



Reducing the Risk of Whale Entanglements in Oregon Crab Gear: Frequently Asked Questions

Whale distribution, abundance, and surveys

1. Which humpback whale populations (or distinct population segments) are here off Oregon, and how do we know that?

Take-home: Humpback whales feeding off Oregon are from the Mexico (threatened) and Central America (endangered) DPSs.

Whale populations in the United States are protected, assessed, and managed by the federal government under the Marine Mammal Protection Action (MMPA) for all species (or stocks), and additionally under the Endangered Species Act (ESA) for threatened and endangered populations (or distinct population segments; DPSs).

In 2016, the globally endangered ESA-listing status for the humpback whale (which was in place since the 1970s) was revised to include 14 DPSs. DPSs are considered discrete from other populations of the species and significant in relation to the entire species (Bettridge, 2015). Humpback whale DPSs are geographically-designated based on winter breeding areas with at least three occurring off the coast of the Tri-state area, including:

- The **Mexico DPS** which breeds along the Pacific coast from Mexico to the Revillagigedo Islands, transits the Baja California Peninsula, and feeds from California to the Aleutian Islands;
- The **Central America DPS** which breeds along the Pacific coast of Central America and feeds off the West Coast of the United States and southern British Columbia; and
- The **Hawaii DPS** which breeds in the main Hawaiian Islands and feeds in most of the known feeding grounds in the North Pacific, particularly Southeast Alaska and northern British Columbia.

Of these, the Central America DPS is listed as endangered, the Mexico DPS is listed as threatened, and the Hawaii DPS is no longer listed under the ESA.

The relationship between ESA DPSs and MMPA stocks is complex. For MMPA purposes, NMFS defines humpback whales that feed off the U.S. West Coast as one California/Oregon/Washington stock ("CA/OR/WA stock") which primarily includes whales from the Central America DPS (endangered) and the Mexico DPS (threatened), with a small number of whales from the Hawaii DPS (non-listed). Due to the high proportion of whales originating from ESA-listed DPSs, the CA/OR/WA stock is currently considered "depleted" under the MMPA.

The CA/OR/WA stock can further be divided into two feeding groups: the California/Oregon ("CA/OR") and Washington-southern British Columbia feeding groups. These feeding groups are recognized based on photo identification and genetics (Calambokidis *et al.*, 2017). The

CA/OR/WA stock is estimated to include around 2,900 animals (and a minimum of 2,784 whales), of which ~85% (or ~2,374 animals) form the CA/OR feeding group (NMFS, 2018).

The CA/OR feeding group is comprised of a mixture of the Mexico DPS (threatened) and the Central America DPS (endangered), with the majority (~90%) attributed to the Mexico DPS. Though the Central America DPS makes up only ~10% of the total CA/OR feeding group, it represents virtually all (~91%) of the whales in the Central America DPS (Wade, 2016).

2. Aren't the whale populations increasing, and could that explain why we're seeing more entanglements?

Take-home: While changing whale populations may be contributing to interactions with crab gear, it does not likely explain the entire observed increase in entanglements.

There is significant uncertainty about actual population sizes, but the most recent abundance estimates for the Central America DPS, Mexico DPS, and Hawaii DPS are 783, 2,806, and 11,571 whales, respectively (Wade, 2017). Several studies have utilized different methods to assess the possibility of mixing between populations. Acoustic monitoring studies have suggested that there is ongoing, but annually variable, mixing of North Pacific humpback whale populations (Darling *et al.*, 2019). However, genetic and photo identification data indicate significant genetic differences among different breeding and feeding areas in the North Pacific (NMFS, 2018).

From 1991 – 2008, it was estimated that the CA/OR feeding group was growing at a rate of ~8% per year. However, more recent estimates through 2014 indicate a leveling-off of the CA/OR/WA stock size (Calambokidis *et al.*, 2017). The CA/OR feeding group is comprised of a mixture of the Mexico DPS and the Central America DPS. Only a small proportion of these whales are estimated to be from the Central America DPS, so growth trends for the Central America DPS are considered unknown (Bettridge, 2015).

The recent increase in whale entanglements is believed to be the result of several complex factors including changes in whale abundance and distribution, shifting prey patterns or availability, changes in environmental conditions, shifting fishing effort and other human activities, and increased public reporting (NMFS, 2019).

3. When will threatened (Mexico) and endangered (Central America) populations of humpback whales be recovered? Can we get rid of whale entanglement mitigation management measures if they are recovered?

