Red Knot (*Calidris canutus*) migration on the Pacific coast of the Americas

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INTRODUCTION:

The Pacific Flyway population of Red Knots (*Calidris canutus roselaari*) uses key stopover sites in coastal Washington during spring migration. In contrast to *C.c. rufa*, which occurs on the Atlantic coast, almost nothing is known about the ecology and status of *C.c. roselaari*. *C.c. roselaari* was proposed for listing, but the USFWS lacked sufficient information upon which to adequately inform a listing decision. Beginning in 2006, we investigated aspects of Red Knot migration in coastal Washington, and provide a summary of that information here.

STUDY AREA AND METHODS:

Red Knots have long been known to have a limited distribution both along the Pacific Flyway and in Washington. Our study sites within Grays Harbor and Willapa Bay include areas where knots were formerly abundant (Bowerman Basin, Ocosta), but are now uncommon or rare, as well as areas where they remain reasonably common (Grass Creek, North River Cove).

Washington study sites

The project began with an effort to document abundance in known areas of use. This included ground-based counts – involving refuge staff and volunteers – at Bowerman Basin and Ocosta. At this same time, Roberto Carmona and his students began marking Red Knots with leg flags in Baja California Sur. Some of these knots were observed in 2007 and 2008 in Washington. In 2009, we secured funds to implement a project that used WDFW airboats to access greater areas of the estuaries and increase observations of marked knots. We developed and used a protocol for scanning flocks to detect and read codes on leg flags. In 2011, we banded and attached leg flags to 162 Red Knots at Grays Harbor.

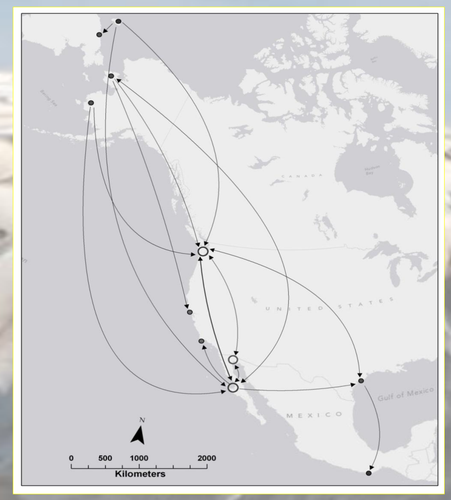
Leg flag applied to 002 in Mexico

Clockwise from upper left: Red Knot foraging habitat, boat observation of Red Knots, 1st Red knot banded in Washington, banding crew processing Red Knots

FINDINGS:

We observed 255 Red Knots that had been marked at study areas in northwestern Mexico, representing 34.3% of the marked knots. We observed small numbers of Red Knots marked at Wrangel Island, Russia, at Alaskan breeding grounds near Nome, and at the Yukon-Kuskokwim River delta. Over 25% of the knots we banded have been re-observed, including 20 in Mexico. The re-observation data indicate strong migratory connectivity between Washington, northwestern Mexico and other areas.

In 2009 and 2010, we conducted surveys throughout the migration period. Red Knots were more abundant at Grays Harbor than at Willapa Bay in both years. The peak of migration (about 7000 birds in 2010) was in early May, and knots were relatively common until after mid-May. This is the latest migration window for a shorebird in the Pacific Flyway. We noted a smaller, second peak in abundance in the last few days of migration in both years and these peaks coincided with increased observations of flags not previously detected, further suggesting arrival of a "new" cohort of migrants. There was a significant correlation in the timing of first observation of individual knots in both years (e.g. early migrants in 2009 tended to arrive early in 2010).



Map depicting connectivity: arrows point to re-observation sites

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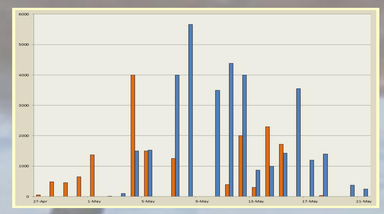
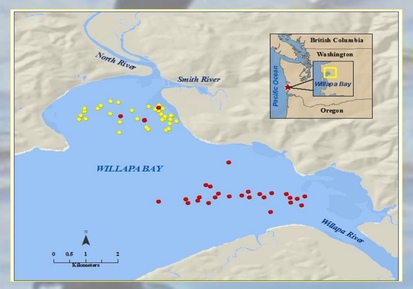


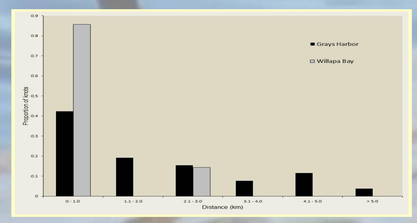
Counts of Red Knots in 2009 (blue) and 2010 (red)



Areas used early in migration are shown in yellow; subsequent use areas shown in red

Differences in patterns of stopover duration suggest that cohorts of birds use sites differently. The median stopover duration was less than 2 days, which means that many birds likely acquired their primary fuel elsewhere. Conversely, other individuals were present for 10-14 days, and these birds likely accumulated fat reserves at our study site required for migration. Our banding data from 2011 indicated that body mass of knots was surprisingly low. Given that these birds fly directly to Alaska from Washington, the low level of fuel reserves (e.g. body fat) in most birds we banded was unexpected and potentially of concern. Insufficient fat reserves may prevent successful migration or reproduction.

GPS coordinates for Red Knot encounter locations indicated a shift in use of foraging areas during migration at both sites in both years. Despite such within-area shifts, there was a high degree of fidelity to specific foraging areas from one year to the next.



Minimum distance between initial locations of knots observed during each year (2009 and 2010)

Observation data were collected to develop an estimate of Red Knot abundance. Analysis is underway, but preliminary results indicate a population of about 20,000). This estimate is several times smaller than that for *C.c. rufa*, and indicates that *C.c. roselaari* is the smallest population of (non-vagrant) sandpipers that move between arctic breeding grounds and overwintering areas south of Canada along the Pacific Flyway.

This Knot was banded on Wrangel Island, Russia.

One of the most interesting aspects of this project involved migratory movement documented in spring 2012. In May 2011, one of the knots we banded was given the flag code of 8HV. In April 2012, this bird was captured on the coast of Texas. This was unexpected, because *C.c. roselaari* was believed to occur only on the Pacific coast. Even more surprising was the re-observation of 8HV at Grays Harbor 10 days after last being observed in coastal Texas. This suggests that a segment of the population may regularly stopover in coastal Texas.

Locations in Mexico supporting major aggregations of Red Knots during the non-breeding season

WDFW participants (field or other support) in Red Knot project:
Gretchen Blatz, Michelle Boutiette, Keith Brady, William Bryan, Steve Desimone, John Evans, Joe Evenson, Gerry Hayes, Dave Heimer, Brock Hoenes, Les Holcomb, Jane Jenkerson, Alexis Leonard, Mary Linders, Warren Michaelis, Nels Mikkelsen, Bryan Murphie, Russell Nunez, Brad Otto, Jackie Pahutski, Rodrigo Purpon, Greg Schirato, Beau Smith, Mack Watson and Gary Wiles.

Photos: Joe Evenson , Steve Desimone, & Rod Gilbert

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