large, I apologize for that.
It is my hope that the several images contained within are of adequate resolution for when you print them out for the binders.

If you have any questions or comments, or if these files are not legible, please contact me and I will respond asap.

File 1 - MRC 2018.03.06 RJames proposed BMP-ver.1.5

File 2 - MRC 2018.03.06 RJames escrow issues

Thank you,

richard james
coastodian

Proposed Best Management Practices (BMPs) for California Shellfish Farmers

For Item 8 on the agenda

Submitted by Richard James (richard@coastodian.org) on 21 Febraury, 2018 for consideration by the Marine Resource Committee of the California Fish & Game Commission.

These BMPs shall be an integral part of each lease. The practices shall be mandatory practices meant to ensure Tomales Bay and the ocean in general is kept free of lost plastic and other debris from aquaculture operations.

To have the intended effect of reducing litter in Tomales Bay attributed to aquaculture, it is imperative that these practices be adequately and regularly enforced.

Harming the environment is a criminal matter, not an administrative matter.

1. Growers shall uniquely and clearly identify all of their gear with company name and phone number. Possible means of uniquely marking gear include: unique colors of bags, wires, tags, PVC pipes, rope, and "branding info into gear."

2. Growers shall train all employees in concepts of Leave No Trace, *see* http://LNT.org, or similar training about environmental stewardship.

3. Growers shall continually improve gear and methods in a quest to lose less gear.

4. Growers shall replace single use items (i.e. zip-ties, copper wires) with more durable items such as stainless halibut clips.

5. Growers shall NOT use floats that are easily degraded by sunlight or pecked by birds in search of food.

6. Growers shall securely tie large groups of non-floating bags together when deploying bags for future securing to anchor lines to ensure they do not drift.

7. Growers shall remove all tools and materials each day after working on lease areas, including: fencepost drivers, gloves, water bottles, PVC pipes, wires, and ropes. Work barges shall be secured to ensure items are not blown into the bay.

8. Growers shall NOT dump shells, lumber, bags or other debris on the bay floor to walk upon or for any reason.

9. Growers shall promptly (within 90 days) remove culture structures and other items comprising a method that did not work as desired or is no longer used.

10. Growers shall patrol lease areas and the shores of Tomales Bay on a monthly basis, twice monthly during windy or heavy surf times. Patrols must occur at both high and low tides to ensure gear buried in the mud is promptly collected.

11. Growers shall uniquely and clearly identify all of their boats and barges. Boats should be clearly identifiable with binoculars from a distance of 1 mile. Unique color, large letter and/or number or combinations of these may work.

To support item 11 above, the below images show boats used by various growers. Notice how many of the boats look identical. Also shown is one suggested ID method to allow distant observers to know which grower a particular boat belongs to.

The reason for my concern centers on the damage done to the eel grass beds on or near the leases. Below are three images recorded from overhead, showing deep and permanent damage done to the eel grass by the propellers of boats accessing the lease areas.


2016.05.27
Eel grass near leases 04, 02, 10


M-430-15 HIOC - 2018.01.28

Lease M-430-15

On numerous occasions I have witnessed oyster boats operating at low tides, attempting to access areas of the bay not deep enough to access without driving the prop of the boat into the bottom of the bay, destroying everything that the prop meets, like a blender, loudly throwing a tall, brown rooster-tail into the air, easily visible/audible from a mile+ away.

If boats were clearly labeled, interested stakeholders would be able to give the Commission/Department accurate information with which to hopefully take action.
The below images show the reasoning behind item 8.

Shells dumped on Marin OC lease 02.

Shells dumped on Charles Friend OC lease 04

The cleanup escrow system as it exists is woefully inadequate.

For item 8 on the agenda

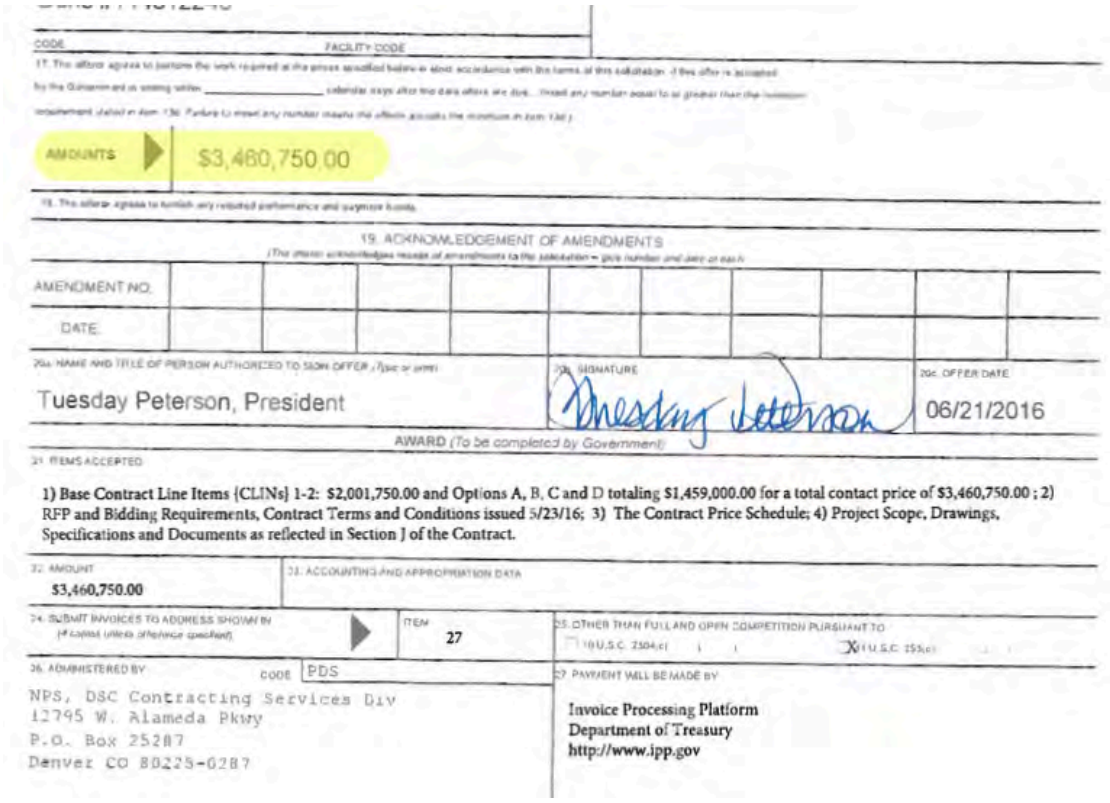
The figure below (from K. Ramey files acquired via PRA) shows how much has been contributed (allegedly) by each grower. Total on account (allegedly) is $106,255.

