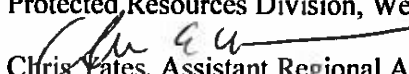




UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

December 7, 2016

MEMORANDUM FOR: Protected Resources Division, West Coast Region

FROM: 
Chris Yates, Assistant Regional Administrator for Protected Resources

SUBJECT: West Coast Region's Endangered Species Act implementation and considerations about "take" given the September 2016 humpback whale DPS status review and species-wide revision of listings

The purpose of this memo is to document the available evidence on the presence of the different Distinct Population Segments (DPSs) of humpback whales (*Megaptera novaeangliae*) off the coasts of Washington, Oregon, and California and to describe our approach to assessing the effects of various human activities on those DPSs pursuant to the Endangered Species Act of 1973, as amended (ESA). With the revised ESA statuses of humpback whales documented off the U.S. west coast (all humpback whales will still be protected under the MMPA), NMFS West Coast Region (NMFS-WCR) will use this approach in all ESA analyses following the final listing decision of September 8, 2016 (81 FR 62260). This approach applies to those cases where the DPS origin of an animal affected by or proposed to be affected by human activities cannot otherwise be assigned based on photos or other samples taken from the affected animal.

NMFS has identified three DPSs of humpback whales that are found off the coasts of Washington, Oregon and California. These are: the Hawaii DPS (found predominately off Washington and southern British Columbia), which is not listed under the ESA; the Mexico DPS (found all along the coast), which is listed as threatened under the ESA; and the Central America DPS (found all along the coast), which is listed as endangered under the ESA.

NMFS-WCR reviewed the available scientific information on the distribution and abundance of these different DPSs off the west coast of the U.S. Initially, NMFS-WCR will use the results from analysis of photo identification data to describe the proportional occurrence of the various DPSs off different parts of the contiguous U.S. west coast, and will use those proportions when assessing the impacts of human activities. There are two primary lines of evidence for the origin



of humpback whales found off the west coast: photo identification catalogues and genetic identification of sampled individuals. Whales identified via photo identification can be affirmatively assigned to one DPS or another based on photos taken on the breeding grounds. On the other hand, genetic analysis cannot yet conclusively assign an individual whale to one DPS over another due to overlapping haplotype occurrences in mitochondrial DNA. More work is needed using existing and future samples to develop specific assignments of individual origin. As a result, NMFS-WCR will rely on photo identification information until genetic information is further refined. In addition, NMFS-WCR will consider all lines of evidence available, including the confidence limits associated with the estimated proportion of animals from specific breeding grounds migrating to areas off the U.S. west coast to forage.

Based on photo identification work, we know that humpback whales that forage off California and Oregon originate both from the Central America breeding population (listed as an endangered DPS, comprising approximately 400 (Coefficient of Variation, CV =0.30) animals) and the Mexico breeding population (listed as a threatened DPS, comprising approximately 3,200 (CV=0.058) animals), Wade et al., 2016¹). From the SPLASH data set (Structure of Populations, Levels of Abundance and Status of Humpbacks), and as summarized most recently in Wade et al. (2016), approximately 10.4% of humpback whales seen foraging off California and Oregon originated from Central America, with the rest (89.6%) originating from the Mexico DPS (Table 1). This percentage may reflect the lower population abundance estimates in Central America, which are an order of magnitude less than the Mexico breeding population. However, the smaller number of photo identifications of animals off Central America yielded a higher coefficient of variation (0.45) for the percentage of matches compared to the number of photos collected off of Mexico (0.16). As the data are presented for California and Oregon waters combined, we recognize there may be a gradient of the proportional presence of each DPS within that large area. This merits further analysis for future refinement of the proposed approach, and is recommended below for further research. In addition, if continued analysis of the available SPLASH data revises the proportions of animals from each DPSs (Wade et al, 2016), we will revise our analytical approach to reflect the best available information.

Off of the state of Washington and southern British Columbia, a very small proportion (5.2%) of foraging humpback whales are expected to originate from the endangered Central America DPS, while the majority of humpback whales are expected to originate from the threatened Mexico DPS (41.9%) or the non-listed Hawaii DPS (52.9%). The probability of humpback whales originating from the Central America DPS yielded a higher CV (0.91) than either the Mexico

¹ Wade, P.R., T.J. Quinn, J. Barlow, C.S. Baker, A.M. Burden, J. Calambokidis, P.J. Clapham, E.A. Falcone, J.K.B. Ford, C.M. Gabriele, D.K. Mattila, L. Rojas-Bracho, J.M. Straley, B. Taylor, J. Urbán, D. Weller, B.H. Witteveen, and M. Yamaguchi. 2016. Estimates of abundance and migratory destination for north Pacific humpback whales in both summer feeding areas and winter mating and calving areas. Paper SC/66b/1A/21 presented to the International Whaling Commission Scientific Committee. Available at www.iwcoffice.org.

