

STAFF SUMMARY FOR JUNE 24-25, 2020

11. MARINE RESOURCES COMMITTEE (MRC)**Today's Item**Information Action

Discuss updates and potentially approve recommendations from the previous meeting. Consider approving new topics to address at a future committee meeting. Consider approving draft agenda topics for the next committee meeting.

Summary of Previous/Future Actions

- | | |
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| • Most recent MRC meeting (Part 1) | Mar 17, 2020; MRC, Santa Rosa/
Teleconference/Webinar |
| • FGC adopted recommendations from MRC meeting Part 1 and scheduled Part 2 | Apr 15-16, 2020; Teleconference |
| • Most recent MRC meeting (Part 2) | Apr 29, 2020; Webinar/Teleconference |
| • Today consider recommendations from MRC meeting Part 2 and potentially approve agenda topics for next meeting | Jun 24-25, 2020;
Webinar/Teleconference |
| • Next MRC Meeting | Jul 29, 2020; Webinar/Teleconference |

Background

MRC works under FGC direction to set and accomplish its work plan (Exhibit B1).

(A) MRC Meeting Summary

In Apr 2020, FGC received a summary of the MRC's Mar 17 meeting. The MRC meeting agenda included eight substantive topics; not all topics could be completed due to unprecedented public turnout via a new remote participation option (teleconference and webinar) as well as the in-person venue.

At its Apr 15-16 meeting, FGC approved MRC recommendations related to topics covered on Mar 17, and approved an additional meeting day of Apr 29 to complete the agenda; today's meeting will focus on a summary and recommendations from the additional meeting day. MRC met on Apr 29 and covered the remaining substantive topics carried forward from Mar 17 (marine aquaculture in California, Experimental Fishing Permit (EFP) Program phase II rulemaking, recreational swordfish fishery, and Marine Life Management Act master plan implementation update).

A meeting summary spanning both meeting dates is provided as Exhibit A1.

MRC Recommendations from Apr 29

Based on the meeting discussion, MRC developed three recommendations for FGC consideration:

- I. Receive DFW's updated marine aquaculture information report (AIR; revised after the MRC meeting to integrate feedback) at FGC's Jun 2020 meeting (today)

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and request that DFW present an update at the Jul 2020 MRC meeting regarding next steps and timeline for developing an aquaculture action plan.

- II. Approve a six-month hiatus on receiving new aquaculture lease applications for six months, schedule a review and discussion at the Nov 2020 MRC meeting, and authorize staff to engage in dialogue with the Port of San Diego concerning a potential lease application during the hiatus.
- III. Schedule updates on the EFP Program phase 2 and recreational swordfish, request that DFW refine EFP permit fee structure options and criteria, and request that DFW explore options for changing the recreational swordfish daily bag limit and for improving swordfish data collection methods. Schedule both items for the Jul 2020 MRC meeting. Note that staff is requesting a change to the schedule for swordfish (see FGC staff recommendations).

(B) MRC Work Plan Development and Draft Timeline

The updated work plan (Exhibit B1) includes topics and timelines for items referred by FGC to MRC.

New MRC Topics

Staff requests that FGC refer to MRC an emerging management issue related to marine protected areas (MPAs) where artificial structures permitted by other agencies were installed prior to MPA designation. Structures require maintenance over time, which may result in injury, damage, take or possession of living, geological or cultural resources that are otherwise protected, incidental to any maintenance activities. Options to address the issue have been vetted through the MPA Statewide Leadership Team, and DFW is developing a proposed regulatory pathway. Due to imminent maintenance needs for some structures, staff recommends adding this to the Jul 2020 MRC agenda for discussion.

Draft Agenda Items for Jul 29

Staff has reviewed the list of work plan topics identified for Jul 2020 along with additional items proposed or requested by MRC or staff. The initial topic list for review and FGC direction includes:

1. agency updates, including California Ocean Protection Council update on experimental crab trap pop-up gear project (per MRC request),
2. kelp restoration and recovery tracking update,
3. MLMA master plan for fisheries implementation update,
4. recreational swordfish update from DFW
5. red abalone fishery management plan (FMP) update and potential recommendation,
6. update on next steps for developing an aquaculture action plan,
7. California grunion recreational fishing regulation changes (referred by FGC in Apr 2020),
8. California's Coastal Fishing Communities project update and direction,

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9. MPAs and maintenance of permitted artificial structures,
10. EFP Program phase II discussion of fee structure and criteria options,
11. commercial kelp and algae harvest regulations update, and
12. cowcod recovery and stock status (South of Cape Mendocino).

Clearly there are more topics proposed for the Jul 2020 meeting than can be addressed in one day as stand-alone items, especially via a webinar format. Given recent experience, staff believes that the MRC and stakeholders would be better served by including fewer substantive topics, which would allow for more in-depth dialogue. However, that goal must not be met at the expense of advancing the most sensitive or urgent management issues.

Staff discussions with DFW regarding priorities and topics that can be presented as updates helped inform the staff recommendation below. As described under Agenda Item 33(B), rulemaking timetable updates, the commercial kelp and algae harvest rulemaking (topic 11) is proposed to be moved to “TBD” while DFW staff continues to work with industry members and other stakeholders to refine the proposal; therefore, this topic can be delayed to a future MRC meeting. Topic 10 (EFP Program) was going to be proposed to move onto the rulemaking timetable as discussed at the Mar 17, 2020 MRC, but is now proposed to remain under TBD; however, continuing to vet the proposal will allow DFW staff to prepare the materials necessary to quickly move a rulemaking forward once it can be scheduled. Topic 12 is not urgent and can be delayed to a future meeting, while topics 2-4 and 6 can be presented as updates.

Significant Public Comments

Comments Related to MRC Recommendations

1. *DFW aquaculture information report*: Three non-governmental organizations provide feedback on DFW’s draft AIR, with nine requested revisions (Exhibit A4). Of note, they request to remove or replace the “Looking Ahead” section of the report, which they believe is prematurely skewed toward aquaculture expansion. Other requests are for clarifications to be made about available acreage, permitting, environmental review, and shorebird and other wildlife and ecological impacts.
2. *Marine aquaculture state action plan*: A consortium of six academics express support for a state action plan for sustainable marine aquaculture, specifically focusing on seaweed and shellfish, and offering to assist with plan development. Examples of their current work in aquaculture are provided (Exhibit A5).
3. *Proposed marine aquaculture lease hiatus*: The Port of San Diego expresses opposition to a moratorium on new aquaculture lease applications and requests that any hiatus be limited to six months and exclude public agencies. The Port further expresses a desire to collaborate with FGC and offers to provide resources to assist in facilitating continued acceptance of aquaculture lease applications (Exhibit A6).

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Comments Related to MRC Work Plan Topics

4. *Proposed kelp and algae regulation changes:* A commercial kelp harvester expresses opposition to harvest limits and statewide closure of bull kelp harvest (Exhibit B2).
5. *Red abalone FMP de minimis fishery options:* A former member of the FMP integration administrative team provides independent comments and requests that FGC direct DFW to include additional programmatic alternatives to the recommended biological and de minimis fisheries for the FMP (Exhibit B3).

The Waterman's Alliance requests that FGC direct DFW to include an option in the FMP to immediately open a small recreational fishery (600-900 per year) and submits a petition containing over 2,500 signatures and a table with individual comments (Exhibit B4, which includes a sample signature page).

Recommendation

FGC staff: (A) Approve the MRC recommendations from Apr 29, and (B) refer the topic related to maintenance of pre-existing structures in MPAs to MRC and approve the identified agenda topics for the Jul 2020 MRC meeting (some under agency updates), except to delay topics 11-12 to a future date.

Exhibits

- A1. [Summary of MRC meeting held Mar 17 and Apr 29, 2020](#)
- A2. [DFW memo transmitting AIR report](#), received Jun 17, 2020
- A3. [The Status of Commercial Marine Aquaculture in California](#), dated May 2020
- A4. [Email from Anna Weinstein on behalf of Audubon California, Oceana, and the Pew Charitable Trusts](#), received May 19, 2020
- A5. [Email from Maddelyn Hardin, University of Southern California \(USC\), on behalf of a consortium of researchers and staff from USC and Sea Grant](#), received Jun 11, 2020
- A6. [Email from Paula Sylvia, transmitting three letters from San Diego Port District](#), received Jun 11, 2020
- B1. [MRC work plan](#), updated Jun 6, 2020
- B2. [Email from Ian O'Hollaren, Seaquoia Wild Seaweeds](#), received May 21, 2020
- B3. [Email from Jack Likins](#), received May 7, 2020
- B4. [Email from Joshua Russo, Watermen's Alliance, transmitting petition with over 2500 signatures and comments table](#), received Jun 11, 2020

Motion/Direction

- (A) Moved by _____ and seconded by _____ that the Commission approves the recommendations from the April 29, 2020 Marine Resources Committee meeting as recommended by staff.

OR

Moved by _____ and seconded by _____ that the Commission approves the recommendations from the April 29, 2020 Marine Resources Committee meeting as

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as recommended except for _____ for which it approves
_____.

AND

(B) Moved by _____ and seconded by _____ that the Commission approves the draft agenda topics for the July 2020 Marine Resources Committee meeting as recommended by staff.

OR

Moved by _____ and seconded by _____ that the Commission approves the draft agenda topics for the July 2020 Marine Resources Committee meeting as recommended by staff, except _____.

Commissioners
Eric Sklar, President
Saint Helena

Samantha Murray, Vice President
Del Mar

Jacque Hostler-Carmesin, Member
McKinleyville

Russell E. Burns, Member
Napa

Peter S. Silva, Member
Jamul

STATE OF CALIFORNIA
Gavin Newsom, Governor

Fish and Game Commission



*Celebrating 150 Years of
Wildlife Heritage and Conservation!*

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MARINE RESOURCES COMMITTEE

Committee co-chairs: Commissioner Silva and Commissioner Murray

March 17, 2020 and April 29, 2020 Meeting Summary

Following is a summary of the California Fish and Game Commission (Commission) Marine Resources Committee (MRC) meeting as prepared by staff. The meeting was held on March 17 as originally noticed but, due to technological and time constraints, was continued to April 29 to complete agenda items not covered on March 17. An audio recording is available upon request.

DAY 1 – MARCH 17, 2020

Call to order

The meeting was conducted in-person with staff at the Justice Joseph A. Rattigan Building in Santa Rosa with the committee co-chairs and additional staff participating via webinar and teleconference. The meeting was called to order at 9:10 a.m. by Co-Chair Murray, who confirmed that she and Co-Chair Silva were in attendance at separate, remote locations. The remote participation option was added pursuant to Governor Newsom's March 12, 2020 executive order allowing state bodies to hold meetings via teleconference and to make meetings accessible electronically.

Susan Ashcraft gave welcoming remarks and outlined meeting procedures and guidelines for participating in Committee discussions, noting that the Committee is a non-decision-making body that provides recommendations to the Commission on marine items. She described how the conversations would be managed given the new webinar format. The following Committee member(s), Commission staff, Department staff, and invited speakers participated from various locations:

Committee Co-Chairs

Peter Silva	Present
Samantha Murray	Present

Commission Staff

Melissa Miller-Henson	Executive Director
Susan Ashcraft	Marine Advisor
Craig Castleton	Staff Program Analyst

Sherrie Fonbuena Staff Program Analyst
Rose Dodgen Sea Grant State Fellow

Department Staff

Mike Stefana Assistant Chief, Law Enforcement Division
Bob Puccinelli Captain, Law Enforcement Division
Randy Lovell Statewide Aquaculture Coordinator
Craig Shuman Regional Manager, Marine Region
Sonke Mastrup State Managed Marine Invertebrates Program Manager, Marine
Region
Kirsten Ramey State Managed Marine Finfish Program Manager, Marine Region
John Ugoretz Pelagic Fisheries and Ecosystem Program Manager, Marine
Region
Marci Yaremko State and Federal Marine Fisheries Program Manager, Marine
Region
Tom Mason Senior Environmental Scientist Supervisor, Marine Region
Rebecca Flores-Miller Environmental Scientist, Marine Region

Invited Speakers

Jenn Eckerle Deputy Director, California Ocean Protection Council
Alexis Jackson Fisheries Project Director, The Nature Conservancy

1. Approve agenda and order of items

The Committee approved the agenda in the order listed; however, Agenda Item 11, Future Agenda Items, was heard out of order, following Agenda Item 6. For purposes of the meeting summary, items are listed in the order of the published agenda.

Note that due to time and technology constraints on March 17, item 7 was not completed in its entirety, and items 8 through 10 were not heard; incomplete items were continued to April 29.

2. General public comment for items not on agenda

Public comments included concerns about the Committee’s ability to foster the public process in light of the webinar and teleconference format, and a request to schedule a discussion of the Department’s California “R3” [i.e., hunting and fishing recruit retain reactivate] plan and the statewide R3 implementation plan released in December 2019 for a future meeting.

3. Staff and agency updates

(A) California Ocean Protection Council (OPC)

Jenn Eckerle provided an update on the recently-adopted 2020-2025 OPC strategic plan to protect California’s coast and oceans, including an outline of select components of the plan. She also provided an update on the outcomes of the February 2020 OPC meeting and highlighted a few key ongoing OPC projects relevant to the Commission’s work, including developing a tribal coast and ocean monitoring program, offshore wind energy development, collaboration with officials from Baja California on coastal and ocean conservation, entanglement risk mitigation, and a pilot project to test pop-up trap fishing gear as a means of reducing whale entanglement risk. Paige Berube provided more information on the timing of the pop-up gear project.

Discussion

A representative from an environmental non-governmental organization (NGO) expressed support for the pop-up fishing gear project. A member of the public expressed concern about derelict gear and debris as an additional consequence of lost crab fishing gear. Jenn clarified that recovery of lost fishing gear was a priority for OPC.

The committee requested an update on the pop-up gear project from OPC at the next MRC meeting.

(B) Department

I. Marine Region

Marci Yaremko provided an update on the recent Pacific Fishery Management Council (PFMC) meeting and the biennial specifications and management process for managing California groundfish. Stock assessments from 2019 are being incorporated into new regulations to take effect in 2021. Notably, cowcod stocks south of Cape Mendocino have been rebuilt ahead of schedule. Other important potential regulation changes include changes in the depth of the groundfish rockfish conservation area (RCA) lines and changes to sub-bag limits, including potential introduction of a sub-bag limit for vermilion rockfish.

Discussion

Comments supported the stakeholder engagement at the recent PFMC meeting. A participant asked whether the movement of the RCA lines would apply to the non-trawl open access commercial sector; Marci confirmed they should.

MRC Direction

The committee requested to schedule a more detailed presentation and discussion of the change in cowcod stock status in California for the July MRC meeting.

II. Law Enforcement Division

Bob Puccinelli provided an update on a gear retrieval program that will be coming online at the end of this crab season to assist with derelict gear. Bob also provided an update on various marine citations including failure to report landings, illegal crab holding, undersized Pismo clams, illegal dumping of cadaver remains, e-tix violations, and license revocations.

Discussion

Comments included a request that a gear removal program be active during the season to remove gear that is abandoned, damaged, or lost at the beginning of the recreational season, not just to remove derelict gear at the end.

III. Other – State aquaculture program

Randy Lovell introduced Jessica Girardot, the new aquaculture program administrator; this new position will increase capacity for the program.

(C) Commission staff

Susan Ashcraft provided an update on new Commission staff, including new Deputy Executive Director Rachel Ballanti and new Staff Services Analyst Cynthia McKeith, and introduced its new Sea Grant State Fellow, Rose Dodgen.

4. Recreational red abalone fishery management plan (FMP)

Alexis Jackson of The Nature Conservancy presented on behalf of the red abalone management integration administrative team. She provided an overview of the results of the recent draft final report from the administrative team, and Sonke Mastrup provided additional comments. The overview included a synthesis of the results of the modeling team regarding length of time until a fishery was projected to be viable under various conditions; it also summarized eight recommendations for potential inclusion in a revised draft red abalone FMP.

Discussion

Comments included input from representatives of several tribes who requested more involvement in the decision-making process. The commenters emphasized that tribal rights to abalone as a resource and engagement with tribes need to take precedence in this discussion, that tribal take should not be a sub-category of recreational take, and that the Commission should not move forward with any FMP until it has completed tribal consultations. A representative from Trinidad Rancheria also suggested collecting additional information from tribes about how much abalone they need to gather for subsistence purposes to understand what level of tribal harvest would be necessary. In response, the committee requested that the Department consider options for how to further engage with tribes on these concepts.

Several members of the recreational fishing community spoke in support of a smaller *de minimis* fishery than currently proposed in the report, arguing that it could be feasible in a shorter time frame with tight controls in place.

One former Department scientist questioned why a fishery was being considered when the population was still declining. Sonke Mastrup clarified that the project was started when a fishery was still considered a possibility but, at this point, no fishery will be considered until the population reaches recovery benchmarks. One commenter suggested that red abalone seed stock should be collected from the environment and maintained in aquaculture facilities until the urchin population declines and kelp, abalone's food source, is restored.

MRC Recommendation

Following discussion, the Committee recommends to the Commission:

- a. Support finalizing the red abalone administrative team report, *Summary of the Management Strategy Integration Process for the North Coast Recreational Red Abalone Fishery Management Plan*;
- b. continue a discussion of the report and recommendations to the July 2020 committee meeting and request that the Department be prepared to clarify decision points;
- c. recommend that the red abalone administrative, project, and modeling teams be formally disbanded having met their charges once the administrative team report is finalized; and
- d. request that Department staff develop a process for how to engage with tribes to add to the July discussion.

5. Whale and turtle protections in the recreational Dungeness crab fishery

Sonke Mastrup provided an overview of Department-proposed management measures for the recreational Dungeness crab fishery and recommendations for:

- a. Gear marking,
- b. a trap limit of 10 crab per angler November 1 through March 31 and 5 per angler April 1 through end of season,
- c. a service interval of 9 days,
- d. a validation stamp for every angler to assist with data gathering on the fishery,
- e. Department director authority for the delay or early closure of the fishing season,
- f. two options for note fishing authorization,
- g. a fair start provision of no less than five days prior to commercial fishery pre-soak, and
- h. specific surface gear requirements.

Discussion

The committee members asked about how the California Dungeness crab fishery compares to that of neighboring states, and requested clarification about triggers for a potential severe weather extension for the service interval requirement. Sonke explained there are much lower trap limits in Oregon and Washington and that they are generally not considered comparable, and that there are several options for triggers for a severe weather extension, such as a small craft advisory issued by the National Oceanic and Atmospheric Administration (NOAA). Bob Puccinelli provided further explanation on the current status of note fishing relative to the current allowance.

Representatives of two environmental NGOs support the regulations, request to add a measure authorizing recovery of lost and derelict recreational gear, and shared the perspective that Department director authority is critical as NOAA fisheries confirmed a whale entanglement in recreational gear last year while the commercial fishery was closed.

A member of the public echoed concerns about pollution from gear debris, some of which may result from gear conflicts with the salmon fishery, and requested that the committee support a small marker buoy and possibly introduce an easily identifiable recreational buoy-marking technique to help prevent plastic waste.

Several representatives of the recreational fishing community spoke in opposition to or requested clarification on several of the proposed measures, expressing particular concern that management measures would be disproportionate to recreational fishing entanglement risk relative to commercial gear entanglement risk.

Sonke Mastrup clarified that the commercial fishery is indirectly impacted by recreational gear entanglements as the commercial fleet is penalized for unidentified entanglements, some of which could be recreational. He further explained that the fair start is being reduced for times when a season delay is needed to protect marine life while avoiding penalizing the commercial fishery for conditions outside its control during an important economic time frame. He also added that, if the Commission supports the measures, the Department would be willing to work with stakeholders to develop options for the recreational fishery which may not be as onerous. Bob Puccinelli added that the Department Law Enforcement Division does not foresee an enforcement issue with a mid-season change in pots. Commissioner Murray also added that Department director authority will provide a faster reaction for risk mitigation than the

Commission could.

Susan Ashcraft noted that removing recreational derelict gear may be outside of current Commission authority but could be investigated further. Sonke agreed that it is not clear whether there is authority to seize property after close of season, but also offered to explore the options further.

MRC Recommendation

Based on the discussion, MRC developed two recommendations for the proposed management measures:

- Advance to a rulemaking, commencing with a notice hearing in June 2020, proposed management measures to minimize the risk of whale and turtle entanglements in the recreational Dungeness crab fishery as recommended by the Department with the following specific provisions:
 - (a) enhanced gear marking with small buoys or unique floats;
 - (b) a trap limit of 10 traps per angler from November 1 to March 31 and 5 traps from April 1 to season end;
 - (c) a service interval of 9 days, with an option for severe weather extension;
 - (d) a validation stamp for all participating anglers, with an option to sunset in 5 years;
 - (e) surface gear requirements for buoys and line length as proposed by the Department;
 - (f) 'note fishing' that may be authorized by text and allows rebaiting of traps;
 - (g) a fair start provision with an options range of no less than 5 to 9 days before commercial pre-soak; and
 - (h) grant the Department director authority to delay the season's start or close the season early when entanglement risk is high based on triggers yet to be defined, with a zonal option and required Commission notification.
- Request that the Department develop draft criteria to determine when a severe weather extension to service interval would be granted, and develop draft criteria for triggering action under Department director authority.