Escrow Accounts for State Water Bottom Leases

Tenant	Lease	Amount	acres	$/acre	Date Deposited	Status of Funds	2014 Clean-up Estimate	2015 Clean-up Estimate
Marin Oyster Company	M-430-02	$1,600.00	5.00	$320.00	01/04/13	Active	$1,600	$1,600
Charles Friend Oyster Company	M-430-04	$449.50	61.90	$7.26	?	Unknown	$150,000	$20,000
Tomales Bay Oyster Company	M-430-05	$100,000.00	156.00	$641.03	?	Unknown	$150,000	$100,000
Cove Mussel Company	M-430-06	$0.00	10.00	zero		Needs to be established	$5,500	$5,500
Hog Island Oyster Company	M-430-10	$97.47	5.00	$19.49	08/30/12	Active	$12,500	
Hog Island Oyster Company	M-430-11	$97.47	5.00	$19.49	08/30/12	Active	$12,500	
Hog Island Oyster Company	M-430-12	$500.00	25.00	$20.00	10/29/12	Active	$12,500	
Point Reyes Oyster Company	M-430-13	$363.00	50.00	$20.00	05/18/94	Active	$100	$500
Point Reyes Oyster Company	M-430-14	$300.00	6.00	$50.00	Need deposit slip to verify	Active	$300	$500
Hog Island Oyster Company	M-430-15	$930.00	128.20	$7.25		Active	$25,000	
Point Reyes Oyster Company	M-430-17	$899.00	61.90	$14.52	Deposited $268.00 on 5/18/94, balance due	Active	$7,500	$7,500
Marin Oyster Company	M-430-19	$1,019.00	25.00	$40.76	05/30/13	Active	$1,200	$1,200
	total	$106,255.44					$378,700.00	$136,800.00

Below is an image showing the main contract paid by the NPS for the cleanup of aquaculture debris left by your tenants in Drakes Estero. This is not the entire sum.

Beyond the $3,460,750 shown below were other substantial fees associated with the removal of oysters and clams left by DBOC.



CODE FACILITY CODE

AMOUNTS $3,460,750.00

19. ACKNOWLEDGEMENT OF AMENDMENTS

AMENDMENT NO.

DATE

20a. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER (Type or print)

Tuesday Peterson, President

20b. SIGNATURE

Tuesday Peterson

20c. OFFER DATE

06/21/2016

AWARD (To be completed by Government)

21. ITEMS ACCEPTED

1) Base Contract Line Items (CLINs) 1-2: $2,001,750.00 and Options A, B, C and D totaling $1,459,000.00 for a total contact price of $3,460,750.00 ; 2) RFP and Bidding Requirements, Contract Terms and Conditions issued 5/23/16; 3) The Contract Price Schedule; 4) Project Scope, Drawings, Specifications and Documents as reflected in Section J of the Contract.