Take-home: ODFW aims to adopt flexible management measures that can be adapted as new information becomes available, so that efforts will effectively reduce the risk of entanglements based on the best available information.

An endangered species is one which is in danger of extinction throughout all or a significant portion of its range, while a threatened species is one which is likely to become an endangered species within the foreseeable future (16 U.S.C. § 1532). For a species to be delisted or downlisted (from endangered to threatened), it must be determined that the threats to the species have been eliminated or controlled based on several factors (e.g., population size and trends, stability of habitat quality and quantity). Recovery plans are developed for endangered and threatened species which outline current threats, methods for controlling those threats through beneficial activities, and benchmarks for downlisting or delisting.

A recovery plan for the humpback whale was published in 1991, prior to the species being divided into DPSs in 2016. Recovery plans have not yet been developed for the listed DPSs and it is not known at this time the timeframe in which one will be developed. The National Marine Fisheries Service (NMFS) prioritizes species for recovery plan preparation and implementation based on the species' demographic risk and recovery potential. As of 2019, the recovery priority number for the Central America DPS is 2C and the Mexico DPS is 4C. See the [Recovery Priority Guidelines \(April 30, 2019; 84 FR 18243\)](#) for an explanation of the recovery priority numbers (NMFS, 2019b).

A Conservation Plan (CP; also called a Habitat Conservation Plan or HCP) is currently being developed for the Oregon commercial Dungeness crab fishery as part of the Incidental Take Permit (ITP) process required under Section 10 of the ESA. The CP will include triggers and opportunities for reevaluation of any whale entanglement mitigation management measure put into place to reduce the risk of whale entanglements in Dungeness crab fixed gear.

4. Is there a certain depth range or season where whales are more abundant off Oregon that could be used to design management measures?

Take-home: ODFW staff are recommending using bathymetry and a gear reduction percentage in combination, for our primary risk reduction measure starting in 2020. More precise data on whale distribution is being collected through a collaborative research project to improve our knowledge of whale presence and absence off Oregon throughout the year.

Management measures that minimize the spatial and temporal co-occurrence of whales and fishing gear represent a potential mitigation strategy for reducing whale entanglements. Currently, the Oregon Department of Fish and Wildlife (ODFW) collects data on the distribution of fishing effort through crab fishery logbooks, but complimentary data on whale distributions off Oregon are lacking.

In 2019, a collaborative research project was initiated between ODFW, Oregon State University, Cascadia Research Collective, and the U.S. Coast Guard to collect whale distribution data in Oregon waters. The three-year project is jointly funded by the Oregon Dungeness Crab Commission (ODCC) and through Section 6 grants under the ESA. Whale

presence and absence data is being collected from monthly aerial surveys to inform predictive distribution models describing species distributions relative to environmental conditions. Outreach efforts guiding opportunistic citizen science data collection will contribute to model validation. Additionally, vessel-based photo-id and tissue sampling will provide information on whale population structures.

As of September 2019, these aerial surveys have observed humpback whales out to 1000 m (~550 fathoms) with the majority observed between 100 and 200 m (~55-110 fathoms). Humpback whales were the most commonly observed whale species. These standardized aerial surveys will fill a critical information gap on whale presence and absence off Oregon throughout the year.

Following discussions with industry and preliminary data from the collaborative study, ODFW staff are moving forward with a recommendation for a gear reduction combined with a depth restriction as our primary risk reduction measure to be implemented during 2020. The depth restriction is intended to move gear out of the way of humpback whales during the time of year when they are typically observed off Oregon. This will be combined with a pot reduction to ensure that gear is not crowded in shallower water creating a potential issue for other whale species. A late-season thirty fathom depth restriction is also in line with the [NMFS proposed critical habitat designation](#) for humpback whales outside 50 meters (27.3fa) off Oregon.

Whale entanglements, assessment, and ITPs

5. How many whales have been entangled in active vs. derelict fishing gear?

Take-home: Most of Oregon's confirmed whale entanglements have been interactions with actively fished gear.

Whale entanglements are collected, verified, documented, and responded to by NOAA Fisheries and originate from a variety of sources including boaters, fishermen, law enforcement, state and federal agency representatives, and other private citizens. Due to the opportunistic nature of entanglement reporting, the location of observation or reporting does not necessarily reflect when or where the entanglement occurred.

