Western Sandpiper

Calidris mauri

Class: Aves

Order: Charadriiformes

Review Status: Reviewed (Alaska)

Version Date: 15 February 2023

Conservation Status

Table 1 Conservation status according to state, national, and international organizations and agencies.

Organization	Rank
NatureServe	G5/S4
ADF&G	Species of Greatest Conservation Need
IUCN	Least Concern
Audubon Alaska	Yellow

Final Rank

Conservation Category: **III. Orange**

High status and low biological vulnerability and action need

Table 2 ASRS categorical scores. Higher numerical scores denote greater concern.

Category	Range	Score
Status	-20 to 20	6
Biological	-50 to 50	-24
Action	-40 to 40	-8

Status

Variables measure the trend in a taxon's population status or distribution. Higher status scores denote taxa with known declining trends. Status scores range from -20 (increasing) to 20 (decreasing).

Population Trend in Alaska (-10 to 10)

Suspected to be declining based on counts during migration and non-breeding (Canham et al. 2021 and references therein; Andres et al. 2012a).

Score: 6

Distribution Trend in Alaska (-10 to 10)

Unknown.

Score: 0

Status Total: 6

Biological

Variables measure aspects of a taxon's distribution, abundance and life history. Higher biological scores suggest greater vulnerability to extirpation. Biological scores range from -50 (least vulnerable) to 50 (most vulnerable).

Population Size in Alaska (-10 to 10)

The global population is estimated at 3.5 million birds, nearly all of which breed in Alaska (ASG 2019). Although the number of birds is certainly greater than 25,000, it is important to note that the data used in this estimate was collected nearly 30 years ago (Franks et al. 2014).

Score: -10

Range Size in Alaska (-10 to 10)

Breeds along Alaska's western and northern coasts from the Alaska Peninsula north to Point Barrow and Camden Bay (Franks et al. 2014). Also found on St. Lawrence Island (ASG 2019). Estimated range size is ~290,000 sq. km, based on range map from ACCS (2017a).

Score: -8

Population Concentration in Alaska (-10 to 10)

Several areas of concentration have been documented. During migration, these areas include the Stikine River Delta in Southeast Alaska, the Copper River Delta in southcoastal Alaska, and Cook Inlet/Kachemak Bay in southcentral Alaska (ASG 2019). The Yukon-Kuskokwim Delta is also an important area during migration and during breeding, where it is estimated to support more than >50% of the population (Franks et al. 2014; ASG 2019). The number of Western Sandpipers that pass through these areas is astounding, with more than half a million birds seen along a stretch of tidal flats in a single day and several millions observed over the course of migration (Isleib and Kessel 1973; Senner et al. 1981). We therefore estimate that the number of important concentration sites does not exceed 25.

Score: 2

Reproductive Potential in Alaska

Age of First Reproduction (-5 to 5)

While Western Sandpipers can breed in their first year of life, most begin to breed when they are 2 years old (Franks et al. 2014).

Score: -5

Number of Young (-5 to 5)

Females lay a single, 4-egg clutch every year; re-nests are possible if the first one fails (Franks et al. 2014).

Score: 1

Ecological Specialization in Alaska

Dietary (-5 to 5)

Compared to other shorebirds, Western Sandpipers seem to have a fairly diverse diet, which varies spatially and temporally (Senner et al. 1989; Franks et al. 2014). During the breeding season, they consume larval and adult insects, as well as spiders and invertebrates found in

wetlands, tidal flats, and along the margins of ponds. During migration, their diet shifts to one that is more marine-based;clams, crustaceans, and polycheate worms are consumed (Franks et al. 2014). Biofilm also appears to be an important dietary component during migration (Kuwae et al. 2008).

Score: -5

Habitat (-5 to 5)

Nest sites are typically situated on coastal plains in upland or well-drained tundra dominated by dwarf shrubs or graminoids (Johnson and McCaffery 2004; Franks et al. 2014). Foraging takes place in nearby wetlands, tidal flats, and along the margins of ponds. During migration in Alaska, found along intertidal habitats, especially mud flats, but also in salt marshes and on beaches (Bishop 2007; Taylor et al. 2010; Franks et al. 2014).

