

Marvels of migration: the northward flight of the Western Sandpiper

by Mary Anne Bishop



Western Sandpipers

The migration of birds has fascinated people since the time of Aristotle, and continues to intrigue us today. One of the most impressive demonstrations of bird migration occurs from mid-April to the beginning of May at San Francisco Bay. Walk, sail, or bicycle to areas of the Bay where you can see exposed mudflats, and you will see thousands of shorebirds. Even a quick glance to the mudflats as you drive across the Dumbarton or San Mateo bridges at low tide will reveal thousands of

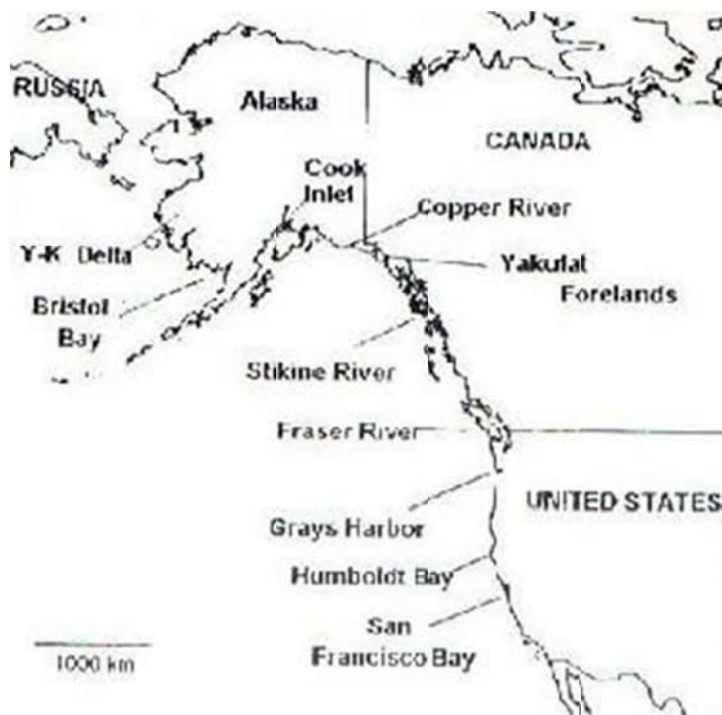
shorebirds gathered along the shoreline eating worms and clams as fast as they can, to prepare for a migration that will take them to the northern reaches of the continent. San Francisco Bay Estuary, including San Francisco and San Pablo bays, is recognized as a site of hemispheric importance for shorebirds, based on estimates of as many as 1,000,000 shorebirds passing through on a single day during peak spring migration periods. The majority of both wintering and migrating individuals are made up of one species, the Western Sandpiper (*Calidris mauri*).

The Western Sandpiper, a small bird weighing less than an ounce, is the most numerous shorebird along the Pacific Flyway population of a few million birds. They nest principally in the arctic and sub-arctic zones of western Alaska, on the Yukon-Kuskokwim Delta and Seward Peninsula. Small numbers breed in northern Alaska and on the Chukchi Peninsula in Northeast Russia. Western Sandpipers winter mainly in coastal lagoons from California to Peru, along the southern Atlantic Coast, and the Gulf of Mexico to Central and South America. Around 200,000 Western Sandpipers winter within the San Francisco Bay Estuary, most to the south of the San Mateo Bridge.

Through the support of the U.S. Fish and Wildlife Service, the National Biological Service (now the U.S. Geological Survey) and a host of other individuals, agencies and organizations, recent studies of Western Sandpipers at San Francisco Bay have revealed much about their ecology. These studies were greatly aided by the use of small radiotransmitters to track movements of animals. A tiny radiotransmitter on the

back of the bird emits a signal at a specific frequency. A receiver and antennas pick up these specific frequencies. If the bird with the radiotransmitter is in range, the receiver sounds a beep. The range of the radiotransmitter is a few kilometers or a couple miles if the receiver is on the ground and up to 10 km or over 6 miles if the receiver is in an airplane. In 1995, we initiated a radiotelemetry study to follow the migration of Western Sandpipers from San Francisco Bay north to their breeding grounds.

To begin our study of these birds, we captured Western sandpipers in mid to late April in 1995 and 1996 at Don Edwards San Francisco Bay National Wildlife Refuge. Birds were harmlessly trapped with mistnets placed in salt ponds and along salt pond levees, and then measured, banded and released. A total of 58 Western Sandpipers had 0.9 gram (.03 ounce) radiotransmitters glued to the feathers on their lower backs. The nice thing about this method is that once a bird reaches the breeding grounds, the radio is molted off with the old feathers. After birds were radiomarked at San Francisco Bay, we listened for their radio signals from trucks and airplanes equipped with tracking equipment. When we knew a bird was missing from the San Francisco Bay, we contacted other trackers to the north and asked them to begin listening. Along with our many collaborators, we searched sites (mostly using airplanes) from Humboldt Bay in California all the way to the Yukon-Kuskokwim Delta in Alaska (over 4,000 km or 2,500 miles away from San Francisco Bay).