Whales may become entangled in gear that is actively fishing or that is derelict. Due to the unknown difference between the time of observation and the earlier time of entanglement, it is difficult to determine whether the entangling gear was being actively fished or was derelict. Additionally, whales can travel great distances, possibly remaining entangled in gear for weeks, months, or even years (NMFS, 2019a).

Of the six humpback whale entanglements confirmed in Oregon Dungeness crab gear, one is more strongly believed to have been an entanglement with derelict crab gear. The whale was observed in October 2015, trailing gear with ODFW tags from the 2011-12 and 2012-13

commercial seasons. Based on the animal's fresh injuries, it was believed to be a relatively recent entanglement, and was classified as an entanglement with derelict crab gear. The other five humpback whale entanglements confirmed in Oregon gear are classified as the result of an entanglement with active gear because the whales were entangled in gear with that season's buoy tags.

6. How is the impact to whale populations from fishing gear estimated?

Take-home: The impact to whale populations is a combination of population estimates, evaluations of whale injury and mortality, and fishing interactions.

NMFS uses nationally consistent and transparent guidelines for distinguishing between human-caused serious and non-serious injuries (NSI) of marine mammals, and for assessing and quantifying injuries (NMFS, 2012). A serious injury (SI) is defined as "any injury that will likely result in mortality". The annual injury determinations for each region are documented in a written report which, for the U.S. Pacific West Coast, is prepared by the Southwest Fisheries Science Center. Summarized injury determinations are also incorporated into annual marine mammal [Stock Assessment Reports \(SARs\)](#) published by NMFS.

Under the MMPA, the potential biological removal (PBR) level is "the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population. The PBR level is published in annual SARs and is the product of the following factors:

- The minimum population estimate of the stock;
- One-half the maximum theoretical or estimated net productivity rate of the stock at a small population size; and
- A recovery factor of between 0.1 and 1.0."

The most recent PBR published for the CA/OR/WA stock of humpback whales in U.S. waters is 16.7 whales per year. This is calculated as the minimum population size (2,784) times one half the estimated population growth rate for the stock (1/2 of 8%) times a recovery factor of 0.3 (for an endangered species; with minimum population estimate >1,500 and coefficient of variation <0.50; Taylor *et al.*, 2003). To get the PBR for U.S. waters, the total value is then divided by two to account for this stock spending approximately half its time outside of the U.S. Exclusive Economic Zone (EEZ).

$$\frac{2784 \times (0.08 \div 2) \times 0.3}{2} = 16.7 \text{ whales per year}$$

Under the MMPA, the incidental taking of ESA-listed (i.e., threatened or endangered) marine mammal species or stocks during commercial fishing operations must be authorized by NMFS. This may happen only after NMFS determines, among other things, that incidental mortality and serious injury (M/SI) will have a negligible impact on the listed species or stock.

A negligible impact is defined as “an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival” (50 CFR 216.103). NMFS has not issued a negligible impact determination (NID) for the CA/OR/WA stock considering the impact of M/SI resulting from interactions with U.S. commercial fisheries. However, given 10% of PBR as an upper limit of M/SI that could be considered negligible, a threshold value of 1.67 whales is reasonable for insignificant levels of M/SI.

The MMPA requires that each commercial fishery be classified according to the level of M/SI of marine mammals that occurs incidental to the fishery, which can be found in the [MMPA List of Fisheries \(LOF\)](#). The LOF classifies fisheries into one of three categories based on the rate of incidental M/SI (in number of marine mammal individuals per year) due to commercial fishing operations, relative to the stock’s PBR level. The Oregon Dungeness crab pot fishery is currently classified as Category II driven by interactions with whales in the CA/OR/WA stock resulting in a mean annual M/SI rate that is > 1% and <50% of the stock’s PBR level.

For a variety of reasons, the number of reported entanglements is likely an underestimate of the actual number of entanglements that occur. For example, some entangled whales may never be observed or reported, or may die at sea. As a result, the total M/SI rates determined by NMFS and assigned to a specific fishery are likely also an underestimate. There is not currently a method available for estimating the number of undetected entanglements (NMFS, 2018). Additionally, there are some confirmed entanglements that cannot be assigned to a specific fishery or state due to insufficient reporting information.

7. How many whales get disentangled, and do those still count as a serious injury or mortality?

Take-home: Disentanglements are considered and can change the attribution of entanglements to PBR through changing the M/SI status; in other words, disentanglements by trained disentanglement teams are an important way to both protect whales and continue fishing.

