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SEVENTH MEETING OF THE WESTERN HEMISPHERE SHOREBIRD GROUP, 10–14 NOVEMBER 2017, PARACAS, PERU

Eveling A. Tavera & Enver Ortiz López

The Seventh Western Hemisphere Shorebird Group (WHSG) Meeting was held at the DoubleTree Resort by Hilton Paracas, in Paracas, Ica, Peru, during 10–14 November 2017. The Local Committee for this consisted of members of Centro de Ornitología y Biodiversidad (CORBIDI), with the assistance of students from San Luis Gonzaga de Ica National University. The WHSG meets biennially with previous meetings held in Boulder, Colorado, USA (2006), Maturin, Venezuela (2007), Mazatlán, Mexico (2009), Vancouver, British Columbia (2011), Santa Marta, Colombia (2013) and Virginia, USA (2015). The Paracas meeting welcomed 189 participants from 23 different countries; there were four international plenary speakers (Guy Morrison, Nigel Clark, Patricia Gonzalez and Theunis Piersma), ten symposia comprising 134 oral presentations, and 36 poster presentations. In addition, three pre-conference workshops took place on 9 November on: Buff-Breasted Sandpiper *Calidris subruficollis* Conservation; Shorebird Banding (led by the North American Banding Council); and Shorebird Conservation and Shrimp Aquaculture in the Western Hemisphere. Two workshops were held during the main meeting: e-Bird Data Analysis and the Initiative for the Conservation of Coastal Wetlands and Shorebirds on the Arid Pacific Coast of South America. In addition a side meeting took place on 10 November led by representatives of the Peruvian Minister of the Environment (MINAM) and CORBIDI to take the first steps to create a National Shorebird Conservation Plan for Peru. In this meeting, Rob Clay, representing the Western Hemisphere Shorebird Reserve Network (WHSRN) presented the 101st site selected to be part of the network: The Virrilá Estuary, Peru.

Arturo May and Nicholas Gibler provided simultaneous translations for the entire meeting from Spanish into English and vice versa.

The meeting location, Paracas, is one of the main tourist attractions of Peru so several excursions were available on 12 November, organized and coordinated by Enver Ortiz. A total of 115 people participated in the field trips to see: Andean birds; shorebirds and seabirds at Ballestas Island and Paracas National Reserve; with one cultural and traditional trip to Ica with an aerial view of the Nazca lines.

The Scientific Committee responsible for the program was chaired by Fernando Angulo, and consisted of David Lank, Mark Drever, Patricia Gonzalez, Conor McGowan, Nathan Senner and Luis Navedo. Committee members carefully evaluated both oral presentations and posters to create the General Scientific Program, which is available online at: *http://www.corbidi.org/uploads/4/9/8/9/49890817/program_whsg2017.pdf*.

The book of abstracts of the 7th WHSG meeting can be downloaded from: *http://www.corbidi.org/uploads/4/9/8/9/49890817/libro_de_resumenes_whsgc7_v3_web.pdf*.

FINANCIAL SUPPORT

The Travel Award Committee provided 80% of the total cost for travel, accommodation and food for 42 students from the Western Hemisphere and for 37 professionals from Latin America. Acquisition and management of finances was led by Rick Lanctot. These awards were made possible by generous donations by the David & Lucile Packard Foundation (arranged by Josh Donlan), the US Forest Service (Jim Chu – International Programs), National Audubon Society (Stan Senner, River Gates), Manomet, Inc. (Stephen Brown, Rob Clay), and the Pacific Flyway Council. The Peruvian government's CIENCIACTIVA-CONCYTEC event organization provided the majority of funds needed to host the meeting in Peru; awarded to CORBIDI after a national competition. The Local Committee also received financial support to offset the costs of the meeting from Environment and Climate Change Canada (Mark Drever), MINAM, The National Service of Natural Protected Areas by the State (SERNANP), International Conservation Fund of Canada (ICFC), Aleteos Almacén, ISA-rep and the Union of Ornithologists of Peru (UNOP). The Silent Auction was a huge success that helped raise travel funds for the next meeting. The Eighth WHSG meeting will be held in Panama, in October 2019; Rosabel Miró, the Executive Director at Audubon Panama (*rosabelmiro01@gmail.com*), will serve as the chair of the Local Committee.