22. AMOUNT

$3,460,750.00

23. ACCOUNTING AND APPROPRIATION DATA

24. SUBMIT INVOICES TO ADDRESS SHOWN IN (4 copies unless otherwise specified)

ITEM

27

25. OTHER THAN FULL AND OPEN COMPETITION PURSUANT TO

10 U.S.C. 2304(c) ( ) ( ) X 41 U.S.C. 253(c)

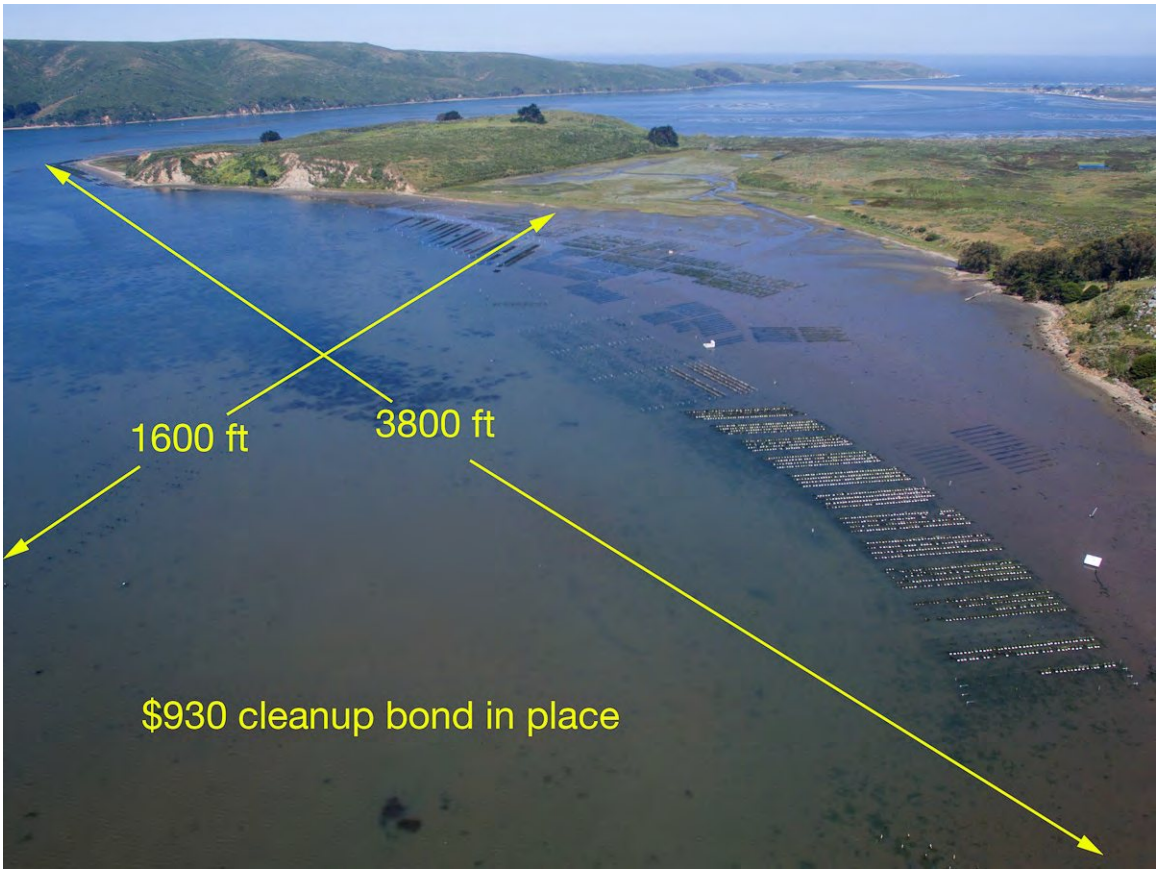
26. ADMINISTERED BY CODE PDS

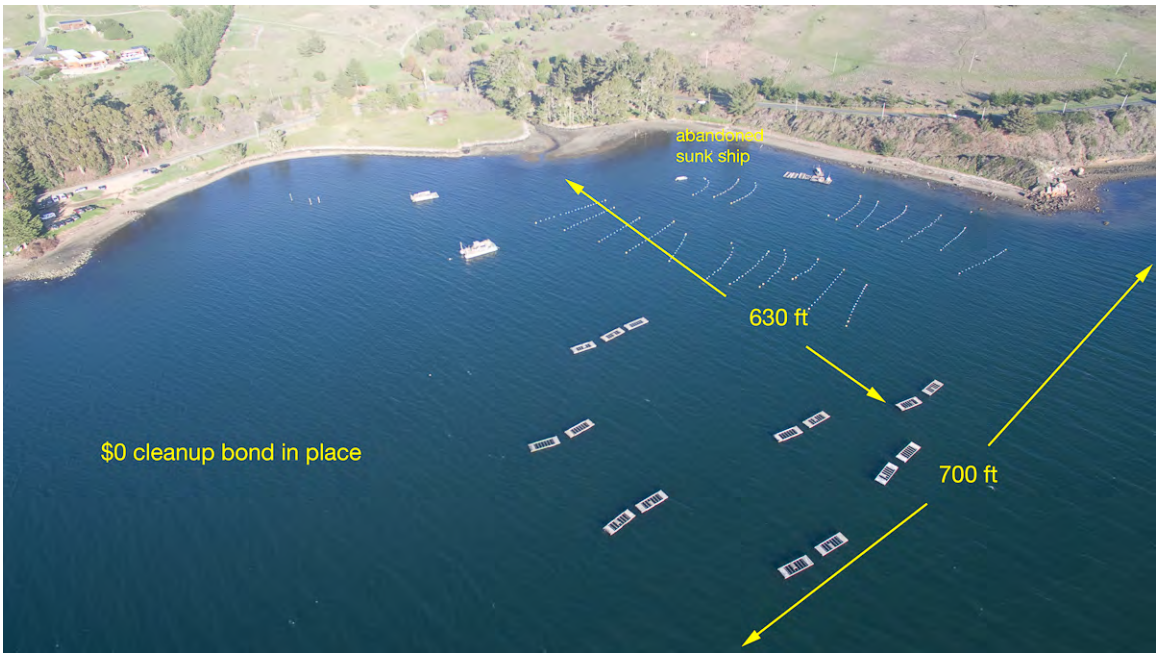
NPS, DSC Contracting Services Div
12795 W. Alameda Pkwy
P.O. Box 25287
Denver CO 80225-0287

27. PAYMENT WILL BE MADE BY

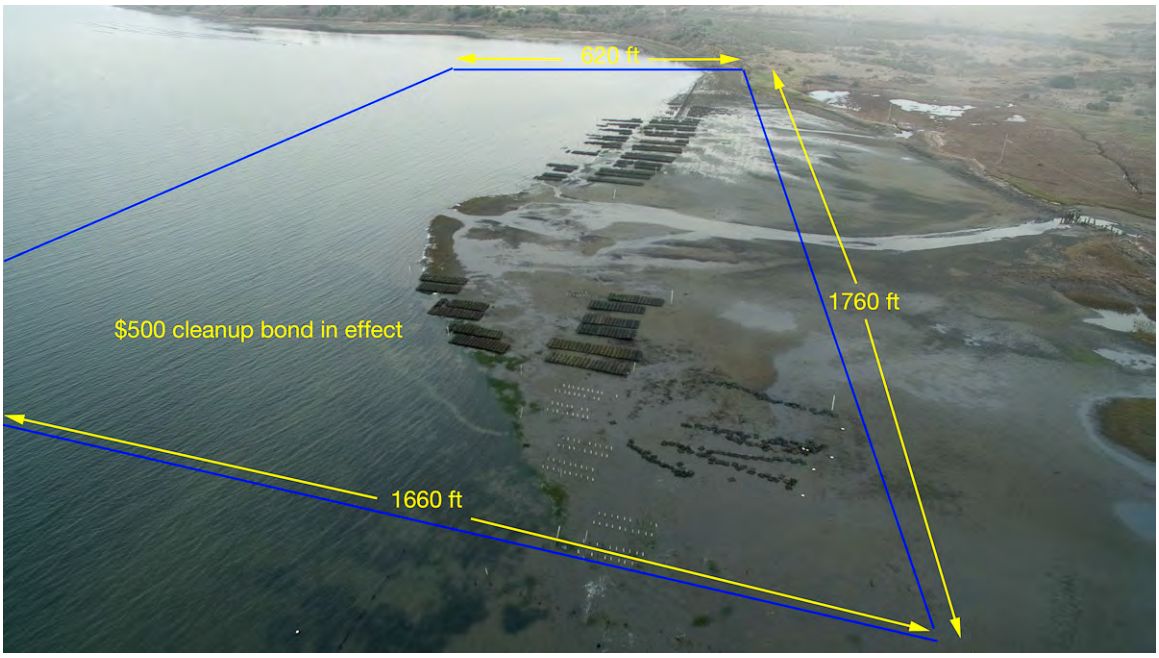
Invoice Processing Platform
Department of Treasury
http://www.ipp.gov