DPS (0.14) or the Hawaii DPS (0.15) foraging off the Pacific Northwest. Photographs of humpback whales in the inland waters of Washington (Strait of Juan de Fuca, Haro Strait and Puget Sound) are currently being analyzed by Cascadia Research Collective to match individuals to the breeding ground photo identification catalogues. In the preliminary analysis to date, individuals from inland waters have been matched to Hawaii and Mexico but not Central America. Until that analysis is complete, however, we will use the same proportions in inland waters as for the outer coast of Washington.

Table 1. Probability of humpback whales moving from summer feeding areas along the U.S. west coast to winter breeding areas (from Table 8b in Wade *et al.* 2016) and estimated lower and upper bounds of associated confidence intervals².

Summer feeding area	DPS origin (CV)	DPS origin (CV)
CA/OR	Mexico (T)	Central America (E)
	89.6% (0.16)	10.4% (0.45)
95% confidence interval	61 - 100% ³	1% - 19.7%

Summer feeding area	DPS origin (CV)	DPS origin (CV)	DPS origin (CV)
WA/SBC	Hawaii (NL)	Mexico (T)	Central America (E)
	52.9% (0.15)	41.9% (0.14)	5.2% (0.91)
95% confidence interval	37%-69%	30.2%-53.6%	0%-14.7%

Application of this information

While NMFS-WCR is responsible for management and conservation of all humpback whales off the west coast, we are particularly concerned with conservation of the endangered Central America DPS due to its low abundance and the persistence of threats to these animals from human activities on and along the west coast. In order to ensure we do not underestimate take of animals from the endangered Central America DPS when assessing the potential impacts of human actions on the DPS, we chose the upper limit of the 95% confidence interval of the probability of that DPS found off California/Oregon. We therefore estimate up to 20% of the humpback whales found foraging off California/Oregon are from the Central America DPS whereas approximately 90% of those humpback whales may originate from the Mexico breeding grounds (Table 2). We recognize that this equates to more than 100% of the animals that could be affected but is protective of the Central American DPS when assessing potential consequences. Similarly, we use the upper bound of the 95% confidence interval to estimate the proportion of humpback whales found foraging off of the state of Washington and southern

² Calculation for 95% confidence interval to attain probability range: [Probability x CV x 2] ± Probability

³ While the upper bound of the confidence interval is 118%, we truncated the calculation at 100% as it would not be possible to affect more animals that we expect to be exposed to an action.

British Columbia that may originate from the endangered Central America DPS (~15%, Table 2). We are not applying the upper 95% confidence interval estimate to the Mexico DPS in either location as the underlying information supporting those estimates yielded significantly lower CVs and the more robust population status of this DPS obviates the need for the conservative approach we are taking to estimate take of the endangered Central American DPS.

Table 2. Proportional estimates of each DPS that will be applied in waters off of California, Oregon, and Washington.

Feeding Areas	Central American DPS (E)	Mexico DPS (T)
California/Oregon	20%	90%
Washington/SBC)	15%	42%

In conclusion, we will consider any humpback whales migrating or foraging off the coast of California and Oregon to be ESA-listed whales that originate either from Mexico or Central America. We will consider humpback whales migrating or foraging off the coast or in inland waters of Washington to primarily originate from the listed Mexico or un-listed Hawaii DPSs, with a smaller proportion of Central America humpback whales. We recognize that the use of the upper 95% confidence interval could yield overestimates of the impacts of actions on the Central America DPS, but given their endangered status under the ESA as a result of the potential for the imminent extinction of that population, a cautious approach to assessing impacts is warranted.

ESA Section 7 Consultations

ESA assessments of human activities, such as section 7 consultations, should be conducted using the best available scientific and commercial information and approaches. For future section 7 consultations, NMFS-WCR will apply a proportional impact approach based on the available photo identification information and as described above and in Table 1. Currently, this information suggests that for actions occurring off the coast of California and Oregon, up to 20% of the humpback whales that could be affected by a proposed action would be members of the endangered Central America DPS and up to 90% would be members of the threatened Mexico DPS. For example, for an action proposed or occurring off California estimated to kill 10 humpback whales, we would assume that 20% (or 2) of those animals affected might originate from the endangered Central America DPS, which consists of approximately 400 whales. We would assess that same activity and associated mortality on the assumption that 90% (or 9) of those humpback whales may originate from the Mexico DPS, which consists of approximately 3,200 whales. Based on the same line of evidence, if the same action was proposed off Washington we would assume about 15% (1.5 whales rounded up to 2 using standard

