



California Whale Entanglement Discussion Dungeness Crab Fishing Gear Working Group Summary of Key Themes, July 18-19, 2017

The California Dungeness Crab Fishing Gear Working Group held an in-person meeting on July 18-19, 2017 to continue building on discussions and progress made during its May 2017 meeting (key themes summary available [here](#)). Goals for the July 2017 meeting included:

- Continue to design the WHAT Program and identify a process for implementing a pilot voluntary effort for the 2017-18 fishing season and begin outlining a legislative framework for implementation beyond 2017-18.
- Learn of any updates/progress of each Project Team since May and discuss how products/outcomes can help inform WHAT Framework and other potential solution and strategies.
- Discuss options and process for engaging and communicating with the commercial and recreational fishing communities prior to the 2017-2018 fishing season to support Working Group efforts.
- Identify goals and desired outcomes for September 2017 Working Group meeting, including anticipated Working Group recommendations, and begin mapping out work plans (e.g., July-September progress, 2017-18 fishing season).

The following summary captures key themes discussed by the Working Group and its advisors during the July 18-19, 2017 meeting; it is not to be considered a transcript. Working Group next steps are captured throughout the document ([blue](#)), and also summarized at the end as part of the “Next Steps” section of the summary. The summary is available to the California Department of Fish and Wildlife (CDFW), National Marine Fisheries Service (NMFS), the Ocean Protection Council (OPC), and the California Dungeness Crab Task Force (DCTF). This summary will also be shared with the Fish and Game Commission and California State Legislature, along with fishing associations and leadership throughout California.

Key themes summaries are developed following all Working Group meetings, and are designed to provide Working Group participants with information to share and discuss with their peers, as well as inform ongoing discussions within the Working Group itself. Additionally, these summaries will act as a source of information for those interested in this topic. Previous meeting summaries, memos, and other information about the Working Group is available at <http://www.opc.ca.gov/whale-entanglement-working-group/>.

Working Group Meeting Framing

At the start of the meeting, the California Department of Fish and Wildlife (CDFW) informed the Working Group the CDFW Director had requested a draft outline by Friday, July 21 of the risk assessment program the group had begun developing in May 2017 (formerly referred to as the Whale Hotshot Action Team (WHAT) Program, [see p10](#) of the May 2017 key themes summary). In response to outside pressures, including a recent notice of intent to sue the State, the Director is seeking more immediate guidance to address the issue of whale entanglements, especially in Dungeness crab fishing gear.

The Working Group collectively expressed their commitment to continuing to develop an outline of a program to assess and mitigate the risk of whale entanglements in Dungeness crab fishing gear that can be tested during the 2017-18 fishing season. The intent was to share an initial framework with the Director immediately following this meeting with additional details addressed following the September 2017 meeting.

Whale Entanglement Risk Assessment and Mitigation Program (RAMP)

In response to CDFW's request, the Working Group continued fleshing out the concept of a risk assessment program (RAMP) as initiated during the May 2017 meeting ([here](#)).

- The RAMP will summarize the collaborative and adaptive steps required to successfully reduce the risk of whale entanglements along California's coast, reflecting the progress and steps taken by the Working Group since 2015.
- Three principal elements will make up the RAMP: prioritization, initial assessment and mitigation, and adaptive risk management.
 - The group agreed that strategic communications at each step/stage is essential - both within the fishery participants and also with other target audiences, including decision makers.
- A RAMP risk assessment framework (RAMP Framework) is the foundational tool that will be used to understand the risk of whale entanglements within a fishery or area at a given time.
- The intent of the RAMP is to reduce entanglements in California Dungeness crab fishing gear, however it could be used as a concept to potentially address this issue across California's fixed-gear fisheries. To help accelerate the process, the Working Group would be available to share their experiences, hurdles, and successes with others interested in addressing this issue, while steps would be tailored for each specific fishery.
- Continued discussion is needed regarding the the process for collating, managing, and organizing RAMP data streams and to identify/develop clear back-end communications processes for how to relay scoring/data updates from researchers to CDFW and other agencies. Additionally, the composition of the RAMP teams also requires additional discussion.
- A program that uses the Dungeness crab as a model and test case could be applied to other fisheries if successful.

