California Whale Entanglement Discussion
Dungeness Crab Fishing Gear Working Group Meeting
Final Recommendations and Summary of Key Themes, October 8, 2015

On October 8, 2015, the Dungeness Crab Fishing Gear Working Group met for a second time to continue developing short-term strategies, explore long-term options, and finalize recommendations to reduce the risk of whale entanglements in California Dungeness crab fishing gear. This marked the final meeting identified in the Working Group's charge, which aimed to build off discussions and recommendations developed during its first meeting on September 21, 2015.

This document captures the Working Group's final recommendations (Section I), which focus primarily on short-term strategies that can be implemented during the upcoming 2015-16 fishing season (Note: recommendations are below in **blue**). The summary also highlights additional details of recommendations and other topics discussed during the meeting (Section II) and includes key next steps for Working Group participants to begin putting recommendations into action (Section III). Answers to clarifying questions (Section IV) and background details (Section V) are also provided.

In addition to informing the implementation of key next steps, the September 21 and October 8 summaries will also support discussions with agencies and other groups engaged in this topic, including the California Department of Fish and Wildlife (CDFW), National Marine Fisheries Service (NMFS), Ocean Protection Council (OPC), and California Dungeness Crab Task Force (DCTF). As appropriate, these summaries and associated recommendations will be shared with the Fish and Game Commission and California State Legislature. Additionally, they will act as a source of information for other parties interested in this topic.

The Working Group is comprised of commercial and recreational fishermen, representatives from environmental organizations, and representatives from federal and state agencies, and was convened by CDFW with support from OPC, NMFS, and Strategic Earth Consulting. A list of the Working Group participants is available at the end of this document.

Note: For the purposes of the Working Group's discussion, "short-term" refers to strategies that are primarily voluntary, intended to be implemented during the 2015-16 season or shortly thereafter, and will be made available for the DCTF's review during its October 2015 meeting. "Long-term" refers to strategies, both voluntary and those that would require regulatory action, that would be implemented according to California Legislative and/or Fish and Game Commission regulatory timelines (i.e., 1-3 years).

I. Working Group Final Recommendations

The Working Group arrived at final recommendations through full consensus agreement during the September 21 and October 8, 2015 meetings. Additional text reflects considerations, caveats, and key discussion points from conversations on September 21 and October 8.

Support for Long-Term Options

The Working Group is in support of thriving whale populations along the West Coast, and also supports a thriving and profitable commercial and recreational Dungeness crab fishery. With this in mind, the Working Group sees value in developing long-term strategies (both voluntary and regulatory) to reduce the risk of whale entanglements in Dungeness crab fishing gear. Long-term goals identified by the Working Group include:

- **Reduce the risk of whale entanglements in recreational and commercial Dungeness crab fishing gear;**
- **Improve outcomes for entangled whales; and**
- **Utilize collaborative approaches for reducing the risk of whale entanglements by establishing multi-interest partnerships.**

However, before considering and/or recommending long-term strategies, the Working Group recognizes that it needs to gain a better understanding of the issue. The Working Group therefore recommends implementation of several strategies designed to provide a more comprehensive understanding of currently available ecological and socioeconomic information, as well as the collection of additional information to fill data gaps.

To better understand the issue of whale entanglements and inform long-term options, the Working Group focused their recommendations on short-term strategies to be tested/implemented during the 2015-16 fishing season. Key steps for fulfilling the recommendations, including designing scientific methodologies and protocols for testing, will be developed following October 8 by a series of "Implementation Teams" designated by the Working Group during the meeting (see page 7 for details).

Recommended Short-Term Strategies

1. TRAIN FISHERMEN AS FIRST RESPONDERS TO WHALE ENTANGLEMENTS

The Working Group recommends that over the coming months (considering availability constraints during the Dungeness crab season), commercial fishermen in 8-9 major ports and harbors in California work with the NMFS Entanglement Response Team join the network of first responders to whale entanglements. The Working Group also recommends that over time, NMFS and commercial fishermen explore ways to integrate fishermen's knowledge into the tools and methods used to disentangle whales.

- This will help build the capacity of the response network, increase the level of information and data available to NMFS, CDFW, and the fishing industry, better classify observed entanglements as novel or re-sights, increase the quality of the data available, and increase the opportunity to respond to and disentangle entangled whales.
- The primary objective of this recommendation is to increase the number of fishermen who can serve as first responders to whale entanglements (Level 1), with support available for those who want to pursue higher levels of responder training.
- Funding for a number of initial trainings has been secured by NMFS, and fishermen in Morro Bay, Half Moon Bay, and Bodega Bay are scheduled for Level 1 orientation on October 20, 2015.