6. Regulations governing commercial harvest of wild kelp and algae

Rebecca Flores-Miller provided an overview of proposed regulation changes, including harvest limits for six edible seaweed species, and a summary of results of the Department's commercial harvester survey.

Discussion

Concerns were raised that there was not enough time to discuss the topic due to the webinar format; requests were made for additional opportunities to discuss and provide comment. Several commercial kelp harvesters expressed a desire for increased stakeholder discussion and input and requested that the Department lay out a clearer purpose and objective for the regulation changes. They further spoke in opposition to the harvest limits, stating that no new

harvesters should be allowed under these limits, that low limits might endanger harvesters attempting to gather kelp too early in the season, and that numeric goals should be in a kelp management plan rather than in regulations. Stakeholders also requested that the Department explore the possibility of harvest distribution by block and expressed an interest in how data presented was distributed between different blocks.

Several representatives of various tribes expressed that kelp should be managed more holistically and raised concerns that the rulemaking should be delayed until harvest limits can account for tribal take and tribal consultations regarding co-management have occurred. A representative from Pew Charitable Trusts spoke in support of a statewide closure of bull kelp and increased sea otter protections in any new regulations.

Following discussion, the co-chairs suggested that additional outreach to affected parties may be beneficial to explore before MRC makes a specific recommendation. Craig Shuman offered to discuss these proposed regulations with the affected community. He requested that harvesters who have offered to help come to him with ideas, but cautioned that localized management would be more difficult for the Department. Susan Ashcraft agreed to engage with the Department on this topic.

MRC Recommendation

MRC recommends that the Commission request that the Department conduct additional outreach with affected commercial harvesters, tribes and other interested parties and continue the item to the July 2020 MRC meeting.

7. Marine aquaculture in California

(A) *Receive Department informational report on marine aquaculture in California, discuss status of the programmatic environmental impact report, and consider proposed next steps*

Randy Lovell presented an overview of the Department's current plan of action for aquaculture in California and a newly-completed aquaculture information report (AIR) intended to build a common understanding of the status of aquaculture in the state to help move the action plan forward. The AIR was delivered to the Commission office the preceding day and has now been posted to the Department and Commission websites. Craig Shuman recommended that the AIR be provided to the Commission at its April meeting due to the broad interest on the topic.

(B) *Discuss possible recommendation for a hiatus in considering new applications for state water bottom leases for the purpose of aquaculture (except three previously received applications currently under consideration)*

Susan Ashcraft provided an overview of the rationale for the staff recommendation to consider a short-term hiatus. Melissa Miller-Henson provided further clarification of the intent and the temporary nature.

Discussion

A representative from the Port of San Diego requested that entities such as the port, which have internal capacity to complete necessary environmental review and could

take administrative weight off the Commission and Department, be exempted from any hiatus. Time did not allow for additional public comment or discussion.

MRC direction

MRC supported providing the Department’s aquaculture information report to the full Commission at its April meeting. The committee members acknowledged that there was significant interest on the topic, expressed appreciation that stakeholders had persisted through the long meeting to participate in the topic, and acknowledged that additional time was needed for discussion and robust public input. MRC concluded that a substantive recommendation could not be made on this topic today due to time constraints, and directed staff to continue the topic to a future meeting.

Recess

Commissioner Silva clarified that the meeting must end at 6:00 p.m., when recording of the proceedings was scheduled to end. MRC acknowledged that agenda items 7-10 would need to be continued to a future MRC meeting, and directed staff to identify an additional date to complete the agenda items.

The meeting was recessed at 6:00 p.m.

DAY 2 – APRIL 29, 2020

Call to order

The meeting was held via webinar and teleconference and the committee co-chairs and staff participated from independent, remote locations. Day 2 of the meeting was called to order at 9:02 a.m. by Commissioner Silva, who confirmed that Commissioner Murray was in attendance.

Susan Ashcraft gave welcoming remarks and highlighted that the meeting was a continuation of the March 17 meeting; as such, only agenda items not completed on that day (i.e., agenda items 7 through 10) were scheduled to be heard. The following Committee member(s), Commission staff, and Department staff participated:

Committee Co-Chairs

Peter Silva	Present
Samantha Murray	Present

Commission Staff

Melissa Miller-Henson	Executive Director
Rachel Ballanti	Deputy Executive Director
Susan Ashcraft	Marine Advisor
Ari Cornman	Wildlife Advisor
Rose Dodgen	Sea Grant State Fellow
Cynthia McKeith	Staff Services Analyst

Department Staff

Mike Stefanak	Assistant Chief, Law Enforcement Division
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Bob Puccinelli	Captain, Law Enforcement Division
Randy Lovell	Statewide Aquaculture Coordinator
Craig Shuman	Regional Manager, Marine Region
Kirsten Ramey	State Managed Marine Finfish Program Manager, Marine Region
John Ugoretz	Pelagic Fisheries and Ecosystem Program Manager, Marine Region
Tom Mason	Senior Environmental Scientist Supervisor, Marine Region

7. Marine aquaculture in California *(continued from March 17)*

Susan Ashcraft introduced the topic, which was continued from the March 17 meeting. She noted that discussion at the March meeting was limited to a Department presentation with minimal dialogue and time for just one public comment.

(A) Receive Department informational report on marine aquaculture in California, discuss status of the programmatic environmental impact report, and consider proposed next steps

Randy Lovell provided an abbreviated version of the presentation he gave on March 17, and provided updates since the last discussion related to the draft aquaculture informational report (AIR). The Department intends to integrate feedback received from the committee and public at this meeting into the draft AIR, and transmit a final AIR to the Commission in June. The Department is planning to use the AIR as a foundation to develop an aquaculture action plan in line with the Ocean Protection Council's strategic plan and Fish and Game Code guidelines for aquaculture. The Department is requesting that the Commission assist with convening a public discussion to identify needs to consider within an action plan.

At the request of the committee members, Randy clarified that this is not intended to replace the CEQA review planned for a Programmatic EIR, but to better establish an understanding of the needs of aquaculture, which can then be used to build a management framework for later CEQA review. He further clarified that, while offshore finfish aquaculture is not currently present in California and not currently being considered, the Department does not believe it should be precluded from public discussion.

Discussion

There was a diversity of public comment and several viewpoints were expressed. Several NGO representatives and environmental advocates spoke in support of the Department's desire to take a careful approach to aquaculture, expressed concerns about authorizing water bottom aquaculture in delicate intertidal environments and about risks associated with offshore finfish aquaculture. One commenter requested that the aquaculture best management practices (BMPs) discussed by MRC over the past few years be incorporated into the process.

The committee asked Jenn Eckerle to provide additional information about OPC's current plan for supporting informed aquaculture development, as reflected in its strategic plan. Jenn highlighted steps they envision taking after Commission receipt of the AIR at its June meeting. OPC intends to convene agency leaders to develop a set of principles to guide sustainable aquaculture management and development in California related to marine seaweed and shellfish culture and land-based finfish culture. These

principles will include a variety of measures to minimize detrimental impacts. They will present OPC with a proposal to fund development of a statewide aquaculture initiative at the September meeting. The grantee's work would include development of a draft action plan, followed by extensive stakeholder engagement.

(B) *Discuss possible recommendation for a hiatus in considering new applications for state water bottom leases for the purpose of aquaculture (excepting three previously-received applications currently under consideration).*

Susan Ashcraft provided more information on the staff-proposed, short-term hiatus on accepting new lease applications. Completing the review process for current lease applications is challenging based in part on lack of dedicated staff or funding. She noted that some commenters expressed support for excepting from hiatus the two offshore lease applications for which the Commission has already made a public interest determination, but not the third from Tomales Bay for which that determination has not yet been made. She highlighted that FGC had previously supported moving all three applications forward for review, and efforts were underway.

Melissa Miller-Henson emphasized that the Commission's staffing situation is exacerbated by the COVID-19 crisis. As the three current lease applications are the first received in over 25 years, they also present a process challenge; no current staff members participated in previous lease consideration processes. There is a need to expand the Commission's resources, but this is unlikely to happen right now given statewide budget concerns resulting from the economic impacts of the epidemic.

Discussion

Representatives of research institutions spoke in support of exploring restorative shellfish and algae aquaculture and potential sustainable offshore finfish aquaculture. Several representatives from the aquaculture industry spoke on the need to supply California's growing population with sustainable and locally-produced seafood, spoke against a hiatus, and requested representation in the development of the Department's action plan.

The Port of San Diego specifically requested that institutions able to provide their own resources and environmental review be exempt from any hiatus. Susan Ashcraft noted that the port has been collaborative and has reached out repeatedly to invite Commission staff to participate in meetings where fishing interests were involved. She suggested that the Commission may want to consider the port's request in spite of staffing limitations, as the port has already facilitated a robust planning and stakeholder engagement process, and offers its capacity and resources to support review of a lease application.

The Committee co-chairs discussed factors to consider regarding a potential short-term hiatus, and if recommended, what duration would balance staff and administrative needs with interests of potential lease applicants. Craig Shuman pointed out that leases should not be considered without a solid foundation, and long-term decisions about leases should not be considered before an action plan is in place. He specifically highlighted written comments received prior to the meeting from Bernard Friedman of Santa Barbara Mariculture, as worth considering in the action plan.

MRC Recommendation

Following discussion, the Committee recommends that the Commission:

- Accept the Department's updated aquaculture information report in June as the final report, and request that the Department return to the Marine Resources Committee in July with proposed next steps for developing an aquaculture action plan following coordination with Ocean Protection Council and Commission staff; and
- Approve a six-month hiatus on considering new state water bottom lease applications not already received by FGC, schedule a follow-up discussion for the November Marine Resources Committee meeting to evaluate whether to end or continue the hiatus, and authorize staff to engage in dialogue with the Port of San Diego concerning a potential lease application and review process during the hiatus.

8. Experimental Fishing Permit (EFP) Program, phase II

Susan Ashcraft introduced the topic, which is to receive a Department update on progress developing an EFP program and the public outreach efforts that the Department has recently undertaken.

Tom Mason presented the Department's current plan for the structure of an EFP program, including the potential application process, standard terms and special conditions for approving a given EFP, grounds for denial, and a potential tiered permit fee approach depending on Department support requirements. During a public stakeholder workshop hosted by Department and Commission staff in January, public input was solicited on program elements; the structure as presented by Tom incorporated input from the workshop.

Items flagged for further discussion included what application cycle would be followed (e.g., open versus semi-annual) and cost recovery structures.

Discussion

Co-Chair Murray asked clarifying questions regarding considerations for the fee structure and inquired about interest in program participation thus far. Tom explained that there is a lot of interest in the program, notably for testing alternate gear for the Dungeness crab trap fishery to reduce entanglement risks for whales and turtles.

Several commenters provided detailed input. A representative of commercial fishing interests in San Diego expressed concern that the Department's limited staff capacity would prevent the research required by the program and expressed support for additional program funding. He requested flexibility on timing of permit applications due to fishery seasonality. He also requested quick program implementation, noting the slow turnaround on phase I of this program led to a raffle for permit issuance, which resulted in key individuals that had initiated the program's development being excluded from participating.

Representatives from two NGOs spoke in support of the new EFP program, as it will allow experimentation and adaptability for responding to concerns such as bycatch, entanglement, and climate change, and it enhances stakeholder involvement in addressing these concerns. One of the representatives expressed concern about a lack of safeguards and requested more restrictions to inhibit potentially destructive gear use in the program, which has presented an issue in the federally-equivalent program.

A graduate student from the Scripps Institute of Oceanography at UC San Diego shared her contact information as she is gathering information for the Department from fishermen who have specific ideas for EFPs they would like to pursue in the program.

MRC Recommendation

Following discussion, the Committee recommends the Commission request that the Department refine options and criteria for the EFP permit fee structure, and schedule the topic for discussion and recommendation at the July MRC meeting.

9. Recreational swordfish

Susan Ashcraft introduced this topic, which was referred to MRC at the Department's request in response to recent increases in recreational take of swordfish in southern California.

John Ugoretz provided an overview on behalf of the Department. An increase in recreational use of "deep drop" gear has increased success in the recreational fishery, which has led to concerns about the potential for waste, gear conflicts, and unverified reports of commercialization. Several management responses have been discussed with stakeholders, including lowering the bag limit, requiring report cards, and setting gear restrictions. Thus far, there has been general support for a bag limit reduction, but opposition from commercial passenger fishing vessels (CPFVs) on reduced boat limits. John suggested that a possible rulemaking to change the current bag limit merits discussion.

Discussion

The discussion focused on concerns about possible commercialization (i.e., reports of fish caught on non-commercially licensed boats and sold to restaurants or consumers), which could result in underselling commercial fishermen by offering product at a lower price than a licensed operation could. Assistant Chief Stefanak confirmed that commercialization is an enforcement concern. While the Department's Law Enforcement Division has followed up on reports, they have not collected any conclusive evidence of commercialization in recreational swordfish.

There was general agreement that an improved tracking and data collection system to estimate effort and total take is needed as there is not currently a good data stream for highly migratory species such as swordfish. Improved data collection methods would help establish a baseline understanding of take, and the Department suggested collaborating with stakeholders to improve monitoring to support the Department's ability to respond to issues like this one.

A representative of an environmental NGO spoke in support of the bag limit and requested that the Department consider exploring recreational gear requirements that would mimic the commercial gear requirements.

A representative of the recreational fishing industry expressed opposition to changing boat limits for CPFVs, arguing that the need for such a change could not be substantiated without a stock assessment suggesting the stock is at risk.

The Department confirmed for the co-chairs that risk to the swordfish stock is not currently a concern. Their concerns are reducing risk of commercialization, reducing waste, and improving data streams and understanding of catch levels.

MRC Recommendation

Based on the discussion, MRC recommends that the Commission request the Department explore options to revise the recreational swordfish daily bag limit and improve data collection methods through regulation change, and schedule this topic for discussion in July 2020.

10. Marine Life Management Act master plan implementation

Susan Ashcraft provided introductory comments, recapping that the Commission had received an updated implementation work plan from the Department at MRC's February 2020 meeting. The work plan identified developing a California halibut fishery management plan (FMP) as a next implementation step.

Kirsten Ramey provided a verbal overview of initial Department preparation for a California halibut FMP, including a stock assessment underway. The stock assessment will be peer reviewed through the California Ocean Sciences Trust and is anticipated to be ready for public review later this year.

Discussion

Environmental NGO representatives expressed support for using the tools adopted in the master plan, such as the "data-limited toolbox" for evaluating data-limited stocks, and the bycatch evaluation framework developed through the bycatch working group. Comments about a California halibut FMP focused on evaluating levels of bycatch and discard, especially in the trawl sector, and on considering the multi-species target assemblage with some halibut gears where other targeted species may be a high priority for the Department. There was a request that a proposed roadmap for the halibut FMP be brought to the July 2020 MRC meeting, including a scoping process and a bycatch inquiry using the bycatch evaluation framework.

Co-Chair Murray asked whether bringing an FMP framework to the July MRC meeting was realistic, considering staff resource constraints. Craig Shuman advised that the request was not feasible, and that the Department already had to put the scoping process for an FMP on hold. The committee responded that it understood that a timeline would need to remain open for the time being.

No formal recommendation was made.

11. Future agenda items (This topic was heard immediately following item 6 on March 17).

(A) Review work plan agenda topics and timeline

Susan Ashcraft highlighted that no available meeting space has been located in San Clemente for the July 21 MRC meeting; there is meeting space available on July 29.

MRC Recommendation

The MRC recommends that the July 2020 MRC meeting be rescheduled for July 29 in San Clemente.

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

Two sport fishing association representatives requested to discuss the Department's R3 initiative at the April FGC meeting, in conjunction with potential 365-day sport fishing license legislation.

A former Pacific herring FMP steering committee member requested to add lessons learned from the Pacific herring FMP. Susan asked that the requestor confer with the Department first before MRC consider adding the topic.

Adjourn

Susan Ashcraft reminded attendees that the next MRC meeting is scheduled for July 29, 2020 in San Clemente.

The meeting adjourned at 12:46 PM.

Memorandum

Date: May 29, 2020

Received by FGC on June 17, 2020
Original signature on file

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

From: Charlton H. Bonham
Director

**Subject: Agenda Item for the June 24, 2020 Fish and Game Commission Meeting
Regarding the Commercial Marine Aquaculture Informational Report**

The Department of Fish and Wildlife (Department) is submitting the final commercial marine Aquaculture Informational Report (AIR) to the Fish and Game Commission (Commission) for their June 24, 2020 meeting. The AIR was prepared as a step toward providing a common understanding of existing marine aquaculture activities in the state, the potential impacts of those activities, and future considerations of expansion. The AIR describes the primary marine aquaculture species and culture methods approved for use, physical setting and potential impacts, the current management context including primary policies and management authorities, and expected opportunities and challenges facing the future development of marine aquaculture.

The draft AIR was presented at the March 17 and April 29 Marine Resources Committee (MRC) meetings. The MRC recommended the AIR be presented to the Commission at their June 24, 2020 meeting. The Department has addressed public comments received in response to the draft as well as corrected inaccuracies and/or inconsistencies. Additional feedback received during the public review process that was outside the scope of the AIR has been documented for consideration during the development of a statewide Marine Aquaculture Action Plan (Action Plan) described below.

The Ocean Protection Council has identified in their Strategic Plan 2020-2025, the need to develop a statewide Action Plan in partnership with the Department, focused on marine algae, shellfish, and land-based finfish operations. The Action Plan will be used to identify approaches to avoid and minimize impacts to habitat, biodiversity, fisheries, and other ocean users, including minimum project criteria to help advance the development of sustainable aquaculture.

The Department recommends the AIR be submitted to the Commission to build momentum towards developing the Action Plan and to provide a foundation for

Melissa Miller-Henson, Executive Director
Fish and Game Commission
May 29, 2020
Page 2

discussion around commercial marine aquaculture management within California moving forward.

Please direct any inquiries to Kirsten Ramey at Kirsten.Ramey@wildlife.ca.gov or (707) 445-5365.

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THE STATUS OF COMMERCIAL MARINE AQUACULTURE IN CALIFORNIA

**Final Report to the
California Fish and Game Commission**



**California Department of Fish and Wildlife
(May 2020)**

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1 INTRODUCTION

Aquaculture is a form of agriculture devoted to the propagation, cultivation, maintenance, and harvesting of aquatic plants and animals in marine, brackish, and freshwater. California Public Resources Code (PRC) Section 828 defines aquaculture as the culture and husbandry of aquatic organisms, including, but not limited to, fish, shellfish, mollusks, crustaceans, kelp, and algae. Aquaculture does not include species of ornamental marine or freshwater plants and animals not used for human consumption or bait purposes that are maintained in closed systems for personal, pet industry, or hobby purposes (California Food and Agriculture Code Section 25.5, California Fish and Game Code [FGC] Section 17).

This aquaculture informational report (AIR) focuses on the current status of commercial marine aquaculture in California and environmental conditions within state waters and does not include federally administered waters beyond three nautical miles (nm) offshore. Artificial propagation, rearing, and stocking projects for the purpose of recovery, restoration, or enhancement of native fish stocks carried out under a valid Scientific Collecting Permit issued by the California Department of Fish and Wildlife (CDFW), or the Ocean Resources Enhancement and Hatchery Program (OREHP) are not included here; these types of activities are addressed through separate regulatory programs. Although there are a small number of land-based hatchery and production facilities, commercial marine aquaculture currently occurs primarily in sheltered and protected bays and estuaries, and, to a lesser extent, in the nearshore and offshore environment in California state waters.

A California marine aquaculture program, or framework, can be broadly conceptualized to include all the policy, management, and regulatory components spread throughout multiple agencies, at all levels of local, state, and federal government, having roles in managing marine aquaculture in the state. CDFW and the California Fish and Game Commission (Commission) are the principal state government entities responsible for the management, protection, and conservation of the state's fish and wildlife resources. As part of that responsibility, the Commission has the authority to regulate certain aspects of commercial marine aquaculture on state lands or in state waters, while CDFW has management responsibility.

This report is intended to serve as a foundation to build a common understanding of existing California commercial marine aquaculture activities and identify areas that need further refinement and consideration. This information will be used to inform a Statewide Aquaculture Action Plan (Action Plan) to guide sustainable marine aquaculture development in California (see further discussion in Chapter 5).

2 DESCRIPTION OF COMMERCIAL MARINE AQUACULTURE OPERATIONS IN CALIFORNIA

The following chapter provides a summary of the status of current commercial marine aquaculture operations in California and includes a description of the primary species and culture methods.