Score: 1

Biological Total: -24

Action

Variables measure current state of knowledge or extent of conservation efforts directed toward a given taxon. Higher action scores denote greater information needs due to lack of knowledge or conservation action. Action scores range from -40 (lower needs) to 40 (greater needs).

Management Plans and Regulations in Alaska (-10 to 10)

Protected under the Migratory Bird Treaty Act (MBTA 1918). Open for subsistence harvest (AMBCC 2020), but subject to regulations.

Score: -10

Knowledge of Distribution and Habitat in Alaska (-10 to 10)

Distribution and habitat associations during breeding and migration is known from surveys and research studies conducted across large parts of its range (e.g., Bishop 2007; Johnson et al. 2007a; Taylor et al. 2010; Hope et al. 2018; Weiser et al. 2018). Radio-telemetry tags affixed to some individuals have also contributed to our understanding of migratory routes and habitat use (e.g., Iverson et al. 1996; Bishop 2007 and references therein; Taylor et al. 2011). Additional research is needed to link overwintering individuals to specific breeding sites (Fernández et al. 2010).

Score: -10

Knowledge of Population Trends in Alaska (-10 to 10)

Detected during multi-species bird surveys on breeding and non-breeding grounds, but data are inadequate for determining statewide population trend (Andres et al. 2012a).

Score: 2

Knowledge of Factors Limiting Populations in Alaska (-10 to 10)

While the Western Sandpiper is considered to be a well-studied shorebird, our understanding of the factors that limit this species' population and distribution remains largely speculative. In large part, this is due to knowledge gaps about seasonal adult survival rates and the factors that influence them; like other long-lived vertebrates, adult survival rates are thought to have the largest influence on changes to this species’ population size (Fernández et al. 2010). Several estimates of annual survival rates have been published (e.g., Sandercock et al. 2000; Johnson

et al. 2010; Weiser et al. 2018c). Interestingly, annual survival, along with nest density and site fidelity, appears to be relatively lower at the northern edge of the Western Sandpiper's breeding range (Saalfeld and Lanctot 2015; Weiser et al. 2018c), although the reasons for this regional variation remain unknown. Harvest estimates for Alaska point to negligible take on breeding grounds. Approximately 600 "small shorebirds", which includes Western Sandpiper and 26 other species, are estimated to be harvested in Alaska each year (Naves et al. 2019).

Comparatively more is known about the factors that affect breeding parameters such as nest survival and hatch dates (Ruthrauff and McCaffery 2005; Kwon et al. 2018; Weiser et al. 2018b). Environmental conditions such as date of snowmelt and temperature affect clutch size, while predator densities affect nest survival (Weiser et al. 2018b). Concentrations of environmental contaminants in eggs do not appear to be of concern, though only a small number of eggs were tested (Saalfeld et al. 2016).

In addition to information on adult survival, additional research is needed to develop demographic models, establish estimates of juvenile dispersal and juvenile survival (Fernández et al. 2010), and investigate the degree to which Western Sandpipers are being exposed to pesticides in their non-breeding habitats (Strum et al. 2010).

Score: 10

Action Total: -8

Supplemental Information

Variables do not receive numerical scores. Instead, they are used to sort taxa to answer specific biological or management questions.

Harvest: Not substantial

Seasonal Occurrence: Breeding

Taxonomic Significance: Monotypic species

% Global Range in Alaska: >10%

% Global Population in Alaska: >90%

Peripheral: No

References

Alaska Center for Conservation Science (ACCS). 2017a. Wildlife Data Portal. University of Alaska Anchorage. Available online: http://aknhp.uaa.alaska.edu/apps/wildlife

Alaska Migratory Bird Co-Management Council (AMBCC). 2020. Regulations for the 2020 Alaska Subsistence Spring/Summer Migratory Bird Harvest. Office of the Alaska Migratory Bird Co-Management Council, U.S. Fish & Wildlife Service, Anchorage, AK, USA.

