Konrad, P. M. 1993. Satellite ornithology: researchers track snow geese from Russia to California by satellite radio telemetry - - an interview with John Takekawa, Ph.D. WildBird 7(4):32-33.

SATELLITE ORNITHOLOGY

Researchers Track Snow Geese from Russia to California by Satellite Radio Telemetry

An Interview with JOHN TAKEKAWA, Ph.D.
by PAUL M. KONRAD

A new, pioneering study by an international team of wildlife biologists is tracking the migration routes of Snow Geese using space-age computer technology. By attaching miniature radio transmitters—some are as small as a match box and weigh less than one ounce—to a number of Snow Geese, American, Russian and Canadian ornithologists can study the geese's migration patterns with the use of satellites.

The international scope of this study does not end within the boundaries of the three nations the geese traverse. A Japanese company, Nippon Telegraph and Telephone, is responsible for engineering the miniature satellite transmitters. In addition, the two satellites that receive the digital signals from the radio transmitters are monitored by the French aerospace agency ARGOs.

Dr. John Takekawa, wildlife research biologist with the U.S. Fish and Wildlife Service in Dixon, California, is directing the research project. In a recent interview, Takekawa explained that the field studies are being conducted cooperatively by biologists with the Russian Academy of Sciences, the Wrangel Island Nature Reserve and the Canadian Wildlife Service. Biologists from these four agencies met the past two breeding seasons on Wrangel Island, located 300 miles north of the eastern tip of Russian Siberia north of the Arctic Circle.

Sean Boyd

The first satellite radio telemetry study is tracking the migration route of Snow Geese that nest in a large colony on Wrangel Island in the Russian Arctic.

In 1991, 30 Snow Geese were fitted with the miniature satellite transmitters. Because the life of the batteries that power the transmitters is only about six months, 24 more Wrangel Island Snow Geese were radio tagged in 1992 to verify the movements of the previous year and to work out "bugs" in the miniaturization technology, Takekawa explained.

"Russian biologists have studied this, the only Snow Goose nesting colony in Asia, for 30 years," said Dr. Takekawa. "Because their numbers declined dramatically during that period, we began an intensive multi-national study."

Snow Geese are a good species to test these transmitters on because they are large enough to carry the transmitters without affecting their chances for survival. They also migrate long distances between nesting and wintering areas. At the same time, there was a real concern about the reduction in this breeding population, so these Snow Geese seemed ideal for this initial satellite telemetry study.

Although Russian and Canadian biologists banded many Snow Geese in this nesting population, band returns over the years did not provide some of the information that the satellite tracking clearly showed. According to banding information, this population of Snow Geese wintered in two distinct locations: one in the Puget Sound region near Vancouver, British Columbia, and Skagit Flats, Washington, and another in the Sacramento Valley of California.

An interesting observation was made when biologists found that Snow Geese wintering in the Puget Sound region of British Columbia and Washington feed in marshes where the feathers on their faces become stained orange by the high iron levels in the water. Geese wintering in California feed in agricultural fields and their feathers remain white.

This environmental distinction provided biologists who study the geese in their nesting colony on Wrangel Island the opportunity to separate the "color-marked" breeding birds into two wintering subpopulations. These two sub-populations are almost equal in number,

with about 30,000 breeding adults in each wintering population.

Biologists used this information to make sure they radio-tagged birds from both wintering sub-populations, as observations of Snow Geese fitted with colored neck collars indicated that at least some of the Snow Geese that wintered in California showed up at a staging area near Edmonton, Alberta. This was puzzling to biologists, and they wanted to learn more about this quirk in migration behavior through the use of satellite tracking.

The information collected by satellite tracking was as exciting as the futuristic technology the researchers used. Takekawa explained that in remote areas of Siberia and Alaska, biologists found that the population stopped to feed and rest at several wetlands that were not known as areas of importance to Snow Geese, as well as some new areas where the birds had never been reported during migration stops. For instance, it was a surprise to learn that most of the Snow Geese stopped at St. Lawrence Island in the Bering Sea between Asian and Alaska.