Overview

Commercial marine aquaculture of shellfish and seaweed occurs throughout the state of California in both coastal waters and private land-based facilities (Figure 2-1 and Table 2-1). Although the majority of operations are within coastal waters, there are three active land-based facilities growing shellfish and/or seaweed for commercial sale and consumption, with a fourth long-standing operation in Cayucos closing business in early 2020. A total of 5,740 acres of California public tidelands are leased for marine aquaculture, by the Commission via a state water bottom lease, unless the tidelands are previously granted or privately owned by other entities. Typically, only a portion of the lease is actively used for aquaculture due to limitations in suitable growing areas, presence of sensitive habitats such as eelgrass, or other considerations. The operational footprint for all tideland leases combined is estimated at approximately 13% of the total acreage leased within the state (Table 2-1).

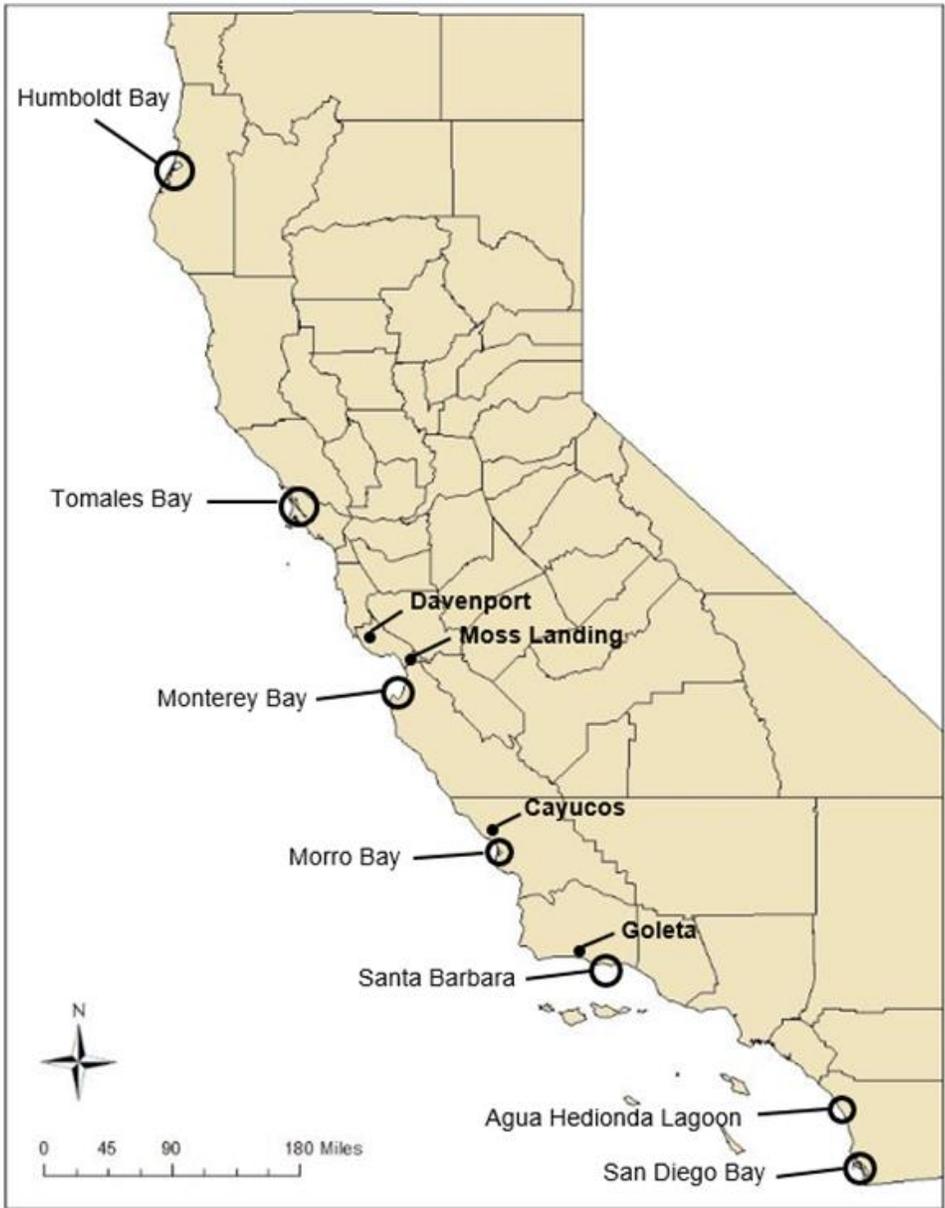


Figure 2-1. Locations of commercial marine aquaculture facilities in California. Open circles show locations with facilities in state waters and closed circles show land-based facilities. Many facilities within state waters also have associated land-based facilities.

Table 2-1. Current commercial marine aquaculture activities in California waters (from north to south).

Location	Total Number of Operators	Total Acreage of Operations	Acreage in Use (estimated)	Tideland Manager	Primary Species	Culture Methods
Humboldt Bay	7	4,825	300	Humboldt Bay Harbor, Recreation, and Conservation District; City of Arcata; City of Eureka	Pacific and Kumamoto Oysters, Mediterranean Mussels, Algae, Manila Clams	Intertidal longlines, stakes, hanging baskets, rack-and-bag, and floating-upweller system (FLUPSY)
Tomales Bay	7	520	152	Fish and Game Commission (state water bottom leases)	Pacific, Kumamoto, Eastern, and European Flat Oysters; Manila Clams; Mediterranean, California Sea, and Bay Mussels	Bags on groundline, rack-and-bag, rack-and-tray, intertidal longlines, stakes and wires, rafts, floating longlines, and in-ground culture with net cover
Monterey Bay	1	2	1	City of Monterey	Red Abalone	Cages on rafts and cages under pier
Morro Bay	2	290	90	Fish and Game Commission (state water bottom leases)	Pacific Oysters and Manila Clams	Longlines, barge, bottom bags, and stakes
Santa Barbara	2	97	25	Fish and Game Commission (state water bottom leases)	Mediterranean Mussels and Pacific Oysters	Subtidal longlines
Agua Hedionda Lagoon	1	5	5	Private	Pacific, Kumamoto, and Olympia Oysters, Green Abalone, Calico and Rock Scallops, Algae, Manila Clams and Mediterranean Mussels	Subtidal longlines, FLUPSY
San Diego Bay	2	<1	<1	San Diego Unified Port District	Seaweed and shellfish seed	Subtidal longlines and FLUPSY

As of early 2020, CDFW manages 17 active state water bottom leases for marine aquaculture totaling 907 acres (Table 2-2), of which approximately 267 acres are currently used. At the time of publication, the Commission has received and is considering three applications for additional state water bottom leases in California state waters. Existing leases range in size from 5 to 156 acres, with an average size of 53 acres. State water bottom leases managed by CDFW are located within Tomales Bay, Morro Bay and the Santa Barbara Channel. The greatest number of state water bottom leases are held in Tomales Bay with a total of 12 leases, operated by seven different businesses. Out of a total of 520 acres leased in Tomales Bay, only 152 acres are currently used. In Morro Bay, two operators occupy three leases in the area, utilizing 90 of their total leased acreage of 290. Two leases in Santa Barbara run by two operators account for 97 acres of leased tidelands, of which only 25 acres are currently used.

Table 2-2. Active state water bottom leases by lessee, location and lease acreage.

Lease Number	Lessee	Location	Number of Acres
M-430-02	Marin Oyster Company	Tomales Bay	5
M-430-04	Charles Friend Oyster Company	Tomales Bay	62
M-430-05	Tomales Bay Oyster Company	Tomales Bay	156
M-430-06	Cove Mussel Company	Tomales Bay	10
M-430-10	Hog Island Oyster Company	Tomales Bay	5
M-430-11	Hog Island Oyster Company	Tomales Bay	5
M-430-12	Hog Island Oyster Company	Tomales Bay	30
M-430-13	Point Reyes Oyster Company	Tomales Bay	25
M-430-14	Point Reyes Oyster Company	Tomales Bay	5
M-430-15	Hog Island Oyster Company	Tomales Bay	128
M-430-17	Point Reyes Oyster Company	Tomales Bay	62
M-430-19	Marin Oyster Company	Tomales Bay	25
M-614-01, parcel 1	Grassy Bar Oyster Company	Morro Bay	143
M-614-01, parcel 2	Morro Bay Oyster Company	Morro Bay	134
M-614-02	Grassy Bar Oyster Company	Morro Bay	15
M-653-02	Santa Barbara Mariculture	Santa Barbara	72
M-654-03, parcels 1 & 2	PharmerSea LLC	Santa Barbara	25

Aquaculture operations without state water bottom leases issued through the Commission, include leases that are managed by city or local government or operate on private tidelands within Humboldt Bay, Monterey Bay, Agua Hedionda Lagoon, and San Diego Bay. These leases total approximately an additional 4,830 acres managed for marine aquaculture in California waters; though, as is the case for CDFW-managed state water bottom leases, not all acreage is operational. In Humboldt Bay, leases are granted to the operators by the Humboldt Bay Harbor, Recreation, and Conservation District; the City of Arcata; the City of Eureka, or through private ownership. These tidelands are held in the public trust by these lessors. Coast Seafoods Company (recently purchased by Pacific Shellfish) leases and/or owns approximately 4,300 acres but farms approximately 280 acres of its lease (CCC 2017). Other companies hold smaller leases ranging from approximately 10 to 350 acres. In Monterey Bay, one operator uses one acre of the two acres leased from the City of Monterey. In San Diego County, five acres of private tidelands are leased to one aquaculture operator in Agua Hedionda Lagoon and less than one acre is split by two operators in San Diego Bay.

Total shellfish production reported to CDFW¹ in 2018 (January through December) was 495.2 metric tons (mt) all species combined (Figure 2-2). This resulted in a value of \$15.3 million². Shellfish production has been on the decline since peaking between 2010 and 2014. The decrease in statewide production after this time period is the result of the Drakes Bay Oyster Company (DBOC) ending their operations within Drakes Estero in late 2014. Historically, DBOC accounted for approximately one-third of the shellfish production in the state. Production in 2018 is similar to levels seen prior to 2010. The culture of Pacific Oysters represented the largest production for the industry, resulting in 57% of total shellfish production, and 53% of the total value in 2018. By location, Humboldt Bay produced 50% of the oysters in California in 2018, followed by Tomales Bay which made up 43% of oyster production. Four and three percent came from Morro Bay and Agua Hedionda Lagoon, respectively. In mussel production, 59% came out of Agua Hedionda Lagoon, followed by 34% from Santa Barbara and 6% from Tomales Bay. In 2018, clams were only reported from Tomales Bay, which produced a half ton of clams and \$5,120 in revenue. No information on abalone production in 2018 was received. Production amounts for seaweed cultivated in

1 Production reports are required as a condition of state water bottom leases. Production reports from facilities outside of state water bottom leases is voluntary to CDFW and not always provided. However, in 2013, the California Department of Public Health (CDPH) implemented mandatory reporting of harvest amounts for all non-state leases to CDPH in addition to the already required reporting for state water bottom leases. Thus, historically, production amounts are likely underestimates; however, beginning in 2013 have been complete.

2 Oyster value based on an average retail/wholesale price per shell for the state (\$0.65). Clam value based on \$5 per pound. Mussel value based on \$3 per pound.

California for commercial sale and consumption are unknown but presumed to be de minimis at this time. Harvests of wild kelp and edible seaweeds are regulated separately and are not within the scope of this report.

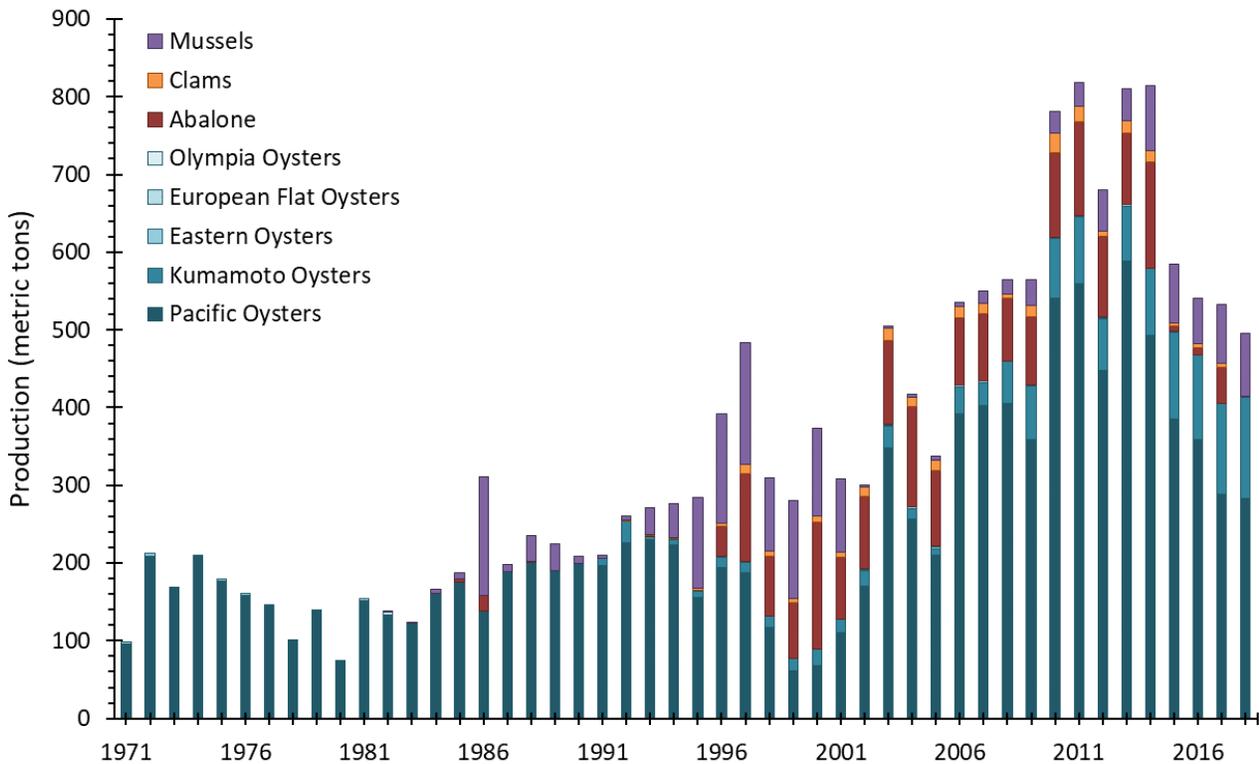


Figure 2-2. California commercial production of mussels, Manila Clams, Red Abalone, Kumamoto Oysters, Pacific Oysters, Olympia Oysters, European Flat Oysters, Eastern Oysters from 1971-2018. The following rates were used to convert reported numbers of oysters into gallons before converting into metric tons: 170 Pacific Oysters/gallon, 300 Kumamoto Oysters/gallon, 300 Eastern Oysters/gallon, 140 European Flat Oysters/gallon.

Cultivated species

California’s commercial marine aquaculture industry consists of the production of oysters, mussels, clams, abalone and seaweed. Operators are restricted to growing the species that are approved on their lease. Additionally, each aquaculture facility must register the species they wish to culture in an annual aquaculture registration with CDFW. The species approved for culture by CDFW in 2019 are shown in Table 2-3.

Table 2-3. Number of registered aquaculture facilities for each marine species cultivated in California in 2019.

Species	Number of Registered Aquaculture Facilities
Pacific Oyster (<i>Crassostrea gigas</i>)	17
Kumamoto Oyster (<i>Crassostrea sikamea</i>)	11
Olympia Oyster (<i>Ostrea lurida</i>)	4
Eastern Oyster (<i>Crassostrea virginica</i>)	3
European Flat Oyster (<i>Ostrea edulis</i>)	3
Manila Clams (<i>Venerupis philippinarum</i>)	11
Mediterranean Mussel (<i>Mytilus galloprovincialis</i>)	10
Bay Mussel (<i>Mytilus trossulus</i>)	2
California Sea Mussel (<i>Mytilus californianus</i>)	1
Red Abalone (<i>Haliotis rufescens</i>)	5
Green Abalone (<i>Haliotis fulgens</i>)	1
Ogo (<i>Gracilaria</i> spp.)	5
Sea Lettuce (<i>Ulva</i> spp.)	5
Dulse (<i>Palmaria palmata</i>)	2
Giant Kelp (<i>Macrocystis pyrifera</i>)	2
Bladderwrack (<i>Fucus</i> spp.)	1
Nori (<i>Porphyra</i> spp.)	1
Kombu (<i>Laminaria farlowii</i>)	1
Turkish Towel (<i>Chondracanthus exasperatus</i>)	1

Shellfish

Generally, the term shellfish refers to marine invertebrates including many species of mollusks, crustaceans, and echinoderms that are used as food and have hard exoskeletons. The

dominant cultured species for commercial marine aquaculture production in California are shellfish including several species of oysters, mussels, clams, and abalone. Shellfish operations occur primarily in estuarine and intertidal state waters, although some production also occurs offshore and in land-based facilities. Further, most shellfish culture operations have some land-based facilities that can be used for hatching, early rearing, and processing of shellfish. As shown in Figure 2-1 and Table 2-1, most shellfish operations in California are located in Humboldt Bay, Tomales Bay, and Morro Bay.

There has been some debate about naturalized populations of nonnative shellfish cultured in California and the question of whether they are invasive. U.S. Presidential Executive Order 13112 (Clinton 1999) defines an invasive species as “an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health.” The National Invasive Species Council describes invasive species as “a non-native species whose introduction does or is likely to cause economic or environmental harm or harm to human, animal, or plant health” (ISAC 2006). The National Invasive Species Management Plan (NISMP) further indicates that the National Invasive Species Council will focus on “non-native organisms known to cause or likely to cause negative impacts and that do not provide an equivalent or greater benefit to society.” The NISMP provides further policy guidance and notes that many established nonnative species “are non-invasive and support human livelihoods or a preferred quality of life.”

Determining relative impacts resulting from naturalized populations of nonnative species is often a subjective, value-driven decision, and impacts can vary from one region to another and over time, particularly under changing ocean conditions. Some nonnative species are considered harmful and therefore invasive by some, while others consider them beneficial. This typifies the discussion of naturalized shellfish populations in California. Various nonnative shellfish species have been approved for cultivation and importation into California, through registrations, permits, and lease conditions that are subject to ongoing adaptive management over time. In this report, the term “nonnative” is used.

Oysters

Five oyster species are cultured in the California shellfish industry. Four of the five species grown are nonnative species. The Pacific Oyster (*Crassostrea gigas*), originally from Japan, is the principal species on the U.S. Pacific coast. The Kumamoto Oyster (*Crassostrea sikamea*), also from Japan, is the second most grown oyster species in California estuaries. The Eastern Oyster (*Crassostrea virginica*), grown on the Atlantic and Gulf coasts, accounts for most U.S. oyster landings but is just a small percentage of the oyster production in California. Two brooding oyster species are cultivated to a lesser extent: the European Flat Oyster (*Ostrea edulis*) and the Olympia Oyster (*Ostrea lurida*), the latter of which is native to the Pacific coast. Figure 2-3 below shows most of the cultured oyster species in California.



Figure 2-3. Species of oysters grown in California. Left, Pacific Oyster; center, Eastern Oyster; upper right, Kumamoto Oyster; lower right, Olympia Oyster (Photo: CDFW).

The first commercial oyster beds were established in San Francisco Bay in about 1851 when mature native (Olympia) oysters were shipped from Shoalwater Bay, Washington (Willapa Bay) and later from other bays in the U.S. Pacific Northwest and Mexico. Market demand for a larger half-shell product stimulated experiments in transporting the Eastern Oyster from the Atlantic states to the Pacific coast. Cool summer water temperatures, however, prevented successful natural reproduction of the Eastern Oyster. Soon after completion of the transcontinental railroad in 1869, shipments of Eastern Oyster seed were made and transplanted in San Francisco Bay for further growth, marking the beginning of actual oyster raising in California. However, with California's population and industrial growth came a degradation of water quality in San Francisco Bay, and by 1939 the last of the San Francisco Bay oysters were commercially harvested (Barrett 1963).

The commercial oyster industry and CDFW began conducting earlier experimental plantings using the Pacific Oyster in Tomales Bay, Elkhorn Slough, Drakes Estero, Bodega Lagoon, and Morro, Newport, and San Francisco bays during the 1930s. Several Pacific Oyster plantings proved successful, demonstrating that imported Pacific Oyster seed could be grown commercially in California. Commercial oyster culture is now centered on five major growing areas: Humboldt Bay, Tomales Bay, Morro Bay, Santa Barbara Channel, and Agua Hedionda

Lagoon. The highest production of commercial oysters occurs in Humboldt Bay, followed by Tomales Bay, Morro Bay, Agua Hedionda Lagoon and the Santa Barbara Channel, respectively. The primary methods of oyster culture employed by California growers are intertidal and subtidal longline culture, rack-and-bag, and bottom bags.