2. ESTABLISH A STATE-WIDE LOST FISHING GEAR RECOVERY PROGRAM

The Dungeness crab industry has participated in a voluntary California lost fishing gear recovery program since 2014. The Working Group supports establishment of a statewide, industry-led lost gear recovery program.

- The Working Group acknowledged the DCTF is engaged in an effort to adopt a permanent statewide version of the current gear recovery program, and supports these efforts by the DCTF.

3. IMPROVE DATA COLLECTION AND ENHANCE REPORTING

The Working Group understands that managers require additional information to inform and address the issue of whale entanglements, and supports efforts being made by NMFS to gain a more comprehensive understanding of the seasonal and temporal distribution of whales (especially humpback whales, where information is less readily available). To gain a stronger understanding of the drivers of entanglements, the Working Group encourages:

- Increased data collection between current monitoring cycles;
- Focus on gathering information that can improve the co-occurrence model of whale distribution and fishing effort;
- Increased understanding of drivers to improve forecast modeling;
- Attain/include data collected during winter and spring in analyses; and
- Attain/include information from non-governmental sources.

With this in mind, the Working Group recommends implementing collaborative data collection and testing enhanced reporting efforts in partnership with agencies, fishermen, and members of the environmental community. The Working Group recommends the following tools be tested during the 2015-16 season to see if they will yield information/data that can inform the issue of whale entanglements:

- **Data loggers and logbooks:** To be developed prior to and/or during the season; enhanced reporting to take place during the season. Potential to design a targeted pilot logbook using The Nature Conservancy's e-Catch platform.
- **VMS (Vessel Monitoring System), AIS (Automatic Identification System), and data plotters:** Enhanced reporting to take place following the close of the commercial fishing season.
- **Aerial surveys:** Efforts will be made to evaluate the potential for information gathered via CDFW, Coast Guard, and nonprofit organizations (e.g., Lighthawk).

The Working Group recommends that data collection begin immediately (or as soon as possible), be conducted opportunistically, and consider fishing schedules. Data collection efforts should aim to be as inclusive as possible (i.e., ensure participants are diverse in their geographic range, vessel size, etc.). Testing multiple tools concurrently may reduce costs and increase efficiency.

The Working Group identified a number of research questions to help ensure tests gather information that is useful to managers who are addressing the issue of whale entanglements; as research methods and protocols are developed (see "Implementation Teams" below), it will be important to consider which tool(s) are appropriate to answer which question(s). Research questions identified as priorities include, but are not limited to:

- What is the set location/geographic area of fishing gear?
- At what depth is each trap set?
- What is the concentration of gear in a given area?

Other research/data collection considerations are:

- Temporal factors (i.e., how often data needs be collected and reported)
- Scale (i.e., number and geographic range of participants needed to assess the research tool)

4. DESIGN STRATEGIES TO REDUCE AND/OR ADDRESS THE RISK OF WHALE ENTANGLEMENTS: TESTING GEAR MODIFICATIONS

The Working Group recognizes the value of experimenting with gear modifications to gain a better understanding of what is feasible and safe for commercial and recreational Dungeness crab operations, and which gear modifications can effectively reduce the risk of whale entanglements.

With this in mind, the Working Group recommends testing two concepts—line profiles and operational tension—during the 2015-16 season. These pilot projects will be operationally focused and conducted in partnership with agencies, fishermen, and members of the environmental community.

- **Line Profiles**: This pilot project will explore the vertical profile of Dungeness crab gear when using sinking versus weighted lines. To help increase efficiency, fishermen using both types of line will be invited to participate. Temporal and geographic scale and other factors will be considered. Project outcomes could be used to assess the efficacy of weighted lines versus floating lines and other gear modifications.
- **Operational Tension**: This pilot project will explore the strain that commercial and recreational fishing line undergoes during normal fishing operations. Project outcomes could be used to assess the efficacy of breakaways, line cutters, or other gear modifications.

The Working Group recommends the above pilot projects begin immediately (or as soon as possible), are conducted opportunistically, and consider fishing schedules. Data collection efforts should aim to be as inclusive as possible (i.e., ensure participants are diverse in their geographic range, vessel size, etc.). Additionally, testing these projects concurrently may reduce costs and increase efficiency.

