

**Draft Biological Report for the Revision to the Designation of Critical Habitat for
Southern Resident Killer Whales – IQA ID402
Peer Review Report**

We solicited review of the draft report titled “Proposed Revision of the Critical Habitat Designation for Southern Resident Killer Whales - Draft Biological Report (to accompany the Proposed Rule)” from four potential reviewers. Two agreed and provided reviews. Reviewer comments are compiled below.

Reviewers (listed alphabetically by last name):

Robin W. Baird, Ph.D.
Research Biologist
Cascadia Research Collective
Olympia, Washington

Penny Becker, Ph.D.
Policy Lead
Washington Department of Fish and Wildlife
Olympia, Washington

Reviewer comments

One reviewer provided a letter summarizing their comments, while the other reviewer provided comments and text edits in track changes on a Microsoft Word version of the draft report. The reviewers’ comments are provided below. An anonymous number identifies each reviewer. Comments are organized by section title of the draft biological report. Reviewers’ suggested edits to text of the report are emphasized by underline (new text) and strikethrough (deleted text). Typos and grammatical edits identified by reviewers are not discussed in this peer review report.

II. Critical Habitat

Reviewer 1 Comment: Within the document on Page 4 there is some explanation that activities without a federal nexus are not subject to restrictions that would result from a Section 7 consultation. One of the examples listed is state-regulated fisheries. In Washington State, fisheries are co-managed with the tribes, and there is indeed a federal nexus (Bureau of Indian Affairs and NMFS) in many cases. Therefore, this could be misleading.

III. Natural History

A. Distribution

Referenced Text: “Three distinct forms of killer whales, termed as residents, transients, and offshores, are recognized in the northeastern Pacific Ocean.”

Reviewer 2 Suggested Edits: “Three distinct forms of killer whales, termed as residents, transients, and offshores, are recognized in the nearshore waters of the northeastern Pacific Ocean.”

Reviewer 2 Comment: Important to recognize that the NE Pacific technically covers from the

equator north and into pelagic waters, and this description of “forms” only applies to the continental shelf from ~California north.

B. Population Status and Trends

Referenced Text: “There is representation in all three pods, J (23 whales), K (18 whales), and L (34 whales).”

Reviewer 2 Comment: This sentence is confusing – not clear what is meant by “there is representation.”

Referenced Text: “The population trend projection is most pessimistic if future fecundity rates are assumed to be similar to those in 2016, and less steep but still declining long-term if an average fecundity rate over the last five years is used for the projections.”

Reviewer 2 Suggested Edits: “The population trend projection is most pessimistic if future fecundity rates are assumed to be similar to those in 2016, and less steep but still declining long-term if an average fecundity rate over the last five years (2013-2017?) is used for the projections.”

Reviewer 2 Comment: Should define what is meant by this [phrase “over the last five years”]. Last five years for a report that comes out in 2018 implies 2013-2017. If the report comes out in 2019 (which seems likely, given the timing) this will be a bit misleading without definition.

Referenced Text: “The projection using 2011 through 2016 fecundity data shows some stability and even a slight increase over the next decade.”

Reviewer 2 Comment: There is a bit of discrepancy – declining if 2013-2017 but increasing if 2011-2016?

Referenced Text: “Using more variable survival and fecundity rates may be more representative than relying on the single poor year of 2016, but this single year scenario provides information on what could happen if poor reproduction continues.”

Reviewer 2 Comment: A table of annual survival and fecundity values would be of value.

Referenced Text: “For example, these growth trends assume the ratio of female to male births is 50:50; however, over the last five years new births have been skewed slightly toward male, and over the entire time series the proportion of births that are female is closer to 43 to 44%.”

Reviewer 2 Suggested Edits: “For example, these growth trends assume the ratio of female to male births is 50:50; however, over the last five years (2013-2017) new births have been skewed slightly toward males, and over the entire time series the proportion of births that are female is closer to 43 to 44%.”