Based on this discussion, an outline for a Whale Entanglement Risk Assessment and Mitigation Program (RAMP) was developed.

- **Sonke will share the RAMP outline with Director Bonham on 7/21, drawing on content from the Working Group's charter to help frame the group's charge.**
- **The Working Group will continue fleshing out the RAMP program with the intention of testing its utility during 2017-18 Dungeness crab fishing season.**

RAMP Framework (formally the WHAT Framework)

Building on progress made by the Working Group during its May 2017 meeting and discussions held by the RAMP Project Team between May and July, the Working Group continued to develop the RAMP risk assessment framework (RAMP Framework) that is the cornerstone to understanding the risk of whale entanglements within this program.

- The goal of the framework is to provide an initial assessment of the risk of entanglements is (e.g. low, medium, or high) based on a number of factors. The framework will be designed to act as both a predictive (prior to season) and responsive (during the season) tool.
 - The group confirmed a number of draft factors that may increase the potential risk to whale entanglements: prey distribution (temporal and geospatial), whale distribution/concentration (temporal and spatial), gear concentration (temporal and geospatial), the health of the salmon season (if Dungeness crab fishermen have other fishing options in the Spring months), delays (market, domoic acid), and the number of whale entanglements.
 - Additional ideas for factors were discussed, including water temperature, oceanographic conditions, and extreme weather (leading in increased gear loss). There was general agreement that these will be adequately addressed within the six factors identified above.
 - Considering each factor, the group conducted a “hindcasting” exercise reflecting on the 2013-14, 2014-15, and 2015-16 fishing seasons. For each season, information available on each factor was discussed by the Working Group and given a draft score based on a simple scoring system (-1 = reduced risk; 0 = neutral risk; +1 = increased risk). Being mindful that this exercise was conducted to explore the parameters of the tool and assess how to continue to refine the framework, draft scores indicated that the 2013-14 fishing season was low risk (or “green”), the 2014-15 season was medium risk (or “yellow”), and the 2015-16 season was high risk (or “red”).
 - The hindcasting exercise illustrated a color/risk spectrum that reflected the increased rates of whale entanglements over the three seasons that were examined, and also illustrated a progression in the potential risk of whale entanglements from low to high over this time period.
 - Recognizing the interconnectedness across factors, the Working Group discussed options for evaluating factors individually or collectively. Additionally, some factors may overlap with each other to create a duplicative effect. The idea of developing a decision tree or series of questions that could be asked to help inform the scoring process was also discussed.
 - **The RAMP Project Team will continue to discuss how best to consider the interconnectedness of factors.**
 - **Jarrod Santora, Karen Grimmer, and Jason Brand will share examples of existing scoring frameworks and/or decision trees used in other programs with the RAMP Project Team for review and consideration.**
- The Working Group discussed the need for scoring to be based on objective, transparent, and readily available information. There group agreed subjective information should be limited when informing scores, with the understanding that objective information may only be available at various times throughout the Dungeness crab fishing season, or not at all.
 - The Working Group agreed that the research projects currently being supported and/or coordinated by the Working Group (e.g. forage/whale distribution, electronic reporting, etc.)

should act as additional data streams to inform the RAMP Framework when the data is available.

