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Return of the Giants of the Salish Sea: Increased occurrence of humpback and gray whales in inland waters

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Extended Abstract for Salish Sea Ecosystem Conference 2018

Return of the Giants of the Salish Sea: Increased occurrence of humpback and gray whales in inland waters

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Changes in the occurrence of two of large cetaceans, humpback and gray whales have occurred in the Salish Sea including Puget Sound since the 1990s. In this talk, we examine some of the recent evidence of these changes and the current occurrence and of these two species.

Humpback whales

The US West Coast serves as a feeding area in spring through fall for humpback whales in the North Pacific (Calambokidis et al. 1996, 2001, 2008, 2015). Humpback whales were once common in the Salish Sea and were reported to over-winter in these waters. A whaling station based in southern Vancouver Island from 1907 to 1910 hunted these whales through the winter months killing several hundred and largely eliminating them from these waters. Sightings of humpback whales in inside waters of Washington State were relatively rare after that through the late 2000s (Calambokidis and Steiger 1990). Cascadia Research has conducted long-term studies of humpback whales along the US West Coast since the 1980s and documented their steady recovery from whaling; population increased at about 7-8% per year through about 2010 and then stabilized suggesting they may have finally recovered to pre-whaling numbers (Calambokidis and Barlow 2004, 2017, Calambokidis et al. 2004, 2017a).

In the late 2000s, we documented increased sighting reports of humpback whales in inside waters and extending into Puget Sound (Figures 1 and 2). Some of these whales were also documented staying through the winter months.

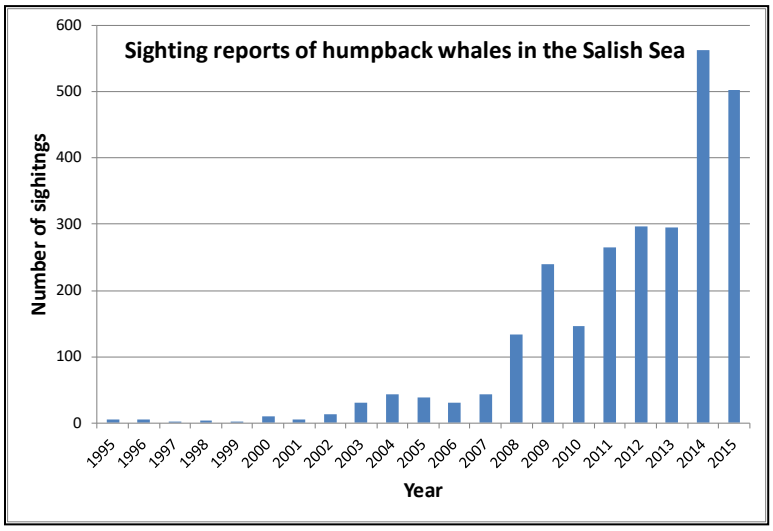

Figure 1. Sighting reports to Cascadia Research and Orca Network of humpback whales in the Salish Sea showing dramatic increase in the last decade.

Humpback whales have now become common in the Salish Sea (Figure 2) and become a focus of some whale watch operations on both the Washington and British Columbia side of the border (especially when killer whales are absent). We used photographic identification to investigate humpback whale movements, matching images to those taken of whales in feeding and breeding ground around the North Pacific. This has revealed that local whales travel to a mix of breeding areas (primarily Hawaii and Mexico) in winter months (Calambokidis et al. 2008, 2017a). Matches also show many of these whales using the inside waters had previously been using outside offshore waters, suggesting a shift over time into inside waters. We speculate that humpback whales, which show site fidelity to specific regions, only returned to these former feeding areas when their recovering population size forced their expansion into inside waters. Their occurrence in these waters exposes them to increased interactions with humans and potential human impacts like ship strikes (Rockwood et al. 2017).

Figure 2. Locations of sightings of humpback whales in the Salish Sea (to Cascadia Research and Orca Network). Sighting locations reflect both locations of whales and people so are biased by presence of reporting parties (such as around Victoria, a base of many whale watch operators).