mathematical rounding) of the humpback whales occurring off the coast of Washington would be from the endangered Central America DPS and about 42% (or 4) would be from the threatened Mexico DPS. As a result, our ESA section 7 analysis would assess whether those impacts to animals from the Mexico and Central America DPSs were likely to jeopardize the continued existence of each of the DPSs. Over time, as population status or environmental conditions change or further genetic analysis or photo identification work occurs, these proportions may change. For consultations on activities that span this entire area, the proportional assessment would need to take into consideration available information or make bridging assumptions about shifts in proportion presence along the coast to describe the proportional impacts of an action on the listed humpback whales.

The few existing biological opinions that have an active incidental take statement for humpback whales off the U.S. west coast may need to be revisited. Any revised opinions should include an analysis of the effects of the proposed action on the endangered Central America DPS and the threatened Mexico DPS, as those are the two DPSs on the west coast that remain listed under the ESA. The proportional assignments discussed above can be used as a proxy for determining the likelihood that a proposed activity (e.g., fishing) may affect this listed entity. For example, a fishery conducted off California may “take” humpback whales, but without knowing the DPS origin of individual animals, a section 7 biologist would conclude that the chances of fishery interactions with a listed entity would be 100%, with differing proportions of the two DPSs found in that area. A similar scenario occurring off the coast of Washington is likely to be more complicated, with potentially a nearly 60% chance of a fishery interacting with a listed entity (42% Mexico and 15% Central America).

Assigning humpback whale takes that occur off the U.S. west coast

Similarly, these proportions may be used for determinations of the likelihood that individual animals that have been taken from one-DPS or another (in cases where the animal is not identified in a photo catalog). Instances of these types of takes include vessel strikes or fishery interactions where no prospective analysis of the action occurred under sections 7 or 10 of the ESA. Using the logic outlined above, if a humpback whale is “taken” off the U.S. west coast where two or more DPSs mix on the foraging grounds and origin is unknown, NMFS could preliminarily assign it according to the likely proportion of the known DPSs that forage or migrate in the area, conservatively taking into account the certainty (or uncertainty) associated with the known estimated proportion, as determined by photo identification. For example, off the coast of Washington, NMFS would consider generally a 60% chance that a humpback whale struck by a vessel to be from one of the two listed DPSs. Complicating the above scenarios, entangled whales have been documented to continue swimming over large distances and long periods of time following the initial interaction. Similarly, we often do not know the origin of a humpback that is found dead or injured as a result of a ship strike. As a result, for entangled or ship-struck humpback whales off the U.S. west coast (where the location of the initial entanglement/strike is unknown), NMFS-WCR will conservatively assume that there is a high

probability that those humpback whales may originate from one of the two listed DPSs until such time as genetic or photo ID information gathered from the event, if available, would be used to make a final determination. For example, in evaluating the baseline level of impacts for an ESA consultation, if 10 fishery interactions were reported in past years along the coast of California with humpback whales of unknown origin, we would assume that all 10 were from ESA-listed DPSs and estimate that 2 were from Central America and 9 could be from Mexico. For past reports from Washington, we would assume that 6 of the 10 fishery interactions with whales of unknown origin were from ESA-listed DPSs, with an estimate of 2 from Central America and 4 from Mexico.

Important additional questions

Beyond the need to continue photo identification data collection and the refinement of genetic assignments of DPS origin, there are other avenues of questioning that might yield useful information for making determinations of the assignment of affected or potentially affected humpback whales to a specific DPS.

Questions for further discussion along with initial implementation of this approach:

- Can the locations of photographed whales be mapped along with the corresponding origin ID to assess any patterns in proportional presence along the coast? Note: This may be biased by sampling effort and environmental variation that may drive whale foraging areas.
- What (if anything) do the shifts in haplotype frequency along the Oregon and California coast mean about the proportional presence of Mexico and Central America DPS whales?

Questions for future, further refinement of the approach:

- Characterization of the foraging areas by importance to the DPSs based on how many individuals from specific DPSs were seen multiple times and in multiple years. In other words, do any of the DPSs exhibit a proportionately larger site fidelity to the U.S. west coast year after year? Or differential fidelity to certain areas?
- Given the distance they must migrate to their breeding grounds, do humpback whales from the Mexico DPS forage longer off the U.S. west coast than those from the Central America DPS? Satellite telemetry data, if they exist, might be important here.
- Do known animals from a DPS associate with one another preferentially or in groups? This may have consequences on the likelihood that an action in a discrete area differentially affects one DPS versus another.