Mussels

There are three primary species of wild mussels along the California coast, the Mediterranean Mussel (*Mytilus galloprovincialis*), the California Mussel (*Mytilus californianus*) and the Bay Mussel (*Mytilus trossulus*). Experiments in the 1980s culturing wild mussel seed stock and in developing hatchery and growout methods have greatly increased the importance of commercial mussel production, particularly the Mediterranean Mussel, which occurs primarily in southern and south-central California. A related species, the Bay Mussel, occurs in northern California and hybrids of the two species are commonly found between Cape Mendocino and Monterey Bay.

Most mussel production in California comes from naturally set Mediterranean Mussel or Bay Mussel seed. However, some growers acquire Mediterranean Mussel seed from U.S. Pacific Coast hatcheries, the same species that is cultured in Spain and most of Europe. Currently, several operations within California actively culture and harvest mussels (primarily Bay and Mediterranean Mussels). The primary methods of mussel culture employed by these growers are submerged longlines and bag culture. Agua Hedionda Lagoon, Santa Barbara Channel, and Tomales Bay are the primary growing areas of mussels in California. Agua Hedionda produced 47.80 mt, \$316,167, Santa Barbara produced 27.78 mt, \$183,753 and Tomales Bay produced 5.22 mt, \$34,545 in 2018.

Clams

Currently, the Manila Clam (*Venerupis philippinarum*) is the only clam species grown commercially in California. The Manila Clam is a nonnative clam introduced to the U.S. Pacific Coast from Japan with Pacific Oysters in the 1930s (Talley et al. 2015). While locally abundant in protected-water areas of California from Elkhorn Slough north (Frey 1971), no commercial fishery exists on local stocks. The commercial culture of clams in California began in 1981, but production levels were relatively low until the mid-1990s. Commercial growers purchase artificially reared clam seed for grow out. Because of its preferred distribution in the upper tidal zone, it is not believed to have displaced any native species (Bourne 1982). The Manila Clam often occurs with Pacific Littleneck Clam (*Protothaca staminea*), Soft Shell Clam (*Mya arenaria*), *Macoma* spp. clams, and other estuarine infauna (NOAA 1989).

Currently, approximately half of the registered shellfish operations in California are actively culturing and harvesting clams. The areas with the highest clam production are Tomales Bay, and Humboldt Bay. The primary methods of clam culture employed by these growers has

historically been direct-seeding to the substrate under protective netting, tethered bags on groundlines, and seed culture in trays hung from floating rafts.

Abalone

Currently, there are three remaining commercial facilities in California raising abalone for sale locally and abroad, while some additional facilities are engaged in research. Abalone are primarily cultured in land-based tanks, but one operation cultures abalone in California waters using cages suspended from floating rafts and under a wharf. The primary species cultured is Red Abalone (*Haliotis rufescens*) and, to a much lesser extent, Green (*Haliotis fulgens*) and Pink Abalone (*Haliotis corrugata*). The White (*Haliotis sorenseni*) and Black Abalone (*Haliotis cracherodii*), federally listed as endangered, are the object of research and/or recovery activities.

Pioneering efforts to mass cultivate abalone in California began about 45 years ago, with a peak in abalone production in 2000. Participation in the industry has declined since that time, which was due in part to disease impacts. However, interest in abalone aquaculture remains high, prompted in part by the closure of the commercial abalone fishery in 1997. Presently, the commercial culture of Red Abalone occurs in three main coastal areas: the Santa Cruz area, Monterey Bay, and Santa Barbara. As of early 2020, a long-standing abalone farm in San Luis Obispo County was closing operations.

Seaweed

While California has a long history of wild harvest of seaweed (also called macroalgae, or large marine algae), interest in seaweed aquaculture has been a more recent development. Early cultivation of seaweeds was done in land-based tanks to support abalone aquaculture operations, though in recent years abalone farmers have started selling the cultivated seaweed to meet a growing market for edible seaweed. In the last few years, the first land-based aquaculture facility devoted entirely to edible seaweed cultivation began operating in Moss Landing. There are currently no operating commercial seaweed aquaculture farms in California waters, although two farms are in the process of starting operations in the Santa Barbara Channel and San Diego Bay. However, several existing aquaculture farms sell seaweed opportunistically harvested from their shellfish cultivation gear, where regulations allow. There is growing interest in culturing a variety of seaweeds in intertidal and offshore waters, and several small scale or research and development projects focused on seaweed aquaculture are in progress.

Currently grown or proposed species include Ogo (*Gracilaria spp.*), Sea Lettuce (*Ulva spp.*), Dulse (*Palmaria palmata*), Giant Kelp (*Macrocystis pyrifera*), Bladder Wrack (*Fucus spp.*), Nori (*Porphyra lanceolata*), Kombu (*Laminaria farlowii*, *Laminaria setchellii*), and Turkish Towel (*Chondracanthus exasperatus*).

Microalgae, or microscopic algae, are raised primarily as feed for hatchery operations and other market applications (e.g., pharmaceutical, bioenergy). Microalgae cultivation primarily occurs on land in contained vessels, tanks, or ponds and is not included within the scope of this report.

Finfish

Currently, there is no commercial aquaculture of marine finfish in California. The only related finfish activity is limited to the OREHP's land-based hatchery and intertidal nursery cage operations that are research oriented and in support of stock enhancement.

Cultivation methods

Aquaculture in California consists of both land-based operations and operations within coastal waters. Land-based facilities can include tanks, raceways, or ponds and related administrative or support structures. Water used for land-based facilities can be municipally supplied and discharged to sanitary sewers or can be drawn from and discharged to the marine environment. Certain marine species may be cultured in inland locations, in full-strength seawater, brackish water, or nearly freshwater. Additionally, land-based facilities may house nursery or hatchery operations which supply grow-out facilities in coastal waters or depuration tanks for removing contaminants or physical impurities.

Aquaculture facilities within state waters utilize a variety of culture methods depending on species, environmental conditions, and logistical considerations. Individual farms will often use several methods and grow several species simultaneously. Culture techniques have evolved over time; many culture methods that were more environmentally harmful have been phased out in favor of methods that are more compatible with resource protection goals. Now, most culture methods used in California place species off the bottom using containers or by suspending them in the water column to avoid additional substrate disturbance. New and innovative techniques continue to be developed to grow species in a wide range of depths and conditions, ranging from shallow estuarine to deeper offshore environments.

Bottom Containers

Methods Included: Bag-on-bottom (aka bags, bottom bags), bags on groundline, cage-on-bottom, tray-on-bottom

Species Cultured: Oysters

Description: Shellfish are placed into a fabricated container which is then placed on the seafloor (Figure 2-4). Most commonly this container is a bag made of Vexar polyurethane mesh. Bottom containers may be either tethered or untethered in place. Tethered containers are typically attached with hooks to a long rope (groundline) anchored at either end with screw

anchors. Hooks are usually made of coated wire, halibut hooks, or another custom design. Untethered containers rely on their larger size and weight to remain in place. Long parallel rows of bottom containers are separated by spaces to walk between lines and to periodically flip bags over to the other side of the line to reduce fouling of the bag, prevent burial, and tumble the shellfish. There are two common spatial designs: one-sided design where bags are all laid on one side, and double-sided design where bags are laid on both sides of the line in an alternating, checkerboard pattern.

This culture method dominates oyster production in California due to its suitability to the extensive intertidal areas in most leases and its low-cost relative to culture methods which require more structural components. Oysters grow well, are relatively easy to handle, allow boats to pass over easily during high tide, and can be walked through relatively easily during low tide.



Figure 2-4. Bags on bottom attached to staked lines; bags are attached to lines using coated wire and closed using zip ties (Photos: CDFW).

Embedded Clam Culture

Methods Included: In-ground culture, clam bags, clam roll

Species Cultured: Manila Clams

Description: Because clams are infaunal species, living in the sediment, special techniques are used to keep clams in the mud but still harvestable. Clams are grown either inside containers or directly seeded into the sediment, the latter of which is a method that is being phased out. Clam bags (typically Vexar mesh bags) are filled with pea gravel and clams are then buried in rows flush with the sediment surface (Figure 2-5). In-ground culture seeds clams directly in the sediment with predator-exclusion netting affixed to the surface. After several years of grow-out time, the bags are removed from the mud and gently shaken to remove sediment. To harvest clams that are directly seeded into the sediment, rakes or hydraulic dredges must be used. Only one company in California still uses in-ground clam culture.

Because of the increased substrate disturbance caused by harvesting with the hydraulic rake, this method will be phased out in the next few years.



Figure 2-5. Left: Embedded bottom bags used for clam culture (Photo: CDFW). Right: Clams seeded into the mud are covered with mesh netting until they can be raked out at harvest time (Photo: California Coastal Commission).

Rack Culture

Methods Included: Rack-and-bag, rack-and-tray, rack-and-cage

Species Cultured: Oysters

Description: Shellfish are placed into a fabricated container (e.g. mesh bag) designed to protect and hold organisms during the grow-out phase of production. Containers are then placed atop and may be attached to constructed racks in the intertidal zone, effectively lifting the containers 1-2 feet off the seafloor. Containers alternate between being submerged at high tide and exposed during low tide. Racks are commonly organized in parallel rows with space between rows to walk. Alternative designs of bag placement on the racks may be used, such as slightly overlapping bags to withstand greater wave energy (Figure 2-6). As with bottom containers, aquaculturists will manually flip, move or adjust the containers during low tide to prevent biofouling and influence the shell shape and strength.



Figure 2-6. Rebar racks and Vexar mesh oyster bags, suspended above substrate using PVC. Bags may be arranged in an overlapping fashion to absorb wave energy more effectively (Photos: CDFW).

This method is commonly used in California for several reasons. Logistically, the raised containers can be accessed by boat and may be easier to handle than bottom containers. In addition, the rack structure allows containers to be placed off-bottom in softer sediments where the bottom container method is not an option due to a high burial risk.

Intertidal Longline

Methods Included: Tumble culture, tip bags

Species Cultured: Oysters

Description: In the intertidal, ropes or wrapped steel cables (longlines) are hung between anchors made with hinged/flange PVC stakes or wire tension supports, with supporting posts of rebar or PVC pipe evenly spaced throughout to keep the line taut. Containers (e.g. bags, baskets) of shellfish are then attached with stainless steel wire gauge, coated wire, or halibut hooks to these lines so that they are suspended approximately 1-4 feet above the seafloor. Optionally, floats may be attached to the unattached end of the containers so that they will rotate up and down, or “tip”, as the water level changes with the tides (Figure 2-7). This replaces the need to manually flip the bags as in bottom container culture and rack culture. Shellfish will be exposed to air during low tide and, if floats are attached, will float at the surface during high tide. During low tide, if the containers are not hung high enough above the seafloor, they may touch the bottom.



Figure 2-7. Intertidally suspended lines with floating bags (top, left and right) and hanging non-floating baskets (bottom) (Photos: Michael Toussaint, Marin Oyster Company).

Subtidal Longline

Methods Included: Floating longline, submerged buoyed longline, mussel longline

Species Cultured: Oysters, mussels, seaweed (in development)

Description: Subtidal longlines are similar to intertidal longlines, but they are used in deeper areas of bays or nearshore waters where the seafloor is always submerged. The longlines are anchored at each end to the seafloor and are suspended near the water surface with a series of buoys. Containers such as baskets, trays, cages, or bags are filled with shellfish and attached to the floating longline (Figures 2-8 and 2-9). There are many variations and designs related to this culture method. To keep culture species floating at the surface, floats may be attached to individual containers. Alternatively, the containers may be suspended in the water column and never exposed to air. This submerged longline variation can include the

suspension of stacked trays or cages of shellfish that hang vertically beneath the longline (Figure 2-10). A variation of this method is used for mussels, which utilizes a specialized “fuzzy mussel rope” with a higher surface area for mussel settling and culturing. Fuzzy rope containing cultured mussels is hung in long repeating loops suspended from evenly spaced attachment points to the submerged longline. The submerged longline can be maintained at a constant water depth, approaching 30 feet deep in some nearshore farms, using a series of submerged floats and counterweights.



Figure 2-8. Subtidal longlines using bags with floats attached to keep the bags at the surface (Photos: CDFW).



Figure 2-9. View of subtidal longlines from a distance (left photo: California Coastal Commission; right photo: CDFW).



Figure 2-10. Submerged longline variations: mussel longline (left) and stacked cages hanging from a submerged longline (right) (Photos: CDFW).

Raft Culture

Methods Include: Barges, floating upwelling raft system (FLUPSY)

Species Cultured: Oysters, mussels, clams

Description: Another method of subtidal culture includes suspending a variety of species and containers from floating barges or rafts (Figure 2-11). Rafts consist of two large floats at either end covered in a plywood decking with a series of poles making up the center of the raft and are anchored to the seafloor. From the poles, containers such as baskets, stacks of trays, or mussel rope can be suspended. Rafts offer a secure structure from which shellfish culture can operate; attachment of containers is reliable and generally holds up well under storm conditions. Rafts allow for operational ease, and large volumes of product can be processed readily with the use of winches and other machinery which lift containers from the water. Interest is growing in this method for growers who are already maximizing use of the intertidal portions of their lease(s) or do not have access to intertidal areas.



Figure 2-11. View of rafts at a distance (left) and up close (right) (Photos: CDFW).

A popular modification of this method, the floating upwelling raft system (FLUPSY), is used to grow shellfish seed quickly to the appropriate size for planting. On a FLUPSY, a series of containers hold small oyster seed while an underwater paddle wheel circulates algae and nutrient-rich waters through the screened bottoms of each container, simulating upwelling (Figure 2-12). Floating rafts support the upwelling containers and keep the shellfish several feet below the water surface. FLUPSYs are typically installed adjacent to piers and held in place using mooring lines and chain as well as anchored to the seafloor.



Figure 2-12. Raft modification: floating upwelling raft system. Upwelling containers hang in compartments on floating rafts (left) with a large paddle wheel directing nutrient rich water through containers (right) (Photos: CDFW).

3 Description of Habitats and Interactions with Aquaculture

A sustainable aquaculture industry depends on the ability to operate within the environmental framework and philosophy of natural resource management. Immediate environmental concerns relative to shellfish culture are the potential biological and physical impacts of culture technology on sensitive components of the marine ecosystem. These sensitive components include eelgrass as essential habitat for salmonid and other finfish, and the invertebrate assemblage present on and within the substrate that is essential to the food web of birds and other marine species. Also included are the impacts on the life habits of birds and marine mammals and on the physical structure of the habitat itself. It is essential that aquaculture activities not have significant impacts upon the health of the ecosystem on which it also depends.

Physical Setting and Wildlife Habitats

The following sections provide brief descriptions of oceanographic conditions, the types of habitats and species that inhabit them, and some of the effects of changing environmental conditions along the coast of California.

Oceanography

Oceanographic conditions such as currents, water masses, and temperature strongly influence marine biodiversity. Variations in oceanographic factors determine areas of productivity where krill, squid, anchovy, seabirds, and marine mammals congregate in the pelagic ecosystem (Yen et al. 2004). Features such as eddies, upwelling plumes, currents, recirculation cells and river outflow plumes can be associated with high marine biodiversity, and transport patterns created by these features can significantly affect recruitment patterns of fish and invertebrates in intertidal nearshore communities (Farrell et al. 1991, Wing et al. 1995, Mace and Morgan 2006). Oceanographic patterns also strongly influence growth, fecundity and survivorship of many species, and well as dispersal and recruitment patterns of sedentary species that have planktonic phases.

The California coast represents a tectonically active continental margin, dominated by processes such as uplift, erosion, and seismic activity, much of which is associated with transform plate movement along the San Andreas Fault. Consequently, the coast in most areas drops quickly into deep water. Generally, the continental shelf is only a few miles wide, although in some parts of the Southern California Bight south of Point Conception it becomes substantially wider. Ocean circulation along the whole coast is dominated by the California Current, an ocean current that sweeps south along the entire west coast of North America from southern British Columbia to southern Baja California (Hickey and Banas 2003).

The California Current is part of the North Pacific Gyre, which swirls clockwise within the northern basin of the Pacific Ocean. The California Current is made up of southward-flowing surface waters extending more than a hundred miles offshore; these waters are cooler than the waters farther offshore. This cold water results in upwelling, which brings nutrient-rich sediments to the ocean surfaces and produces highly productive conditions for wildlife such as whales, seabirds, and fish. Two large countercurrents also influence conditions along the California coastline, including the northward-flowing subsurface Davidson Countercurrent and Southern California Countercurrent. During the winter, the California Current tends to “move” offshore, allowing the inshore countercurrents to dominate in the nearshore surface waters (Reid et al. 1958).

Two large-scale atmospheric processes also influence the California Current system: El Niño-Southern Oscillation (ENSO) events and Pacific Decadal Oscillations (PDO). ENSO events generally reduce upwelling of cold, nutrient-rich waters, increase onshore and northward flows, and increase sea surface temperatures. ENSO events typically occur every several years, and generally result in declines of zooplankton and reductions in productivity that can affect fish, seabird, and marine mammal populations. PDO events occur over much longer timescales (20–30 years) and have large-scale impacts on zooplankton and fish productivity throughout the North Pacific.

North of Point Conception, the California Current sweeps slowly south along the shoreline, and the cool, low-salinity waters of the current are responsible for the cold water temperatures and frequent coastal fogs that characterize this part of the California coast. Also, the prevailing northwesterly winds drive surface water to the right of the wind flow (offshore), and this phenomenon drives coastal upwelling. Upwelling brings cold, nutrient-rich bottom water to the surface where the abundant nutrients support high plankton productivity and, by extension, much of the marine food web, from anchovies to whales. This productivity is at the root of California’s commercial ocean fisheries and shellfish industries, and potentially could support a substantial aquaculture industry. However, the upwelling process is highly variable on both seasonal and inter-annual timescales. When the California Current is slowed or disrupted, as happens during the winter months and during El Niño years (and sometimes at other times), this results in reduced upwelling rates and a sharp decline in plankton production (Hickey and Banas 2003). Consequences include failed or reduced fisheries, and sharp declines in seabird and marine mammal populations as breeding decreases and animals starve or migrate elsewhere to find food.

South of Point Conception, in the waters of the Bight, the shoreline cuts sharply eastward and the California Current moves offshore of the Channel Islands. A counter-clockwise countercurrent is generated, moving generally from south to north along the shoreline from northern Baja California to Point Conception, and producing a very large eddy within the Bight. The Southern California Countercurrent (SCC) is also variable over time, being strongest in

summer and fall and weakest in winter and spring. Upwelling is usually a minor process in the Bight, but strong offshore winds can result in nearshore upwelling and a sharp drop in water temperatures. Water movement through the eddy carries upwelling waters and plankton as well as pollutants and sediments from terrestrial rivers into the Bight. Compared with the coastline north of Point Conception, the waters along the coastlines around the Bight have fewer nutrients, warmer water, and are mixed less with waters of the open ocean. Mixing within the Bight typically results in efficient dispersion of suspended particles, however smaller eddies and wakes formed around islands can temporarily isolate some areas (Mitarai et al. 2008). The coastal waters of the Bight, specifically within 3 nm of the shore, are also relatively sheltered from the prevailing northwest winds by Point Conception and the Channel Islands. This location results in substantial reductions in wave height and energy compared to the coast north of Point Conception (Hickey and Banas 2003).

Benthic Habitats

Benthic (seafloor) habitat in California varies geographically but is typically characterized by either hard (rocky or reef) substrate or soft (sand or mud) substrate. The locations of each benthic substrate type vary within each biogeographic region based on several factors, including the geology of the shoreline. Both substrates provide habitat for numerous invertebrate and fish species. Rocky areas provide hard substratum to which kelp and other algae attach in waters up to approximately 100 feet deep, while in deeper water, hard substratum provides attachment substrate for many species of deep-water invertebrates. In addition to attached organisms, the structural complexity of rocky areas provides habitat and protection for mobile invertebrates and fishes.

Soft-bottom environments range from flat expanses to slopes and basin areas. Soft-bottom habitats lack the complex, three-dimensional structure of hard-bottom substrata, and are somewhat less diverse in species assemblages than rocky reefs, depending on the compositional sediment type. Soft bottom species are generally bottom-dwelling invertebrates and fishes, and many have special adaptations for the habitat such as flattened bodies and concealing coloration (Allen et al. 2006). Soft-bottom habitats can be highly dynamic in nature as sediments shift due to wave action, bottom currents, and geological processes. Shallow, sandy, soft-bottom benthic habitat is found in areas along the coast that are subject to constant tide, wave, and shoreline processes, resulting in a highly changing and low-productivity region. Sandy benthic habitat generally extends to water depths of approximately 300 feet. Muddy sediment bottoms are typically found in water depths greater than 300 feet along the shelf but also occur in estuaries and lagoons.