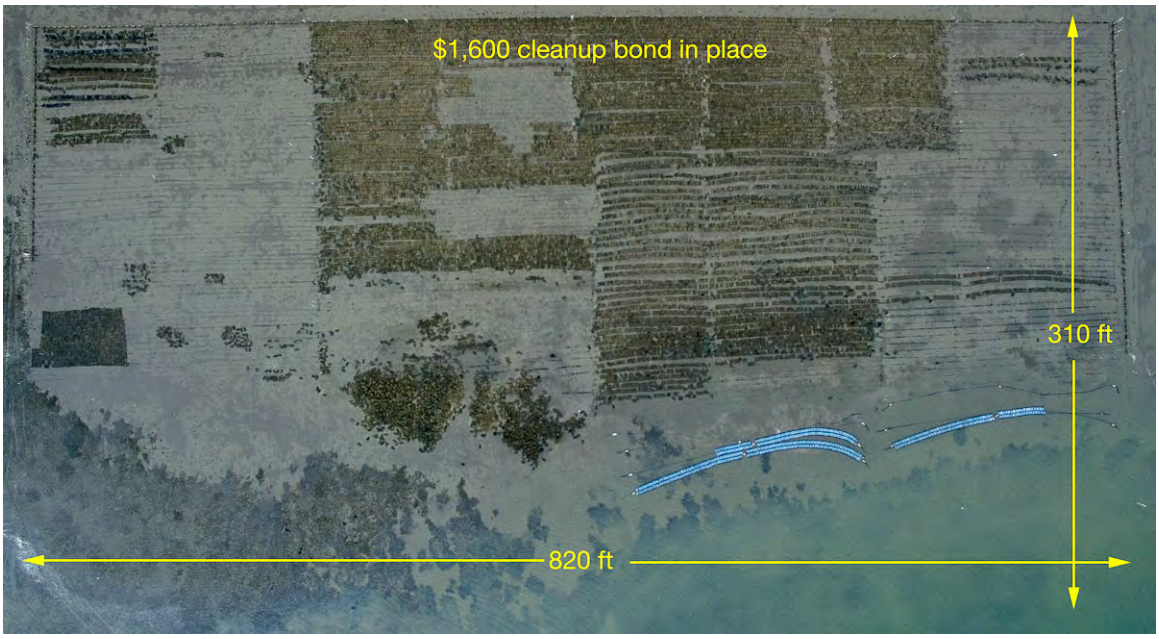
Below are images of some current leases, showing rough dimensions as well as the amount paid into the escrow fund.

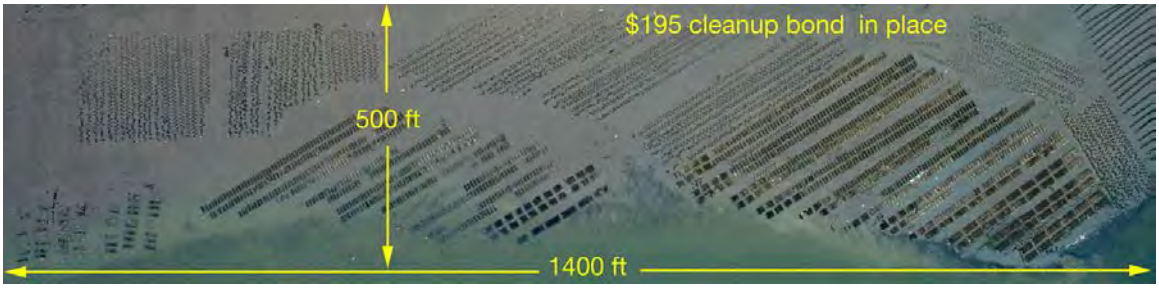





1200 ft
875 ft
1500 ft
$495 cleanup bond in place


620 ft
1760 ft
$500 cleanup bond in effect
1660 ft





Allowing new leases in state waters before cleaning up all the trash left by former (and current) growers erodes public trust in the agencies tasked with not only promoting sustainable aquaculture, but also with **enforcing laws** to protect nature from said aquaculture.

The slide seen below was created by the State Aquaculture Coordinator .

The yellow text I have highlighted reads:

“Emphasize CA’s strict environmental standards as advantage”

My question to The Commission is:

How can one have an advantage based on strict standards if the laws those standards are based on are not enforced?

Please enforce current laws!

west marin environmental action committee

HOG ISLAND OYSTER CO.
Certified B Corporation
MARSHALL
SAN FRANCISCO
NAPA
HUMBOLDT

California Fish and Game Commission
Attention: Marine Resources Committee
1416 Ninth Street, Room 1320
Sacramento, CA 95814
Via electronic mail: fgc@fgc.ca.gov

February 21, 2018

Re: EAC & Hog Island Comments re. BMPs (Marine Resources Committee Agenda Item #8(B))

Dear Commissioners:

The Environmental Action Committee of West Marin (EAC) and Hog Island Oyster Company (Hog Island) (collectively "we") submit these joint comments and proposed aquaculture Best Management Practices (BMPs) (*Exhibit 1*) for your consideration prior to the March 6, 2018 Marine Resources Committee meeting. EAC is grass roots environmental non-profit established in 1971, and Hog Island is a shellfish company established in 1983. We both want to ensure that Tomales Bay is clean, healthy, and free of marine debris.

Our comments focus on marine debris management and aquaculture BMPs for Tomales Bay. Since 2015, EAC has advocated to the Fish and Game Commission (Commission) for the formalization of aquaculture BMPs. Hog Island is also supportive of BMP formalization, and already engages in many of the BMP practices listed in *Exhibit 1* voluntarily.

As discussed in EAC's July 2017 letters to the Commission, EAC is aware that multiple drafts of BMPs have been presented to the Commission, many of which are in the public record. Since July 2017, EAC and Hog Island have developed a revised proposed BMP list, attached hereto as *Exhibit 1*.

We submit this joint letter in hopes of expediting the delayed BMP rulemaking process. We are hopeful that the involvement of the Bren School and their research team may also help move this process along, as well as helping with the uniformity of culture terms. We both agree that bi-annual site inspections of each aquaculture lease by the Department of Fish and Wildlife (Department) are a necessary component of a successful BMP program.

As discussed at the July 2017 BMP stakeholder meeting in Marshall, the best way to incorporate BMPs into each lessee's operations has yet to be determined. Proposed ideas include the

submission of a BMP plan by each grower to the Commission for Commission approval, lease amendments, Coastal Development Permit conditions, or including BMPs as part of a programmatic planning document for Tomales Bay. While the method of incorporation has yet to be determined, *Exhibit 1* provides some of the types of BMPs which must be addressed by each grower. We have included categorical headings, some of which are consistent with the categories proposed in the "Backgrounder for Public Stakeholder Mtg" document which was part of the Commission and Department's agenda for the July 2017 BMP stakeholder meeting. We hope that this joint letter, from local Tomales Bay stakeholders, an environmental group and a shellfish company, helps your Commission prioritize this important BMP rulemaking process. We look forward to continued participation and stakeholder engagement.