- There may also be untapped data streams that could inform the framework including WhaleAlert and HappyWhale, which could be used to assess the number of whales in the area in real-time. **The Communications Project Team will determine how to share WhaleAlert and HappyWhale with the fleet to assess the number of whales in the area**
- Recognizing the RAMP Framework is intended to act as a first/initial indication of an increase in the risk of whale entanglements, the Working Group discussed the importance of having a diverse group of experts - including fishermen - involved in the subsequent stages following the RAMP Framework's output analysis. Under a medium or high output, a "hot shot" team would be mobilized to discuss and determine any next steps, including possible management measures. This process for involving diverse experts is further described in the RAMP program outline.
- Additional work to refine the scoring system, the parameters of each factor, etc. is required to ensure the RAMP Framework is as accurate as possible. It was agreed that the Working Group should be involved in defining all aspects of the framework, to their greatest ability, in partnership with the Working Group's science advisors. The Working Group also agreed identification of possible management measures that could be implemented by a hot shot team based on the outputs of the framework should be lead by the Working Group (see 'Potential Management Measures' section below).
- **Factor leads/data gatherers will develop draft scoring criteria for each factor to further inform what constitutes each score and to help ensure scoring is as objective as possible.**
- The group discussed how to approach entanglement data for informing the scoring of the framework. For example, should entanglements caused by non-Dungeness crab gear be considered? What about out-of-state entanglements?
 - There was general agreement that the framework should consider all entanglements that originated in California, or entanglements where the origin of the entanglement was unknown but observed in California. The framework should also consider the cumulative rate of all West Coast entanglements within a given year and across multiple years.
- Currently, information that is being collected to inform the whale concentration/distribution factor is focused on humpback whale data and related models.
 - The group generally agreed that the initial implementation of the RAMP framework should focus on humpback whales, due to the higher rate of entanglements in most recent years (although 2017-18 is an exception) and lower potential biological removal (PBR) level for humpback whale populations. Additionally, the Working Group is operating under the assumption that reducing the risk of entanglements to humpbacks will also work to reduce entanglement risk to other large whales.
 - Over time, the Working Group sees value in possibly expanding data gathering to include other whale species, including grey and blue whales.
 - Leatherback turtles were also brought forward as another species of concern, as highlighted in the letter of intent to sue. Some Working Group participants recommended leatherbacks be included in the Working Group's RAMP Framework. Other participants acknowledged that there are no leatherback experts currently on the Working Group nor has there been focused data collection or discussions on turtles over the two years the group has been active. Additionally,

- few sea turtle entanglements have been recorded making it difficult to understand and assess the risk of turtle entanglements in Dungeness crab fishing gear. Some Working Group participants suggested that reducing the risk of whale entanglements would also have positive effects for leatherback turtles.
- **CDFW and NMFS will discuss how/if to address leatherback sea turtles in the RAMP Framework beyond the potential benefits to reducing the risk of entanglements that may exist by addressing whales.**
 - The Working Group discussed the need to implement the framework (i.e., conduct the scoring exercise) at different times of the year, since certain data may only become available within a specific season/month. There was general agreement that scoring would be conducted at least three times throughout the fishing season: prior to the season (e.g., Fall), during the season (e.g., February/March), and following the season (e.g., Summer).
 - The group discussed the potential need to weight certain scores in an effort to prioritize some factors over others (e.g., a season delay into the spring months may be weighted higher than a concentration of whales in a given area during winter months). One potential option for addressing weighting that was suggested was to consider a cumulative score that would build over months. There was some concern that weighting, say, whale entanglements as a factor over other factors may disincentivize entanglement reporting by the fleet.
 - There was an acknowledgement that, as a first step, the framework would only consider state-managed fisheries.
 - The Working Group identified the need to continue discussing the scale at which the framework should be focused (i.e., statewide or regionally). **The RAMP Project Team will continue to explore this consideration for further Working Group discussion.**
 - Other philosophical questions must also be addressed to implement the program including: How are entanglements originating outside California considered?; Should all West Coast entanglements, including unknown or those not originating in the Dungeness crab fishery, be included in the scoring?; and How can all West Coast entanglements be considered without specifically penalizing the Dungeness crab fishery?
 - The group talked through the importance of introducing the RAMP Framework and overall program with the fleet in a stepped process, including putting the framework into practice on a voluntary basis during the 2017-18 fishing season. This would allow the fleet, Working Group, and CDFW and NMFS to test out the framework and continue to fine-tune it. The framework would likely require multiple years to adjust and refine as informed by on-the-ground experiences and fleet feedback.
 - **Continued discussion with the fleet through the fishing participants on the Working Group, as well as via the California Dungeness Crab Task Force to communicate the RAMP and framework will be important in advance of the 2017-18 fishing season.**
 - CDFW acknowledged that the State is receiving strong pressure from outside groups to establish regulations to address the issue of whale entanglements in Dungeness crab fishing gear. Looking ahead, there may be a need to give the Director more flexibility in his authority to manage and mitigate risks to whale entanglements.
 - **The RAMP Project Team will continue to develop the draft program to consider the Working Group's role at key stages of scoring and evaluation of related next steps, better define scoring parameters, and other address details that connect the RAMP program with the framework.**
 - **The framework will be further developed to best tested during the 2017-18 fishing season.**

