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Changes in harbor and Dall's porpoise in Puget Sound, 1990s to present

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There are two species of porpoise that occur within the Salish Sea. Harbor porpoise (*Phocoena phocoena*) are the smaller of the two species, considered to be shy, with surface behavior characterized by slow surface rolls (Figure 1). Dall's porpoise (*Phocoenoides dalli*) are larger, and as one of the fastest cetaceans, their surface behavior usually produces rooster tails (Figure 2). Dall's habitat is generally farther offshore than that of the harbor porpoise.

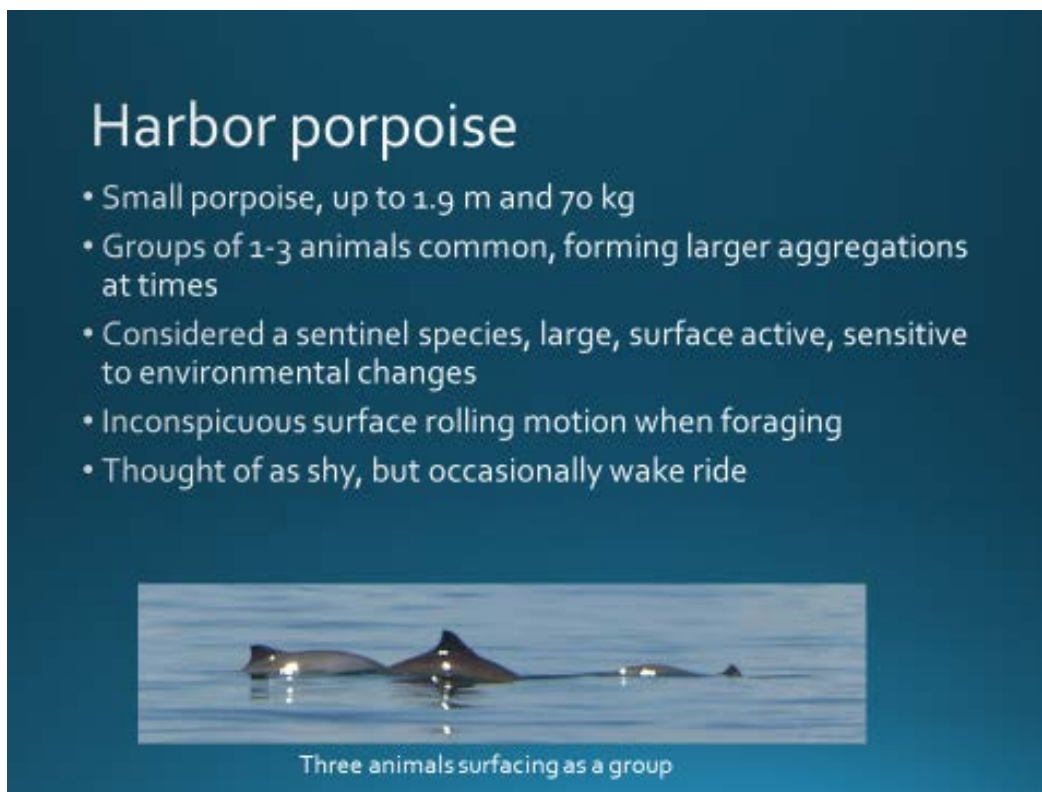


Figure 1: Harbor porpoise, the smaller of the two porpoise species, were absent from the Puget Sound for several decades before their recent return.

Dall's porpoise

- Larger porpoise, up to 2.3 m and 220 kg
- Commonly seen in groups of 2-4 animals, often in larger groups
- One of the fastest cetaceans
- Commonly seen bow and wake riding
- High speed surfacing characterized by rooster tails



Image by John Calambokidis

Figure 2: Dall's porpoise, which were more commonly seen in the Puget Sound while harbor porpoise were absent, have greatly reduced abundance in recent years.