Gray whales

The majority of the eastern North Pacific gray whale population migrates past Washington waters on route between winter breeding areas in Mexico and their feeding ground primarily in Artctic waters, although a few hundred whales stay in the region through the feeding season as part of the Pacific Coast Feeding Group (Calambokidis et al. 1992, 2002, 2015, 2017b). Every spring, a regular group of identified gray whales (termed the Sounders) return to the waters

around Whidbey Island to feed (Figure 3). The first two individuals adopting this strategy were identified in 1990, with four more animals joining them in 1991 (Figure 4). Those animals have returned almost every year from March through May to these same waters. In 1999 and 2000, another half-dozen whales joined this group bringing the total to almost a dozen that return annually. Most have been determined to be males though a few females also regularly return though typically with gaps in their occurrence every 3-4 years that may be the years they have a calf, since none of them have been seen with a calf in northern Puget Sound. These animals are not part of the Pacific Coast Feeding Group that spends the spring, summer, and fall in the Pacific Northwest (Calambokidis et al. 2002, 2017b), they instead appear to continue their migration north to more Arctic feeding areas after the spring-feeding. At least one individual has been extending its stay past the spring in recent years. The years when this core group of whales discovered and adopted these areas were during periods of apparent food stress with higher number of strandings of emaciated gray whales and also more apparently unhealthy whales wandering through the Salish Sea. We speculate that the Sounders represent some of these whales that were in poor condition that motivated them to travel off the migration and seek alternate prey before continuing their migration north and that now choose to return to annually given the abundant prey. Data from suction-cup attached multi-sensor video tags show these animals feed almost exclusively on ghost shrimp in the intertidal zone during high tide periods (Figure 5).

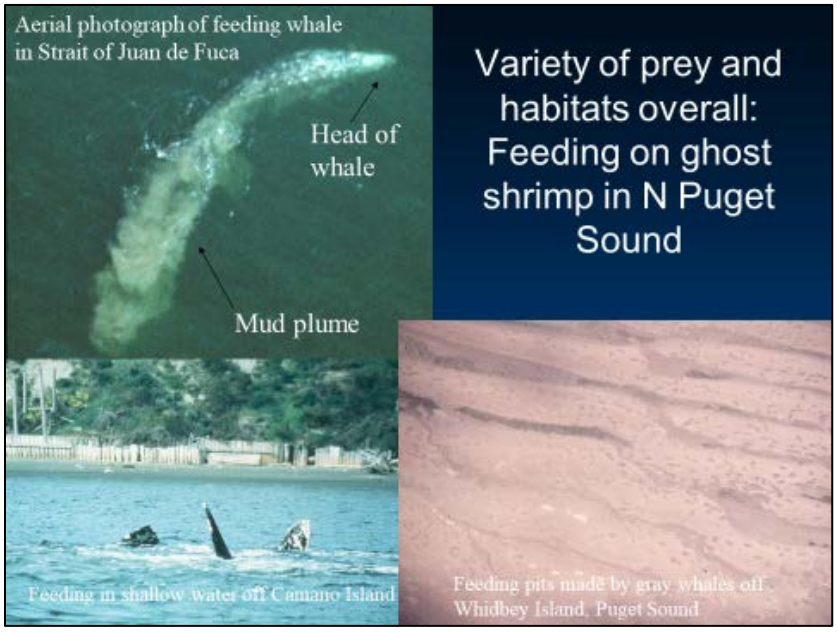

Figure 3. Feeding behavior of gray whales in Washington State. Upper left shows an aerial view of a whale at the surface trailing a plume of mud from having fed on the bottom, Lower left shows left side of fluke and pectoral fins of gray whale feeding in shallow intertidal waters. Lower right shows gray whale feeding pits visible at low tide in the intertidal zone where gray whales had fed at high tide.