Andres, B. A., P. A. Smith, R. G. Morrison, C. L. Gratto-Trevor, S. C. Brown, and C. A. Friis. 2012a. Population estimates of North American shorebirds, 2012. Wader Study Group Bulletin 119(3):178-194.

Alaska Shorebird Group (ASG). 2019. Alaska Shorebird Conservation Plan, Version III. Alaska Shorebird Group, Anchorage, AK, USA. Available online: https://www.fws.gov/alaska/mbsp/mbm/shorebirds/plans.htm

Bishop, M. A. 2007. Monitoring migrant and breeding shorebirds on barrier island beaches of the Copper River Delta, Alaska. Final report, Project T-1-16, Alaska Department of Fish and Game, Nongame Program, Cordova, AK, USA.

Canham, R., S. A. Flemming, D. D. Hope, and M. C. Drever. 2021. Sandpipers go with the flow: Correlations between estuarine conditions and shorebird abundance at an important stopover on the Pacific Flyway. Ecology and Evolution 11(6):2828–2841.

Fernández, G., N. Warnock, D. B. Lank, and J. B. Buchanan. 2010b. Conservation Plan for the Western Sandpiper (*Calidris mauri*), Version 1.1. Manomet Center for Conservation Sciences, Manomet, MA, USA.

Franks, S., D. B. Lank, and W. H. Wilson Jr. 2014. Western Sandpiper (*Calidris mauri*), version 1.0. In Poole, A. F., ed. Birds of the World. Cornell Lab of Ornithology, Ithaca, NY, USA. DOI: 10.2173/bow.wessan.01

Hope, D. D., M. C. Drever, J. B. Buchanan, M. A. Bishop, G. Matz, and M. J. F. Lemon. 2018. Trends in timing of spring migration along the Pacific Flyway by western sandpipers and dunlins. The Condor 120(3):471–488. DOI: 10.1650/CONDOR-17-126.1

Isleib, M. E., and B. Kessel. 1973. Birds of the North Gulf Coast- Prince William Sound region, Alaska. Biological Papers of the University of Alaska no. 14. Reprinted by the University of Alaska Press 1992. University of Alaska Fairbanks, AK, USA.

Iverson, G. C., S. E. Warnock, R. W. Butler, M. A. Bishop, and N. Warnock. 1996. Spring Migration of Western Sandpipers along the Pacific Coast of North America: A Telemetry Study. The Condor 98(1):10–21.

Johnson, M., and B. J. McCaffery. 2004. Use of upland tundra habitats by western and rock sandpipers during brood-rearing on the Yukon-Kuskokwim Delta, Alaska. Wader Study Group Bulletin 103:36–39.

Johnson, J. A., R. B. Lanctot, B. A. Andres, J. R. Bart, S. C. Brown. S. J. Kendall, and D. C. Payer. 2007a. Distribution of breeding shorebirds on the Arctic Coastal Plain of Alaska. Arctic 60(3):277-293. DOI: 10.14430/arctic220

Johnson, M., D. R. Ruthrauff, B. J. McCaffery, S. M. Haig, and J. R. Walters. 2010b. Apparent Survival of Breeding Western Sandpipers on the Yukon-Kuskokwim River Delta, Alaska. The Wilson Journal of Ornithology 122(1):15–22.

Kuwae, T., P. G. Beninger, P. Decottignies, K. J. Mathot, D. R. Lund, and R. W. Elner. 2008. Biofilm Grazing in a Higher Vertebrate: The Western Sandpiper, *Calidris mauri*. Ecology 89(3):599–606.