Historic records show that harbor porpoise were the most commonly sighted cetacean in Washington State, with animals commonly seen in the South Puget Sound (Scheffer & Slipp, 1948). By the 1970s, harbor porpoise were rarely, if ever, sighted in the Puget Sound south of Admiralty Inlet (Everitt, 1979). No records could be found for Dall's porpoise sightings in the Salish Sea before the 1960s, with Cowan (1944) mentioning that they were not found in the Gulf of Georgia, the Strait of Juan de Fuca, or the west coast of Vancouver Island. He also mentions that Dall's porpoise are never encountered in the shallow bays and inlets preferred by harbor porpoise. By the 1970s, Dall's porpoise were found in the inland waters, including the Puget Sound (Everitt, 1979).

In more recent times, Cascadia Research started receiving reports of harbor porpoise in the Puget Sound in 2004, increasing rapidly starting in 2007. At the same time, reports of Dall's porpoise were on the decline within Washington's inland waters. Though no small cetacean surveys were conducted within the Puget Sound in the early 2000s due to the presumed absence of harbor porpoise, WDFW included marine mammal sightings in their annual winter aerial marine bird surveys beginning in 1994. This effort provided a continuous record of the increase of harbor porpoise abundance in the Strait of Juan de Fuca and the Washington Sound (San Juan Islands and Washington portion of the Strait of Georgia) to the north, and the later expansion south of Admiralty Inlet into the Puget Sound.

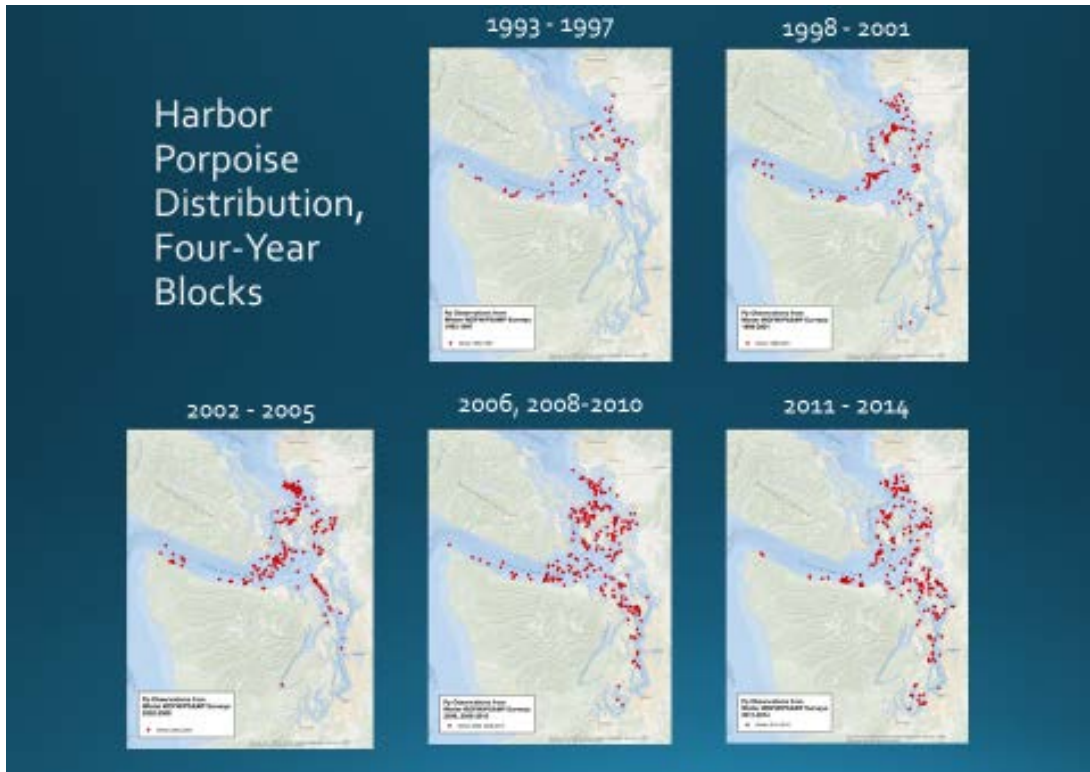


Figure 3: Locations of harbor porpoise sightings in four-year blocks, documenting the increase in the Strait of Juan de Fuca and Washington Sound, as well as the expansion into the Puget Sound during the 2000s.