EXECUTIVE COMMITTEE MEETING

The first official Executive Committee meeting of the WHSG was held on 11 November 2017. Several major changes were made to the Terms of Reference of the WHSG, which outlines the organization and management of the group. The Executive Committee agreed that:

- The term lengths of the Chair and the other Committee members were changed from two years to six years. However, the Graduate Student representative will continue to serve two-year terms. Eveling Tavera, the Chair of the Seventh WHSG meeting, agreed to continue in position for the next four years.

Eveling Tavera, the first Chair of the WHSG Executive Committee.

- The Chair will be responsible for coordinating biennial meetings with the Local Committee Chair and the Local Committee Chair will be responsible for meeting logistics and finances.
- There should be a new online website to be active in early summer 2018 (*www.westernshorebirdgroup.org*). This is in addition to the current listserv (to join send a blank e-mail to: *whsg-join@lists.fws.gov)* and Facebook page. The Executive Committee thanks Manomet Inc. for purchasing the website domain name and paying the maintenance fees for the first year. The website will aim to recruit more shorebird enthusiasts and enhance communication about the activities of the WHSG, the people involved throughout the Western Hemisphere, and the incredible shorebird conservation, management and education being conducted.

AWARDS

Many awards were presented during the banquet on the night of 14 November. Enver Ortiz, who organized the Student Prize Committee, presented the Best Oral Paper Award to Valeria Araya from Chile for her talk entitled "Surveying for antibiotic resistance in long-distance migratory shorebirds", and the Best Poster Award to Gianco Angelozzi from Venezuela for his poster on "Description of the diet of three small calidridine sandpipers on a tropical coastal lagoon". Jim Chu also presented two awards on behalf of the United States Forest Service's *Wings Across the Americas* program. The International Cooperation Award went to Guy Morrison and Enrique Bucher. The Communities in Conservation Award went to Richard Johnston and Vianey Ramírez. Stephen Brown of Manomet, Inc. presented the 2017 Pablo Canevari Award to Wayne Burke from Barbados. Brad Andres described Wayne as an avid shorebird conservationist and founder of the Barbados Shorebird Conservation Trust. In 2008, Wayne began working with BirdLife International to lead efforts with local hunters to address the unsustainable take of shorebirds on Barbados. His efforts led to many favorable changes in the culture of hunting on the island, including self-imposed bag limits by hunters, and the creation of the Woodbourne Shorebird Refuge among other extremely important habitats for shorebird conservation in the country.

For the first time, two new biennial awards were presented to honor Allan Baker and Lewis Oring. Amazing hand-painted plates (designed and painted by Rocio Landivar) were given to each winner, along with a $1,000 monetary award. The *Allan Baker Lifetime Achievement Award for Shorebird Conservation* was given to Guy Morrison. Guy is a legendary character, who has been involved with shorebird conservation for 50 years. In the 1980s, in partnership with Ken Ross, he carried out a shorebird survey along the entire coast of South America; he was also instrumental in founding the WHSRN. He was appointed a Member of the Order of Canada for his contributions to the conservation of Arctic shorebirds and other migratory species. Although he has retired from Environment and Climate Change Canada, where he worked as a Senior Research Scientist for many years, he retains an emeritus position and continues to contribute to Environment Canada's role of ensuring that wildlife is conserved and protected.

Finally, the *Lewis W. Oring Lifetime Achievement Award for Shorebird Research* was presented to David (Dov) Lank and Connie Smith. Dov Lank has devoted 30 years' research work to understanding reproductive strategies within and between the sexes of a variety of shorebirds and other species viewed in the context of population biology and evolutionary ecology. He is most noted for his

Patricia González presenting the Allan Baker Lifetime Achievement Award for Shorebird Conservation to Guy Morrison.