When an authorized disentanglement team responds to an entangled whale, an injury determination will be made prior to disentanglement in the field or as part of rehabilitation. If it is classified as an SI before disentanglement, but the animal is released with no or non-serious injuries, then it will be re-classed to an NSI and will not be counted against PBR in the SAR. However, it will be included in the recorded takes for the LOF. In this way, the SARs will reflect that the animal likely survived and was not removed from the population, but the LOF will demonstrate a more accurate measure of M/SI that is occurring incidental to commercial fishing (NMFS, 2012). If a disentangled whale still has serious injuries when released, the SI will count against the PBR and the LOF.

From 2013 – 2017, disentanglement attempts were reported for approximately 25% of large whale injury reports. This relatively low rate of disentanglement attempts reflects the fact that many entangled whales are only seen once and/or that disentanglement attempts are often not possible due to adverse weather. Over this five-year time period, thirteen instances of large whale injury reports were down-classified from SI to NSI following successful disentanglement efforts or the animal freeing itself over time (NMFS, 2019c). Of these, three records were humpback whales confirmed entangled in Oregon Dungeness crab gear which were determined to be NSI but would have been serious injuries without the disentanglement response.

8. Can fishermen be trained and certified to disentangle whales?

Take-home: Fishermen (and anyone) can pursue becoming certified to help in the disentangling process. If you are interested in being involved, search on the web for the West Coast Large Whale Entanglement Response Program or use this [link](#).

Whale disentanglement is a very complex and dangerous process. The Large Whale Entanglement Response Network is comprised of whale biologists, researchers, naturalists, veterinarians, veterinary technicians, whale watchers, the U.S. Coast Guard, and state agencies along the West Coast who undergo extensive training and years of apprenticeship to learn the proper techniques to ensure their own safety and the whale's safety. There are five Responder Authority Certification Levels which are directly linked to training and experience. Those levels are:

- Level 1–2: First Responders – Responsible for assessing, reporting, documenting, and standing by an entangled whale;
- Level 3: Primary First Responders – Qualified to deploy satellite tags and assist primary entanglement responders directly with cases; and
- Level 4–5: Primary Disentanglers – Experts that lead and consult on all disentanglement events, depending on species.

Only individuals who undergo specific training (Level 4-5) are authorized and permitted under the Marine Mammal Health and Stranding Response Program to attempt to perform or assist in disentangling a whale. That being said, trainings are open to any interested parties and disentanglement teams come from a wide variety of backgrounds. Recreational and commercial boaters are often the first to see and report entangled whales, and may fill an important role in entanglement response networks. NOAA Fisheries offers an online course for [Level 1 First Responder training](#) aimed at proper assessment, documentation, and reporting prior to a response effort. This course does not prepare or qualify you to perform or assist in disentanglement efforts, but is a starting point for those interested in contributing to response efforts and understanding the various roles involved in large whale disentanglement.

9. What other human-caused impacts are there on humpback whales and how are those impacts being addressed?

Take-home: All human activities that have potential or realized negative impacts on marine mammal populations are subject to evaluation under the MMPA and, if appropriate, the ESA. For Oregon crab fishing gear and whale entanglements, our management measures will be evaluated under Section 10 of the ESA, as well as the MMPA.

All known human-caused impacts to humpback whales are covered under the MMPA, with additional requirements under the ESA for endangered or threatened DPSs. For humpback whales, human-caused injuries detailed in recent SARs have been the result of interactions with commercial and/or recreational fishing gear, entanglement in marine debris (e.g., research instruments), or vessel strikes (NMFS, 2018).

Under the MMPA, the incidental take of small numbers of marine mammals during commercial fishing operations is covered under the Marine Mammal Authorization Program (*see [Question 6](#) for the NID process*). The incidental take of marine mammals by activities other than commercial fishing is covered separately through two types of incidental take authorizations: Incidental Harassment Authorizations and Letters of Authorization. These authorizations have mostly been issued for activities that produce underwater sound, such as, military sonar/training, oil and gas development, renewable energy, scientific research, or construction projects. The appropriate authorization depends on the length of time of the activity, and whether the action will result only in harassment or will result in M/SI.