Potential Management Measures

During the May 2017 meeting, the Working Group began brainstorming possible management considerations and options that could be put into practice under certain circumstances (i.e., when the RAMP Framework indicates a 'yellow' or medium potential risk for the coming season). The group continued building on these initial ideas during the July meeting.

- The Working Group is interested in developing a range of options, ideally connected to the indicator levels (green, yellow, red), for the hot shot team to use as guidance. Additionally, the Working Group would like to be involved in the end-of-season debrief/review with CDFW to reflect on any management measures that may have been implemented to help support fine-tuning the program and adjustments that may be needed for future seasons.
- Reducing the number of vertical lines was identified as the option that would have the greatest potential positive impact in reducing risk of entanglements. Gear modifications may offer management options in the future, however, additional research and exploration is required (and underway).
 - The Working Group discussed management measures within the framing that they would aim to be temporary, enforceable, and focus on the smallest area and timeframe possible. The program should employ a variety of communications tools to reach out to the fleet if voluntary or mandatory management measures are required including, but not limited to, creating a webpage with live status updates, Coast Guard transmissions, and other print and electronic means.
 - The Working Group generally agreed that any action should be accompanied by continued monitoring to be responsive to the whales and the fishery.
 - **The RAMP Project Team will continue to develop ideas for the full Working Group's consideration regarding guiding principles for implementing management measures, and how to measure effectiveness once measures are put into place.**
- There were discussions about tools that would need to be in place to effectively and efficiently communicate any voluntary or regulatory measures with the fleet. The 2017-18 pilot could be an appropriate time to test and/or establish communications channels. Additionally, the group identified that communications with CDFW Enforcement will be essential, particularly to help inform the rate of implementation of measures.
- The Working Group walked through a hindcast scenario to consider what possible management measures could have been put into place during the 2015-16 season. The exercise was conducted over a series of months, starting with prior to the season (traditional) openers, through to July 2016. Some of the ideas discussed and considered included mobilizing the hot shot team prior to November based on a number of factors (season delay, forage and whale distribution "abnormal"), increased communication with the fleet, and a regionally-focused limit to the number of traps at the start of the delayed season.
- **The RAMP Project Team will continue to consider management measures under certain circumstances and scenarios for full Working Group's consideration during the September 2017 meeting.**

Funding the RAMP

The Working Group discussed the need for additional funding to support the RAMP implementation and evaluation for the 2017-18 pilot and beyond. A Section 6 grant is a funding source that could be appropriate to support the RAMP comprehensively, including making connections to additional research identified by the Working Group as priority topics.

- There was general interest expressed by the Working Group to explore the opportunity for a Section 6 grant proposal.
- CDFW would like to see a human dimensions component be included in a Section 6 proposal. This would help CDFW gain a better understanding of the social and economic needs and potential impacts to fishermen, which could help inform the RAMP design and implementation (e.g., communications, managing fleet dynamics).
- CDFW expressed the need for additional administrative capacity to execute a Section 6 grant. Additional discussions with the Pacific States Marine Fisheries Commission (PSMFC) are needed to explore PSMFC's possible role to support CDFW in this effort.
- **Strategic Earth will work with CDFW, Karin Forney, and Geoff Shester to continue the discussion on developing a Section 6 grant proposal for submittal in 2017.**

Informing the RAMP Framework: Project Updates

The Working Group has identified a number of research and pilot projects to support and engage in to better understand the risk of whale entanglements and potentially inform the RAMP framework.

Enhanced Reporting

In an effort to better understand the dynamics of fishing effort and whale distribution, a number of enhanced reporting projects have been supported by the Working Group including vessel surveys, aerial surveys, and electronic reporting tools (e.g. solar loggers and eCatch).

