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## Changes in Strandings of Cetaceans in Puget Sound/Salish Sea

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**Speaker**

Jessica L. Huggins, Amanda Warlick, Stephanie Norman, Jennifer Olson, Dyanna M. Lambourn, Joseph K. Gaydos, and John Calambokidis

## Changes in strandings of cetaceans in Puget Sound/Salish Sea

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Cetacean strandings in the inland waters (Puget Sound/Salish Sea) of Washington State are common and have been systematically recorded in Washington State since the early 1980's, providing an invaluable dataset with which to track spatiotemporal trends and changes in stranding patterns. These patterns are cyclical but generally increasing (Figure 1). This increase is likely due to a variety of factors, including population increase, emerging diseases, funding for stranding response, and public awareness/ease of reporting. Harbor porpoise and seasonally occurring gray whales are the two most commonly stranded species in inland waters.

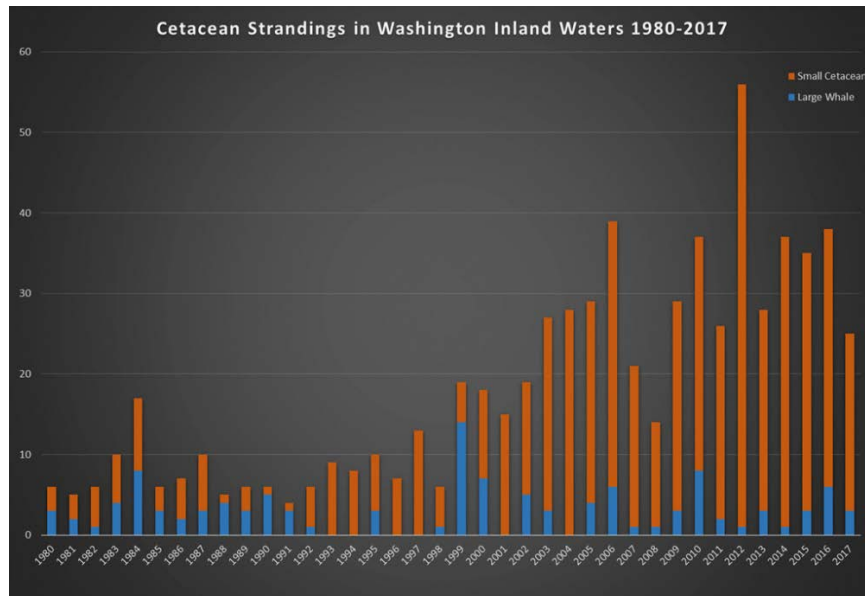


Figure 1. Cetacean stranding in inland waters of Washington state. Small cetaceans (orange) far outnumber large whales (blue).

Gray whale strandings peak in spring and early summer, with an average of 5-6 per year. In 1999-2000 an unusual mortality event (UME) occurred throughout their entire range—during that time period there were more than 20 strandings per year in Washington. Stranded individuals are often young and emaciated, although entanglements and ship strikes cases have been increasing.

The return of humpback whales to Washington inside waters, which has been captured by sighting records, has also been confirmed by an increase in stranding events (Figure 2), with the first stranding ever recorded inside the Puget Sound in late 2015, and three additional strandings in the following years. This increase appears to be the result of an increasing population and a return to areas formerly utilized by these whales.

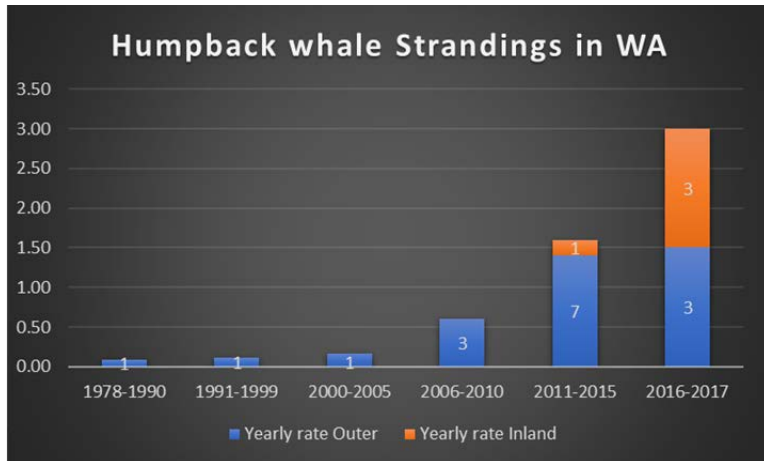


Figure 2. Yearly rates of humpback whale strandings in Washington state. Numbers in the bars represent actual number of stranded animals. Strandings began increasing on the outer coast (blue) for several years before inland waters (orange).

Strandings of other large rorquals such as blue, fin, and sei whales have been historically documented in the region, though were brought into inland waters wrapped on the bows of ships. Ship strike mortality in large whales has increased dramatically in recent years. Beginning in 2001, the percentage of cetacean strandings (particularly fin whales) showing evidence of ship strikes has risen from 4% (1991-2000) to over 20% (Figure 3).