Additionally, there is evaluation under the ESA for impacts. For non-federal entities, activities that may result in the take of endangered or threatened species are regulated under the permit requirements in Section 10 of the ESA. ODFW is currently developing a CP as part of the application process for an ITP under Section 10. Authorization under Section 10 may occur only after NMFS conducts a NID (*see [Question 6](#)*) based on a review of incidental M/SI. NMFS provides guidance for injury determinations for all human-caused injuries of marine mammals, with the exception of noise-related injuries which are unlikely to be detected in live animals (NMFS, 2012). For federal agencies, activities that may affect a listed species are covered separately under Section 7 of the ESA and require consultation with NOAA Fisheries. Incidental take of listed species by a federally-managed commercial fishery would be addressed through Section 7.

Ship strikes are one of the primary threats to large whale species and may result from collisions between whales and all sizes and types of vessels. The establishment of shipping lanes and voluntary and incentivized speed reductions are the primary measures used to reduce the risk of lethal ship strikes.

10. What is an Incidental Take Permit, and how is it different from the Marine Mammal Protection Act take authorizations we get every year?

Take-home: The ITP would be a new authorization, if approved, and is separate from the annual marine mammal authorization certificates.

An ITP is required under Section 10 of the ESA for the incidental take of ESA-listed species during otherwise lawful activities by non-federal entities. ODFW is applying for an ITP to address interactions between ESA-listed species and Oregon Dungeness crab commercial fishing gear.

The ITP would be a new authorization, if approved, and is separate from the annual marine mammal authorization certificates required under the MMPA for owners of commercial fishing vessels that operate in a Category I or II fishery. These certificates are required each year because the Oregon Dungeness crab pot fishery is currently classified as Category II in the MMPA LOF based on M/SI levels (*see Question 6*).

11. Why doesn't Oregon already have an Incidental Take Permit? Why does the permit process take so long?

Take-home: An ITP is not a simple application process, but rather a long analytical and legal "discussion" between the management agencies (ODFW and NMFS), the fishing industry, and the public on the current impacts to whales and the acceptable approach to reducing those impacts.

NMFS has not previously issued an ITP for an ESA-listed marine mammal that has interactions with a commercial fishery. As such, it was not immediately apparent to all management agencies involved that this was an appropriate step in the process to reduce entanglement risk in fishing gear.

Applying for an ITP is a lengthy and iterative process. The length of time for each phase of the process can vary, but is estimated to take around 3-5 years in its entirety. It begins with a pre-application planning phase during which ODFW consults with NMFS to discuss the CP process, determine the type and scale of CP, consider the necessary level of National Environmental Policy Act (NEPA) analyses, etc. This pre-application phase is also when ODFW is working with the industry to develop the management measures that will be the core actions in the CP, including gear marking, electronic fish tickets, monitoring of whales, reduction of gear-whale interaction risks, and monitoring of the fishery (*see Question 14*). Arguably, ODFW has been actively working with industry on management measures since the Oregon Whale Entanglement Working Group started convening in 2017.

After pre-application consultation between ODFW and NMFS, ODFW will develop a statutorily complete draft CP, while NEPA documents are concurrently developed by NMFS. When the CP and NEPA documents are deemed complete drafts, NMFS then begins the CP public review and permit decision processes, which will include revisions and finalization of

all documents. When documents are finalized, a permit may be issued and the CP will be implemented along with compliance monitoring.

ODFW declared intent to apply for an ITP in January 2019 and plans to have the first CP draft complete by winter 2020/21. The process will require significant staff and financial resources. At this point, the ODCC has committed up to \$100,000 which will help support one dedicated ODFW staff position and a contractor to work on CP development.

An overview of the CP planning process can be found [here](#).

12. Why should Oregon be concerned about this since we have so few entanglements (compared to the other states)? What are we doing right?

Take-home: Any "take" of ESA-listed whales without an ITP is illegal; Oregon needs to contribute proportionately to the solutions to protect ESA-listed whales.

Under the ESA, the take of one endangered or threatened animal without an ITP is illegal. To bring the Oregon Dungeness crab ocean commercial fishery into compliance with federal law, Oregon must address our contribution to this West Coast problem. However, Oregon has a lower number of observed entanglements than either California or Washington. It is not known at this time why the numbers are different, but there are a number of factors that could affect the entanglement rate (e.g., whale distribution/abundance, fishing patterns, environmental conditions). It is also possible that detection rates are a factor, since generally speaking, there are more people on the water in California that may observe entangled whales than in Oregon or Washington (NMFS, 2019a).

13. How does NMFS "confirm" an entanglement? Is false reporting an issue?

Take-home: The confirmation process is designed to be conservative to weed out spurious reports and ensure accuracy.