Thank you for your work on this important issue and your consideration of these comments. We hope that the BMP rulemaking process can move forward as soon as possible, and Tomales Bay aquaculture can be a leader in the industry for sustainable practices.

Respectfully,

Morgan Patton & Ashley Eagle-Gibbs
Executive Director Conservation Director
Environmental Action Committee of West Marin

John Finger
Co-Founder, CEO
Hog Island Oyster Company

cc:

Susan Ashcraft, Marine Advisor, Fish and Game Commission
Kirsten Ramey, Marine Aquaculture Coordinator, Department of Fish & Wildlife
Randy Lovell, State Aquaculture Coordinator, Department of Fish & Wildlife

Exhibit 1: PROPOSED BEST MANAGEMENT PRACTICES REGARDING MARINE DEBRIS FOR TOMALES BAY SHELLFISH GROWERS

Once adopted, the below list of proposed best management practices (BMPs) shall be mandatory and legally binding for all aquaculture lessees. The Fish and Wildlife Department and/or the Fish and Game Commission shall include enforcement provisions for instances of lessee non-compliance with the BMPs. Third party inspections shall take place on all lease sites on an annual basis (at a minimum) to ensure compliance with the following BMPs and to suggest potential improvements. The Department of Fish and Wildlife is an appropriate entity to conduct these inspections. Ideally, inspections shall occur at least bi-annually before and after the winter storm season (i.e. at the end of summer and in early spring). The finalized and adopted BMPs shall be reviewed and revised on a regular basis (at least every ten years) through a transparent public process. As new technologies become available, BMP revisions may be needed in the aim for continuous improvement.

Training & Education:

1. Growers[1] shall implement a written training program and processes for their staff[2], which shall include regular staff education on reducing environmental impacts and marine debris reduction practices, with the goal of marine debris elimination. Growers may be able to partner with other local organizations and agencies regarding implementation of this training program.
2. All staff shall be trained to look for and remove, repair, or secure any loose culture gear on or near growing leases on a regular basis.

Recover and Reduce Marine Debris (Operational Discipline & Oversight):

3. Leases and surrounding areas shall be patrolled to recover lost and broken gear on a monthly[3] basis. Where possible, before high wind and storm events, gear shall be properly secured. Following high wind and storm events, patrols shall occur as quickly as reasonably possible or within two weeks.

[1] The term "Growers" is defined to include aquaculture farmers, growers, and their staff.
[2] The term “Staff” is defined to include all contractors, employees, volunteers, workers, personnel, owners, and operators of each aquaculture lease(s).
[3] For intertidal leases, patrols shall occur at both high and low tides to ensure gear buried in the mud is promptly collected.

4. Growers shall organize or participate in quarterly bay wide clean ups that include walking the bay shoreline and wetlands, in order to gain access to hard to reach areas. Where possible, growers shall aim to work with other coastal clean-up people and/or local organizations to coordinate clean-up efforts. The volume of all debris collected, including non-shellfish related debris, shall be recorded and documented, with the goal being to continually reduce that volume.
5. When tossing out loose bags or bundles of lightweight seed bags, growers shall ensure that all bags or bundles are either heavy enough to not to drift away[4] or are secured or anchored to prevent drifting or movement. All loose bags that might drift shall be secured as soon as possible, but at a minimum within two weeks of being tossed out.
6. Growers shall avoid leaving tools, loose gear, and construction materials on leases and surrounding areas for long periods of time (i.e. longer than one week).[5] All materials staged on leases shall be kept neat, and secured, to prevent movement and/or burial.
7. If a culture method is being discontinued, all materials (including but not limited to culture structures and other items) shall be promptly removed (within one year).
8. Staff and contractors shall not litter. All debris and trash (including non-shellfish items) shall be properly disposed of once ashore.

BMP Compliance, Oversight & Robust Design:

9. Growers shall implement a monthly self-monitoring and inspection program to certify BMP compliance. The program should include monitoring and recording of marine debris collected (including date, time, and location where possible), and a record of monthly lease patrols and staff education training. The goal of this self-monitoring program is to increase the percentage of recoverability and decrease the volume of lost gear and debris.
10. Growers shall strive to continually improve gear, so that breakage and scattering of debris are minimized. The quest being for zero lost gear.
11. Growers shall strive to avoid the use of single-use materials.[6] Growers shall minimize waste generation by purchasing materials with a long-life span, preferably re-usable, but at least recyclable.[7]
12. Growers shall strive to phase out the use of plastic wrapped blue foam floats and/or floats that are easily degraded by ultraviolet rays or pecked by birds in search of food.
13. Growers shall secure all buoys and/or floats and floating gear properly in order to minimize and ideally eliminate lost gear.
14. A review of lease escrow accounts shall occur on a regular basis (at least annually) to ensure that adequate funds are available to clean up abandoned leases. Growers shall retain the right to perform the clean up of any abandoned leases themselves, so as to not

[4] Growers shall securely tie large groups of non-floating bags together when deploying bags for future securing to anchor lines to ensure the bags do not drift.
[5] Ideally, tools and other equipment should be removed daily after working on lease areas, including: fencepost drivers, gloves, water bottles, PVC pipes, wires, and ropes.
[6] i.e. copper wires and zip ties
[7] i.e. stainless-steel halibut clips or other re-usable and recyclable materials

decrease the balance in the escrow account. Grower led clean-ups shall be subject to third party inspections.

15. All floating gear shall be uniquely and clearly identified with the unique company name and phone number.
16. Annual proof of use forms shall be completed and timely filed with the Department of Fish and Wildlife. Forms shall be made publicly available.

2/6/2018

Bernard Friedman
Santa Barbara Mariculture Co.
4365 Cuna Dr.
Santa Barbara, CA 93110

Californian Fish and Game Commission
P.O. Box 944209
Sacramento, CA 94244-2090

Dear Commissioners,

Regarding the CEQA document review for Santa Barbara Mariculture.

Thank you for listening and responding to my plea at the last commission meeting in December 7, 2017. The lease you are considering provides the majority of my income for my family. The timely consideration of my application and CEQA document promotes my family's welfare.

I would like to thank Aquaculture Coordinator Randy Lovell for working with me to complete the CEQA document and help me understand all the intricate details. We have both struggled and commiserated together in the CEQA collaboration as we generated the first CEQA review of an offshore farm in California.. I regard him as a competent college even when our viewpoints have differed. I enjoy working with Mr. Lovell and I hope to continue a professional relationship with him in the future.