Coastal Habitat

The coast of California is composed of sandy beaches, rocky headlands, sea cliffs, and lagoons in the intertidal and nearshore environment. Generally, the coastline north of Point Conception is rugged, with prominent headlands, stretches or sea cliffs, and small sandy beaches. South of Point Conception, the shoreline is typically adjacent to coastal plains and marine terraces; and long sandy beaches are common. Tidal flats, sandy or muddy expanses that become exposed at low tides and are associated with coastal rivers as well as bays and estuaries, are distributed along the California coast. Beds of mussels (*Mytilus* spp.), seagrass beds, and algal assemblages from turfs (e.g., *Endocladia muricata*) to low canopies of leathery kelp and stalked algae species (e.g., *Pterygophora californica*, *Postelsia palmaeformis*) are distributed in patches throughout rocky shoreline habitat along the coast.

Estuarine and wetland habitat

Estuarine and wetland habitats encompass soft-sediment habitats, including tidal mudflats, eelgrass beds and areas of open water. Habitat formed by eelgrass and other plants plays an important functional role as foraging and nursery areas for a diverse range of fish and invertebrate species, many of which inhabit estuaries as juveniles before moving to kelp and other offshore habitats as adults. Estuaries, coastal bays and beaches are also an important part of the Pacific Flyway and host millions of migrating and provide important foraging and nesting area for resident bird populations (CDFW 2009; Senner et al. 2016).

Seagrass habitat

Seagrass habitats support an abundant and biologically diverse assemblage of aquatic wildlife species. The most common type of seagrass in estuaries and sheltered coastal bays in California is Common Eelgrass (*Zostera marina*). A second variety of eelgrass, *Zostera pacifica*, is found mainly along the open coast of southern California. Eelgrass beds provide refuge, foraging, breeding, or nursery areas for a variety of invertebrates, fish and birds. The most common type of seagrass along the open coast of California is Surfgrass (*Phyllospadix* spp.), which forms beds that fringe nearly all the rocky coastline at the zero-tide level down to several meters below the zero-tide level.

Kelp forest habitat

Kelp forests are an important component of California's marine ecosystems that provide shelter for both juvenile and adult species of fish, provide important nursery habitat for Southern Sea Otters (*Enhydra lutris nereis*), offer vertical and horizontal substrate for a variety of marine organisms, and account for a large portion of the primary productivity in the nearshore communities. In California, there are two primary canopy-forming kelp species: Giant Kelp (*Macrocystis pyrifera*) and Bull Kelp (*Nereocystis luetkeana*). In addition, intertidal boulders, platforms and cliffs, as well as tidepools, are home to many species of snails,

barnacles, anemones, crabs, sea stars, and fishes. Kelp forests grow along rocky coastlines and typically remain nearshore in subtidal communities.

Offshore rocks and islets

Many offshore rocks and islets are present along California's rocky coastlines, which provide habitat for many species of pinnipeds (i.e., seals and sea lions) and seabirds. Many seabird species occur and nest in colonies on these features along the California coast. In addition, many marine mammal species, which are protected under the federal Marine Mammal Protection Act (MMPA), are known to occur within the nearshore environment along the California coast.

Wildlife Corridors and Nurseries

The marine environment provides migration corridors for many wildlife species, and the spatial and temporal scales of these migrations vary based on the specific marine environment (e.g., nearshore, pelagic). Wildlife movement within the marine environment includes nearshore migration of Gray Whales between Baja California and the Bering Sea, seasonal movements of juvenile salmon out of rivers and along the shoreline, and daily movements of pinnipeds between haul-outs and foraging grounds. Larval dispersal from marine invertebrate and fish species occurs over long distances and is important when considering connectivity of populations. Migratory birds utilize the Pacific Flyway, which extends along the entire Pacific coast, because of its unique biological characteristics.

Nearshore pelagic habitat

The nearshore pelagic habitat supports planktonic organisms that float or swim in the water, as well as fish, marine birds, and marine mammals. The pelagic community is composed of microorganisms such as phytoplankton (e.g., diatoms, dinoflagellates) and zooplankton (e.g., protozoans, radiolarians, copepods, amphipods), and other organisms like worms, mollusks and jellyfish. Many pelagic fish species, seabirds, cetaceans, and sea turtle species occur off the coast of California or are associated with nearshore habitat.

Submarine Canyons

Submarine canyons are submerged steep-sided valleys that cut through the continental slope and occasionally extend close to shore. These features exhibit bathymetric complexity, support unique deep-water communities, and affect local and regional circulation patterns. Canyons provide habitat for young rockfish and flatfish that settle in nearshore waters to grow and move offshore as adults. Canyons also attract concentrations of prey species and provide important foraging opportunities for seabirds and marine mammals (Yen et al. 2004).

Effects of Climate Change on the Environment

According to the Intergovernmental Panel on Climate Change, which was established in 1988 by the World Meteorological Organization and the United Nations Environment Programme, global average temperature is expected to increase by 3–7 degrees Fahrenheit (°F) by the end of the century, depending on future GHG emission scenarios (IPCC 2014). According to California’s Fourth Climate Change Assessment, temperatures in California are projected to increase by 5.6 to 8.8°F by 2100 (OPR et al. 2018a).

Water resource–related vulnerabilities also include potential degradation of watersheds, alteration of ecosystems and loss of habitat, impacts on coastal areas, and ocean acidification (CNRA 2018a). The ocean absorbs approximately one-third of the CO₂ released into the atmosphere every year from industrial and agricultural activities, changing the chemistry of the ocean by decreasing the pH of seawater. Ocean acidification affects many shell-forming species, including oysters, mussels, abalone, crabs, and the microscopic plankton that form the base of the oceanic food chain (Kroeker et al. 2010, 2013). In addition, significant changes in the behavior and physiology of fish and invertebrates attributable to rising CO₂ and increased acidity have already been documented (OPR et al. 2018a).

California’s ocean supports a vast diversity of marine life, as well as fishing communities that depend on fish and shellfish for their livelihoods and that provide a diverse supply of seafood to the state and for export. In the last few years, California has experienced an unprecedented marine heat wave, resulting in closures of fisheries and a significant loss of northern kelp forests. There is increasing evidence that sea-level rise, ocean acidification, and ocean warming associated with climate change are transforming and degrading California’s coastal and marine ecosystems (OPR et al. 2018b).

Potential Impacts of Commercial Aquaculture Development

While the scope of this report does not include an analysis of environmental impacts and this list is not exhaustive, the following potential issues and areas of concern have been identified regarding commercial marine aquaculture development:

- Escape of cultured organisms and subsequent genetic, disease transmission, and competition effects, including past and present impacts and ecosystem-level impacts;
- Impacts associated with a potential increase in disease vectors;
- Impacts of predator control activities and devices on nontargeted species;
- Pathway for aquatic nuisance species;

- Impacts of cultured species on protected and sensitive species;
- Water quality concerns, including pollution and eutrophication from aquaculture operations;
- Disturbance impacts to birds, mammals, and other wildlife from aquaculture activities;
- Impacts to the ecological carrying capacity;
- Modification of local water circulation patterns and current speeds from aquaculture infrastructure;
- Marine debris resulting from aquaculture gear loss;
- Physical impacts from aquaculture activities and infrastructure on the seafloor and substrate affecting biological resources, such as sensitive marine habitats and species;
- Ecosystem and public health impacts related to the use of fish meal and fish oils and aquaculture discharges into the water;
- Hazardous materials concerns related to the use of chemicals;
- Impacts to coastal aesthetic values;
- Impacts to tribal and/or cultural resources;
- Conflict with existing uses and navigation, including fishing grounds, recreation areas, public access, consumptive and non-consumptive uses, and natural preserves; and
- Contribution of anthropogenic impacts to global climate change.

Some potential positive impacts of commercial marine aquaculture development on the environment have also been identified:

- Improved water quality and bioremediation of polluted waters;
- Habitat provision; and
- Carbon sequestration and local mitigation of ocean acidification.

Impact Mitigation and Avoidance

Many of the potential impacts to biological resources can be minimized and/or avoided through the establishment of siting criteria, best management practices, and adaptive management.

For example, potential impacts to tribal cultural resources, land use, aesthetics, recreation, and navigation or traffic may be reduced and/or avoided following discretionary review processes that would require projects be consistent with applicable policies, regulations, and local plans. Chapter 5 provides a brief overview of potential siting, best management practices, and adaptive management measure for current and potentially future marine aquaculture operations and activities that may occur within state waters.

4 MANAGEMENT CONTEXT

This chapter provides a brief overview of current primary national and state policies and management authorities for current marine aquaculture operations and activities that may occur within state waters.

Policies and Management Authorities

National Policy

In the National Aquaculture Act of 1980, the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) stated, “It is, therefore, in the national interest, and it is the national policy, to encourage the development of aquaculture in the United States.” U.S. aquaculture is governed by environmental laws such as the MMPA, Clean Water Act (CWA), Endangered Species Act (ESA), and Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

A primary objective of the federal aquaculture policy is to develop more efficient permitting processes to promote industry development while setting standards for environmentally safe operations. Federal support, engagement and authorities span several agencies: the U.S. Food and Drug Administration (FDA), U.S. Environmental Protection Agency, U.S. Army Corps of Engineers (USACE), U.S. Fish and Wildlife Service (USFWS), and U.S. Department of Agriculture. Interagency collaboration and cooperation can help promote the development of new technologies that improve sustainability as well as improve the efficiency of the permitting pathways.

State Policies

California has a long history of marine legislation, policy, management, and regulatory measures (CDFW 2016). With respect to marine aquaculture in California more specifically, the Aquaculture Development Act (PRC Sec. 825 et seq.) provides state policy direction encouraging the practice of aquaculture to augment food supplies, expand employment and economic opportunities, increase native fish stocks, enhance commercial and recreational fishing, and protect and better use the land and water resources of the state. Further, FGC Section 1700 declares a statewide policy to encourage the conservation, maintenance and utilization of the ocean and waters under the jurisdiction of the state for the benefit of the state citizenry and development of fisheries, including commercial aquaculture. In providing oversight of marine aquaculture development, the state is also directed to provide regulatory

and administrative efficiency and effectiveness (Assembly Joint Resolution 43 (2014 Chesbro); FGC Sections 15100, 15702; and Government Code 65920 et seq.).

CDFW and the Commission are the principal state government entities responsible for the management, protection, and conservation of the state's fish and wildlife resources. As part of that responsibility, the Commission has the authority to regulate certain aspects of commercial marine aquaculture on state lands or in state waters, while CDFW has management responsibility. Specifically, the FGC provides CDFW and the Commission the authority to regulate marine aquaculture in four ways:

- registration of aquaculture facilities and species cultured within the state;
- lease of state water bottoms and water column for the purpose of aquaculture;
- permitting and licensing of various aquaculture-related activities, including stocking, broodstock collection, and importation; and
- detection, control, and eradication of disease in aquaculture facilities.

Although CDFW and the Commission are primarily responsible for marine aquaculture, the following federal, State, and local entities, among others, also play important roles: U.S. Army Corps of Engineers, NOAA National Marine Fisheries Service, California Department of Food and Agriculture, California Department of Public Health, California State Lands Commission, California Coastal Commission, State Water Resources Control Board and regional water quality control boards, and local zoning agencies (Table 4-1).

California Environmental Quality Act

California requires state and local agencies to perform environmental impact analyses when granting permits. Potential environmental impacts are addressed primarily through the California Environmental Quality Act (CEQA) review of the proposed project. Although not a permit, CEQA compliance is mandatory for state, local, and other agencies subject to the jurisdiction of California to evaluate the environmental implications of their actions. For aquaculture lease requests on state water bottoms or the water column, the Commission functions as the Lead Agency responsible for carrying out or approving the project under CEQA. CDFW may play various roles under the CEQA process. CDFW is always a Trustee Agency, but under certain circumstances it may also be a Lead Agency or a Responsible Agency. The lead agency determines whether a negative declaration or environmental impact report (EIR) will be prepared (CEQA Statutes, Sections 21080.3 and 21104.2; Guidelines, Sections 15050 and 15367). Pursuant to FGC Section 15400 and as evaluated under CEQA, a lease shall not unreasonably interfere with fishing or other uses or public trust values, unreasonably disrupt wildlife and marine habitats, or unreasonably harm the ability of the

marine environment to support ecologically significant flora and fauna. Additionally, a lease shall not have significant adverse cumulative impacts.

California Fish and Game Code Sections 15000–15703—Aquaculture

FGC Sections 15000 through 15703 (Division 12) provide a framework for regulation of aquaculture operations in California. FGC includes regulations for broodstock acquisition, leasing of state water bottoms, disease control, and importation of shellfish and finfish. Pursuant to FGC Section 15400, the Commission may lease state water bottoms or the water column to any person for aquaculture, including, but not limited to, marine finfish aquaculture. No state leases shall be issued, unless the Commission determines that the lease is in the public interest in a public hearing conducted in a fair and transparent manner, with notice and comment, in accordance with commission procedures. In addition, pursuant to Section 15411 lessees may not unreasonably impede public access to state waters for purpose of fishing, navigation, commerce, or recreation. The lessee may, however, limit public access to the extent necessary to avoid damage to the leasehold and the aquatic life culture therein.

Title 14, California Code of Regulations

Title 14 of the California Code of Regulations (CCR) provides implementing regulations under this authority. In addition, 14 CCR Section 15386 identifies CDFW as a trustee agency which has jurisdiction by law over natural resources affected by a project that are held in trust for the people of the state of California.

Senate Bill 201 and the Marine Aquaculture Programmatic Environmental Impact Report

The abovementioned authorities to regulate marine aquaculture were modified when the California Legislature passed the Sustainable Oceans Act, also known as SB 201, in 2006. This act added FGC Sections 54.5 and 15008 and amended FGC Section 15400 and PRC Section 30411. As amended by SB 201, leases and regulations adopted by the Commission for marine finfish aquaculture shall meet, but are not limited to, the standards pursuant to FGC Section 15400(b). This law has three major implications:

- It provides that “the commission may lease state water bottoms or the water column to any person for aquaculture, including, but not limited to, marine finfish aquaculture” (FGC Section 15400) under certain conditions and with certain restrictions (see Chapter 5: SB 201 factors).
- It requires that “the department [CDFW] shall, in consultation with the Aquaculture Development Committee, prepare programmatic environmental impact reports for existing and potential commercial aquaculture operations in both coastal and inland areas of the state” (FGC Section 15008[a]) if funds are appropriated to CDFW and matching funds are provided by the aquaculture industry.

- If a final programmatic EIR (PEIR) is completed, it “shall provide a framework for managing marine finfish aquaculture in an environmentally sustainable manner” (FGC Section 15008[b]) “so as to avoid adverse environmental impacts, and to minimize any unavoidable impacts” (FGC Section 15008[b][10]).

For over thirteen years, CDFW has attempted to reconcile the CEQA framework and substantive considerations mandated by SB 201 with the delivery of a draft PEIR that addresses a new marine aquaculture management framework that is in accord with stakeholders throughout the state. Rather than engaging in this important policy and planning effort within the constraints of a CEQA document as a starting point, CDFW is coordinating steps with the Commission (with guidance and support from the California Ocean Protection Council (OPC)) toward the development of a refined management framework through an Action Plan for marine aquaculture development in California (see further discussion in Chapter 5).

CDFW Tribal Consultation Policy

The CDFW Tribal Communications and Consultation Policy provides the foundation for CDFW to work cooperatively, communicate effectively, and consult with Tribes. Pursuant to this policy, CDFW seeks to establish and maintain respectful and effective communications and consultation with Tribes with respect to current and proposed future aquaculture activities.

Regulatory Overview

There are numerous other federal, state, and local agencies that also provide approvals or permits for aquaculture activities in the state. Depending upon the location and the nature of the activity, regulatory approvals or permits may be required from the agencies listed in Table 4-1. Each of these agencies and its general regulatory authority is discussed briefly below.

Table 4-1. Federal, state, and local involvement in state waters.

Agency	Jurisdiction	Permit or Statutory Authority	Subject
U.S. Army Corps of Engineers (USACE)	Waters of the United States	Section 404, Clean Water Act Nationwide Permit 48, Existing Commercial Shellfish Aquaculture Activities	Placement of dredge or fill material, including structures, in jurisdictional waters of the United States
USACE	Waters of the United States	Section 10, Rivers and Harbors Act	Placement of materials in navigable waters
USACE	Federally listed wildlife and plant species	Federal Endangered Species Act (ESA)	Section 7 consultation regarding harm to or take of listed wildlife and plant species, including certain marine species
NOAA National Marine Fisheries Service (NMFS)	Federally listed marine and anadromous fish, sea turtles and marine mammals	ESA	Section 7 consultation regarding harm to or take of listed species
NMFS	Federally listed marine and anadromous fish, sea turtles and marine mammals	Marine Mammal Protection Act	Incidental harassment authorization or letter of authorization regarding harm of marine mammals
NMFS	Federally listed marine and anadromous fish, sea turtles and marine mammals	Magnuson-Stevens Fishery Conservation and Management Act	Designates and protects Essential Fish Habitat via a requirement for interagency consultation Issue exempted fishing permit or other authorization to grow federally managed species in the exclusive economic zone
NOAA National Ocean Service	National marine sanctuaries	National Marine Sanctuaries Act	Consultation requirement (similar to ESA Section 7) regarding management and trust responsibilities for National Marine Sanctuaries

Table 4-1. Federal, state, and local involvement in state waters.

Agency	Jurisdiction	Permit or Statutory Authority	Subject
U.S. Coast Guard	Navigable waters of the United States	Private Aids to Navigation Permit	Responsible for obstructions or aids to navigation in waters of the United States, including requiring aquaculture-related structures located in navigable waters be marked with lights and signals to ensure navigational safety
California Fish and Game Commission	State water bottoms	Lease of State Water Bottom, Fish and Game Code	Use of state-owned tidelands (Sovereign Lands)
California Department of Fish and Wildlife (CDFW)	Fish and wildlife	Aquaculture Registration, Fish and Game Code	Registration of aquaculture facilities
CDFW	State-listed fish and wildlife species	California Endangered Species Act (CESA)	Take of state-listed species
CDFW	Fish and wildlife	Letter of Authorization	Placing or planting of any live fish, fresh or saltwater animal, or aquatic plant within a water of the state
CDFW	Fish and wildlife	Standard Live Importation Permit	Importation of most live aquatic species
CDFW	Fish and Wildlife	Long-Term Live Importation Permits	Importation of aquatic species on an ongoing basis that do not represent a significant concern for potential impacts on state wildlife resources Importation of aquatic species
CDFW	Fish and wildlife	Health Certificate by appropriate out-of-state agency	Generally required for aquaculture products stocked in the state, except for sales between aquaculturists registered with CDFW for the species in question
CDFW	Fish and wildlife	Wild Broodstock Collection Permit	Permission to collect wild stock for use in developing a domestic broodstock

Table 4-1. Federal, state, and local involvement in state waters.

Agency	Jurisdiction	Permit or Statutory Authority	Subject
CDFW	Fish and wildlife	Restricted Species Permit	Certain species identified in FGC Section 2118 that are not established in California or listed as detrimental
CDFW	Fish and wildlife	Addition of species to individual certificates of registration	Adding species to current registration list
CDFW	Fish and wildlife	Aquarium Dealers Permit	Aquarium dealers wishing to sell certain species of fish; must be obtained from registered aquaculturists and sold as pets
CDFW	Fish and wildlife	Marine Life Protection Act	Designates Marine Protected Areas; develops plans for their management; reviews proposed developments for consistency
California Coastal Commission (CCC)	Coastal zone	Coastal Development Permit (CDP), California Coastal Act	Development activities within the California coastal zone
CCC	Federal waters beyond coastal zone	Coastal Zone Management Act, federal consistency determination or certification (in the case of a federal activity)	Development activities beyond the coastal zone
Regional Water Quality Control Boards (RWQCBs) and California State Water Resources Control Board (SWRCB)	Waters of the state	Section 401 Water Quality Certification, Clean Water Act (CWA)	As part of Section 404 permit process, ensure that project would meet state water quality standards
RWQCBs and SWRCB	Waters of the state	Section 402 National Pollutant Discharge Elimination System (NPDES) Permit, CWA	Discharges to waters of the United States
RWQCBs and SWRCB	Waters of the state	Waste Discharge Requirements, Porter-Cologne Water Quality Control Act	Discharges to waters of the state

Table 4-1. Federal, state, and local involvement in state waters.