NMFS uses criteria to identify unique instances of whale entanglement, weeding out redundant and spurious reports, to maintain accuracy. Criteria are evaluated using all the information submitted by first-hand observers of entangled whales including submitted documents, follow-up sightings, and entanglement response information. The following criteria deem an entanglement report "confirmed":

- Photos/videos of the whale with entangling gear;
- Direct visual observation by NMFS staff;
- The report is from a trusted source (i.e., trained or professional reporting party);
- A NMFS expert or experienced partner from the West Coast Marine Mammal Stranding Network interview the reporting party and receive information that is detailed and specific enough to confirm; and/or

- Multiple sources provide reports with detailed descriptions of the animal and entanglement.

14. How do we know how much will be enough, and is there a specific number of reduced pots/lines that we are trying to get to? Can management measures be implemented with a review option so that we can “get something back” if it isn’t working?

Take-home: There is not a specific number of pots/lines that we are trying to get to. Instead, the objective is to satisfy the maximum extent practicable standard by employing management measures that effectively minimize impacts to listed species. As ODFW develops the CP, the goal will to employ an adaptive management approach with triggers built into the plan.

In order to issue an ITP, NMFS must determine that “the applicant will, to the extent practicable, minimize and mitigate the impacts of such taking” (16 U.S.C. § 1539). This is referred to as the Maximum Extent Practicable Standard. In applying for an ITP, ODFW will have to:

1. Estimate the type and amount of take expected from Oregon’s ocean commercial Dungeness crab fishery, and the impacts of such taking on listed species and/or their habitat;
2. Determine, from a biological perspective, how conservation measures in the CP will *minimize* the impacts of the takings on the species’ status and/or habitat; and
3. Determine, from a biological perspective, how conservation measures in the CP will *mitigate* the remaining impact of the taking on the species’ status and/or habitat (USFWS & NMFS, 2016).

NMFS will then determine whether the minimization and mitigation measures are adequate by either leaving no remaining impacts of the taking on the species or by demonstrating that the plan represents the most that the applicant (i.e., ODFW) can practicably accomplish. More details on how this is determined can be found in the [HCP handbook](#).

There is not a specific number of pots/lines that we are trying to get to. Instead, the objective is to satisfy the maximum extent practicable standard by employing management measures that effectively minimize impacts to listed species. ODFW is working with the best available information to reduce the overlap between whales and fishing gear as much as possible, while maintaining the economic viability of the fishery. As ODFW develops the CP, the goal will to employ an adaptive management approach with triggers built into the plan. If something is not working, or new information becomes available, the plan is to build in alternative options or next steps to consider, so that the maximum extent practicable standard is met.

15. How will economic impacts to the fishery be evaluated?

Take-home: Economic impacts to the fishing industry are a component of the CP/ITP process in both Oregon statutes and laws (e.g. Oregon FIS), as well as in federal statutes and laws (e.g. NEPA).

Economic impacts to the fishery are being considered at every step. First, as ODFW adopts rules to reduce risk of entanglement, there is economic evaluation of the management measures and impacts through the Oregon fiscal impact statement (FIS). Second, during the development of the CP, ODFW will include economic analysis of recommended strategies, as well as alternatives not being pursued, as points of comparison. Once a CP draft is complete, the National Environmental Policy Act (NEPA) process requires analysis of both environmental and economic impacts of the proposed strategies in the CP.

To help with economic analysis and information, the ODCC has contracted The Research Group (TRG) to investigate economic trade-offs of two potential whale entanglement mitigation measures: late-season pot reduction and early closure. This work will utilize the existing [bioeconomic model](#) that they developed for the Oregon ocean commercial crab fishery in 2015 and will include an updated description of the fishery using recent fish ticket and logbook data, economic assessment of the two effort reduction measures, and discussion of the possible impacts and economic risk of these measures. Results are anticipated as early as spring 2020.

16. How will the population status of whales be factored into the Conservation Plan?

Take-home: As the population status of the CA/OR/WA stock and/or the DPSs of humpback whales change, the status will be reflected in PBR, NID, and will be adaptively addressed in the CP/ITP.

Population estimates and current growth trends are included in annual SARs and contribute directly to our understanding of the stock status (including any appropriate adjustment of PBR). As such, population growth is a factor in the NID which informs the issuance of an ITP. Additionally, the CP will contain planned adaptive measures (building in flexibility to account for the future state of the stock and the fishery). See [Question 3](#) for a description of the ESA downlisting or de-listing procedure as it relates to humpback whales.

