



U.S. Fish & Wildlife Service

Pacific Walrus

2006 Population Survey

Background

Life history aspects of the Pacific walrus make it one of the most difficult species of marine mammals to study. They feed primarily on benthic invertebrates (especially clams), and spend the majority of their time in the water. Walrus regularly haul out on land or sea ice, and they generally do so in large aggregations. Their distribution is closely tied to the seasonal advance and retreat of sea ice in the Bering and Chukchi seas. The pack ice they inhabit is one of the most remote environments in the world.

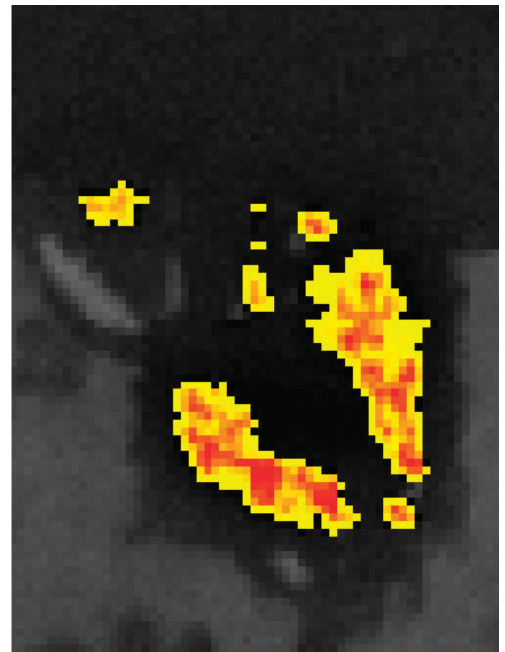
In 2000, the Service and the U.S. Geological Survey (USGS) hosted an international workshop to discuss ways to improve survey methods for this species, as it was universally agreed that previous visual methods were inadequate for estimating population size and monitoring trends over time. One of the major recommendations from this workshop was to explore the use of remote sensing technologies to allow larger areas of walrus habitat to be surveyed. Another recommendation was to develop a technique for estimating the number of walrus that were in the water, and therefore unavailable for detection.

Beginning in 2002, the U.S. Fish and Wildlife Service (Service) initiated field trials of thermal imaging systems to detect walrus by their body heat. Earlier studies had suggested this technology had potential as a survey tool, but advancements in sensor technology and computer processing power had made this a more feasible prospect. Initial tests conducted in 2002 and 2003 demonstrated that Pacific walrus could be readily detected with thermal imaging when hauled out on sea ice.

At the same time, USGS began work to develop a satellite transmitter that could be remotely attached to walrus, thereby eliminating the need to capture and immobilize animals.