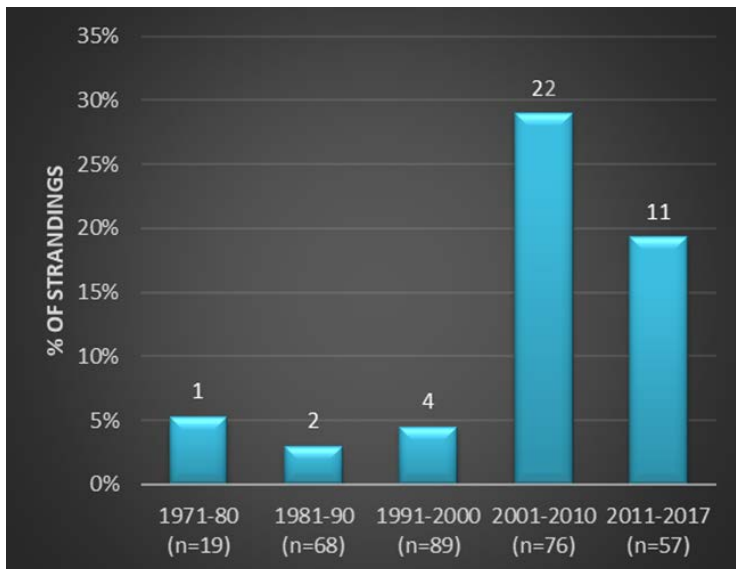
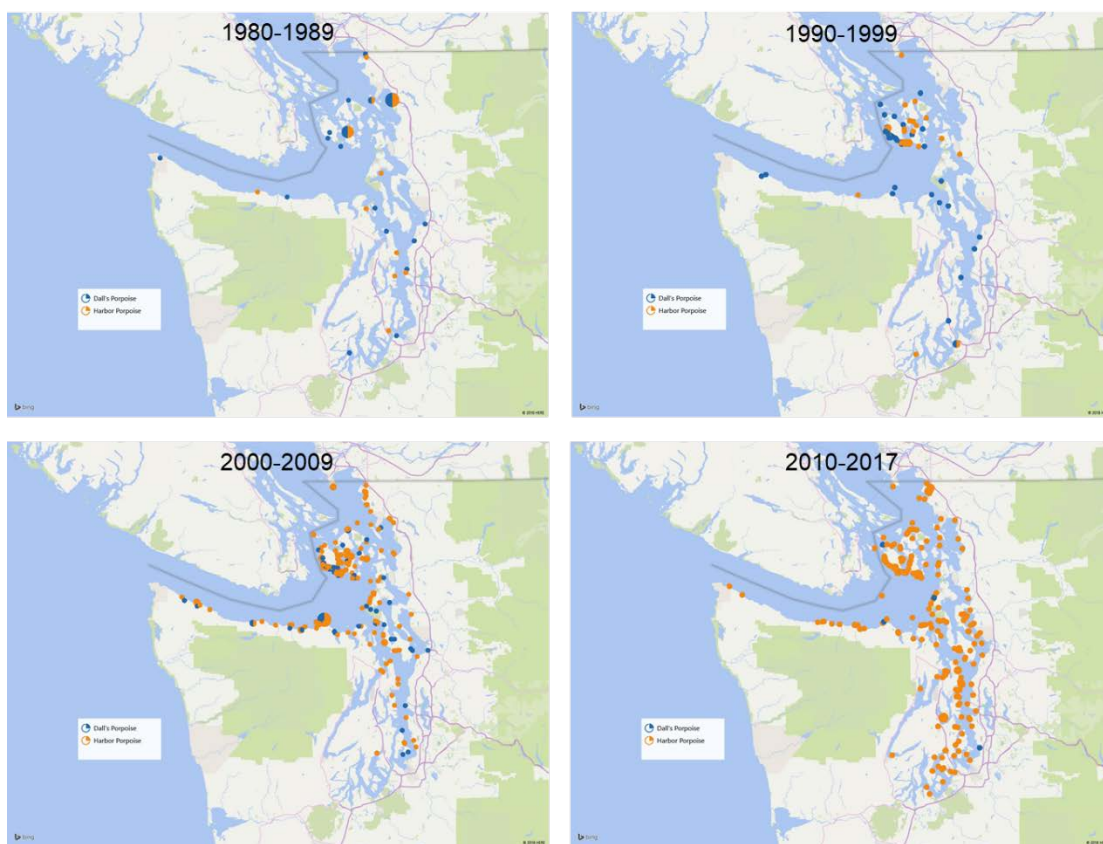


Figure 3. Percentage of large whale strandings showing evidence of ship strike.

Drastic changes in stranding occurrence, characterized by UMEs, have been documented in gray whales (UME in 1999-2000) and harbor porpoises (UME in 2006-2007) and continued high levels of post-UME strandings for both species have also been noted. These changes likely reflect increased population sizes of these two species, and in the case of harbor porpoises, a return to areas within the Puget Sound where they had previously disappeared. While harbor porpoise strandings have increased, Dall's porpoise strandings have decreased dramatically since the early 2000s (Figure 4). These patterns of increasing harbor porpoise and decreasing Dall's porpoise strandings mirror those observed in sightings of live animals in the region (see Dave Anderson's presentation during the same session). Causes of mortality in harbor porpoises largely include infectious diseases (some emerging protozoal and fungal diseases) and traumatic injuries (both human-caused and naturally occurring). Fishery entanglements continue to be of particular concern, especially during fall salmon runs.



*Figure 4. Strandings of harbor porpoise (orange) and Dall's porpoise (blue) in inland waters of Washington from 1980-2017.*

Extra-limital strandings of warm water cetacean species have been observed over the past 10 years. In inside waters these include sightings of live individuals followed by stranding events involving Bryde's whales, bottlenose dolphins, and common dolphins (see Laurie Schuster's presentation during the same session). Common dolphins and striped dolphins have also stranded with increasing frequency on the Washington outer coast.

Over the last 15-20 years we have seen a general increase in cetacean strandings, changes in the species involved in stranding events in the region, and differences in causes of mortality (emerging diseases, increase in ship strikes and entanglements). For some species, such as harbor porpoise and humpback whales, these changes appear to indicate favorable conditions in the region and a return to areas previously occupied. However, for warm water species, the small numbers of live individuals and high mortality rates suggests that their presence here may not be ideal.