I hope the Mr. Lovell is just as proud as I am that we took on a challenge very few food producers in California are required to do. California's agriculture farmers are not required to go through the CEQA review process. Individual farmers are covered under broader county zoning regulations freeing the farmer to concentrate on the business of farming.

Agriculture does have a massive environmental impact, but it is necessary for our survival as a society on this planet. The review process should highlight the lower environmental impacts of an offshore farm compared to its terrestrial counterpart. Growing food for people has always been and will continue to be difficult and challenging and the CEQA review should be evaluated in the context of food production in California. I personally agreed to the CEQA process as a learning tool for regulatory agencies implementing the future of seafood production. California needs to become more responsible for its massive seafood consumption. Harvesting seafood from foreign environments and relying on foreign regulatory policy distorts the true costs and impacts of living on this planet. Other country's environments and economies are being exploited so Californian's can eat a healthy and nutritious protein.

The CEQA document you are reviewing should be considered in the context of not only the environment in the marine waters of California, but also the planet's environment. It should be considered in the context of food production on this planet and how the citizens of this world plan to feed themselves in the future. Please remember, there is no such thing as a free lunch.

While you are pondering the benthic impacts of my farm please consider the impacts all farms have on the natural environment. Most other farms have to clear the land of native plants and animals in order to plant their non-native crops. My farm does not clear the benthic environment of plants and animals.

While pondering the impacts to marine fauna please consider the impacts all farms have on any native wildlife on this planet. Most farms have to prevent rodents, birds, and other mammals from entering and foraging on the farm. My farm has open access for all wildlife to pass through and forage.

While pondering the impacts of debris created by the farm please consider the amount of packaging and waste created by importing our seafood into California. All that seafood comes on ships, planes, and trucks. It is stacked on pallets, packed in insulated containers, wrapped in plastic, cooled with gel packs, and held under constant refrigeration. That's all before it even gets to the store. There is a tremendous amount of energy and waste created from importing seafood into California.

While pondering the potential impacts of fostering invasive species created by my farm please consider that the spread of invasive species comes from the global economy that we have so diligently fostered. The shipment of goods by container ship is the number one culprit for spreading invasive species. Containerships are also the culprit for many whale fatalities and noise pollution harming marine mammal populations throughout the world. You can counter this mass scaling of globalization by eating local food.

Actions have consequences and so does inaction. Know that if you do not permit this farm you are simply implying that it is okay to grow and harvest shellfish in other parts of the world. Why is it okay to grow shellfish in another country but not okay to grow it in California? The CEQA document is too narrowly focused on the immediate environment and does not provide context for the environment as a whole. This lack of context and proportion can skew perspectives. By looking under the microscope you are disregarding the universe. Please be conscious of the entire environment in which we live. At the last commission meeting I attended, the commission just closed California's abalone fishery despite the State's best and most expensive conservation efforts. Our marine environment is still rapidly changing under its glossy veneer. It's time to consider a more holistic approach. We are still compartmentalizing separate relationships with the environment. The problem lies within the way we relate to our environment as a whole. It's time to think differently. Analyzing the data generated by this CEQA document doesn't provide all the tools necessary to think about environmental awareness.

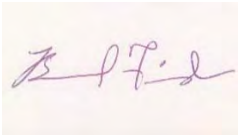
Through ingenuity, hard work, and trial and error, I have become the most productive and experienced offshore shellfish farmer in the United States. I have an MSc in Fisheries Management, Development, and Conservation from the University of Ireland, a B.A. in Biology from University of California, Santa Cruz, and an A.S. in Marine Diving Technologies from Santa Barbara City College. I am a farmer and a commercial fisherman and have worked all my life to try and understand how I can minimize my impact on the planet and leave the environment better than I found it.

My farm and way of doing business is a conscious effort to rein in costs. I am conscious of my contradictions with nature and conscious of my consumerism. I always look for ways to reduce expenses in my life, therefore reducing my cost for living on this planet. We cannot spend our way to sustainability.

I understand the gravity of working in California's precious marine environment. This is a public resource that I cherish every day and it is a privilege and an honor to be working on the ocean. Throughout the years of working this lease, I have presented myself as open and as honestly as I can, and it is my sincere hope that this Commission will grant me the permission to continue to do so.

Sincerely,

Bernard Friedman



Santa Barbara Mariculture Co.

COMMITTEE STAFF SUMMARY FOR NOVEMBER 9, 2017

9. CALIFORNIA'S COASTAL FISHING COMMUNITIES

Today's Item **Information ☒** **Direction ☒**

Receive staff update on coastal public meetings concerning California's fishing communities.

Summary of Previous/Future Actions

- MRC initial discussion on fishing communities — Mar 4, 2015; MRC, Marina
- MRC discussion on fishing communities — Nov 4, 2015; MRC, Ventura
- Public meeting and discussion — Jul 20, 2016; Petaluma
- FGC approval for series of meetings — Aug 24-25, 2016; FGC, Folsom
- Update on planning efforts — Nov 15, 2016; MRC, Los Alamitos
- Review of proposed meeting locations — Mar 15, 2017; MRC, San Clemente
- Update on meetings — Jul 20, 2017; MRC, Santa Rosa
- FGC approval of revised meeting schedule — Aug 16, 2016; FGC, Sacramento
- **Today's update** — **Nov 9, 2017; MRC, Marina**

Background

Discussions in Mar and Nov 2015 between MRC and members of various coastal fishing communities demonstrated the potential value in expanding a conversation surrounding challenges facing California's coastal fishing communities. An initial public meeting and discussion was held Jul 20, 2016 in Petaluma. Based on public feedback in support of continuing the coastal fishing communities discussion, in Aug 2016 FGC supported an MRC recommendation to schedule a series of fishing community discussions with more locally-focused public meetings along the coast. As a result, a series of seven public meetings were scheduled for 2017 and early 2018.

The focus of the public meetings is on current and future needs in specific fishing-dependent coastal communities, and how FGC could potentially support localized efforts to foster stability and long-term well-being in California's diverse fishing communities. As of this meeting, four of the seven public meetings have been held (Exhibit 1). A sample agenda and regional fisheries "snap shots" are provided in exhibits 2 and 3. Today provides an opportunity for a staff update and public input and discussion on the public meetings.

Significant Public Comments

One fisherman commented that collaborative fisheries research, partnerships, and co-management with DFW will support coastal fishing ports (Exhibit 3).