Lew Oring (center) presenting the Lewis W. Oring Lifetime Achievement Award for Shorebird Research to Connie Smith and Dov Lank.

extensive research on Ruffs *Philomachus pugnax* in which he has, through careful maintenance of a captive flock, unraveled the genetic mysteries associated with male mating strategies and plumage variation. His work and the way he has motivated others has inspired many graduate students to pursue careers in behavioral and conservation ecology. He has always and continues to work as a Research Associate and Adjunct Professor in the Behavioral Ecology Research Group at the Centre for Wildlife Ecology (CWE) at Simon Fraser University, Canada. Connie has been a major supporter of Dov, his graduate students, and the CWE department (not to mention their two daughters) for >30 years. Her invaluable assistance has enabled Dov, his students, and all the many shorebird projects to enjoy great success over the years.

SYMPOSIA AND WORKSHOPS

NABC Shorebird Bander Training and Certification Workshop, Paracas, Peru 2017

Organized by Lesley Howes and Christian Friis

The second North American Banding Council shorebird bander training and certification workshop involved topics such as: 1) legal responsibilities and the role of government; 2) scientific and ethical standards; 3) human health and safety considerations; 4) essentials of shorebird capture, including the appropriate use of audio-lures and reducing risk of injury and capture myopathy; 5) ageing on the non-breeding grounds; 6) capture of birds with mist, whoosh and cannon nets; 7) visual and electronic markers and attachment methods; 8) feather and blood collection; 9) data management and data sharing; and 10) the Pan American Shorebird Program and the importance of coordination, resighting flags and how to report them.

There were two breakout exercises where participants were invited to share, demonstrate and practice some techniques and skills in the field. The first session reviewed bird band types, sizes, correct band placement and application, and band corrections and removal. The second session focused on how to make high quality flags (including engravings) and how to safely attach them to birds. There was also a field training session during the evening of 15 November with 20 participants. Topics covered were capture and banding site selection, how to set up mist nets, how to manage net rounds and a field crew, shorebird extraction and handling, and processing shorebirds in the field. Over 30 people from eight countries attended the workshop and 13 participants took the NABC shorebird certification exam. Twelve people passed the exam and will earn certificates as an assistant, bander or trainer once they have met all remaining certification criteria including sufficient practical experience for their level.

Biofilm and Shorebirds

Organized by Ron Ydenberg

Biofilms grow on all kinds of surfaces, and are important in settings as diverse as industrial piping and civic water systems, the preservation and restoration of paintings, dental health, and much else. Interest in biofilms is growing as their importance is recognized. Mudflat surfaces throughout the world are coated with biofilm, consisting of microorganisms, other tiny creatures and some debris, all contained within a matrix of mucilaginous substances secreted by the microbes. The stickiness of biofilms (think 'snot') contributes to the stability of mudflats, and it is consumed by a wide variety of invertebrates such as clams and snails. The discovery that biofilm is an important food source for some small calidridines was a first for any vertebrate, and biofilms are for a variety of reasons now important in shorebird research. However, our understanding is limited, and there is a need for more data on how widespread biofilm foraging is among shorebirds, for measurement methods that are more useful in the field, for better knowledge of biofilm dynamics and the environmental factors influencing its growth, on its nutritional importance for sandpipers, and much else. We organized this session to bring together shorebird researchers active in this area, and here we briefly summarize each presentation.