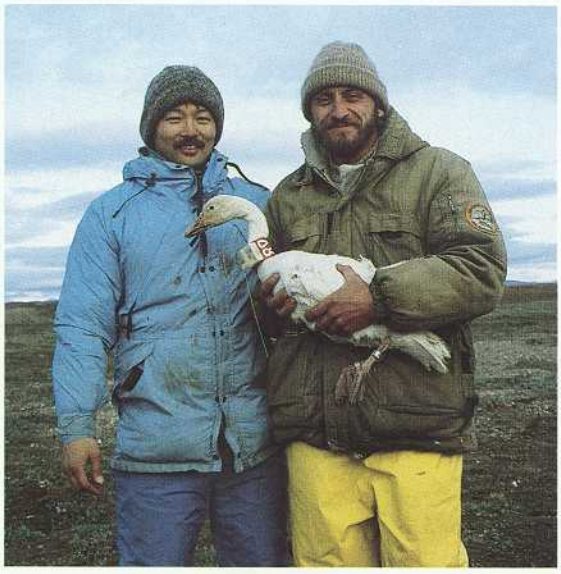
One of the biggest surprise to researchers was when they found that the population divided in two as the birds migrated south along the coast of Alaska and British Columbia. About one-half of the Snow Geese continued south to wintering areas along Puget Sound. The other half took an abrupt left turn near the Queen Charlotte Islands, continuing east across the Rocky Mountains to the staging area near Edmonton!

No one could have predicted that move. Most biologists had predicted that the California-wintering geese that came to Alberta passed into the Central Flyway by passing over the north slope of Alaska to join with Canadian-nesting Snow Goose populations.

Takekawa provided a verbal explanation of the fall migration route traced by satellite. The Snow Geese left Wrangel Island in early September, flying south to the Asian mainland. They stop at some little-known Siberian wetlands on the Chukotka Peninsula and Kolyuchin Bay. Their next stop is St. Lawrence Island in the Bering Sea, then on to the north end of the Yukon Delta on the west coast of Alaska.

From the Yukon Delta, some birds make a stop along the upper Alaska Peninsula before flying to wetlands along the southeast coast of Alaska, including the Copper River Delta, Yakutat Bay and Stikine River Delta. In this area of southeast Alaska and northern British Columbia, adjacent to the Queen Charlotte Islands, the two wintering sub-populations split with half the birds continuing south to their wintering areas in the Puget Sound area. The other half crosses the Rocky Mountains, migrating east to the Edmonton, Alberta area.

From this prairie-parkland area, the California-wintering birds continue south to Freezeout Lake, Montana, then migrate southeast through Idaho and Oregon to the Klamath Basin along the California-Oregon border. After a period there, these geese continue southward to the Sacramento Valley.



Sean Boyd

Project leader John Takekawa and Russian biologist Vasily Baranyuk are members of an international team who have fitted satellite transmitters on Snow Geese.

Dr. Takekawa pointed out the significance of the satellite technology is the quick return of pertinent information in a very short time. "In a few months, we learned more about these geese than we did with more than 20 years of banding data." Takekawa acknowledges that "although satellite tracking is a costly research method, it provides a wealth of accurate information quickly. Information about daily movements of radio-tagged birds can be obtained in just a few hours using satellite telemetry.

"The real importance of this study is its application in the future," said Dr. Takekawa. "The use of these satellite transmitters has its greatest potential for getting information about bird movements and habitat use quickly to apply to endangered species management.

"Today, we still do not know where some endangered birds nest in Asia, and this technique provides a means of tracking birds from wintering areas to their nesting grounds," said Takekawa. (This method would have proved helpful when biologists searched for years to find the last nesting location of the few remaining breeding pairs of Whooping Cranes in the 1950s. Perhaps some day this work could be used to track near-extinct Eskimo Curlews to their nesting, migration and wintering areas so protective measures could be developed.)

"Satellite tracking of migratory birds will probably become more important as endangered birds require intensive management in the future," added Takekawa.

Ornithology has come a long way since the days of Wilson and Audubon as it continues to utilize space-age technology. As each new method is added to this science, our understanding of birds, their behavior, and their significance in our natural world is enhanced day by day. WB