Agency	Jurisdiction	Permit or Statutory Authority	Subject
RWQCBs and SWRCB	Waters of the state	Approvals specific to Areas of Special Biological Significance	Areas of Special Biological Significance are 34 ocean areas monitored and maintained for water quality by SWRCB. Within these areas, NDPEs permits are not issued unless the RWQCB grants a special exemption.
California Department of Public Health (CDPH)	Health of California residents	Certification of Growing Water	All shellfish harvested commercially for human consumption
CDPH	Health of California residents	Shellfish Handling and Marketing Certificate	Shellfish dealers
California Department of Food and Agriculture	Agricultural operations	Weighmaster Registration	Those selling aquaculture products by weight
California State Lands Commission (CSLC)	State-owned submerged tidelands	Review of CDFW leases	Ensure lands leased by CDFW for aquaculture are not otherwise used
California State Historic Preservation Office	Historic structures	Compliance with Section 106 of National Historic Preservation Act (NHPA) as part of USACE Section 404 permit	As part of Section 404 permit process, ensure that project would not adversely affect historic properties
Cities, Counties, Special Districts	Project area	Land Use Permit and/or CEQA review	Compliance with local regulations and state environmental review requirements Type of approval varies by planning area

5 LOOKING AHEAD

This report is designed to build a common understanding of existing marine aquaculture and its management framework, pointing to areas that need further consideration for potential future marine aquaculture development. Building on the management context review in Chapter 4, this section discusses known unresolved issues to facilitate discussions on sustainable current and future development of marine aquaculture in California.

In general, it is difficult to predict how commercial-scale marine aquaculture could evolve along California's coast in the future. A myriad of factors may influence the number, location, type, and size of aquaculture operations, including federal, state, and local regulations; environmental conditions; markets; technology and husbandry techniques; economics; and competition for space. Expansion of marine aquaculture would also include associated land-based and dock-side infrastructure and support facilities.

While the majority of existing shellfish operations within the state are located within intertidal areas, there is a potential for future shellfish, seaweed, and/or finfish aquaculture facilities in offshore areas. Offshore operations would require floating or submerged gear technology, tethered in some way to the bottom and sited in accordance with a variety of considerations. Support facilities, such as offices, feed storage and hatcheries on land (where applicable), as well as docks and boats, would enable the operators to conduct offshore aquaculture production. Operational visits to offshore facilities would need to be conducted in cooperation with other offshore activities to ensure safe and efficient marine transport.

Marine aquaculture expansion on land would likely occur on private property or granted state lands (e.g., often administered by ports and special harbor districts) and would not require a lease from the Commission. The lead regulatory authority for land-based aquaculture expansion is anticipated to be the CCC, either directly or through local coastal programs administered by counties after approval by the CCC, and RWQCBs with regard to discharge permitting.

Siting Analysis, Best Management Practices, and Adaptive Management

Sound management of marine aquaculture in public waters relies on a foundation of appropriate siting of operations. Some criteria for suitable siting of marine aquaculture operations originate in the existing local, state, and federal regulatory framework and the public trust doctrine; other criteria are provided by the legislative mandate of SB 201 explicitly; and still other criteria may arise from stakeholder or environmental impact concerns.

The following section describes some examples of potential mitigation or avoidance measures that may be adopted to reduce certain environmental impacts from commercial marine

aquaculture facilities and may be used during consideration of their approval or denial of an application or renewal. For example, potential criteria for siting aquaculture facilities include requirements to reduce and/or avoid impacts to resources and may include:

- minimum depth requirements;
- minimum and/or maximum current speeds or water circulation patterns;
- minimum distances from sensitive habitats such as essential fish habitat, seagrass, kelp, rocky reefs, marine protected areas, and other management areas such as areas of special biological significance or national marine sanctuaries;
- minimization of impacts to the seafloor, substrate, and sensitive species and habitats;
- avoidance of areas with harmful algal blooms;
- minimum distances from other aquaculture facilities or maximum density of facilities;
- avoidance of the range or habitat of wild populations of the same species being cultured;
- avoidance of the range or habitat of one or more special-status species; and/or
- avoidance of waste discharge points or areas that are otherwise unsafe to harvest finfish, shellfish, or seaweed for human consumption.

The use of best management practices to avoid and minimize adverse effects on wildlife might include specifications for gear, lighting, noise levels and duration (both above and underwater), and vessel speed limits. Best management practices for the commercial aquaculture industry could also include specifications on the types of monitoring, recordkeeping, and reporting requirements. For example, a Hazard Analysis and Critical Control Point Plan could outline methods to prevent the introduction and spread of aquatic invasive species and implementation measures should prevention efforts fail. A Shellfish and Finfish Disease Prevention and Response Plan could identify the methods for disease prevention and response should disease outbreaks occur. Recordkeeping, biosecurity measures, use of antibiotics, vaccines or other therapeutants may all be covered in this plan.

Environmental impact models now allow potential lessees and regulators to assess the suitability of sites, understand the potential risks and benefits of proposed operations, and estimate the limits of acceptable farm biomass before they are permitted. The National Centers for Coastal Ocean Science website provides a portal to easily access coastal planning tools designed to assist the planning of sustainable aquaculture development. For example, models such as Depomod or AquaModel may be used to examine near and far field effects of farms in the coastal shelf where nearshore or open-ocean aquaculture may develop (NCCOS 2017).

Modeling tools are useful during the initial screening of potential sites, but they do not replace the need for actual site surveys and should not be a regulatory requirement without further testing, sensitivity analyses, and validation studies.

Adaptive management is defined in FGC §13.5 as that which “improves the management of biological resources over time by using new information gathered through monitoring, evaluation, and other credible sources as they become available, and adjusts management strategies and practices to assist in meeting conservation and management goals.” Adaptive management is a systematic, decision-based approach for improving resource management by learning over time from management outcomes. A rapidly growing body of data, engineering, and management experience have been accumulating globally and form the foundation of the impact analyses and components of new aquaculture management frameworks (DeCew et al 2012, Price and Morris 2013, Rust et al. 2014). The adaptive management approach can reduce reactionary responses and strengthen the management, viability, and sustainability of marine aquaculture (IUCN 2007).

Path Forward – Action Plan

CDFW has incorporated additional information based on feedback received during the public review process of the draft AIR. Comments that were outside the scope of the AIR have been documented and will be considered during the development of the Action Plan. The AIR is intended to serve as a foundation to build a common understanding of existing California commercial marine aquaculture activities and identify areas that need further refinement and consideration for future marine aquaculture development. The AIR and ensuing discussions will inform the development of an Action Plan that identifies areas of opportunity and avoidance to minimize impacts to habitat, biodiversity and wild fisheries. OPC, in partnership with CDFW, will convene representatives from State agencies who play important roles in aquaculture, including members of the Aquaculture Development Committee, to develop a set of guiding principles for the development of the Action Plan. These guiding principles will be informed by the existing regulatory framework, the AIR, and stakeholder input.

As a starting point, the guiding principles, at a minimum, should address the following:

- measures to minimize impacts of existing and potential future aquaculture projects through permit conditions and regulatory tools that already exist;
- regulatory gaps that may require legislative or regulation changes;
- gaps in scientific understanding or technological innovation that may point to needed research & development;
- best practices for eliminating detrimental impacts of current and potential future aquaculture activities;

- siting criteria or zones where marine aquaculture might develop that minimize user conflicts and resource impacts and enhance economic opportunity within the state; and
- administrative capacity, funding and expertise.

The goal of the Action Plan will be to support the development and piloting of innovative tools and approaches to inform sustainable current and potential future aquaculture management in California (OPC 2020).

6 REFERENCES

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From: Weinstein, Anna [REDACTED]
Sent: Tuesday, May 19, 2020 1:30 PM
To: Shuman, Craig@Wildlife <Craig.Shuman@wildlife.ca.gov>
Cc: FGC <FGC@fgc.ca.gov>; Ramey, Kirsten@Wildlife <Kirsten.Ramey@wildlife.ca.gov>; Lovell, Randy@Wildlife <Randy.Lovell@wildlife.ca.gov>; Ashcraft, Susan@FGC <Susan.Ashcraft@fgc.ca.gov>; Teufel, Cassidy@Coastal <Cassidy.Teufel@coastal.ca.gov>
Subject: Informal input in Aquaculture Impact Report

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

Dear Craig,

Please accept these informal comments on behalf of our organizations. Please don't hesitate to reach out with any questions or concerns. Thank you.

Regards,

Anna

Anna Weinstein
Director, Marine Conservation
National Audubon Society

[REDACTED]
[REDACTED]

Re: Aquaculture Information Report
May 19, 2020

Dear Dr. Shuman,

We are writing to provide “informal” input on the draft [Aquaculture Information Report](#) (AIR) before it is submitted to the Fish and Game Commission at its June meeting. Thank you for your invitation to the public to provide this input.

Deputy Director of Ocean Protection Council (OPC) Jenn Eckerle noted that the scope of the State’s Aquaculture Plan will be limited to marine algae and shellfish aquaculture and land-based finfish farms, and will not include marine finfish aquaculture. We agree with this focus, and that finfish aquaculture should be explored for shoreside operations only, with a focus on existing shoreside operations. We believe the primary value of an Aquaculture Plan is to provide a more comprehensive approach to managing existing state aquaculture operations, which are currently managed inconsistently and on an ad hoc basis. It would be premature to conclude that any form of aquaculture should be expanded without a robust analysis of impacts, spatial ecological mapping effort, and thorough stakeholder input. We hope to see the plan and timeline for these steps to occur as part of the Aquaculture Plan process that the MRC requested the Department provide at the July MRC meeting. We also ask that the *Looking Ahead* section of the AIR be revised to reflect the fact that there has not been a decision on future aquaculture development.

Here are our specific comments on the draft AIR:

We recommend the AIR note that the Coastal Commission, under legislative mandate, is developing “Coastal Development Application Guidance for Aquaculture” that will be subject to public review in summer or fall 2020 and will be integrated into the Aquaculture Plan.

The statement on page 4, and cited elsewhere, that “a total of 4,960 acres of California public tidelands are utilized for marine aquaculture” may lead to confusion among the public because it is not widely known that the lease areas - estimated by CDFW at 4,960 acres - are larger than the operational areas. We suggest this nuance could be clarified by using the term “leased” rather than “utilized,” and the reasons why operational areas are a smaller subset of lease areas be explained early in the document.

Another key point that would enhance public understanding is to explain that each operational area within a lease is subject to a Coastal Development Permit (CDP) under the California Coastal Act. These permits are renewed and updated at regular intervals or at the discretion of the Coastal Commission. CDPs must ensure the operation complies with the Coastal Act. Most of the time, the CDPs include Special Conditions to ensure compliance with the Coastal Act. Special conditions are written to protect eelgrass, reduce disturbance to wildlife, ensure recreational access and safety, manage marine debris, and more.

In Table 2 (page 5) and elsewhere, acreages leased and acres under operation are incorrect and sometimes inconsistent. Coast Seafoods, the largest grower in Humboldt Bay, has a 2017 CDP for 273 acre operational footprint within its lease area. According to personal communications

from the Humboldt Bay Harbor District and local DFW staff, the remaining area under operation by other growers is about 25 acres. That is a total of around 300 acres. Yet, the AIR states the total area under operation in the bay is 386 acres. It would be helpful for the AIR to check and cite its sources of this information, and to ensure accuracy and consistency throughout.

The Tideland Manager (page 4) is also the lead agency under CEQA, which is very important for public understanding. The document should include a description of the differences between areas where the FGC is tidelands lease manager and lead agency under CEQA, and where other jurisdictions are tidelands lease manager and lead agency under CEQA. The AIR should also clarify that FGC was ceded overall authority for aquaculture by the State Lands Commission, but important exceptions - especially Humboldt Bay - exist where authority was legislatively ceded to a local authority.

Similarly, statements such as these are confusing to the public: “Aquaculture facilities without state water bottom leases include operations within Humboldt Bay, Monterey Bay, Agua Hedionda Lagoon, and San Diego Bay. These facilities account for an additional 4,053 acres set aside for marine aquaculture in California waters.” This implies that 4,053 acres are available now for aquaculture, which is not the case. Numerous considerations constrain the operational footprint of these aquaculture operations. These include the infeasibility of growing oysters in certain areas due to public health, access, elevation and other issues; limited suitable growing areas; natural resource and recreational considerations; and vessel access and safety considerations.

There are millions, not thousands (page 22), of migrating and resident shorebirds on California’s coast. The best available updated information can be found in Senner et al. (2016).¹ The AIR should use the best available information on the relationship of shorebirds and waterbirds with estuarine habitats in California specifically. Stralberg (2011)² noted that over 90% of California’s historical two million hectares of wetlands has been lost. Yet in California, “estuarine habitats including eelgrass, tidal flats and tidal marsh are the most limited in spatial extent, yet support the highest densities of shorebirds and waterbirds.” The study’s lead author confirmed with us via personal communication that “these habitats can be considered the highest priority for protection from further loss of even small acreages from habitat degradation and conversion, and disturbance.”

Many impacts of intertidal and subtidal aquaculture are already documented in California (page 27). The list of known and potential impacts should be expanded to include:

- Disturbance impacts to birds, marine mammals, and other wildlife from aquaculture activities;
- Degradation or lack of access to resting and foraging habitats due to the presence of aquaculture infrastructure within eelgrass, mudflats, and tidal channels as well as routine maintenance in these areas;

¹ Senner, S. E., B. A. Andres and H. R. Gates (Eds.). 2016. Pacific Americas shorebird conservation strategy. National Audubon Society, New York, New York, USA. Available at: <http://www.shorebirdplan.org>.

² Stralberg, R. Cameron, M. Reynolds, C. Hickey, K. Klausmeyer, S. Busby, L. Stenzel, D. Shuford, G. Page. 2011. Identifying habitat conservation priorities and gaps for migratory shorebirds and waterfowl in California. *Biodiversity Conservation* 20: 19-40

- Destruction or degradation of eelgrass habitats from aquaculture infrastructure and routine maintenance, primarily in Humboldt Bay.
- Non-compliance with Coastal Development Permits (most notably, in the case of Coast Seafoods) exacerbating impacts to natural resources and other coastal users.

The “Looking Ahead” section of the AIR (page 38) is incomplete and skewed toward aquaculture expansion, and should be removed and replaced with a placeholder sentence that these ideas will be vetted with public input at the July 2020 MRC meeting and beyond. We believe that the Aquaculture Plan should address the following needs: improve management of existing operations, protect natural resources and other uses of these state water bottoms, and promote sustainable aquaculture development. We agree with the definition of “sustainable” provided by the Ocean Protection Council in its Strategic Plan.

Thank you very much for your attention to these comments, and we look forward to continued participation in this process.

Sincerely,

Anna Weinstein, Audubon California
Geoff Shester, PhD, Oceana
Gillian Lyons, The Pew Charitable Trusts

Cc:

Samantha Murray
Peter Silva
Susan Ashcraft
Randy Lovell
Kirsten Ramey
Cassidy Teufel

Dear California Fish and Game Commission,

In regards to **Agenda item 11** (Marine Resources Committee) of the upcoming June 24-25, 2020 Public Meeting, we offer the following comments:

A diverse consortium of USC researchers and Sea Grant staff would like to **express its support for a state action plan for sustainable marine aquaculture and our interest in collaborating with the Commission on this plan.**

Our USC consortium has been collaborating with industry and government partners over the past two years to support the growth of California's blue economy, with a particular focus on farming of marine seaweeds and shellfish. We believe seaweed and shellfish aquaculture in California can address key goals and objectives in OPC's strategic plan centered on protecting marine ecosystems and improving ocean health through a blue economy (OPC Goals 3 & 4). Marine farming of seaweed and shellfish in California can provide new sources of food, fuels, and animal feeds and fertilizers, while improving water quality, restoring habitat and mitigating ocean acidification.

We would like to highlight 6 examples of our solutions-oriented work that may be relevant to the development of the state aquaculture plan:

- In the Department of Biological Sciences, we are creating seed banks for native kelps and bivalves to preserve genetic diversity and identify strains optimized for habitat restoration projects or commercial farming. **(Figure 1)**
- At USC's Wrigley Marine Science Center on Catalina Island, we are developing new technologies to grow kelp at scale in the open ocean for carbon-neutral biofuel production.
- The School of Architecture is designing new forms of aquaculture farms that are aesthetically pleasing and ecologically & economically performative. **(Figures 2-3)**
- In the School of Public Policy, we are refining techniques for bringing stakeholders together to reach consensus on marine aquaculture standards, regulations, and siting.
- Economists at USC are quantifying economic benefits of aquaculture including the ways it can mitigate risks posed by coastal environmental changes.
- The Sea Grant program at USC supports sustainable aquaculture initiatives -- not only at USC, but throughout California -- by funding applied scientific research and sharing research findings with decision-makers, educators, and a diverse network of stakeholders through outreach, technical assistance, and education.

Thank you for your time and **we welcome future opportunities to share our expertise and collaborate with the Commission on crafting a state action plan for sustainable marine aquaculture.**

Sincerely yours,

¹Amalia Aruda Almada, Provost Fellow, Dornsife College of Letters, Arts & Sciences,

Maddelyn Harden, Dornsife College of Letters, Arts & Sciences, mharden@usc.edu

Sergey Nuzhdin, Dornsife College of Letters, Arts & Sciences, snuzhdin@usc.edu

Aroussiak Gabrielian, School of Architecture, aroussig@usc.edu

Marika Schulhof, USC Sea Grant, mschulho@usc.edu

William Leach, Price School of Public Policy, leachw@price.usc.edu

College of Letters, Arts
& Sciences

Biological Sciences

Molecular and
Computational Biology
Program

University of
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Molecular and
Computational
Biology 201B
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California 90089-2910

Tel: 213.740.5557
Fax: 213.740.8631

¹ Dr. Almada will be speaking on our group's behalf at the June 24-25th public meeting.



Figure 1. Example of a kelp “seedbank” with immortalized strains maintained in an incubator. **Photo Credit:** Alberto Lab., University of Wisconsin, Milwaukee.

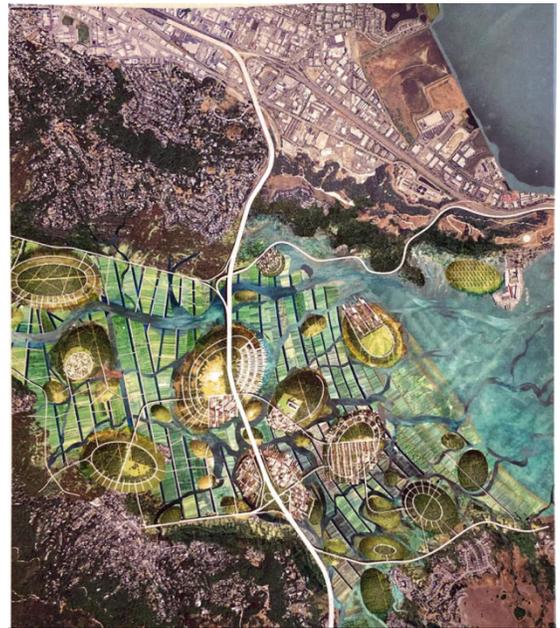


Figure 2. Plan depicting proposed aquaculture and agriculture plots that infill between new urban mounds at Corte Madre in San Francisco Bay. **Photo Credit:** “Aquaculture Landscapes: Fish Farms and the Public Realm” (2020) by Michael Ezban. Tom Leader/TLS, Making Ground/Farming Water 2010.

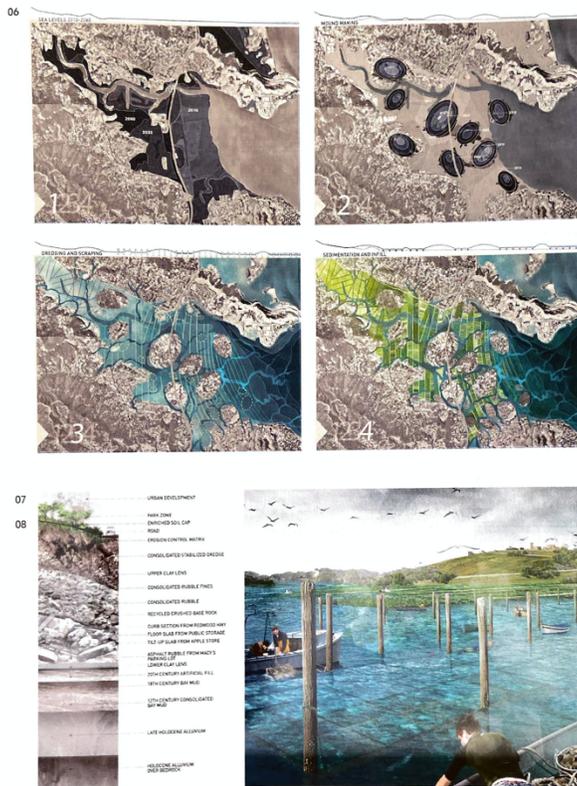


Figure 3. 6) Site plan depicting emergency and key processes 7) Urban development atop layers of detritus and geology 8) Rendering of oyster farming with a mound in the background. **Photo & Caption Credit:** “Aquaculture Landscapes: Fish Farms and the Public Realm” (2020) by Michael Ezban. Tom Leader/TLS, Making Ground/Farming Water 2009-2010.