Regionally, sightings of harbor porpoise increased steadily in the Strait of Juan de Fuca from 1994 through 2014 surveys, while sightings in Washington Sound increased through the 1990s, leveling off since right around 2000 when harbor porpoise started moving into the Puget Sound (Figure 4). The highest density was found in the Strait of Juan de Fuca in 2014, with density in the Puget Sound approaching that found in Washington Sound. The results of this study matched the reports of sightings received by Cascadia Research, as well as an increase in harbor porpoise strandings (Jessie Huggins presentation on strandings during this session).

At the same time that harbor porpoise were increasing, the survey recorded decreasing sightings of Dall's porpoise in all regions (Figure 4), dropping to zero sightings in the final year of the survey covered in the report (2014). In subsequent years, Dall's porpoise were seen during survey efforts, and sightings were occasionally received by Cascadia Research and Orca Network.

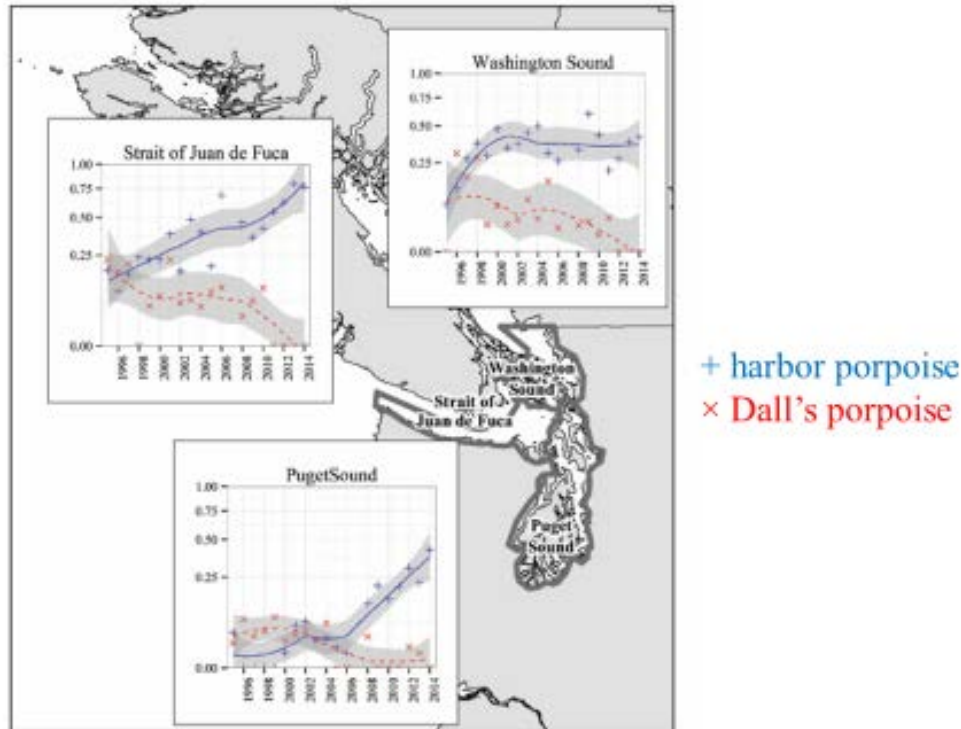


Figure 4: Regional abundance of harbor and Dall's porpoise per km² over the study period. While Harbor porpoise abundance increased steadily throughout the study period in the Strait of Juan de Fuca, it leveled off in Washington Sound at about the same time that sightings began in the Puget Sound. Dall's porpoise decreased in all areas during the study, with none sighted during the 2014 survey.

Takeaways from aerial survey:

- Harbor porpoise are back in the Puget Sound!
- Dall's porpoise are being seen less often, supporting observation in Cowan (1944) that Dall's were rarely seen in these waters, and avoiding areas with harbor porpoise
- Rate of harbor porpoise increase in Puget Sound greatly exceeds reproductive rate – coming from somewhere else
- Density leveled off in Washington Sound around the time that animals started moving into Puget Sound

Why did harbor porpoise leave/disappear? Why are they back?

We don't know, but we can make educated guesses:

- Entanglement risk with drift net and set net fishing, common through 1970s, now strictly regulated
- Competition with forage fisheries
- Reducing pollution load over time
- Pressure to move out of an area, leading to migration to new areas