Locations of major western sandpiper monitoring sites, 1995-1996

What did we find out about the migration of Western Sandpipers that pass through San Francisco Bay? First of all, it appears that male Western Sandpipers migrate through San Francisco Bay before the females. Early spring migration (April 10-20) of Western Sandpipers at San Francisco Bay is dominated by male birds, which may represent Western Sandpipers that wintered at the Bay as well as early migrants from more southerly sites. Reasons for this are not entirely clear, however we do know some things. First of all, male Western Sandpipers generally winter farther north than females. Most of the Western Sandpipers that winter in California and northern Mexico appear to be males, while the

females are more abundant from Panama down into South America. The later pulse of females at San Francisco Bay is probably birds moving up from the south. It is generally unknown where Western Sandpipers are coming from, but birds banded in Mexico and Panama have been resighted within the estuary during the spring migration.

The second thing of interest that we found is that San Francisco Bay birds were detected at all of the coastal sites that we monitored (see Table). We take this to mean that Western Sandpipers require a series of stopover sites along their migration route. While it is true that they can fly from San Francisco Bay up to Alaska without stopping, we found that it was rare for them to do so. It appears as if they make stops every 300 to 1,000 km (190 to 620 miles) to rest and refuel. For instance, Western Sandpiper #4706, a male bird that we radiomarked in 1996, was banded on April 18 behind the headquarters of the Don Edwards San Francisco Bay National Wildlife Refuge. He stayed in the south Bay until sometime on May 1. On May 3 we picked him up for one day at Grays Harbor, Washington (about 1,000 km or 620 miles to the north of San Francisco Bay). Six days later we detected the bird for one day at Yakutat Forelands, Alaska and the next day he was at the Copper River Delta (about 3,000 km or 1,860 miles from San Francisco Bay) where he spent two days and was not heard from again.

One site stood out as being extremely important for our birds, the Copper River Delta in Alaska. The Copper River Delta lies at the south end of the Prince Williams Sound and each spring is host to millions of migratory birds heading to their sub-arctic and arctic breeding grounds. We found that 65% of the radiomarked birds from San Francisco Bay were detected at the Copper River Delta, making it the single most important stopover site for birds marked at San Francisco Bay.

After our birds stopped at the Copper River Delta, they headed up to their final breeding destinations at Bristol Bay, on the Yukon-Kuskokwim Delta, and perhaps farther north. We were very interested to learn how long it took birds to migrate from the San Francisco Bay to sites in Alaska. One bird astounded us by flying from San Francisco Bay to the Copper River Delta in about 42 hours, or at over 70 kilometers per hour (44 mph)! In general, however, Western Sandpipers take 10 to 15 days to travel from San Francisco to the Copper River Delta, staying 1 to 4 days at each place they stop. They would not want to reach the breeding grounds too early since it is likely to be snowy and cold with little food at breeding sites in early May. At the same time, they do not want to be too late since the breeding season up there is very short. Their average arrival to the breeding grounds is around May 15.

Recovery Location	1995	1996
Humbolt Bay, California	-	9
Grays Harbor, Washington	5	11
Fraser River Delta, British Columbia	8	8
Stikine River Delta, Alaska	3	9
Yakutat Forelands, Alaska	2	7
Copper River Delta, Alaska	16	20
Cook Inlet, Alaska	3	3
Bristol Bay, Alaska	1	2
Mulchatna River, Alaska	-	2
Yukon-Kuskokwim Delta, Alaska	3	3

The Western Sandpipers passing through San Francisco Bay use all of the major coastal estuaries we monitored in the 4,000 km (2,500 mile) stretch between San Francisco Bay and the Yukon-Kuskokwim Delta, revealing the extraordinary interconnectedness of the wetlands along the north coast of our continent. Maintaining healthy populations of Western Sandpipers depends on suitable habitat within this procession of estuaries and bays. Along the Pacific Flyway, public lands, such as Don Edwards San Francisco Bay National Wildlife Refuge, Humboldt Bay National Wildlife Refuge, Grays Harbor National Wildlife Refuge and the Copper River Delta in the Chugach National Forest, offer vital refuge for these migrating birds.

San Francisco Bay, which hosts the largest wintering population of Western Sandpipers, and one of the largest migrant populations, is undoubtedly a critical link in this series. The maintenance of feeding and roosting habitat for Western Sandpipers within San Francisco Bay should be a management priority. During peak spring migration, approximately April 1 through May 15, Western Sandpipers are especially sensitive to disturbance within the Bay. Within that period, birds must be able to maintain and increase the quality of their body condition to ensure successful northward migration and breeding.

San Francisco Bay is a vital place for shorebirds. The protection of the remaining habitat within the Bay area is of extreme importance if we are to continue to enjoy the unique spectacle of millions of birds passing through our urban environment.

***Nils and Sarah Warnock**, Forest and Rangeland Ecosystem Science Center, U.S. Geological Survey, are biologists currently living in Corvallis, Oregon, have studied shorebirds in the San Francisco Bay area for over 12 years.*

***Mary Anne Bishop**, Center for Streamside Studies, University of Washington and Copper River Delta Institute, Pacific Northwest Research Station, U.S. Forest Service, is a research biologist with the U.S. Forest Service and studies bird use of the Copper River Delta in Alaska.*