Recommendation (N/A)

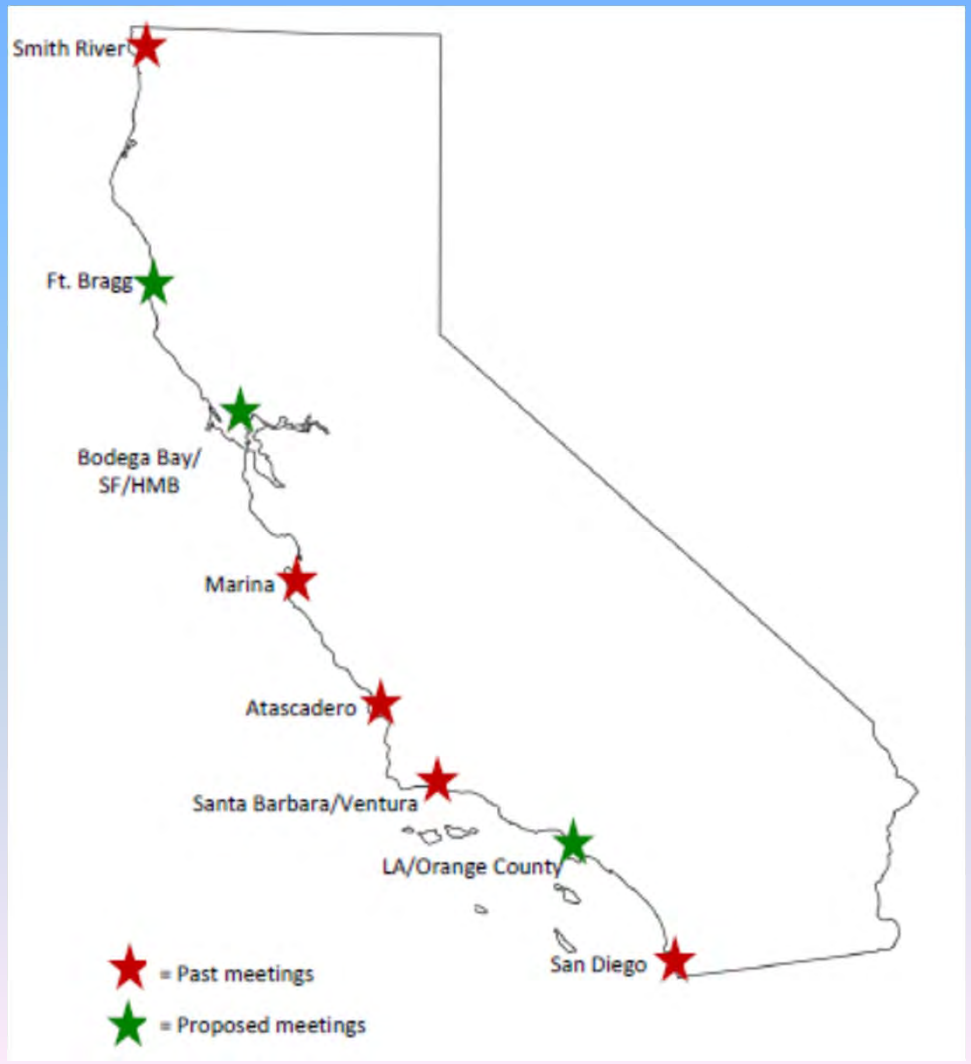
Exhibits

1. Agenda for coastal fishing communities public meeting in Monterey, Nov 8, 2017
2. Regional fisheries snapshots for Morro Bay/San Luis Obispo and Ventura/Santa Barbara port areas
3. Email from Chris Voss, received Aug 7, 2017

Committee Direction/Recommendation (N/A)

FGC Fishing Communities Meeting Locations (2016-2018)

Updated February 2018



California's Fishing Communities Project Update

Marine Resources Committee Meeting

Susan Ashcraft, March 6, 2018

State Law: MLMA Goals

- Conserves Entire Systems
- Non-Consumptive Values
- Sustainability
- Habitat Conservation
- Fishery Restoration
- Bycatch Limitation
- **Fishing Communities**

State Law: MLMA Goals

- Conserves Entire Systems
- Non-Consumptive Values
- Sustainability
- Habitat Conservation
- Fishery Restoration
- Bycatch Limitation

- **Fishing Communities***: Fisheries management should recognize the long-term interests of people dependent on fishing, and adverse impacts of management measures on fishing communities are to be minimized.*

FGC Fishing Communities Project (2016-2018)

Goal: To identify fishing community sustainability goals and potential opportunities to support them

Coastal Fishing Communities Meeting Dates

Jul 2016	• Coast-wide meeting – Santa Rosa
Jun 2017	• Regional meeting – Smith River
Sep 2017	• Regional meeting – Ventura
Oct 2017	• Regional meeting – Atascadero
Nov 2017	• Regional meeting – Marina
Dec 2017	• Regional meeting – San Diego
TBD 2018	• Regional meetings (TBD) – Bodega/SF/HMB; Ft Bragg/Eureka, LA/OC

Key Themes

- **Access challenges**
  - Restricted access to entering commercial fisheries
  - Access to fishing grounds, beaches, piers
  - Regulatory changes
  - Environmental / climate changes
- **Competing uses, loss of facilities**
  - Marine spatial planning –wind energy, aquaculture, etc.
  - Economic competition – warehouse breweries, sailboat and yacht mooring

Key Themes

- **Planning for the future**
  - Community efforts/ cooperatives
  - New participants
    - Overcoming cost hurdles
    - Apprenticeships
  - Societal values, investment from cities/counties
- **Value in multiple coastal uses, local support**

Future Opportunities

- Next Steps: Staff to propose range of possible actions under FGC purview, e.g.:
  - FGC policy?
  - Restricted access policy review?
  - Expand sustainable community plans to include State-managed fisheries?
  - Collaborations
  - Let's get creative (test cooperatives, local initiatives)

Questions?

Rodger Healy

EVER THOUGHT ABOUT A CAREER IN COMMERCIAL FISHING?

FIND OUT MORE

Commercial Fishing Apprenticeship Program

work outdoors - independence - new experiences - contribute to sustainability

Where

Handlery Hotel, Presidio Ballroom
950 Hotel Circle N, San Diego, 92108

When

Monday, March 5th 2018, 4:30-7:30 pm

How

Come & meet veteran fishermen to find out what it means to have a career in commercial fishing in the 21st century; and learn more about the state's first commercial fishing apprenticeship program!