Proposed short-term measures

17. Why are pot reductions, closures, or intermission the only three ideas for short term measures, instead of measures that potentially have less economic impact like gear modifications or fleet education? Where did these ideas for risk reduction measures come from?

Take-home: Pot reductions, closures, and intermissions are management measures that are the most likely to be effective at reducing risk of entanglement, and they came from a variety of sources including Dungeness crab commercial fishery participants.

In order to meet the maximum extent practicable standard (*see Question 14*), ODFW must include management measures in the CP that minimize the impacts of the crab fishery on listed species. The three short term risk reduction measures that were presented at the October 2019 public meetings (i.e., pot reductions, closures, or intermission) represent the best known options for effectively minimizing risk of interactions between whales and crab gear and that could be ready for implementation in the 2019-2020 commercial season. These measures were selected following extensive discussions with the [Oregon Whale Entanglement Working Group \(OWEWG\)](#), evaluation of the OWEWG's preliminary recommendations, and evaluation of measures that neighboring states are taking to address this issue. These options are being discussed for short-term implementation to achieve the greatest risk reduction based on the best available information.

There are a number of other risk reduction measures that may be viable options in the long-term, but are not logistically feasible at this time. Examples include gear modifications (e.g., longlining) or innovation (e.g., ropeless or breakaway gear), "late-season" limited entry, permit stacking, and a vessel/permit buyback program. These avenues will continue to be considered, and may be included as longer term options in an adaptive management strategy.

Other ideas that have been proposed, such as fisher education and best practices, are being considered as components of the CP, but are not considered stand-alone options that will sufficiently minimize impacts to whales.

18. What is the evidence that pots out of the water will reduce the risk of whale entanglement?

Take-home: Until we have information to support more strategic risk reduction, the best available information and most widely accepted method to reduce whale entanglements is to reduce the number of lines in the water when whales are present.

Reducing the amount of gear and line in the water, particularly during the spring and summer months when ESA-listed whales are in Oregon’s coastal and offshore waters, is the best known way to reduce risk of whale entanglement (OWEWG, 2018; WVEWG, 2019). There is currently limited information on the quantitative relationship between co-occurrence (of whales and fishing gear) and risk, however, every line in the water has the potential to interact with a marine mammal. If there was no fishing line in the water, there would be no interactions between fishing line and whale entanglements. Therefore, line reduction is the most widely accepted means to reduce the risk of interaction of whales. Better information on the spatial and temporal distribution of whales, such as that described in [Question 4](#), will improve our knowledge of patterns of co-occurrence and will be a component of the CP adaptive management strategy.

19. Is safety to the fleet being considered (with all measures, but particularly the intermission)?

Take-home: ODFW has been and will continue to evaluate these concerns as we develop risk reductions measures and the CP.

Fleet safety is considered during the planning and implementation of all management measures. ODFW staff rely on the commercial crab industry to engage in discussions about the impacts of potential management actions, including vessel safety concerns and options for minimizing risk. At the 2019 public meetings, ODFW heard considerable concern about removing a lot of gear in April and even into May.

20. What is the process from here, and how do I participate?

Take-home: There are many pathways to provide input to this process and we encourage you to participate in finding solutions to this problem.

ODFW is currently working to finalize recommendations to the Oregon Fish and Wildlife Commission (OFWC) for rulemaking in April 2020. The OFWC meeting on April 17th will be a public meeting, and anyone may attend. The OFWC will be considering recommended measures for implementation within the 2019-2020 season and at the start of the 2020-21 season. Concurrently, ODFW is in the process of developing the draft CP to submit to NOAA for application of the ITP; the CP is targeted for completion in the winter of 2020/2021 (*see [Question 11](#) for additional details on the ITP process*). We want you to participate, and we have provided relevant information on this [webpage](#) so that you can learn more about this topic, and the meetings and process that have led up to this point.

ODFW staff have had many, many conversations on this topic at meetings, one-on-one, and in small groups over the past 3-5 years. We encourage you to reach out to us to discuss this issue on an on-going basis. Additionally, ODFW regularly seeks input from the fleet by consulting with ODCAC which has recently been expanded to include representatives from Oregon’s port marketing associations. You should feel free to approach your ODCAC

representatives and provide your input on the issues and topics that are of importance to you. ODCAC membership and recent meeting summaries are on the [ODFW website](#). If you feel more comfortable passing on your concerns or recommendations to the port marketing associations, to the ODCC, or another representative, we encourage you to do that also.