5. DEVELOP A BEST PRACTICES GUIDE

The Working Group recommends development of a "best practices" guide to inform and educate commercial and recreational Dungeness crab fishermen on ways to reduce the risk of whale entanglements and avoid navigational hazards (e.g., reduce excess/slack in fishing lines, improve use of leaded lines and/or use of sinking rope, create standards for weighting recreational traps, prevent strings of traps to be dropped on one another, etc.).

II. Additional Considerations and Discussion Topics

The following includes additional considerations for Working Group recommendations, as well as discussion topics raised by the Working Group that did not lead to a recommendation. This information is intended to provide additional context to the Working Group's discussions, and can be referenced during future meetings of the Working Group and/or in other forums.

Improve Data Collection and Enhance Reporting

- To the extent practicable, the Working Group discussed moving away from proxies for fishing effort (i.e. landings data) toward actual information (e.g. number of vertical lines in the water). This will greatly inform enhanced assessments of whale entanglement risk.
- Participants highlighted that using VMS to enhance data reporting may pose technical (i.e., not every boat has one, VMS is expensive to obtain) and/or legal (i.e., may not be able to mine VMS data for the purpose of reducing the risk of whale entanglements) challenges. Additionally, while it is possible to extrapolate from VMS where and when fishing activity is occurring, VMS does not capture information regarding trap density or location, which agency participants highlighted as important to improving quality of data sets.

  - VMS/AIS data could be mined after the end of the fishing season, while data loggers or any type of "logbook" would benefit from planning and implementation prior to the onset of the season.
  - A fishing participant stated it would be helpful to know how many commercial Dungeness crab fishermen have VMS and how many VMS operated boats would be needed for an effective test. This is something the implementation team will explore further.

- The Working Group discussed geographic area and/or seasonal management options.
  - There was general agreement among participants that *any future consideration of spatial/temporal closures would benefit from enhanced data collection to inform an improved co-occurrence model*. This would help improve understanding of where and when concentrated fishing effort is occurring, and where and when whales are mostly likely to encounter that gear.
  - One potential mechanism to implement on a voluntary basis would be to communicate sightings of large groups of whales to the fleet and allow fishermen to make informed choices about where to set their gear.
  - Fishing participants expressed concern that moving gear out of a particular area to reduce trap density could re-create the same issue somewhere else. Prior to closures being considered, it would be important to determine how defined whale migration paths are and how far gear would need to be moved to reduce rather than compound the risk of entanglements.
  - Environmental organization representatives commented that area and seasonal closures have effectively reduced whale entanglements when implemented in other areas (e.g. reduction of right whale entanglements on the East Coast).

Testing of Gear Modifications

- The Working Group suggested CDFW examine the feasibility of mandating gear marking (including lines) across all fixed-gear fisheries operating in state waters.
  - One of the main data gaps the Working Group identified is the large number of confirmed entanglements that are not attributed to gear from a specific fishery. This hinders understanding of the extent to which individual fisheries contribute (or don't contribute) to whale entanglements in California, as well as the location where entanglements occur.
  - Through continued discussion, the Working Group concluded that addressing this data gap requires a holistic approach across all California fixed-gear fisheries, rather than focusing on enhanced gear marking in the Dungeness crab fishery alone. Periodic Fisheries Management Plan updates conducted by CDFW were identified as one potential avenue for implementation.
  - As gear marking is developed, important considerations include:
    - Which part(s) of the gear should be marked?
    - How long would the gear marking remain detectable by on-site observers and in after-the-fact analysis of photographs?

- A number of potential mechanisms for conducting aerial surveys were identified: volunteer pilots from Lighthawk, surveys flown by CDFW Law Enforcement Division, and fly-overs as part of routine Coast Guard operations.
    - Lighthawk recruits volunteer pilots to assist with conservation efforts, and has expressed interest in exploring how they could assist with informing expanded co-occurrence models. Regular flights (more than once or twice per season) would likely require outside funding support. In order to extract maximal value from the aerial surveys, pilots would need to be joined by fishermen or agency technical staff to help interpret what is being seen on the water.
    - Aerial surveys conducted by CDFW Enforcement or the Coast Guard would require advance coordination and could be subject to scheduling changes. Both agencies have access to historical data sets that could help inform improved data collection.
    - The Working Group highlighted that after aerial data is collected, technical capacity and expertise would be required to process the visual data and summarize in an accessible form.
- The Working Group revisited the "two traps to one line" concept and ultimately decided substantial safety concerns preclude conducting a pilot project.

