**Supplementary Material**

Lesterhuis AJ, Clay RP, Centrón S, Aldabe J. 2024. Impact of habitat change on abundance of Buff-breasted Sandpiper Calidris subruficollis and other Nearctic shorebirds in Bahía de Asunción, Paraguay. Wilson Journal of Ornithology 136(4). DOI: 10.1676/23-00044.

**Western Hemisphere Shorebird Reserve Network (WHSRN)**

WHSRN is a conservation initiative built around a grassroots, voluntary network of public and private partners working to protect the ecological integrity of the most important sites for shorebirds throughout the Americas (Myers et al. 1987, Harrington et al. 2002). Sites can qualify to join the Network if they meet 2 criteria: (1) Demonstrated importance for shorebirds; (2) Agreement of the sites’ responsible entity (or entities) to include shorebird conservation in management practices. A site’s importance for shorebirds is based on peak species counts or on calculated turn-over rates. Importance for shorebirds is assessed in terms of overall numbers and/or percentage of the biogeographic population, with each site categorized in 1 of 3 levels (Table S1). Currently a total of 121 sites in 20 countries form part of the Network, protecting key sites along the flyways for at least 38 species of shorebirds.

**Table S1.** Biological criteria for sites to become eligible as a Western Hemisphere Shorebird Reserve Network site. \* WHSRN created the “Landscape” category to accommodate vast areas or complex habitats where defining a “site” is not feasible.

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| --- | --- | --- |
| Level | Importance | Criteria |
| 1 | Sites/Landscapes\* of Hemispheric Importance | At least 500,000 shorebirds annually; AND/OR At least 30% of the biogeographic population for a species |
| 2 | Sites of International Importance | At least 100,000 shorebirds annually; AND/OR  at least 10% of the biogeographic population for a species |
| 3 | Sites of Regional Importance | At least 20,000 shorebirds annually;  AND/OR  At least 1% of the biogeographic population for a species |

**Table S2.** Presence and abundance of shorebirds at Bahía de Asunción generally declined after dredging operations in 2010. Presence rate, highest count and mean count for shorebirds surveyed at Bahía de Asunción during 2000–2004 (pre-dredge, n = 88 surveys) and 2011–2016 (post-dredge, n = 50 surveys). Common species have 30% presence rate or higher in this study. Mean count was not calculated for uncommon species (indicated with “–”). \*\* Accidental species.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Species | Presence  (% of total surveys) | Max count | Mean count | % Change in mean count post-dredge |
| **Common species** | | | | | |
| American Golden Plover  (*Pluvialis dominica*) |  |  |  |  |
| Pre-dredge | 73% | 172 | 21.3 |  |
| Post-dredge | 38% | 144 | 8.1 | -62% |
| Upland Sandpiper  (*Bartramia longicauda*) |  |  |  |  |
| Pre-dredge | 33% | 16 | 1.6 |  |
| Post-dredge | 26% | 11 | 1 | -38% |
| White-rumped Sandpiper  (*Calidris fuscicollis*) |  |  |  |  |
| Pre-dredge | 81% | 500 | 86.8 |  |
| Post-dredge | 50% | 314 | 20.3 | -77% |
| Pectoral Sandpiper  (*Calidris melanotos*) |  |  |  |  |
| Pre-dredge | 90% | 600 | 110.3 |  |
| Post-dredge | 62% | 243 | 21.9 | -80% |
| Buff-breasted Sandpiper  (*Calidris subruficollis*) |  |  |  |  |
| Pre-dredge | 68% | 250 | 24.3 |  |
| Post-dredge | 40% | 37 | 4.6 | -81% |
| Stilt Sandpiper  (*Calidris Himantopus*) |  |  |  |  |
| Pre-dredge | 65% | 229 | 11.3 |  |
| Post-dredge | 26% | 23 | 1.9 | -83% |
| Solitary Sandpiper  (*Tringa solitaria*) |  |  |  |  |
| Pre-dredge | 49% | 14 | 1.8 |  |
| Post-dredge | 52% | 19 | 1.8 | 0% |
| Greater Yellowlegs  (*Tringa melanoleuca*) |  |  |  |  |
| Pre-dredge | 50% | 14 | 1.6 |  |
| Post-dredge | 24% | 11 | 0.9 | -44% |
| Lesser Yellowlegs  (*Tringa flavipes*) |  |  |  |  |
| Pre-dredge | 94% | 374 | 45.6 |  |
| Post-dredge | 48% | 144 | 7 | -85% |
| Wilson’s Phalarope  (*Phalaropus tricolor*) |  |  |  |  |
| Pre-dredge | 46% | 40 | 5.1 |  |
| Post-dredge | 30% | 129 | 7.7 | 51% |
|  | | | | | |
| **Uncommon species** | | | | | |
| Black-bellied Plover  (*Pluvialis squatarola*) |  |  |  |  |
| Pre-dredge | 10% | 5 | – | – |
| Post-dredge | 2% | 1 | – | – |
| Rudy Turnstone  (*Arenaria interpres*)\*\* |  |  |  |  |
| Pre-dredge | 5% | 1 | – | – |
| Post-dredge | 0 | 0 | – | – |
| Hudsonian Godwit  (*Limosa haemastica*) |  |  |  |  |
| Pre-dredge | 30% | 6 | – | – |
| Post-dredge | 6% | 2 | – | – |
| Red Knot  (*Calidris canutus*) |  |  |  |  |
| Pre-dredge | 6% | 3 | – | – |
| Post-dredge | 0 | 0 | – | – |
| Sanderling  (*Calidris alba*) |  |  |  |  |
| Pre-dredge | 7% | 3 | – | – |
| Post-dredge | 6% | 4 | – | – |
| Baird’s Sandpiper  (*Calidris bairdii*) |  |  |  |  |
| Pre-dredge | 15% | 5 | – | – |
| Post-dredge | 4% | 4 | – | – |
| Dunlin  (*Calidris alpina*)\*\* |  |  |  |  |
| Pre-dredge | 1% | 1 | – | – |
| Post-dredge | 0 | 0 | – | – |
| Spotted Sandpiper  (*Actitis macularius*) |  |  |  |  |
| Pre-dredge | 2% | 2 | – | – |
| Post-dredge | 4% | 1 | – | – |

**Literature cited**

Harrington BA, Brown SC, Corven J, Bart J. 2002. Collaborative approaches to the evolution of migration and the development of science-based conservation in shorebirds. The Auk 119:914.

Myers JP, Morrison RIG, Antas PZ, Harrington BA, Lovejoy TE, et al. 1987. Conservation strategy for migratory species. American Scientist:19–26.