Reviewer 2 Comment: Give percentage [associated with the phrase “been skewed slightly toward males”]. The 43-44% seems “slightly skewed” so presenting the actual sex ratio for births

Referenced Text: Figure 4.

Reviewer 2 Comment: Is it possible to recreate with lines a different type (e.g., dotted and solid) to make it easier to discriminate, particularly since there isn’t a line on a pink background as shown in the legend.

C. Reproduction and Growth

Referenced Text: “However, calves are born in all months, indicating that conception occurs year-round, including during times when the Southern Residents inhabit coastal areas.”

Reviewer 2 Comment: [Specific to the phrase “coastal areas”] Technically the coast (and thus coastal areas) extends along all shorelines (e.g., Puget Sound), should define this as the “outer coast.”

Referenced Text: “Although there is considerable overlap in the geographic ranges of Southern and Northern Residents, pods from the two communities have not been observed to intermix (Ford *et al.* 2000, Ford *et al.* 2011).”

Reviewer 2 Comment: This seems out of place in this section.

Referenced Text: “Reproductive maturity for Southern Residents is reached between 10 and 42 years for both males and females, although males are more likely to become reproductively successful in their late teens or early twenties (Olesiuk *et al.* 2005, Ford *et al.* 2011, Ford *et al.* 2018).”

Reviewer 2 Comment: I’m sure they were sexually mature well before they were 42. Are you confusing age at first (known) birth? Or reproductive lifespan? This implies at least one individual first became mature at age 42.

Referenced Text: “Inbreeding depression, or fitness effects of inbreeding (e.g., lower survival or fecundity), may be an emerging concern for Southern Residents (Ford *et al.* 2018).”

Reviewer 2 Suggested Edits: Inbreeding depression, or fitness effects of inbreeding (e.g., lower survival or fecundity), may be an ~~emerging~~ concern for Southern Residents (Ford *et al.* 2018).

Reviewer 2 Comment: This has been a concern for a long time, so calling it an emerging concern [comment incomplete]

E. Foraging and Prey

Referenced Text: “This work suggests an overall preference for Chinook salmon during the summer and fall.”

Reviewer 2 Comment: Reference to chum and other salmon warranted here.

Referenced Text: “Females older than 12 years require as much as 218,000 kcal per day, while males over 12 years require up to 269,000 kcal per day (Noren 2011).”

Reviewer 2 Comment: As much as? Is this meant to be an average, or for the largest females? Better to include a range or mean value rather than a maximum value only.

Referenced Text: “Although some salmon runs vary in energy content, Columbia River Chinook can provide as much as about 13,000 kcal per fish, depending on fork length and lipid content. It would take roughly 2.7 coho, 3.1 chum, 3.1 sockeye, or 6.4 pink salmon to obtain the same amount of energy as can be found in one Chinook salmon (O’Neill *et al.* 2014).”

Reviewer 2 Comment: [Regarding the phrase “as much as about 13,000 kcal per fish”] Ditto – better to give average and present # fish/whale/day.

F. Threats

F.3 Oil spills

Referenced Text: “Recent observations of killer whales in the Northwest near more localized spills support those findings (Canadian Press 2007, Williams *et al.* 2009).”

Reviewer 2 Comment: [Regarding the word “Northwest”] This is a colloquial term and should not be used. They live, for example, in the eastern North Pacific, so referring to NW is just confusing.

Referenced Text: “Common dolphins (*Tursiops truncatus*) in Barataria Bay, an area that had prolonged and severe contamination from the Deepwater Horizon oil spill, were found to have health effects consistent with adrenal toxicity and increased lung disease (Schwacke *et al.* 2013, Venn-Watson *et al.* 2015), low reproductive success rates (Kellar *et al.* 2017), and changes in immune function (de Guise *et al.* 2017).”

Reviewer 2 Suggested Edits: “Common bottlenose dolphins (*Tursiops truncatus*) in Barataria Bay, an area that had prolonged and severe contamination from the Deepwater Horizon oil spill, were found to have health effects consistent with adrenal toxicity and increased lung disease (Schwacke *et al.* 2013, Venn-Watson *et al.* 2015), low reproductive success rates (Kellar *et al.* 2017), and changes in immune function (de Guise *et al.* 2017).”