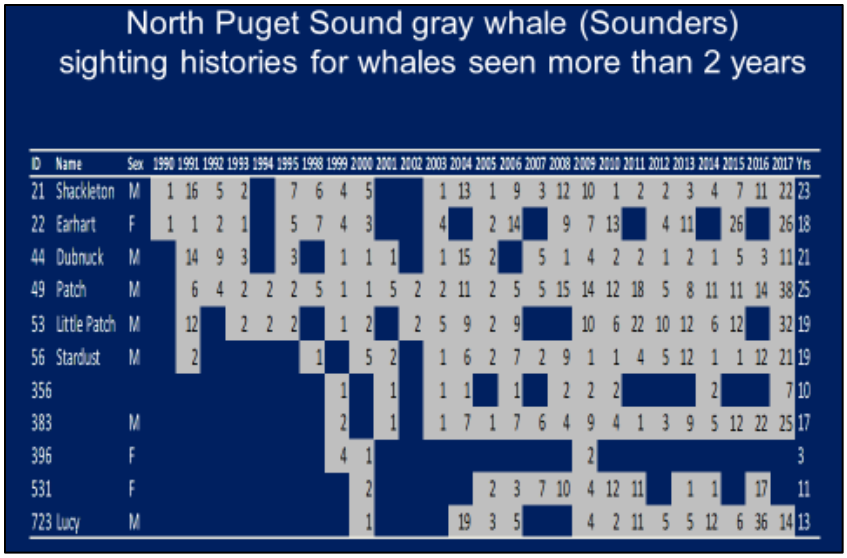

Figure 4. Number of photo-documented sightings of different identified "Sounder" gray whales from N Puget Sound. Rows show different individuals and columns show years from 1990 to 2017. Gaps between shaded areas indicate no sighting although that does not mean the whale was not present since there was limited survey effort especially in 2001-2003.

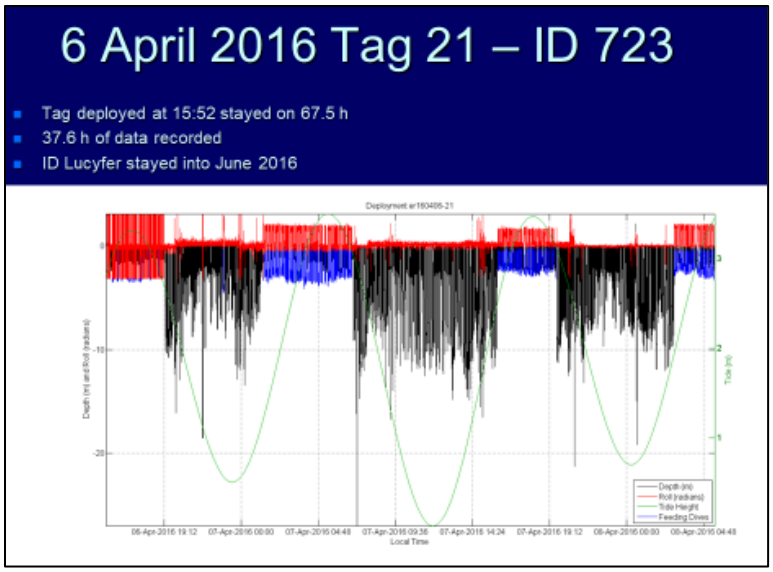

Figure 5. Record from a gray whale with a suction-cup attached multi-sensor video tag deployed in 2016, one of 10 deployed in 2015 and 2016 on Sounder gray whales to examine their feeding behavior. Red shows rolling events with the higher red bars corresponding to when the whale was rolling approximately 90 degrees on its right side to feed with blue showing the shallow feeding dives during those periods. The green line shows the tide height and that whales were feeding at high tides only and even then primarily on the rising high tide.

Conclusions

- Humpback whales have returned to Salish Sea expanding into areas they used to use prior to whaling.

- Return of humpback whales is likely a result of the recovery of their populations from whaling and slow expansion into areas of former use.
- Sounders gray whales appear to have discovered a high-risk feeding strategy in N Puget Sound as a result of food stress in high mortality years
- Estimate of prey extracted by whales may be as high as 100-300 metric tons, compared to about 20 mt for harvest
- Use of Salish Sea exposes both species to increased human activities and impacts

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