Kwon, E., W. B. English, E. L. Weiser, S. E. Franks, D. J. Hodkinson, D. B. Lank, and B. K. Sandercock. 2018. Delayed egg-laying and shortened incubation duration of Arctic-breeding shorebirds coincide with climate cooling. Ecology and Evolution 8(2):1339–1351. DOI: 10.1002/ece3.3733

Migratory Bird Treaty Act (MBTA). 1918. U.S. Code Title 16 §§ 703-712 Migratory Bird Treaty Act.

Naves, L. C., J. M. Keating, T. L. Tibbitts, and D. R. Ruthrauff. 2019. Shorebird subsistence harvest and indigenous knowledgein Alaska: Informing harvest management and engaging users in shorebird conservation. The Condor 121(2):duz023. DOI: 10.1093/condor/duz023

Ruthrauff, D. R., and B. J. McCaffery. 2005. Survival of Western Sandpiper broods on the Yukon-Kuskokwim Delta, Alaska. The Condor 107:597–604.

Saalfeld, S. T., and R. B. Lanctot. 2015. Conservative and opportunistic settlement strategies in Arctic-breeding shorebirds. The Auk 132(1):212–234. DOI: 10.1642/AUK-13-193.1

Saalfeld, D. T., A. C. Matz, B. J. McCaffery, O. W. Johnson, P. Bruner, and R. B. Lanctot. 2016. Inorganic and organic contaminants in Alaskan shorebird eggs. Environmental Monitoring and Assessment 188(5):1–7. DOI: 10.1007/s10661-016-5270-y

Sandercock, B. K., D. B. Lank, R. B. Lanctot, B. Kempenaers, and F. Cooke. 2000. Ecological correlates of mate fidelity in two Arctic-breeding sandpipers. Canadian Journal of Zoology 78:1948–1958.

Senner, S. E., G. C. West, and D. W. Norton. 1981. The spring migration of western sandpipers and dunlins in southcentral Alaska: Numbers, timing, and sex ratios. Journal of Field Ornithology 52(4):271–284.

Senner, S. E., D. W. Norton, and G. C. West. 1989. Feeding ecology of western sandpipers, *Calidris mauri*, and dunlins, *C. alpina*, during spring migration at Hartney Bay, Alaska. Canadian Field-Naturalist 103(3):372-379. Available online: https://biodiversitylibrary.org/page/34348204

Strum, K. M., M. J. Hooper, K. A. Johnson, R. B. Lanctot, M. E. Zaccagnini, and B. K. Sandercock. 2010. Exposure of nonbreeding migratory shorebirds to cholinesterase-inhibiting contaminants in the Western Hemisphere. The Condor 112(1):15-28. DOI: 10.1525/cond.2010.090026

Taylor, A. R., R. B. Lanctot, A. N. Powell, F. Huettmann, D. A. Nigro, and S. J. Kendall. 2010. Distribution and community characteristics of staging shorebirds on the northern coast of Alaska. Arctic 63(4):451–467. DOI: 10.14430/arctic3334

Taylor, A. R., R. B. Lanctot, A. N. Powell, S. J. Kendall, and D. A. Nigro. 2011. Residence time and movements of postbreeding shorebirds on the northern coast of Alaska. The Condor 113(4):779–794. DOI: 10.1525/cond.2011.100083

Weiser, E. L., S. C. Brown, R. B. Lanctot, H. R. Gates, K. F. Abraham, R. L. Bentzen, …, B. K. Sandercock. 2018b. Effects of environmental conditions on reproductive effort and nest success of Arctic-breeding shorebirds. Ibis 160(3):608–623. DOI: 10.1111/ibi.12571

Weiser, E. L., R. B. Lanctot, S. C. Brown, H. R. Gates, R. L. Bentzen, J. Bêty, ..., and B. K. Sandercock. 2018c. Environmental and ecological conditions at Arctic breeding sites have limited effects on true survival rates of adult shorebirds. The Auk 135(1):29–43. DOI: 10.1642/AUK-17-107.1

Alaska Center for Conservation Science
Alaska Natural Heritage Program
University of Alaska Anchorage
Anchorage, AK