Referenced Text: “In the Northwest, Northern and Southern Resident killer whales are the most vulnerable marine mammal populations to the risks imposed by an oil spill due to their small population sizes, strong site fidelity to areas with high oil spill risk, large group size, late reproductive maturity, low reproductive rate, and specialized diet, among other attributes (Jarvela-Rosenberger *et al.* 2017).”

Reviewer 2 Comment: [Regarding the phrase “In the Northwest”] See comment above. Note that Canadians don’t refer to BC as the “northwest”, and you are including northern residents here (plus much of the range of SRKWs is in Canada). Salish Sea? Temperate coastal eastern North Pacific?

F.4 Vessel impacts

Referenced Text: “Although there is significant room for improvement in compliance among recreational boaters, the regulations have had some positive impacts for the whales (Ferrara *et al.* 2017).”

Reviewer 2 Comment: Would be good to be more explicit about compliance, good or bad. If this reference includes stats on compliance, would be good to note some of them.

IV. Geographical Area Occupied by the Species

Referenced Text: “While it was known that the whales occupied these waters for a portion of the year, there were only 28 sightings of Southern Residents in coastal waters that were used to describe their coastal range (Krahn *et al.* 2004, NMFS 2006).”

Reviewer 2 Suggested Edits: “While it was known that the whales occupied these waters for a portion of the year, there were only 28 confirmed sightings of Southern Residents in coastal

waters that were used to describe their coastal range (Krahn *et al.* 2004, NMFS 2006).”

Reviewer 1 Comment: The report explains that similar to the 2006 critical habitat designation, areas shallower than 20 feet in depth and bays and estuaries with no sightings within the geographical area occupied by the species are not being considered for critical habitat. We suggest strengthening the rationale for why these areas are not included, and include more information regarding how impacts to these areas that are important to SRKW prey are separately managed and conserved.

A. Opportunistic sightings

Referenced Text: “Together, these visual sightings have confirmed Southern Resident killer whales as far north Chatham Strait, southeastern Alaska (Hilborn *et al.* 2012, Hanson *et al.* 2017, Carretta *et al.* 2018) and as far south as Monterey Bay, California (Black *et al.* 2001), a range of approximately 2,300 km (1429 mi) (Black *et al.* 2001, Ford *et al.* 2017).”

Reviewer 2 Suggested Edits: “Together, these visual sightings have confirmed Southern Resident killer whales as far north Chatham Strait, southeastern Alaska (Hilborn *et al.* 2012, Hanson *et al.* 2017, Carretta *et al.* 2018) and as far south as Monterey Bay, California (Black *et al.* 2001), a north-south range of approximately 2,300 km (1429 mi) (Black *et al.* 2001, Ford *et al.* 2017).”

B. Satellite Tracking: Range, Habitat Preferences, and Prey Sampling

Referenced Text: “According to Hanson *et al.* (2017), almost all (96.5%) coastal locations of satellite-tagged Southern Residents occurred in continental shelf waters of 200 m (656.2 ft) depth or less. Animals showed a preference for waters between 18 m (59 ft) and 54 m (177.2 ft) (though depths ranged between 18 m (59 ft) to 126 m (413.4 ft), with the broadest depth range occurring off the northern coast of Washington).”

Reviewer 2 Comment: This is inconsistent – if 3.5% are >200 m then why is the depth range to 126 m?

Referenced Text: “These locations were typically within 34 km (21.1 mi) of shore and were rarely located in shallow waters within 2 km (1.3 mi) of shore or in deeper waters outside of 34 km (21.1 mi).”

Reviewer 2 Comment: “typically in” and “rarely located” are ambiguous terms and should be replaced with some quantitative numbers. Percentage of time in different depth or distance bins would be good.