From: Paula Sylvia <psylvia@portofsandiego.org>

Sent: Thursday, June 11, 2020 3:07 PM

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

Cc: Miller-Henson, Melissa@FGC <Melissa.Miller-Henson@fgc.ca.gov>; Wildlife DIRECTOR <DIRECTOR@wildlife.ca.gov>; Lovell, Randy@Wildlife <Randy.Lovell@wildlife.ca.gov>; Smith, Robert M.

Subject: San Diego Unified Port District Comment Letters

Dear All-

Please accept the attached comment letters on behalf of the Port of San Diego in regard to the upcoming California Fish and Game Commission Meeting on June 24-25, 2020 as well as previous letters related to March 17, and April 29, 2020 California Fish and Game Commission, Marine Resources Committee meetings. We appreciate the opportunity to comment and look forward to the meeting next week.

Warm Regards,

Paula Sylvia
Program Director – Aquaculture and Blue Technology

June 11, 2020

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

VIA EMAIL

RE: Agenda Item 11.A.II: Proposed Six-Month Hiatus on Receiving New Aquaculture Lease Applications

Dear Commissioners,

The San Diego Unified Port District (District) appreciates the opportunity to provide comments on the Fish and Game Commission's (Commission) June 24, 2020 Agenda Item 11.A.II, proposing a six-month moratorium on new aquaculture lease applications.¹ The District is a regional, public benefit agency created in 1962 through the California State Legislature's adoption of the San Diego Unified Port District Act (Port Act). Through the Port Act, the District was granted the state tidelands and submerged lands around San Diego Bay (Bay) and is entrusted with managing and protecting the tidelands and diverse waterfront uses in a manner that is consistent with the Public Trust Doctrine, promoting and balancing navigation, commerce, fisheries (including aquaculture), recreation, and environmental stewardship. In parallel with the Commission's mission, the District's mission and strategic goals include protection and improvement of the Bay's environmental resources and the District is constantly working to assess, manage, and adapt to current and future ocean and coastal opportunities and challenges.

Aquaculture is key part of the District's strategic plan. In 2015, the District created an Aquaculture and Blue Technology Program to explore environmental and economic opportunities in and around the Bay. In 2016, the District created a Blue Economy Incubator (BEI) program to assist in the creation, development and scaling of new business ventures focusing on aquaculture and blue technology. In partnership with the National Oceanic and Atmospheric Administration's National Ocean Service, National Centers for Coastal Ocean Science, the District has identified through spatial planning 10,000 acres that could be suitable for aquaculture, 8,000 acres of which would be subject to California Fish and Game leasing requirements. The District is very interested in ensuring that sustainable aquaculture can expand in California, subject to appropriate regulation and environmental review.

¹ The District also submitted comments on this agenda item to the Commission's Marine Resources Committee on March 12, 2020 and April 24, 2020. This letter is supplemental to our previous letters, which are attached hereto.

Fish and Game Commissioner
June 11, 2020
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As further described below, the District respectfully requests that the Commission refrain from imposing a moratorium on aquaculture applications. While the District strongly supports the Commission's goals of providing more transparent and predictable regulation of aquaculture, the District believes that working together we can accomplish this goal without a moratorium or hiatus.

The District is currently in the final site selection process to identify two sites for potential seaweed and shellfish aquaculture pilot projects, both of which would be ready for submission of applications within the next few months. At least one of these projects would likely be located in an area subject to Commission leasing requirements. The proposed hiatus will not only significantly delay these projects but will also make it difficult, if not impossible, for the District to solicit aquaculture companies to engage in a public-private partnership to develop these aquaculture pilot projects.

As further explained in our previous correspondence to the Marine Resources Committee, while the District understands the Department of Fish and Wildlife's and Commission's current staffing and resources limitations, we believe that the proposed hiatus is not the right solution to address those issues. It is inconsistent with the Legislature's mandate to find ways to expand sustainable aquaculture in the state and the Commission's own statutory requirements to process applications; and sends the wrong message to potential aquaculture companies that the state is not open for commerce.

In addition to the concerns detailed in our previous letters, the District is concerned that the proposed six-month hiatus, which will already significantly impact the District's projects (as well as other potential aquaculture projects throughout the state), could be extended beyond the initial six months. We understand that some commenters that would like to see this happen. If the Commission adopts a six-month hiatus, we strongly encourage that the hiatus sunset after six months with no possible extension. Any extension would exacerbate the already significant negative impacts of the proposed hiatus.

Further, if the Commission adopts the proposed six-month hiatus, the District respectfully requests that the hiatus exempt applications submitted by public agencies, including port districts. We understand the primary motivation for the recommended hiatus is the lack of Commission staffing and resources to properly address the Commission's current leases and those for which applications have already been submitted. The District, and other port districts and public agencies, are in a position to assist Commission staff in this process. Public agencies can assist with public outreach, environmental review, site planning, and development of appropriate terms and conditions to ensure that aquaculture projects are environmentally sustainable. Indeed, the District has already assisted with these tasks as part of projects already approved through its BEI Program.

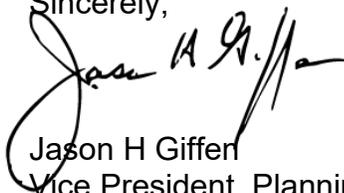
Fish and Game Commissioner
June 11, 2020
Page 3

These new pilot projects would allow both the public agency applicant and Commission staff to develop greater expertise in leasing, permitting, and managing aquaculture projects while reducing the demand on Commission staff and resources.

The District agrees with Commission staff that the State leasing process can be improved with a more transparent and predictable leasing process and additional details and regulations to guide aquaculture applicants and Commission staff, including but not limited to best management practices and/or mitigation measures, to ensure that sustainable aquaculture is carried out responsibly while minimizing potential environmental impacts. While the District does not agree with the proposed hiatus, it is fully supportive of a public process to improve the application process, and would like to partner with the Commission to achieve that goal. The District is willing to provide staff resources to assist the Commission. We also look forward to collaborating with the Commission to seek additional possible funding opportunities so that the Commission can continue to accept and process aquaculture leases in State waters. However, in the event the Commission elects to move forward with the proposed hiatus, we respectfully request that it be limited to six months with no opportunity to extend and that applications submitted by public agencies be excluded from the hiatus.

If you have any questions, please do not hesitate to contact Paula Sylvia at (619) 686-6491 or via email at psylvia@portofsandiego.org, or myself at (619) 686-6473 or via email at jgiffen@portofsandiego.org. Thank you for your time and consideration of this important matter.

Sincerely,

A handwritten signature in black ink that reads "Jason H Giffer". The signature is stylized and includes a large loop at the beginning.

Jason H Giffer
Vice President, Planning, Environment & Government Relations

cc: Melissa Miller-Henson, Executive Director, California Fish and Game Commission
Chuck Bonham, Director, California Department of Fish and Wildlife
Randy Lovell, California Aquaculture Coordinator
Paula Sylvia, Program Director, Aquaculture and Blue Technology, Port of San Diego
Robert M. Smith, K&L Gates LLP



April 24, 2020

Melissa Miller-Henson
Executive Director
Fish and Game Commission
P.O. Box 944209
Sacramento, CA 94244-2090

VIA EMAIL

Re: **Marine Resources Committee April 29, 2020 Agenda Item 7: Marine Aquaculture in California**

Dear Ms. Miller-Henson,

The San Diego Unified Port District (District) appreciates the opportunity to provide comments on the Fish and Game Commission's (Commission) Marine Resources Committee (MRC) April 29, 2020 agenda items 7(A) and 7(B) regarding marine aquaculture in California.¹ The District is a regional, public benefit agency created in 1962 through the California State Legislature's adoption of the San Diego Unified Port District Act (Port Act). Through the Port Act, the District was granted the state tidelands and submerged lands around San Diego Bay (Bay) and is entrusted with managing and protecting the tidelands and diverse waterfront uses in a manner that is consistent with the Public Trust Doctrine, promoting and balancing navigation, commerce, fisheries (including aquaculture), recreation, and environmental stewardship.

In parallel with the Commission's mission, the District's mission and strategic goals include protection and improvement of the Bay's environmental resources. The District is constantly working to assess, manage, and adapt to current and future ocean and coastal opportunities and challenges. Aquaculture is a key part of the District's strategic plan to accomplish these goals. In 2015, the District created an Aquaculture and Blue Technology Program to explore environmental and economic opportunities in and around the Bay. In 2016, the District created a Blue Economy Incubator (BEI) program to assist in the creation, development and scaling of new business ventures focusing on aquaculture and blue technology.

¹ The District also submitted comments concerning these agenda items on March 12, 2020. This letter is supplemental to our previous letter.

Melissa Miller-Henson
April 24, 2020
Page Two

In partnership with the National Oceanic and Atmospheric Administration's National Ocean Service, National Centers for Coastal Ocean Science, the District has identified, using spatial planning tools, nearly 10,000 acres that could be suitable for shellfish and seaweed aquaculture, 8,000 acres of which would be subject to California Fish and Game leasing requirements. The District is very interested in ensuring that sustainable aquaculture can expand in California, subject to appropriate regulation and environmental review.

The District supports Agenda Item 7(A), including the continued development of a Programmatic Environmental Impact Report (PEIR) for marine aquaculture in California. Environmental review under the California Environmental Quality Act is a critical element of responsible and sustainable growth of aquaculture in California; however, it is currently cost-prohibitive for many aquaculture companies to conduct extensive environmental review, and rather than providing a pathway, acts as a barrier to diversifying California's aquaculture industry. Our hope is that the PEIR can evaluate many of the general environmental impacts associated with aquaculture and recommend appropriate mitigation measures, thereby significantly reducing the cost of environmental review for subsequent, specific projects.

As further described below, the District respectfully requests that the Commission refrain from imposing a hiatus on aquaculture applications. While the District strongly supports the Commission's goals of providing more transparent and predictable regulation of aquaculture, the District believes that this goal can be accomplished without a moratorium or hiatus. Further, a hiatus sends the wrong message to the industry that the State is not open for business, which can seal it off from both current and future investment in aquaculture in the State at a time when the State should be encouraging environmentally sustainable industries that can support job creation. Other progressive states, such as Washington, Hawaii, and Massachusetts, provide examples of robust State aquaculture leasing programs that do not sacrifice oversight, regulation, and environmental review. While we must design a regulatory program that works for California, we should not do so at the risk of losing the industry we are seeking to regulate.

1. A Hiatus is Not Necessary While the Commission Considers Regulatory and Program Improvements

Generally, a hiatus, or moratorium, on applications is proposed when the status quo is creating specific harms and immediate action needs to be taken to address that harm while an agency considers how to regulate it or to prohibit significant (and established) economic or environmental impacts. Examples include the State's recent moratorium on evictions on renters impacted by COVID-19, Governor Newsom's moratorium on

Melissa Miller-Henson

April 24, 2020
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fracking pending further scientific study, and local government restrictions on adult-use marijuana after it was legalized in the State. A hiatus or moratorium is traditionally viewed as an option of last resort, given that they almost always have significant economic impacts, to be utilized when no other remedy is available to prevent immediate and significant harm.

It is unclear what immediate and significant harm the Commission is seeking to avoid through imposing a hiatus. The Commission, due to the hard work of its staff, has recently approved several amendments to Commission aquaculture leases, including those for Hog Island Oyster Company in Tomales Bay and Santa Barbara Mariculture in Southern California. These were accomplished with appropriate environmental review, a robust set of mitigation measures and conditions of approval, and little opposition. While the District certainly understands the Commission's limitations concerning staff resources and budget, there does not appear to be an overwhelming number of applications that would warrant a hiatus, nor rampant illegal activity that would warrant stopping the application process.

The Commission is charged under statute to process applications for aquaculture projects. This responsibility cannot be met from the sidelines, but with diligent and direct engagement. We believe the Commission can continue to perform this function while seeking ways to improve its regulatory and application process. Indeed, one of the best ways to learn how a process can be improved is to have case studies to evaluate as examples.

The proposed hiatus can also be counterproductive towards developing new regulations or an improved application process. While such a process will benefit from input from the aquaculture industry, there will also be certain parties that generally oppose any aquaculture that may seek to delay the process so that the temporary hiatus resembles a permanent moratorium. However, a transparent public process without a hiatus removes these conflicting interests from the discussion and will likely facilitate greater cooperation and coordination between interest groups, interested government agencies, and the general public. Engagement and openness is the key to progress.

2. A Hiatus is Counterproductive and Signals California is Deterring Sustainable Aquaculture or Blue Economy Businesses

Only 3% of the seafood consumed in the United States comes from domestically produced aquaculture and 6.5% from domestic fisheries. The remaining 91% of the nation's need for seafood must be imported, regardless of cost. In economic terms, this contributes to over \$16 billion dollars in trade deficit each year. In environmental terms, the carbon footprint or energy used to import seafood far exceeds the energy and

Melissa Miller-Henson

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resources required to harvest and deliver seafood in and to U.S. seafood markets. In California alone, the current demand for seafood based upon per capita consumption exceeds 600 million pounds annually, an opportunity which represents nearly \$6 billion in total economic benefit, if California chose to harvest through sustainable fisheries and aquaculture. When compared to other forms of animal production, which rely heavily on fossil fuels, freshwater resources, and animal feed, seaweed and shellfish aquaculture deliver several environmental benefits, such as water filtration and reduction of excess nutrients.

As you know, the California Legislature recognized the importance of developing a State aquaculture industry in its unanimous approval of Assembly Joint Resolution 43 (2014), which stated that coastal “communities could greatly benefit from a coordinated effort to promote sustainable shellfish aquaculture production” that achieves both economic benefits and preserving the environment. The Legislature found that “California has an enormous opportunity to create living-wage jobs in coastal communities, improve water quality, and restore important ecosystem functions through expansion of sustainable shellfish farming and habitat restoration.” For these reasons, the Legislature supported “access to additional acreage for shellfish farming and restoration, and further supports a dialogue between industry, environmental, and federal and state agency leaders to develop an improved permitting process that is efficient and economical for both shellfish restoration, and commercial farming.” In the eyes of the Legislature, these were complementary goals that could be achieved at the same time. The Commission’s proposed hiatus is also inconsistent with the goals of Senate Bill 262 (2019), wherein the Legislature requires the California Coastal Commission to coordinate with federal and state agencies (including the Commission and Department of Fish and Wildlife) to create regulations that reduce the amount of time required to obtain a permit.

Since 2017, the District has engaged in several pilot projects to shepherd responsible development and innovation in the aquaculture industry, including the formation of a shellfish nursery in partnership with San Diego Bay Aquaculture LLC and a pilot seaweed project with Sunken Seaweed LLC. Expansion of the District’s aquaculture program will likely include proposed projects within the 8,000 acres identified as potentially appropriate for aquaculture development that is subject to Commission leasing requirements. However, the proposed hiatus will hamper these efforts, making it significantly more difficult, if not impossible, for the District to find potential partners for future aquaculture projects. This tempts a technological regression for the State, rather than inviting the scientific innovation that has marked California as a progressive global leader.

Melissa Miller-Henson
April 24, 2020
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At a time when many states, including Maryland and New York, are using shellfish aquaculture projects for environmental remediation as well as economic development and seeking additional investment from aquaculture companies, it is the wrong time to tell the industry that California state waters are not open for commerce. This is particularly true right now, where the COVID-19 pandemic is resulting in significant losses to hundreds of different California industries, including fisheries, aquaculture companies, and restaurants, and an unprecedented number of layoffs and unemployment claims.

To place a hiatus on applications will not only result in a missed opportunity for California to develop an environmentally sustainable source of food production and much-needed employment in coastal communities, it will signal that California is an unpredictable and unstable market for expansion, deferring development of best practices to other states, which would set our own sustainable environmental efforts behind for years to come. This would also foreclose additional potential lease revenue for the Commission and Department of Fish and Wildlife to help fund additional staff resources to process applications.

The District views aquaculture as a critical economic opportunity for California coastal communities over the next decade and strongly encourages MRC and the Commission to continue to receive and process applications as the Commission strives for ways to improve its review process.

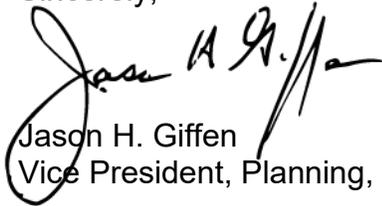
3. The District Would Like to Partner with the Commission to Improve the Permitting and Leasing Process

As noted above, the District agrees with Commission staff that the State leasing process can be improved with a more transparent and predictable permitting and leasing process. The District appreciates the assertion that additional details and regulations to guide aquaculture applicants and Commission staff, including but not limited to best management practices and/or mitigation measures, would ensure that sustainable aquaculture is carried out responsibly while minimizing potential environmental impacts. While the District does not agree with the proposed hiatus, it is fully supportive of a public process to improve the application process and would like to partner with the Commission to achieve that goal. The District is willing to provide staff resources to assist with this effort. We also look forward to collaborating with the Commission to seek additional possible funding opportunities so that the Commission can continue to accept and process aquaculture leases in State waters. We believe that embracing progress is California's story, and we hope to assist and advance those efforts with you any way possible.

Melissa Miller-Henson
April 24, 2020
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If you have any questions, please do not hesitate to contact Paula Sylvia at (619) 686-6491 or via email at psylvia@portofsandiego.org, or myself at (619) 686-6473 or via email at jgiffen@portofsandiego.org. Thank you for your time and consideration of this important matter.

Sincerely,

A handwritten signature in black ink, appearing to read "Jason H. Giffen".

Jason H. Giffen
Vice President, Planning, Environment and Government Relations

cc: Chuck Bonham, Director, California Department of Fish and Wildlife
Randy Lovell, California Aquaculture Coordinator
Paula Sylvia, Program Director, Aquaculture and Blue Technology, Port of San Diego



VIA EMAIL

March 12, 2020

Melissa Miller-Henson
Executive Director
Fish and Game Commission
P.O. Box 94244-2090

RE: California Fish and Game Commission Marine Resources Committee Meeting,
March 17, 2020 Agenda

Dear Ms. Henson,

The San Diego Unified Port District (District) appreciates the opportunity to provide comments on the Fish and Game Commission's Marine Resources Committee (MRC) March 17, 2020 agenda items 7(A) and 7(B) regarding marine aquaculture in California. The District is a regional, public benefit agency created in 1962 through the California State Legislature's adoption of the San Diego Unified Port District Act (Port Act). Through the Port Act, the District was granted the state tidelands and submerged lands around San Diego Bay (Bay) and is entrusted with managing and protecting the tidelands and diverse waterfront uses in a manner that is consistent with the Public Trust Doctrine, promoting and balancing navigation, commerce, fisheries, recreation, and environmental stewardship. In parallel with the Fish and Game Commission's mission, the District's mission and strategic goals include protection and improvement of the Bay's environmental resources and the District is directly working to assess, manage, and adapt to current and future ocean and coastal opportunities and challenges.

The District is pleased to be able to provide public comment and engage with the MRC at the upcoming meeting to express our support of the MRC's work on marine aquaculture and continuing the momentum of the programmatic environmental impact report.

In response to agenda item 7(B), marine aquaculture in California, regarding the possible recommendation for a temporary hiatus in considering new applications for state water bottom leases for the purpose of aquaculture (excepting previously received applications currently under consideration), the District respectfully offers the following comments:

Economic and Environmental Importance of Aquaculture

In the U.S. only 3% of domestically produced seafood comes from aquaculture and 6.5% from fisheries, the remaining 91% is imported. In economic terms, this contributes to over \$16 billion dollars in trade deficit each year. In environmental terms, the carbon footprint or energy used to import seafood far exceeds the energy required to harvest and deliver seafood in and to U.S. seafood markets. In California alone, the current demand for seafood based on per capita consumption exceeds 600 million pounds annually, an opportunity which represents nearly \$6 billion dollars in total economic benefit, if California could harvest this through sustainable fisheries and aquaculture. In agricultural terms, California already supports the fifth largest economy in the world, which can and should be bolstered by supporting sustainable fisheries and the development of a sustainable, domestic marine aquaculture industry, inclusive of a range of land and ocean-based technologies across all species and market segments to meet the growing demand for seafood and ensure our nation's food security.

While there is a clear food production component to this demand, aquaculture offers multiple co-benefits, such as fisheries enhancement, ecosystem restoration and services, mitigation banking, bioremediation, carbon sequestration, bio-fuel/medical purposes, and education and outreach. When compared to other forms of animal production, which rely heavily on fossil fuels, freshwater resources, and animal feed, seaweed and shellfish aquaculture have several environmental benefits, such as water filtration and reduction of excess nutrients.

Recommendation: The District recommends the MRC continue to consider new applications for state water bottom leases for the purpose of aquaculture to support the growth of aquaculture in California and the economic and environmental benefits it affords.