Other management measures

21. What are the qualifications for a “late-season” limited entry program?

Take-home: Although the OFWC adopted a “control date” in September 2019, there are currently no recommendations being actively developed to change the Dungeness crab limited entry program at this time.

The OWEWG discussed the concept of a “late-season” limited entry program as a potential long-term measure to reduce the risk of whale entanglements. Because the concept of an additional limited entry program was being discussed, the OWEWG made the preliminary recommendation to ODFW to propose setting a control date as soon as possible to reduce the motivation for “prospecting” which could result in an unintentional increase in fishing effort during the late portion of upcoming seasons that in turn could increase risk of entanglement.

In September 2019, the OFWC adopted a control date of August 14, 2018 for a potential commercial crab late-season limited entry system. During the development of any future permit limits in the late portion of the crabbing season, only landings made prior to that date will be considered for qualification. Future discussions will be necessary to determine whether to pursue a late-season limited entry program and, if so, how participation would be limited.

22. Has a voluntary buyback (permits, vessels and/or pots) been considered?

Take-home: ODFW has encouraged the Oregon Dungeness Crab Advisory Council (ODCAC) and industry to investigate buyback options.

A voluntary buyback is on the list of potential long-term options for lowering the risk of whale entanglements through effort reduction. A vessel/permit buyback program would require significant funding which has not been identified at this time. In the past, such programs have been industry-funded, and based on a loan from the federal government.

23. Can we reduce vertical lines without reducing pots by allowing or requiring longlining?

Take-home: Longlining or duplexing crab pots remains of interest; however, there are implementation concerns (most importantly, gear conflicts) that must be alleviated before longlining would be recommended for adoption.

Longlining or a modified “duplex” configuration (i.e., two pots per line) has been proposed as a way to reduce entanglement risk by reducing the number of vertical lines in the water. Although “ropeless gear” has been a topic of discussion for years and remains an active area of research, the technology is too expensive and unreliable to date to make it an economically viable option (Shester, 2018). ODFW is considering longlining as a potential long-term option to address whale entanglements.

Longlining has been prohibited in the Oregon Dungeness crab fishery since 1997, due largely to the incidence of gear conflicts with other gear users (e.g., single pot, trawl gear). Gear conflicts remain a concern today, along with the challenge of pot limit enforcement. Additionally, there are a number of information gaps that must be resolved for longlining to be considered a viable option. First, longlining is thought to affect the severity of entanglement injuries and may impact disentanglement efforts. Also, depending on the type of groundline used, there may be unintentional impacts to other species and habitat that would require evaluation.

The Pacific State Marine Fisheries Commission (PSMFC) has compiled [input](#) from marine mammal experts and fishermen about the potential for longlining gear to address whale entanglements. Additionally, the OWEWG has recommended gear modification or innovation as an area for collaboration with working groups in Washington and California (OSG, 2019).

24. What about the possibility of creating improved or additional incentives for derelict gear retrieval throughout the season?

Take-home: ODFW supports and will continue to work with the crab industry to improve and further incentivize in-season derelict gear retrieval.

Although derelict gear is estimated to be a small part of the whale entanglement problem (see [Question 5](#)), ODFW is eager and open to evaluating ideas on improving and/or increasing incentives for derelict gear through the season. Most recently, ODFW proposed initiation of a “late-season” derelict gear removal program, incentivized by allowing ownership of retrieved pots (same as the post-season program), at crab industry public meetings as a recommendation for implementation in December 2020. This measure did not receive wide support from industry and as a result is not included in the package of short-term measures being proposed to OFWC in April 2020.

25. We heard a lot about “pingers” at the meeting. Do they work, and is it legal to use or at least test them?

Take-home: As currently designed, pingers have not been demonstrated as effective mitigation measures for large whale entanglements and, in fact, demonstrate potential acoustic harassment impacts that would need to be evaluated and mitigated before they would be authorized for use by NMFS.

Acoustic deterrent devices, or “pingers”, have been effective in some cases to deter certain small cetacean species, but there is limited evidence of their ability to deter large whales. Comprehensive research is needed to test the efficacy of pingers for reducing large whale entanglements and to determine the other potential impacts of pingers (e.g., noise) on marine species.

The use of acoustic deterrent devices, or “pingers”, to deter ESA-listed marine mammals in fixed gear fisheries on the U.S. West Coast is currently not authorized under the MMPA and ESA. However, a [federal research permit](#) can be applied for to conduct research on the effectiveness of these devices.

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