- Working Group participants generally agreed that reliable data on fishing gear distribution and density would be a valuable input into the RAMP framework to better assess risk. A pilot will be initiated during the 2017-18 fishing season to test the eCatch and solar logger tools. Approximately 20 volunteers would be sought to test these tools. Updates were provided on the Project Team's progress toward implementing the pilot.
 - eCatch: has been modified from its original use in the groundfish fishery to better reflect the needs of the Dungeness crab fishery and will be finalized for deployment and testing prior to the season opener.
 - eCatch will provide a high level time series view across the entire fishing season, rather than individual events as recorded by the solar loggers. The eCatch tool could also be valuable in calibrating the solar logger data so it is more easily interpreted.
 - Solar loggers: Volunteers must be identified and solar loggers must be purchased to initiate the pilot. The Nature Conservancy (TNC) offered to help purchase solar loggers for those individuals who are unable to purchase the tool, but wish to volunteer for the pilot.
 - For both tools, data is owned by the individual utilizing the tool. TNC has agreements in place to allow them to utilize the data in an aggregated form, which will allow TNC to analyze and summarize the data to inform Working Group discussions. Similar agreements will need to be

established with Pelagic Data Systems to be able to utilize the solar logger data and a funding stream will need to be identified to support analysis of the solar logger data.

- **RAMP Project Team will consider options for funding the data analysis associated with the solar loggers.**
- The Working Group highlighted that there may also be opportunities to utilize existing CDFW reporting tools to collect data on fishing distribution.
 - **CDFW will check in with the e-tickets staff to share the Working Group's interest and explore the possibility of adding new parameters/fields to new electronic tool that can inform the RAMP framework.**
- Updates were not provided on aerial and vessel surveys, but may be briefly revisited for the September 2017 meeting.
 - **NMFS and Jason Brand will discuss the US Coast Guard's role in supporting aerial surveys.**

Gear Modifications

There were no new updates on the gear modification projects following the May 2017 Working Group meeting. However, there was an acknowledgement that following additional research and exploration gear modifications may be a useful management options to feed into the RAMP framework.

Forage Species Distribution: Prey and Whale Distribution Data

Updates on the forage species and whale project were integrated into the discussion of the RAMP framework.

Communications

The Working Group discussed how best to share the details of the RAMP program and framework more broadly with the fleet.

- To communicate the RAMP effectively, the Working Group needs to be able to convey why the program is needed, why fishermen should participate, and what are the tangible benefits to the fishermen to participate in the pilot program.
 - **A need was also identified for the Communications Project Team to work with the E-Reporting Project Team to help solicit volunteers to conduct the pilot project during the 2017-18 pilot.**
- Dungeness Crab fishermen (commercial and recreational) and the Legislature are the highest priority audiences to reach out to. Monterey Bay National Marine Sanctuary (MBNMS) was also identified as a priority audience to receive future Working Group products and reports.
- The Communications Team developed a key messaging document to provide background on the Working Group for the Legislature and other decision-makers. **The key messaging document was further refined during the meeting and sent to Sonke to share with Director Bonham by July 21. The document will also be updated to be relevant to the 2017-18 fishing season and posted on the Working Group's webpage.**
- Noah Oppenheim, Pacific Coast Federation of Fishermen's Association (PCFFA), explained that PCFFA was pursuing funding through a National Fish and Wildlife (NFWF) grant that could complement the Working Group's existing communications efforts. If awarded funding, PCFFA could utilize their network to distribute communications materials on behalf of the Working Group allowing the Working Group to

reach a broader audience of individuals who are impacted by the Working Group's efforts. PCFFA is also planning port visits to discuss their efforts and could also loop in information from the Working Group.

- PCFFA requested an endorsement by the Working Group for their efforts. The Working Group provided a verbal confirmation of support during the meeting, but also requested some formal agreement to ensure Working Group ideas were appropriately communicated. **The Working Group will develop and share a memorandum of understanding (MOU) with PCFFA if the NFWF proposal is funded.**

Informing the RAMP Framework: Recommendations for Standard Gear Marking

The largest category of whale entanglements is associated with unknown gear types and fisheries. Working Group participants highlighted the value in better understanding the fisheries involved in the unknown category to better address the broader issue of whale entanglements in California and along the West Coast.