Aquaculture and the Blue Economy

The District provides essential working waterfront infrastructure that supports vibrant commercial and recreational fisheries and the livelihoods and communities that depend on them. In 2015, the District created an Aquaculture and Blue Technology Program to explore environmental and economic opportunities in and around San Diego Bay, as well as created a Blue Economy Incubator (BEI) program to assist in the creation, development and scaling of new business ventures focusing on aquaculture and blue technology. To date, pilot projects supported through the BEI program range from shellfish nursery operations, to copper remediation technology, a drive-in boatwash, a

smart marina application, a marine debris removal vessel, and seaweed aquaculture. As the state-legislated trustee of tidelands around San Diego Bay, fostering sustainable domestic aquaculture and District-related blue tech innovation helps the District fulfill our public trust responsibility to promote fisheries and commerce, as well as aligning with our mission to enhance and protect the environment.

Ongoing Marine Spatial Planning and Port Aquaculture Pilot Projects

A strong body of scientific knowledge exists regarding aquaculture siting and science-based best management practices to reduce and/or eliminate the risk of potential environmental impacts; however, the limited number of working aquaculture farms in California presents a lack of regional and local data. To fill in some of this gap, the District has utilized coastal marine spatial planning tools to conduct a constraints and opportunities analysis for aquaculture in and around San Diego Bay with a focus on seaweed and shellfish. This work was conducted by the National Oceanic and Atmospheric Administration's (NOAA), National Ocean Service (NOS), National Centers for Coastal Ocean Sciences (NCCOS), Coastal Aquaculture Siting and Sustainability Program (CASP), which identified nearly 10,000 acres of potential area to investigate further for a variety of seaweed and shellfish opportunities, including nutrient bioextraction. Of particular note was nearly 2,000 acres were identified inside San Diego Bay with the remaining 8,000 outside the Bay, including a large area in the District's southernmost jurisdiction offshore of Imperial Beach, which is frequently water-quality impacted by the Tijuana River Watershed. Other complimentary initiatives at the District include environmental conservation projects with a focus on wetland and blue carbon mitigation banking as a tool to protect and conserve coastal environments while simultaneously allowing for economic growth. The District has also conducted a bay-wide infrastructure feasibility study to assess infrastructure capable of supporting pilot and demonstration projects. The District is taking an active leadership role in the expanding domestic aquaculture industry and facilitating early development of regional marine aquaculture projects.

Launching from the District's planning efforts, in 2017 the Board of Port Commissioners (BPC) approved a pilot project with San Diego Bay Aquaculture LLC to demonstrate a shellfish aquaculture nursery operation. The goal of this pilot project is to demonstrate the feasibility of shellfish aquaculture in San Diego Bay by growing oysters from the nursery to juvenile stage for the commercial market and to assess the environmental co-benefits of shellfish aquaculture. Since then, support from California Ports and harbors continues to grow, with organizations like the District advancing balanced, science-guided support for this industry. In 2018, the BPC approved a pilot project with Sunken Seaweed LLC

Ms. Melissa Miller-Henson
March 12, 2020

Page 4

to demonstrate the feasibility and environmental co-benefits of seaweed aquaculture in the Bay. This pilot project is developing and evaluating techniques for growing culinary seaweeds and kelps for a range of food and manufacturing uses as well as researching the environmental co-benefits associated with growing seaweed. The minimal resources and low investment required to farm shellfish and seaweeds presents aquaculture as a particularly sound strategy and a tool providing for multiple co-benefits and uses such as bioremediation, carbon sequestration, restoration, mitigation banking, habitat enhancement and otherwise improving water quality and ecosystem productivity. For these reasons, the District is embracing these aquaculture pilot projects and supporting the emerging shellfish and seaweed aquaculture industry in California.

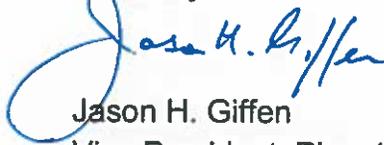
The next step for the District's experimental pilot projects is siting larger pilot operational farms to continue environmental monitoring, establish monitoring protocols, and assess best management practices, specific to California. This process would likely require a state water bottom lease and the MRC's consideration of a temporary hiatus in considering new applications for the purpose of aquaculture would delay important and informative research.

Recommendation: The District recommends the MRC facilitate establishing in-water aquaculture farms so research, environmental monitoring protocols, and science-based best management practices can be developed at the local and regional level.

The projects described above show the District's commitment to developing aquaculture in California and the District will continue to share our progress on our efforts with the MRC and we look forward to future collaboration on research, development, assessment, and implementation of new strategies and technologies for aquaculture.

If you have any questions, please do not hesitate to contact Paula Sylvia at (619) 686-6491 or via email at psylvia@portofsandiego.org, or myself at (619) 686-6473 or via email at jgiffen@portosandiego.org.

Sincerely,



Jason H. Giffen

Vice President, Planning, Environment & Government Relations

cc: Paula Sylvia, Program Director, Aquaculture and Blue Technology, Port of San Diego

California Fish and Game Commission
 Marine Resources Committee (MRC) 2020 Work Plan
 Scheduled Topics and Timeline for
 Items Referred to MRC
 Updated June 18, 2020

Topic	Category	MAR/APR ^a 2020	JUL 2020	NOV 2020
		Santa Rosa (Mar); Teleconference/ Webinar (Mar/Apr)	Teleconference (proposed format)	Monterey
Planning Documents & Fishery Management Plans (FMPs)				
MLMA Master Plan for Fisheries - Implementation Updates	Master Plan Implementation	X	X ^c	X
Abalone FMP / ARMP Update	FMP	X/R	X/R	X
Aquaculture Program Planning (Information Report, Action Plan)	Aquaculture	X/R	X	
Regulations				
Aquaculture Lease Best Management Practices (BMP) Plan Requirements (HOLD, TBD)	Aquaculture			
Experimental Fishing Permit Program, Phase II	Fisheries	X	X	
Kelp and Algae Commercial Harvest	Kelp	X/R	(X/R) ^b	
Whale and Turtle Protections in the Recreational Dungeness Crab Fishery	Fisheries	X/R		
Update on and possible review of California Spiny Lobster FMP implementing regulations (<i>added Feb 2019; timing TBD</i>)	FMP			
California Grunion Recreational Fishing Regulations (<i>added Apr 2020</i>)	Fisheries		X	
Emerging/Developing Management Issues				
Aquaculture State Water Bottom Leases: Existing & Future Lease Considerations	Aquaculture			
Potential Short-Term Moratorium on New Aquaculture Lease Applications	Aquaculture	X/R		X
Kelp Restoration and Recovery Tracking	Kelp		X ^c	
Recreational Swordfish Fishery	Fisheries	X	X/R ^c	
"Maintenance of Existing Structures" within Marine Protected Areas (<i>NEW - Proposed</i>)	Marine Protected Areas		X	
Special Projects				
California's Coastal Fishing Communities	MRC Special Project		X	
Informational / External Topics of Interest				
Recovery of Cowcod Stock Status (South of Cape Mendocino)	Fishery management	X	(X) ^b	

KEY: X Discussion scheduled

X/R Recommendation developed and moved to FGC

a The March 17 MRC meeting was continued to April 29 to hear items not completed; all items are identified in this column regardless of which day heard.

b Topics are proposed by staff to be removed from agenda and delayed to a future date (TBD).

c Topics are proposed by staff to be heard as updates under "Agency Updates" (a standing agenda item) rather than a stand-alone agenda topic.

From: Ian OHollaren [REDACTED]
Sent: Thursday, May 21, 2020 6:13 PM
To: Flores Miller, Rebecca@Wildlife <Rebecca.FloresMiller@wildlife.ca.gov>; Wildlife Kelp <Kelp@wildlife.ca.gov>; FGC <FGC@fgc.ca.gov>
Subject: Proposed Regulation Comments

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

Hi Rebecca,

Thank you for putting on the webinar on Wednesday. I was hoping to speak but we ran out of time. I agree with Doug Bush, Andrew Daunis, and James Jungwirth on all of their points. Basing these proposed regulations off the last ten year average is not scientifically accurate. I appreciate the intention of the department to establish limits and closures when deemed necessary, but this is not the reality with the proposed regulations.

In my specific harvest areas, there is little to no pressure on the resource. The Giant Kelp forests off Santa Cruz have been thriving, as well as the Bull Kelp forests just north of Santa Cruz. The intertidal seaweeds, along with Postelsia, seem to be in great shape with no pressure as well. My harvest method encourages new healthy growth of each specie I take, and over the years I have witnessed little to no change in specie density. Any decline I have seen was strictly environmental, ie. large swell.

My concern and testimony for the proposed regulations are as follows:

1. Although I don't harvest much Bull Kelp, prohibiting the commercial harvest state-wide is like cutting down the whole orchard because one row is diseased. There are plenty of healthy stands of bull kelp I have seen from Half Moon Bay to Southern Big Sur. I suggest simply closing individual beds of Bull kelp as needed instead of an overall state-wide closure.

2. I am highly against establishing harvest limits as well. As was stated in the webinar, seaweeds mature and reproduce at different times throughout the year from south to north. Depending on weather conditions, swell, tides, etc throughout California, dictate not only specie availability, but time of harvest. As stewards of the resource, commercial harvesters are not in a race to harvest the most seaweed, or harvest before plants have reached maturity, or undergoing reproduction. This process in itself is self regulating regarding appropriate harvest methods, although all harvesters must harvest appropriately to ensure proper management of the resource.

-A 3,500 ton limit on Giant Kelp is scientifically unjustified. I'd imagine the aquaculture industry makes up the majority of the Giant Kelp yearly harvest. This seems like a set tonnage they require each year. My business model is based on harvesting a significant amount of Giant Kelp in the next 5 years, on the basis that it is the most abundant and regenerative perennial kelp in California and healthy kelp forests off Santa Cruz to harvest from. The versatility of Giant Kelp in the food supply chain, agriculture, cosmetic, and biofuel industries is immense. This proposed limit threatens the ability of a burgeoning industry for many new business endeavors which support California. A 3,500 ton cap can be reached with a couple more mechanical/or hand harvest operations that are working on a large scale. With no cap on licenses, this quota threatens the livelihoods of all commercial kelp harvesters and aquaculture businesses which have worked so hard to create the industry which we have today.

3. I am not familiar with the Pacific Herring spawning habitat in specific bays, but of course I would support protecting their habitat if necessary.

4. Closing the Sea Palm harvest completely seems unjustified. As stated, I have not seen a decline in Sea Palm in my harvest grounds, nor from other harvesters in their areas. Following proper harvest protocol of Sea Palm has proven successful commercially and for regeneration of each plant in order to reproduce. I don't believe seasonal harvesting is necessary because the harvest is self regulating based on environmental factors and following proper harvesting technique is sufficient.

5. I agree with streamlining the overall kelp logs and reports, regulation clarity, etc. Please push to get the kelp logs and royalty payments online!

As a small community of commercial kelp harvesters, it has taken all of us years to get to where we are at today. This is my full time job and focus. All of us have the best interest of the resource in mind and have educated ourselves, each other, and the general public throughout the years about the importance of this resource. We harvest in accordance with the tides, moons, specie

availability, and overall health. Whether someone has been harvesting for 1 year or 40 years, we are the departments best source of information because we're out there every week. Please allow scientific data to justify limits and closures. An ebb and flow in the environment is completely natural and commercial harvesters take on the responsibility in maintaining equilibrium in the areas in which we harvest. I can say that I look at the resource as my own garden, and take responsibility to conserve this precious resource. A collaboration with the department and harvesters is what I'd like to see most before any decisions are made.

All the best,

Ian O'Hollaren
Seaquoia.com



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

May 7, 2020

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

Dear President Sklar and Commissioners:

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

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

The Bottom line take-away from the Final Report

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

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

Why are the Timeframes so Long?

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

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

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

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

Suggestions for a Fishery Going Forward:

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

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

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

Benefits of the Integration Process

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

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

Sincerely,

Jack Likins

Email address:

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

Esteemed commission,

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

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

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

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

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

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



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

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

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

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

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

We would propose that CDFW instead consider a third option for consideration by the California Fish and Game Commission (Commission) to include within the final FMP. This option would provide a level of take between the levels of harvest currently outlined in the biological fishery and those in the *de minimis* fishery. **Such a biological fishery, with a level of harvest between 600 to 900 abalone, would serve to increase the amount of data available to inform management and decision-making without putting the resource at risk.** Further, by engaging fishermen it would increase public confidence in the data. It would also provide ample opportunity to ensure that the recreational dive culture remains alive and well in California. The experts and the data have shown that this can be accomplished with minimal risk to the recovery of the fishery and no delay in the timeline for reaching the *de minimis* fishery.

Within the Administrative Team report, the modelers conducted an analysis to determine what level of data would be needed to manage a third management zone. Three hundred samples was demonstrated to provide enough statistical power to reliably manage a fishing zone, thus we would

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

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

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

Signatures

Name Location Date

Jack Likins Gualala, CA 2020-05-11

Rich Stachowski Oakland, CA 2020-05-13

Kristine McKee Fort Bragg, CA 2020-05-13

michael wood Fairfield, CA 2020-05-13

Matthew Rice Laguna Niguel, CA 2020-05-13

Tony Rayford Georgetown, CA 2020-05-13

toby chan Sacramento, CA 2020-05-13

Regina Bianchi US 2020-05-13

Glenn Ford Sonora, CA 2020-05-13

Shannon Anderson Napa, CA 2020-05-13

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

change.org

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

Letter: Greetings,

Provide a Recreational Abalone Fishery in Northern California

Comments

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

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

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

Name	Location	Date	Comment
levi cloud	napa, CA	2020-05-13	"I grew up diving for abalone and it is a passion of mine to dive for these snails and would like my children to one day be able to enjoy this great sport as I have been able to do."
Michael Eberhardt	South San Francisco, CA	2020-05-13	"I LIVE OFF THE OCEAN. Without it, my family would not survive."
Jim Vandegrift	Santa Cruz, CA	2020-05-13	"I have been an avid abalone diver for the last 35 years and hope that some accommodation can be made that would allow the resumption of abalone diving that does not compromise the establishment of a healthy abalone population."
Jake White	Sonoma, CA	2020-05-13	"Anything is better than nothing"
Marci Colburn	Eureka, CA	2020-05-13	"I want for myself and future generations to be able to experience the love of this sport again."
Derek Cash	Ukiah, CA	2020-05-13	"I'm a diver that loves the sport and with sustained harvest in certain areas we should still be allowed to harvest abalone."
Robert Sandner	Yigo, Guam	2020-05-13	"There are way more abalone than the computers can predict. Get in the water look around you'll be surprised."
Ron Whang	San Francisco, CA	2020-05-13	"Let us dive before we die!"
james george	Lompoc, CA	2020-05-13	"southern california also needs to reopen.after taking off 15 years from diving im seeing so many abs that were never in previous areas"
Christy Ruhl	Napa, CA	2020-05-13	"Christy Ruhl"
Gabe Silveira	Half Moon Bay, CA	2020-05-13	"I am a free diving and would like the abalone season to open again"
Alan Murakami	Sebastopol, CA	2020-05-13	"I agree with a limited, controlled and measured recreational abalone harvest."
Todd Werling	Farmington, NM	2020-05-13	"Give Tim McCormick Abalone"
Christy Mang	Lompoc, CA	2020-05-13	"This was a part of my childhood. I would love to have my family enjoy as I did:)"
Benjiman Azevedo	Oroville, CA	2020-05-13	"Need to keep recreationaldiving alive!!"
charles zinser	Reno, NV	2020-05-13	"I support a limited abalone season it is very important. Total closure makes no sense and creates negative feelings of the folks that manage our recreational fisheries."
Patrick Ward	Santa Barbara,, CA	2020-05-13	"Patrick Ward"
jackie swaim	Citrus Heights, CA	2020-05-13	"We love abalone diving"

Name	Location	Date	Comment
David Gagne	Elk Grove, CA	2020-05-13	"It's not fair that there's only commercial fishing for abalone. I also a big supporter of the free diving community as well as a also being a diver."
Rogan Seamans	Oakland, CA	2020-05-13	"I love to dive"
Dustan Baker	Ladera Ranch, CA	2020-05-13	"Legal and responsible Recreational take of marine resources for consumption is an important activity. The culture of this practice should not be overlooked, but embraced."
Matthew Wright	Lakeport, CA	2020-05-13	"Because I dive"
Matt Sum	San Bruno, CA	2020-05-14	"I am signing because of people ned to have a balance of life. Have an outdoor life and ocean recreation is important to most of us as Californian."
Steven C Adams	Oxnard, CA	2020-05-14	"I believe! Let's do this..."
Mike Maher	US	2020-05-14	"There are plenty of abs out there, maybe Fish and game just need to bust those that are poaching a little better"
Sean Klinger	Sacramento, CA	2020-05-14	"Because it's the right thing to do"
Steven Clement	Sacramento, CA	2020-05-14	"Because I support the cause"
Claire De Biasio	Novato, CA	2020-05-14	"Recreational abalone divers are responsible, respectful people who hunt in a sustainable manner. They will not abuse this opportunity."
Tiffany Miller	Napa, CA	2020-05-14	"Tiffany Miller"
James O'Brien	Annandale, VA	2020-05-14	"I believe in this cause, having grown up on the Northern California coast, going abalone diving with my father as a young boy is one of my fondest memories. Keep it alive!"
Kathryn Lyons	Reno, NV	2020-05-14	"I believe in this cause."
Max Salgado	Southampton, England, UK	2020-05-14	"The ocean is for all"
Rob Flecksteiner	Penn Valley, CA	2020-05-14	"Sport Diving ensures the continued support for the environment and a controlled take of game helps to ensure good resource management and discourages poaching."
erin mcdonald	Stockton, CA	2020-05-14	"I believe this is a sound proposal to aid in protecting the abalone, gaining accurate data, and providing opportunities for the diving community."
Jocelyn Peach	Vacaville, CA	2020-05-14	"Abalone is awesome!"
Sarah Mitchel	Sebastopol, CA	2020-05-14	"I would like to dive with my son and show him how to collect abalone one day."
Pat Mathews	Fremont, US	2020-05-14	"I love fishing and abalone."

Name	Location	Date	Comment
Laura Lee Fitzpatrick	Napa, CA	2020-05-14	"Such an important hobby good for one's understanding of our seas."
Tom Caldera	Santa Maria, CA	2020-05-14	"Everyone loves abalone."
Amanda Risen	Kansas City, MO	2020-05-14	"I agree with the petition"
Jason Moreci	Novato, CA	2020-05-14	"Jason Moreci"
Sarah Olson-Saunders	Sweet Home, OR	2020-05-14	"The people who follow the rules should not be punished for poachers. This is something I grew up doing with my family, put food on the table. Don't punish the law abiding citizens, crack down hard on them disgusting poachers."
Chris Freitas	Cloverdale, CA	2020-05-14	"I love the ocean"
david currier	Ketchum, ID	2020-05-14	"Sustainability is where it's at."
Rachelle maher	Kelseyville, CA	2020-05-15	"We should support the group"
Melanie Mondo	San Francisco, CA	2020-05-15	"We love abalone"
Kathleen Bunting	Cloverdale, CA	2020-05-15	"Because my family has grownup diving and truly miss it"
Daniel Rodarte	Rocklin, CA	2020-05-15	"Abalone diving on the north coast has suffered tremendously over the past decades through poaching, mismanagement, and the purple urchin invasion. As a result, law abiding divers, dive shops, and tourism businesses have paid the price, from the Bay Area north to Humboldt County. Bring back a limited take to share the joy of diving for abalone again."
John Staggs	US	2020-05-16	"We need to fish"
Shel Barsanti	Mckinleyville, CA	2020-05-16	"Abalone season has been a fun activity for many of our family members."
Christopher Carlton	Magnolia, CA	2020-05-17	"I enjoyed collecting abalone when I used to lived in Commiefornia."
Rick Augustine	Castro Valley, CA	2020-05-17	"Its essential and I only collect fully grown alabones. Not babies ones. Its legal and hunting permit is included."
Jonathan Boykin	Lemoore, CA	2020-05-17	"Great idea."
Raymond Mori	South Lake Tahoe, CA	2020-05-17	"We all dive"
Dean August	US	2020-05-17	"I love diving and an abalone dinner"
Ben Oyle	Novato, CA	2020-05-18	"I support this idea"
Catherine Lamb	Stockton, CA	2020-05-18	"There is nothing like abalone diving in the north coast."
Mark Hamerdinger	Morro Bay, CA	2020-05-19	"I believe there is enough abundance of Abalone to harvest giving that size limits would be strictly enforced."

Name	Location	Date	Comment
Genie Minikel	Redway, CA	2020-05-19	"My family has been diving for abalone long before I was born and would like our children to be able to enjoy this lifestyle also"