Why a commercial fishing apprenticeship?

1. Gain diverse, relevant skills working under experienced fishermen
2. Employment and classroom instruction while training
3. Be at the heart of the local, sustainable seafood movement
4. Find info and registration at: https://caseagrant.ucsd.edu/apprentice

Sea Grant California

Questions? Contact: Theresa Talley, tstalley@ucsd.edu, 858-200-6975

Marine Resources Committee (MRC) 2018 DRAFT Work Plan

Scheduled topics and timeline for items referred to MRC from California Fish and Game Commission

Updated February 2018

Topic	Category	2018		
		MAR	**JUL**	NOV
		Santa Rosa	**San Clemente**	Sacramento
Management Plans				
Abalone FMP / ARMP Update (upon request by FGC)	FMP Development			
Herring FMP Updates	FMP Development	X	**X**	
Regulations				
Sport Fishing Regulations	Annual	X		
Kelp & Algae Harvest	DFW Project	X	**X**	
Aquaculture - Best Management Practices	DFW Project	X	**X / R**	
Emerging Management Issues				
Aquaculture - Existing and Future Lease Considerations	Initial Review	X	**X**	
Box crab experimental fishing permit program and applications criteria	DFW Project			
Special Projects				
California's Fishing Communities	MRC project	X	**X / R**	
Informational / Special Topics				
Marine Debris and Plastic Pollution	Informational			
Offshore Wind Energy (BOEM Project)	Informational			

KEY: **X** Discussion scheduled **X/R** Recommendation developed and moved to FGC

California Fish and Game Commission – Perpetual Timetable for Anticipated Regulatory Actions

(dates shown reflect the date intended for the subject regulatory action)

Updated: 02/09/18

For FGC Staff Use				REGULATORY CHANGE CATEGORY	ACTION DATE, TYPE AND LOCATION	2018																		2019
						FEB 6	FEB 7 | 8	MAR 6	APR 12	APR 18 | 19	MAY 17	JUN 19	JUN 20 | 21	JUL 17	AUG 22 | 23	SEP 20	OCT 16	OCT 17 | 18	NOV 14	DEC 12 | 13	JAN TBD
QUARTERLY EFFECTIVE	DFW RU ANALYST	FGC ANALYST	LEAD			TC SACRAMENTO	FGC SACRAMENTO	MRC SANTA ROSA	FGC TELECONFERENCE	FGC VENTURA	WRC LOS ALAMITOS	TC SACRAMENTO	FGC SACRAMENTO	MRC SAN CLEMENTE	FGC FORTUNA	WRC SACRAMENTO	TC FRESNO	FGC FRESNO	MRC SACRAMENTO	FGC OCEANSIDE	WRC TBD
					File Notice w/OAL by		12/12/17		02/13/18	02/20/18			04/24/18		06/26/18			08/21/18		10/16/18	
					Notice Published		12/22/17		02/23/18	03/02/18			05/04/18		07/06/18			08/31/18		10/26/18	
					Title 14 Section(s)																
✱	KM	ST	WB	Tricolored Blackbird - Incidental Take	749.9		A		E 4/1 X												
	KM	RP	FB	Central Valley Salmon Sport Fishing (Annual)	7.50(b)(5), (68) & (156.5)		D		A		V			E 7/1		R				N	
	MR	JS	WLB	Waterfowl (Annual)	502		D			A	V			E 7/1		R				N	
	KM	SF	FB	Klamath River Basin Salmon Sport Fishing (Annual)	7.50(b)(91.1)		D		A		V				E 8/1	R				N	
	MR	JS	WLB	Upland (Resident) Game Bird (Annual)	300		N			D			A			E 9/1 V					R
	MR	JS	WLB	Sage Grouse Preferential Points and Draw	716					N			D		A						E 1/1
	SB	SF	FGC	Tribal Take in MPAs	632(b)(33), (34), (97), (98), (112) & (117)					N			D		A						E 1/1
✱	SB	RP	FGC	Rockport Rocks Special Closure	632(b)(17)					N			D		A						E 1/1
	MR	RP/SF	WB	Trapping Fees	TBD								N		D			A			
✱	SB	ST	MR	Groundfish	TBD										N			D		A	
	MR	JS	LED	Deer/Elk Tag Validation	708.6, 708.11										N			D		A	
	MR	JS	LED	Archery Equipment and Crossbow	354(f)										N			D		A	
	KM	JS	FB	Sport Fishing (Annual)	1.05 et al.			E 3/1			R				N			D		A	
	MR	JS	WLB	Mammal Hunting (annual rulemaking, if needed)	TBD						V					R				N	
	MR	JS	FGC	Use of Dogs for Pursuit/Take of Mammals or Dog Training 2016	265				E 4/26												
	MR	JS	FGC	Use of Dogs for Pursuit/Take of Mammals or Dog Training 2017	265				E 4/26												
✱	KM	ST	FB	Commercial Take of Rattlesnakes	42, 43, 651, 703				E 4/1												
✱	KM	ST	MR	Nearshore and Deeper Nearshore Fishing Permits	150,150.01,150.02,705				E 4/1												
✱	MR	ST	MR	Commercial Fisheries Landing Requirements	197				E 4/1												
	KM	ST	MR	Abalone Certificate of Compliance	29.15				E 4/1												
✱	MR	ST	MR	Commercial Sea Urchin (Phase II)	120.7, 705				E 4/1												
RULEMAKING SCHEDULE TO BE DETERMINED																					
✱			MR	Kelp and Algae Harvest Management	165, 165.5, 704			V													
✱				Possess Game / Process Into Food	TBD																
✱			OGC	American Zoological Association / Zoo and Aquarium Association	671.1																
				Night Hunting in Gray Wolf Range	474																
				Shellfish Aquaculture Best Management Practices	TBD			V						R							
✱		ST		Fisher	670.5																
✱			MR	Ridgeback Prawn Incidental Take	120(e)																
✱		ST		Northern Spotted Owl	670.5																
✱				Ban of Neonicotinoid Pesticides on Department Lands	TBD																
✱			MR	Commercial Crab Incidental Take Limits	120(e)(4), 125.1(c), 126(a)(7) & Add 129																
✱			MR	Commercial Pink Shrimp Trawl	120, 120.1 and 120.2																

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, WRC = Wildlife Resources Committee, MRC = Marine Resources Committee, TC = Tribal Committee