V. Physical or Biological Features Essential to Conservation

B. Identification of Essential Features

Referenced Text: “Southern Residents are highly mobile and, based on satellite tag tracks, are known to travel up to 408 km (253.5 mi) in a 24-hour time period (NWFSC unpubl. data), allowing rapid movements between areas.”

Reviewer 2 Comment: 17 km/h sustained for 24 h seems biologically unrealistic. Is this

cumulative distance moved based on consecutive locations of sat tag locations? If so, this is probably artificially inflated due to low quality locations. If you do an assessment of travel speed based on locations separated by multiple hours or using only high quality LCs there would be a more accurate travel speed.

B.2 Prey species of sufficient quantity, quality and availability to support individual growth, reproduction and development, as well as overall population growth

Referenced Text: “Southern Residents need to maintain their energy balance all year long to support reproduction, including maintaining body condition to support successful pregnancies and lactation.”

Reviewer 2 Comment: Maintaining body condition is also important in terms of mobilization of contaminants in blubber stores.

B.4 Consideration of sound as an essential feature

Reviewer 1 Comment: Although in-water sound levels was previously proposed as one of the essential habitat features for SRKW critical habitat and this was requested to be included by the petitioners, it was not included in this draft as an essential feature. Acoustic effects and vessel interactions were identified in the NMFS Recovery Plan for Southern Resident killer whales and is the focus of considerable efforts for conservation of the species. The designation of in-water sound levels as an essential function of critical habitat is consistent with NMFS, state, and recovery partner goals to minimize impacts from anthropogenic sound on SRKWs. Despite this, there was very little analysis or description presented on the effects noise has on SRKWs and the reasoning given for the exclusion of this factor as an essential feature was lacking. We encourage NMFS to reconsider adding in-water sound levels as an essential feature of critical habitat to give this issue the weight it deserves as an important threat to address for SRKW recovery.

Referenced Text: “We believe this is consistent with the approach in the critical habitat designations for the two other ESA-listed odontocetes in U.S. waters: the Cook Inlet beluga whale DPS, the Main Hawaiian Islands (MHI) insular false killer whale DPS.”

Reviewer 2 Comment: This belief doesn’t appear to be supported.

Referenced Text: “While identifying sound as a separate habitat feature or a component “characteristic” of a feature highlights to Federal agencies the significance of sound levels in support the whales’ habitat use and its conservation value, we believe that potential habitat-related effects of anthropogenic noise (e.g., abandoning critical habitat areas, creating a barrier that restricts movement through or within a critical habitat area, impairing feeding and communication) on the conservation value of habitat can also be reached through the prey and passage essential features identified for Southern Resident killer whales.”

Reviewer 2 Comment: Basing the lack of inclusion on a “belief” seems inappropriate.

VI. Specific Areas

Referenced Text: Table 1, boundaries of Area 6: Pigeon Point, CA (37°11'00" N) south to Point Sur, CA (36°18'00" N), between the 6.1-m and 50-m isobath contours.

Reviewer 2 Comment: Depths to only 50 m in 3-6 is inconsistent with Figure 9.

A. Area 1

Referenced Text: Figure 10.

Reviewer 2 Comment: Including names of major rivers would be very helpful for discussions. [The commenter repeated this comment for the maps of Areas 3, 4, and 5.]

Referenced Text: “Tagged whales moved within a broader north-south corridor off the Washington coast (~75% of locations occurred in a 17-km [10.6-mi] wide band that was 3-20 km [1.9-12.4 mi] offshore) compared to when they were off Oregon (10-km wide band [6.2 mi] 2-12 km [1.2-7.5 mi] offshore) or California (6-km [3.7 mi] wide band 2-8 km [1.2-5.0 mi] offshore) (Hanson *et al.* 2017).”

Reviewer 2 Comment: Would be good to include this information up front when first talking about satellite tagging work and the range of the population.

Referenced Text: Figure 12 [but referring to Figures 12, 13, 16, 17, 19, 20, 23, and 24]

Reviewer 2 Comment: None of these captions are accurate – they aren't showing the “average” depth, they are showing the distribution of depths. Also, if these are filtered locations, this should be noted. If they aren't filtered locations, they should be. Also, the number of locations in the >200 bin are inconsistent with earlier information on depth distribution.