Talks included an assessment of biofilms and the omega fatty acids produced by marine organisms at Roberts Bank, on the Fraser River estuary in British Columbia. Measured in a state-of-the-art laboratory, the data reveal a profile of 28 different fatty acids, including saturated fatty acids ('SFA'), monounsaturated fatty acids ('MUFA'), as well as some of the polyunsaturated fatty acids ('PUFA') believed to be essential, including omega 3s. Measures of the quantity of biofilm at the same site were presented by Jay Rourke. To do so, scrapings of the mudflat surface were carefully collected at locations across the site, and the amount of each of 30 components of biofilm (the 28 fatty acids, chlorophyll a, total carbohydrates) was measured. Other topics included the use of a portable chlorofluorometer to measure biofilm dynamics in the field. The instrument is capable of quickly measuring the density of chlorophyll a and hence can log hundreds of measurements over the course of a single tidal interval. Another measuring device uses isotopes to estimate biofilm contributions to diets of shorebirds by measuring isotopes in exhaled breath. This technique has the advantage that breath is easy to collect, and all the carbon in a properly-collected sample has been through the metabolism of the captured sandpiper. Finally the session included a talk on biofilm-consumption by southbound Semipalmated Sandpipers *Calridris pusilla* in the upper Bay of Fundy on the Atlantic coast of Canada. This species feeds on biofilm primarily at night, and the use of biofilm may be related to the decline of their previous main prey item, the amphipod *Corophium volutator*. Biofilm has a fatty acid profile similar to *C. volutator.* There was compelling evidence that consumption of biofilm was higher in the arm of the Bay where biofilm had higher proportions of n–3 PUFAs.

Buff-breasted Sandpiper Conservation Workshop

Organized by Richard Lanctot

The third meeting of the Buff-breasted Sandpiper Working Group was held a day before the formal WHSG meeting. Previous meetings had considered updates on the natural history, status, distribution, and threats facing the species; developed and revised the species conservation plan, and helped develop new proposals on migration tracking, habitat use, and surveys throughout the species' annual cycle.

Lew Oring gave the first presentation in which he described his studies of the species in Oklahoma during 1961–1963. His early work focused on the unique courtship and territorial behaviors of the species, as well as how the length and frequency of stopovers affect migration monitoring. Lee Tibbitts and Rick Lanctot next spoke about a full-cycle migration tracking study designed to uncover areas of use and factors in those areas that may be contributing to the species' decline. Next Natalia Martínez-Curci described her upcoming post-doctoral study that will: 1) evaluate the influence of landscape variables in the patterns of abundance and distribution of grassland shorebirds, and 2) use this information to construct habitat suitability maps. She described her proposed use of the normalized difference vegetation index to estimate forage above-ground net primary production that may help extrapolate population densities to short and tall grass areas.

Arne Lesterhuis then spoke about habitat use and threats faced by Buff-breasted Sandpipers at migration and wintering sites in seven countries in South America using GPS-Argos tagged birds. Birds were found in grasslands (both flooded and dry), agricultural fields, and wetlands. Potential threats included urban expansion and habitat clearance, and contaminants in agricultural fields. Joaquin Aldabe next described how forest cover and tall grass negatively influenced the presence of Buff-breasted Sandpipers and American Golden-plovers *Pluvialis dominica*, and how short grass areas had lower arthropod levels, suggesting that these species use short grass for other reasons, perhaps for easier detection of predators or prey.

Next Juliana Almeida spoke about conservation efforts and current threats facing Buff-breasted Sandpipers at Lagoa do Peixe National Park in Brazil. Some of the challenges include: 1) a history of conflict between the park and community, 2) land ownership, 3) resource use, 4) isolation from the shorebird community, and 5) lack of staff and capacity. A Shorebird Ecology, Conservation, and Habitat Management Workshop was held at the park in 2017 to show staff how cattle ranching can be used as a management tool to produce high-quality Buff-breasted Sandpiper habitat. Juliana further described efforts to promote good governance at the site and ways to establish a legal framework for allowing cattle to remain in the park.

