

UNDERSTANDING ECOSYSTEM PROCESSES IN THE BERING SEA 2007-2013

*V* PROJECT

# Changing Wind and Ice Conditions in the Bering Sea

WHEN DO WALRUS HUNTERS CHOOSE TO STAY HOME?

BEST-BSIERP

(Berin

The biggest factor in walrus hunting success is whether hunters go hunting. This is not surprising—but what makes walrus hunters sometimes choose to stay home? Changing wind and ice conditions can affect hunting success, but hunters are used to dealing with variable conditions. We wondered if conditions attributable to climate change may affect walrus hunting by affecting decisions about whether or not to go hunting.

## How We Did It

Our analysis considered wind speed, wind direction, and sea ice concentration in relation to walrus hunting from Gambell and Savoonga, on St. Lawrence Island (Figure 1). We used those variables to see how they affected the number of hunting trips that were made and the number of walrus that were harvested.

First we compiled daily data on walrus harvest, number of hunting

continued on page 2





Map of St. Lawrence Island and the eastern Bering Sea, showing the communities of Gambell and Savoonga.

# The Big Picture

Bering Sea Project researchers are very interested in how the ecosystem is changing and what those changes mean, especially for people who depend on the Bering Sea for food and for their livelihood. Changes in sea ice are a prominent part of ecosystem change in the region. By examining the impact of changing sea ice, along with winds, we were able to show that walrus hunters on St. Lawrence Island may indeed be affected by those changes, but also that other factors may be more important, such as the skill and experience of the hunters, who are accustomed to dealing with variability and are quick to adjust and adapt as needed.

Marcus Janoi

SUBSISTENCE HARVEST, USERS AND LTK ECOSYSTEM PERSPECTIVE

A component of the BEST-BSIERP Bering Sea Project, funded by the National Science Foundation and the North Pacific Research Board with in-kind support from participants.

trips, wind speed, wind direction, sea ice concentration, and visibility for both Gambell and Savoonga. Then we analyzed these data using a "generalized additive model." This method allows us to model several parameters together to predict an outcome, so we used wind speed, wind direction, and sea ice concentration at various distances from the villages to see what influence they had, individually and together, on hunting outcomes. We also considered visibility, with the expectation that foggy conditions were not good for hunting, but found that the addition of visibility to the model did not appear to be much of a factor.

One-quarter to one-third of the variability in the number of hunting trips that were made could be

explained by wind and ice conditions. While other factors combine to explain much more of the variability, wind and ice conditions do matter. Our analysis also helped explain how they matter, in other words, how a change in wind or ice would affect hunting. For example, higher winds make boating more dangerous and difficult, so hunters tend to stay on shore when it is too windy. Similarly, too much ice makes boat travel difficult, but too little ice can mean there are few walrus since the walrus like to haul out on ice; or too little ice can allow waves to build much higher, again making it dangerous for hunters.

### Why We Did It

Hunters in Savoonga told us that wind conditions affect sea ice, and

that both together affect how well they are able to hunt walrus. We wanted to test that idea, and also to see if we could understand the relationships between those physical factors and walrus hunting. By doing so, we may be able to understand better how changes in climate can affect walrus hunting.

#### Henry P. Huntington

George Noongwook, Savoonga Whaling Captains Association Nicholas A. Bond, Joint Institute for the Study of the Atmosphere and Ocean, University of Washington (UW) Bradley Benter, Marine Mammals Management, U.S. Fish and Wildlife Service (USFWS) Jonathan A. Snyder, Marine Mammals Management, USFWS Jinlun Zhang, Applied Physics Laboratory, UW

The Bering Sea Project is a partnership between

the North Pacific Research Board's Bering Sea Integrated Ecosystem Research Program and the National Science Foundation's Bering Ecosystem Study. www.nprb.org/beringseaproject



George Noongwook leads a discussion of traditional knowledge in Savoonga.

![](_page_1_Picture_12.jpeg)

George Noongwook driving his skiff along the north shore of St. Lawrence Island, west of Savoonga.