C. Area 3

Referenced Text: “While foraging may be occurring, it has rarely been observed in Area 3 despite dedicated monitoring for predation. The majority of activity observed in Area 3 is travel. In addition to passage between feeding areas, prey resources and water quality are also identified as habitat features in this area.”

Reviewer 2 Comment: This is a great example of where sample size (# hours/days of data) in particular areas may be important.

Referenced Text: “Only K and L pod have been documented to use Area 3 based on sightings, acoustic detections, and satellite tag data. From 1975-2016, there were 49 confirmed opportunistic sightings of Southern Resident killer whales in U.S. coastal waters (excluding those in inside waters of Washington, those in inside or coastal waters of Canada, and the single sighting in Alaska) (see Appendix A). Eight of these occurred in Area 3, in January-May.”

Reviewer 2 Comment: This warrants some general statement of opportunistic effort, at least a relative ranking of effort by area within the depth range of SRKWs. The lack of sightings in many of the areas is likely strongly related to the amount of effort in those area.

Referenced Text: “From 1975-2016, there were 49 confirmed opportunistic sightings of Southern Resident killer whales in U.S. coastal waters (excluding those in inside waters of

Washington, those in inside or coastal waters of Canada, and the single sighting in Alaska) (see Appendix A). Eight of these occurred in Area 3, in January-May.”

Reviewer 2 Suggested Edits: From 1975-2016, ~~there were~~ of the 49 confirmed opportunistic sightings of Southern Resident killer whales in U.S. coastal waters (excluding those in inside waters of Washington, those in inside or coastal waters of Canada, and the single sighting in Alaska) (see Appendix A). Eight of these occurred in Area 3, in January-May.

Reviewer 2 Comment: This is repeated a number of times.

D. Area 4

Referenced Text: Figure 19 [but referring to Figures 12, 13, 16, 17, 19, 20, 23, and 24].

Reviewer 2 Comment: Changing units of all of these from frequency to percentage would make them easier to interpret.

E. Area 5

Referenced Text: “Foraging may be occurring in Area 5, but it has not been observed despite dedicated monitoring for predation.”

Reviewer 2 Comment: It would be good to note sample size – there was intense monitoring when they were followed, but were they followed for 10 h, 100 h, or 500 h, in that area?

Referenced Text: “Prey resources are present, though not aggregated in conditions that promote feeding behaviors when Southern Residents are there, and Chinook salmon utilize the area during their marine migrations as indicated by fisheries catch data (Figure 22) (NWFSC unpubl. data)”.

Reviewer 2 Comment: It would be good to include some basis for this conclusion (see above comment). Also, this comment is inconsistent with Figure 22, which shows pretty concentrated.

Referenced Text: Figure 21.

Reviewer 2 Comment: Include table of Chinook run sizes for major rivers up and down the coast.

F. Area 6

Referenced Text: “Additionally, the total abundance of fall Chinook is thought to be generally lower than more northern areas (Shelton *et al.* 2018).”

Reviewer 2 Comment: What about winter/spring/summer chinook?

G. Comparison of Areas

Referenced Text: Table 2.

Reviewer 2 Comment: Would be good to add a row for effort for prey sampling, even if qualitative/relative (extensive, limited, none), as this plays an important role in interpreting the number of prey samples.

VII. Special Management Considerations

A. Activities That May Require Special Management Considerations

A. 1 Salmon fisheries & incidental bycatch

A.1.a. Salmon fisheries

Referenced Text: “For Pacific salmon ocean fisheries, NMFS works with the Pacific Fishery Management Council (PFMC) to establish annual harvest levels in federal waters from three to 200 miles (4.8 to 321.9 km) off the coasts of Washington, Oregon, and California that meet MSA standards.”

Reviewer 2 Comment: What about within 3 miles?

IX. References

Reviewer 2 Comment: Many of these reports are not easily available – including links to those that are online would be of value to readers/reviewers.