Best Practices Guide

- The Working Group has identified several potential options for distribution, including port meetings, fishing organizations, outreach meetings hosted by CDFW, informational announcements by the US Coast Guard, and gear shops (see September 21 key themes summary for more details). Additional outreach through environmental organization mailing lists and online platforms was also mentioned.
    - There was general agreement that the guide should be available in both electronic and print format.
    - Working Group participants committed to sharing a draft guide with CDFW Law Enforcement Division for review prior to publication and distribution.
    - Additional details to address include:
        - What practices should be included in the guide? Initial ideas include reducing excess/slack in fishing lines, improving use of leaded lines and/or use of sinking rope, creating standards for weighting recreational traps, and preventing strings of traps to be dropped on one another.
        - Strategic communication considerations were discussed, including: who are the target audiences, how do target audiences receive information, and what do they care about? Working Group participants expressed interest in using neutral language, and avoiding "lecturing" in favor of appealing to the enlightened self-interest of the fishing community.
        - Are there external organizations not represented on the Working Group who could provide useful guidance and support, such as California Sea Grant?
        - The Working Group recognizes there is value in inviting the broader fishing community to contribute their suggestions to the development and distribution of the guide.

Outreach And Communications

- The Working Group expressed interest in developing a communications plan to support unified messaging.
    - There was discussion about the value of releasing a press release around the opening of the recreational fishing season in District 10 (November 7, 2015), and how the announcement of the Working Group's recommendations would be stronger if the "Best Practices" guide was available at the same time.
        - Additionally, there could be media opportunities around the October 20 disentanglement training in Half Moon Bay.
        - CDFW offered to write and distribute a press release on November 7 (back up option on November 15) and NMFS offered to take the lead in drafting the "Best Practices" guide within this timeframe.
    - Additionally, two Working Group participants agreed to draft an op-ed that would be circulated to the full group in advance of submitting it to a high-profile publication (e.g., LA Times, SF Chronicle).
    - The Working Group identified the need to continue discussing communications details as a group, via email as well as during a potential future conference call in early 2016.

III. Next Steps

During the October 8, 2015 meeting, the Working Group recognized that many of its recommendations would benefit from continued development and collaboration, at a minimum through the end of the 2015-2016 fishing season. Two avenues for this continued work were identified, to be pursued simultaneously:

1. Development of "Implementation Teams" to follow-up on recommendations above. A leader for each of these teams has been identified and will be responsible for coordinating production of a detailed proposal, which will then be shared with the broader Working Group for feedback. A number of these recommendations are targeted towards implementation before or at the start of the 2015-16 Dungeness crab season in mid-November; pilot projects and some enhanced reporting options will occur after January 2016. The composition of the Implementation Teams is as follows:
    - **Entanglement Response:** Tom Dempsey, NMFS (lead)
    - **Enhanced Reporting (Logbooks/e-Catch):** Jim Anderson, Tom Dempsey (lead)
    - **Enhanced Reporting (VMS/AIS/Data Plotters):** Gerry Hemmingson, Dan Kammerer, Tom Mattusch, Kristen Monsell, Brian Nolte, Geoff Shester (lead), Andrea Treece
    - **Enhanced Reporting (Aerial Surveys):** Jim Anderson (lead), Shannon Anthony, Andy Robertson, Lauren Saez
    - **Gear Modifications:** Jim Anderson, Dan Lawson (lead), Christy Juhasz, Bob Maharry, Kristen Monsell, Brian Nolte, Geoff Shester
    - **Best Practices Guide**: Tom Dempsey, Doug Laughlin, Dan Lawson (lead), Gerry Hemmingson, Christy Juhasz, John Mellor, Lauren Saez
    - **Communications Strategy:** Bob Maharry, Geoff Shester

2. Overall coordination and support of the Working Group through the 2015-16 fishing season, and potentially beyond. The Working Group discussed the value of maintaining this group in its current form and composition as recommendations move forward and that the group reconvenes to report on the results of strategy testing and pilot studies.
   - While additional discussion is needed, the initial suggestion of the Working Group is for the Ocean Protection Council and Strategic Earth to continue their role in convening and facilitating the Working Group through additional in-person meetings, conference calls, and/or email correspondence.
   - The Working Group may also consider re-convening during the upcoming season should a large number of confirmed, severe entanglements occur.