- Working Group expressed support for gear marking requirements throughout all commercial and recreational West Coast fixed gear fisheries. Marking all fixed fishing gear would provide insights on the origin of an entanglement, gear set-up that caused the entanglement, inform prioritization and triage related to the RAMP Framework, etc.
- Requiring all fishing gear to be marked is complicated since it involves both state and federal regulations. Such an effort is complex and would require cooperation among the three states, CDFW, the Fish and Game Commission (FGC), NMFS, Pacific Fisheries Management Council (PFMC), and others, it would be a positive step to reduce the questions surrounding the source of whale entanglements.
- The Working Group highlighted the importance of having conversations with other fisheries to educate them on the issue and discuss opportunities to support one another in addressing the issue of whale entanglements. As a first step, **the Working Group will share the Best Practices Guides to other fixed gear fisheries in hopes they will use it as a model in their own fisheries.**

Recommendation to CDFW/Legislature and PFMC: *The California Dungeness Crab Fishing Gear Working Group supports requiring all fishing gear types, involved with all fixed-gear fisheries, to be marked so they are fishery specific (and specific to the individual fisherman to help inform origin of the gear). The Working Group recommends that the California Legislature grants authority to the state/CDFW to take action on this recommendation.*

- *Consideration: NMFS, CDFW, and Coast Guard can advise what this what this gear marking should look like*
- *Consideration: How other federal fisheries are marked- Need to share this recommendation with PFMC*
- *Consideration: All fishing gear including recreational fishing*
- *Consideration: Also includes Dungeness crab outside of CA (OR/WA)*
- *Goal: Address data gaps reflected in the high percentage of whale entanglements recorded as "unknown" by creating a way to improve identification of gear associated with whale entanglements.*

- **This recommendation will be shared by Sonke Mastrup with Director Bonham on July 21 and will be included in the Working Group's 2017 memo to the Legislature, CDFW, and FGC.**

Whales Update

John Calambokidis, Cascadia Research Group and Working Group Science Advisor, provided the Working Group with a presentation on the status of West Coast whales. Key highlights from his presentation include:

- The predictability of humpback whales returning to feeding grounds can help inform the RAMP Framework in terms of where, geographically, humpbacks are expected to return each year. As humpback whale populations increase, it is likely to see these whales increase the amount of time spent on feeding grounds and/or an expansion of humpbacks into historical areas that they had not occupied in recent decades.
- To develop a sufficient management plan, it is important that data from a variety of sources be incorporated. Pulling data from multiple datasets can be challenging, but there is value in ensuring the full picture is being presented.
- While Humpbacks are able to switch prey types during periods of decreases in food sources, blue whales are exclusively krill feeders and must adjust with the source location. Blue whales are not site specific and they migrate based on the location of krill populations making it harder to predict migration patterns.
- It is also important to note that entanglement data for blue whales is only from the last two years, making it difficult to determine how much of the changes observed are from factors over time versus increased reporting of incidents, and what is driving regional bias.

Additional Next Steps

In addition to any next steps described above:

- **Strategic Earth will continue to maintain open lines of communication with agency staff in Oregon and Washington who are helping to coordinate efforts to convene similar Working Groups to address the issue of whale entanglements in Dungeness crab fishing gear.**
- **A summary of key themes will be developed and circulated to the Working Group for review, prior to making it publicly available on the OPC website.**
- **Strategic Earth will follow up with Tom Weseloh, Joint Committee on Fisheries and Aquaculture, to discuss informational needs to inform potential Legislation.**
- **Strategic Earth will share the following documents with the Working Group:**
 - **RAMP overview document**
 - **Language on recommendation for gear marking**
 - **Draft “research priorities” document**
 - **A list of philosophical questions that need to be addressed to refine the framework**

Meeting Participants

Jim Anderson, *Commercial Fishing, DCTF Member*
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