Arne Lesterhuis gave his second talk on the status of the Buff-breasted Sandpiper in Asunción Bay, Paraguay. Although it was declared as a WHSRN site of Regional

Importance for Buff-breasted Sandpipers in 2008, development of a road (Costanera) in 2010 destroyed about 70% of the shorebird habitat. Buff-breasted Sandpiper numbers declined thereafter. In 2013, Guyra Paraguay began restoring parts of the bay, including beach cleaning, removing invasive vegetation, and creating shallow ponds of water.

Gustavo Sanchez next described his group's efforts to develop a shorebird program in Bolivia that would focus on Buff-breasted Sandpipers. This program would include environmental education, identification of key sites, monitoring and banding. Then Fernando Faria described the population size and trends of Buff-breasted Sandpipers in Brazil. Population size models yielded estimates ranging from 1,415 to 2,718 birds at three survey sites during a seven-year period. The Torotama Island and Lagoa do Peixe sites had the highest bird densities in all years and there was a population increase through time. Then Fernando described some aspects of trophic relationships between Buff-breasted Sandpiper and other shorebirds at Torotama Island using fecal samples and stable isotope analysis.

Lindsay Brown talked about density trends and habitat use of Buff-breasted Sandpipers in the Rainwater Basin, Nebraska. Using a revised survey protocol in 2016 and 2017, she described how densities appear to have increased in the most recent years, perhaps due to a population increase, or by changes in the proportion of the population using the Rainwater Basin. Lindsay then described a modeling effort that indicated Buff-breasted Sandpipers consistently selected higher and flatter areas in an apparent homogeneous agricultural area.

Finally, Jim Lyons spoke about monitoring Buff-breasted Sandpipers during northbound migration through the Flint Hills ecoregion of E Kansas and NE Oklahoma, and the Western Gulf Coastal Plain ecoregion of Texas and Louisiana. In the Flint Hills ecoregion, extrapolation of population densities indicated 12,782 to 20,727 birds were present. These surveys showed that the species used areas with a high proportion of native grass, little development, and that had been recently burned. In the Western Gulf Coastal Plain ecoregion, an estimated 2,637 birds were present at the surveyed points in 2016 (no extrapolation to unsurveyed area) but precision around this estimate was poor. Analyses are underway for 2017 and surveys will continue in April 2018, when density estimates will be combined with turnover rates generated from a tracking study to generate more precise population estimates.

Following the completion of the scheduled talks, Isadora Angarita of BirdLife International Americas Partnership Secretariat asked the group to participate in a future update of the species conservation plan using an open standards methodology so as to identify new and high priority threats, as well as strategies to resolve these threats in a full life-cycle framework. This update would also incorporate climate change impacts developed by BirdLife International. At the very end of the meeting, a lengthy discussion was held among researchers participating in a winter ground tracking study to take place shortly after the meeting in Argentina, Brazil, and Uruguay.

Within-species differences in migration strategies

Organized by Jesse Conklin & Yvonne Verkuil

Individuals in a species or a population can differ in migration strategies; such differences may manifest in, for example, timing of movements or molt, duration of non-stop flights and stopovers, or management of trade-offs between time and energy. How these strategies arise dictates whether they will stably co-exist or lead to the evolution of separate populations. This symposium aimed to spotlight shorebird systems in which multiple migration strategies exist, to gain insight into the mechanisms driving these differences, and their potential ecological and evolutionary consequences.

Talks included the use of geolocators and direct observation to show that northward departure date of Bar-tailed Godwits *Limosa lapponica* from New Zealand has advanced since 2008. The rate of advance depended on an individual's breeding destination in Alaska: on average, southern breeders advanced by three days, whereas northern breeders advanced by eight days. However, after longer stopover durations in Asia, neither group arrived in Alaska earlier. This suggests that the earlier New Zealand departures may represent differential responses to staging conditions experienced by the two groups *en route*, rather than to changing breeding phenologies.