Additional next steps include development of a number of documents:

- A summary of the Working Group's final recommendations, which has been reviewed by the Working Group prior to being circulated to the DCTF and made publicly available on OPC's website.
- NMFS will continue to develop and refine a collection of strategies to reduce the risk of whale entanglements on the West Coast. This document will be designed as a living document, to be periodically updated as strategies are tested and new ideas emerge.
- CDFW, NMFS, OPC, and Strategic Earth plan to develop reflections memo exploring the novel approach taken with this Working Group from a process standpoint. This document would be used to inform future efforts working with other fixed-gear fisheries, as well as the potential re-convening of this Working Group at a future date.

IV. Key Questions

Meeting participants asked a number of questions throughout the day's discussion. Key questions and their associated responses are captured below (presented in the order asked during the meeting). Additional answers to key questions are captured in the August 20, 2015 and September 21, 2015 meeting summaries.

Q: *What data do management agencies need to better understand whale entanglements?*

A: NMFS wants annual information to compare patterns of known entanglements to patterns of fishing activity. By comparing changes in fishing patterns to changes in entanglement occurrence, in combination with knowledge of whales, NMFS can better predict entanglement risk. Knowing where gear is set (with GPS coordinates if possible), how deep gear is set, and how much gear is set would be extremely helpful.

Q: *How has logbook data from Oregon and Washington been used by NMFS thus far?*

A: Oregon and Washington have previously provided summarized information from their logbooks, rather than the raw information. The ability to discern fishing patterns from summarized logbook information is still rough and it doesn't allow direct assessment of how shifting fishing effort affects entanglement occurrence, but it still provides finer scale information regarding where the fishery operates than NMFS had previously.

Q: *What information would improving the co-occurrence model provide?*

A: Improving the model builds a greater understanding of where and how much overlap happens between Dungeness crab fishing gear and whale distributions. If there is a lot of overlap and we are able to identify where and when that overlap occurs, that informs our next-steps in reducing entanglement risk. The model could also show that overlap is not the main driver of entanglement (i.e. entanglements are not driven by trap density), which would prompt management agencies to focus resources on other options to reduce entanglement risk.

V. Background and Purpose

On August 20, 2015, CDFW, NMFS and OPC hosted a meeting to share information and explore ideas for reducing the risk of whale entanglements in California Dungeness crab fishing gear. This discussion was convened to be responsive to the notable increase in the number of whales entangled in fixed-gear fisheries along the West Coast over the last several years. Given that the largest portion of the identifiable gear involved in these entanglements is from the Dungeness crab fishery, the primary focus of the August 20 discussion was share data collection and information amongst interested parties in an effort to explore ways to reduce the risk of entanglements with Dungeness crab fishing gear. The meeting agenda, presentation slides, and key themes summary are available on the OPC website: (http://www.opc.ca.gov/2015/08/public-meeting-to-discuss-whale-entanglements-off-california/).

One outcome of the August 20 discussion was the need to convene an informal Working Group to further discuss and develop short-term strategies and begin exploring long-term options for reducing the risk of whale entanglements in California Dungeness crab fishing gear. The Working Group met twice prior to the start of the 2015-16 fishing season, and included CDFW and NMFS staff, fishermen, ENGOs, and others, as appropriate. All recommendations developed by the Working Group will be made available to CDFW, NMFS, the DCTF, and other interested parties.

Working Group Participants

Jim Anderson, *Commercial Fishing, DCTF Member*
Lt. Shannon Anthony, *Coast Guard*
John Collins, *Commercial Fishing*
Tom Dempsey, *The Nature Conservancy*
Gerry Hemmingson, *Commercial Fishing, DCTF Member*
Christy Juhasz*, CDFW Marine Region*
Dan Kammerer, *Commercial Fishing*
Doug Laughlin, *Coastside Fishing Club*
Dan Lawson, *NMFS*
Bob Maharry, *Commercial Fishing*
Tom, Mattusch *CPFV Owner/Operator*
John Mellor, *Commercial Fishing*
Kristen Monsell, *Center for Biological Diversity*
Brian Nolte, *Commercial Fishing*
Keith Olson, *Commercial Fishing – Absent on October 8*
Andy Roberts, *CDFW Enforcement*
Lauren Saez, *NMFS*
Geoff Shester, *Oceana*
Andrea Treece, *EarthJustice*

Additional Attendees

Tom Barnes, *CDFW Marine Region*
Peter Kalvass, *CDFW Marine Region*
Craig Shuman, *CDFW Marine Region*
Mary Loum, *CDFW*
Valerie Termini, *OPC*
Morgan Ivens-Duran, *OPC*

Facilitation Team

Kelly Sayce, *Strategic Earth Consulting*
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