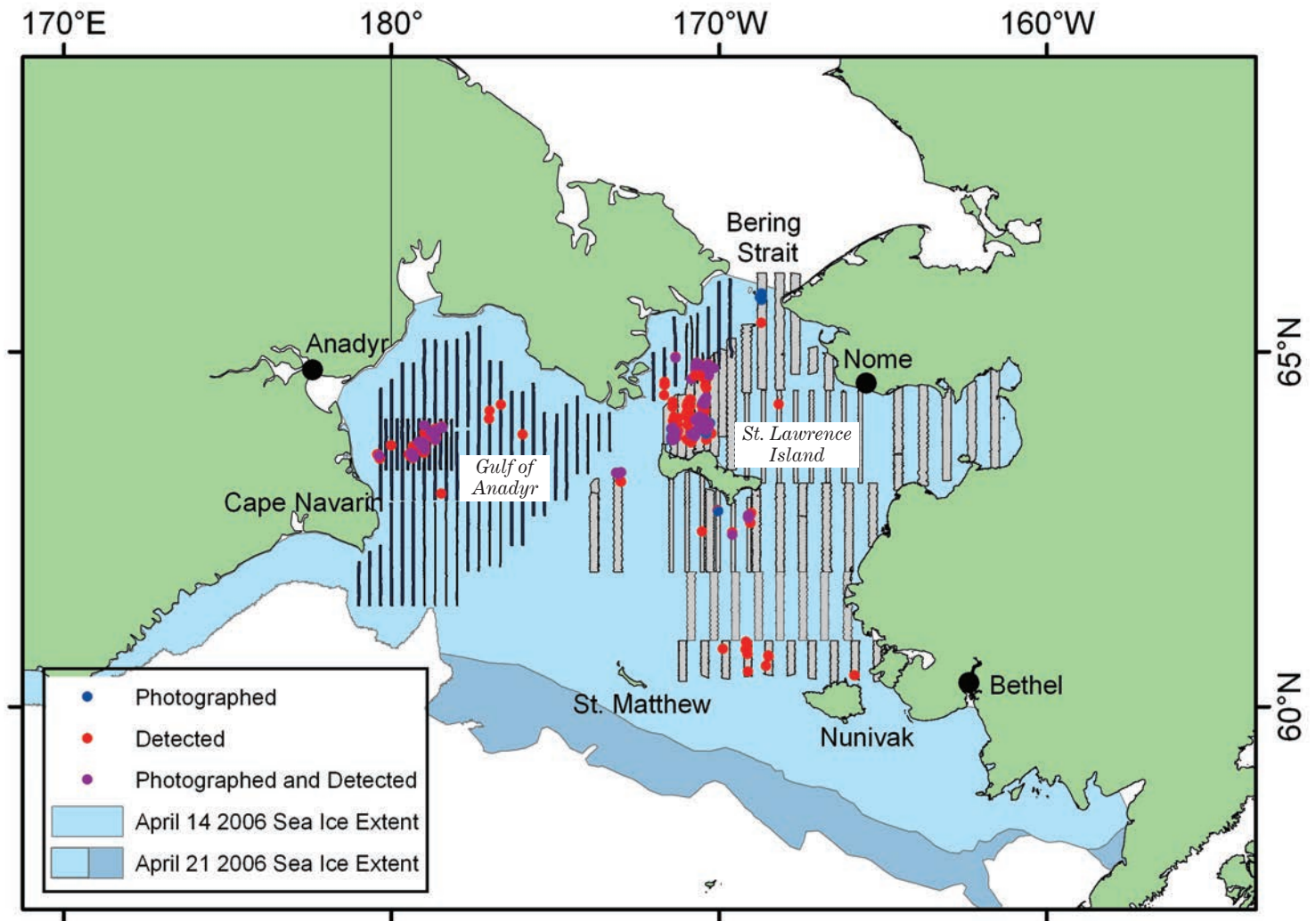
Pacific walrus mother and calf resting on ice in the Chukchi Sea.



Walrus groups were both digitally photographed and detected by their body heat.

These transmitters were designed with a wet-dry sensor to detect whether the walrus was in the water or on the ice. The information collected by the transmitters could then be used to adjust estimates of walrus detected on sea ice (with thermal imaging) to account for those in the water.

As these new technological advances were under development, biologists from the Service also began working with their counterparts in Russia to determine if they had the capability to participate in a walrus survey using these new methods. In 2006, the first U.S. – Russia aerial survey of the Pacific walrus was conducted in over 15 years.



Primary walrus concentrations were found in the Gulf of Anadyr and north of St. Lawrence Island in the Bering Sea.

Survey Results

In March 2006, biologists aboard ice-breaking ships attached satellite transmitters to Pacific walrus in the Bering Sea. Shortly afterwards, aerial survey teams in the U.S. and Russia began flying over the pack ice, collecting thermal imagery and digital photography to estimate the number of walrus that were hauled out. The two teams set out to survey the entire spring range of the Pacific walrus, however, inclement weather and changing ice conditions allowed them to survey only about one-half of the area. Therefore, the survey results are only representative of the area surveyed, and not for the total population.

The estimated number of walrus in the surveyed area at the time of the survey in April 2006 was 129,000 with 95% confidence limits of 55,000 to 507,000. As some of the tagged walrus were known to have been in the unsurveyed areas, the total population size is higher than this estimate. This is the first walrus population estimate that quantifies walrus in the water and includes an estimate of precision that fully accounts for all sources of uncertainty, which are reflected in the broad confidence intervals.

The survey participants will meet again in January 2010 in Anchorage, Alaska, to present their results at the

Alaska Marine Science Symposium, and to discuss recommendations for future analyses and surveys. Additional benefits of the survey include:

- Development of a technique to reliably survey large areas for walrus.
- Development of remotely-attached satellite transmitters to study walrus movements and behavior.
- Information about walrus habitat use during the spring.
- International partnerships for future collaborative studies.

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