Data from PTT-tracked Hudsonian Godwits *Limosa haemastica* migrating between southern Chile and breeding sites in Alaska showed that the godwits used different routes and strategies on their northward and southward migrations: the former journey includes a direct oceanic flight to central North America followed by one or few stopovers, whereas the latter includes a more indirect route through the eastern USA, involving shorter flights and multiple stops in South America. Additional variation is contributed by the occurrence of mid-continental storms during migration, which can prompt unexpected stops and delay arrival in Alaska by up to five days. These additional stops appeared to be more disruptive to schedules of birds with only one 'planned' stop, because they did not compensate by reducing time spent at the main staging site.

Next, the various migration strategies used by Alaska-breeding Marbled Godwits *Limosa fedoa* were discussed. Using multi years of satellite-tracking, and despite high breeding and non-breeding site-fidelity, individuals showed substantial annual variation in both timing and routes of migration, and these differences were not obviously correlated with environmental variables.

A 20-year multi-species study was presented on how fueling strategies can differ at the same northward staging site. At Delaware Bay, Ruddy Turnstones *Arenaria interpres* gained mass earlier in the season and more slowly than did Red Knots *Calidris canutus*, which could gain mass

very rapidly but with more variation in timing, and were more sensitive to temporal variation in food availability.

The final presentation indicated that a revision of global population structure in Red Knots was needed. Genetic research indicated that two populations migrating in the Americas (subspecies *rufa* and *roselaari*) are much more distantly related than previously thought, and probably reflect secondary contact after a long period of isolation. Also, the Wrangel Island and Alaskan breeding populations, currently considered the same subspecies *roselaari*, are genetically distinguishable.

The Migratory Shorebird Project: connecting communities of the Americas through climate-smart conservation science

Organized by Matthew Reiter

With climate change as a long-term threat that will compound existing threats to migratory shorebirds such as coastal urbanization, human disturbance, and pollution, wetland managers and conservation decision-makers need to be even smarter in their work today to set and accomplish management goals that will be sustainable and effective for generations to come.

The Migratory Shorebird Project (*www.migratoryshorebirdproject.org*) was initiated in 2011 to establish a coordinated research and monitoring network throughout the non-breeding range of *Pacifica* Dunlin *Calidris alpina* and Western Sandpiper *Calidris mauri*. This hypothesis-driven 10-year project facilitates climate-smart conservation actions because it provides essential knowledge on multiple species and ecosystems over a broad scale, assesses several current and future threats, and prioritizes the landscape for conservation and management actions. Currently, more than 40 organizations in 12 countries are actively participating in the Migratory Shorebird Project, applying standardized survey protocols, and centralizing data through the California Avian Data Center.

The symposium consisted of eight presentations that highlighted progress by the Migratory Shorebird Project to provide data and solutions that support coastal wetland and shorebird conservation both now and in the future. The objectives of the symposium were to:

1. Highlight the extensive network of project locations conducting coordinated research and monitoring across 12 countries along the Pacific Coast of the Americas.
2. Share research of the impact of threats on shorebirds and the benefits of conservation actions.
3. Increase awareness of the value of hypothesis-driven coordinated research and monitoring at a broad scale.
4. Promote understanding of how the Migratory Shorebird Project enables climate-smart conservation.
5. Enhance recognition of the value of standardized protocols and centralized data management that enables large-scale research and monitoring.

After an overview presentation, two talks evaluated changes in population sizes and distributions in the Upper Bay of Panama and on the Baja Peninsula in Mexico respectively. The following three presentations highlighted the impact of specific threats to shorebirds including drought, predators and human disturbance, and habitat loss. Lastly two talks targeted examples of using Migratory Shorebird Project data to help prioritize conservation actions for shorebirds. One example was specific to conservation planning in Ecuador and the other looked across the Pacific Americas Flyway from Mexico to Peru.

By highlighting both local and broad-scale applications of research and monitoring data, the symposium promoted key climate-smart conservation principles including conservation prioritization and collaboration across sectors. The diversity of research and applications of the findings highlighted the capability of a coordinated research and monitoring network that utilizes standardized protocols and centralized data management to quickly turn data into action. Overall the symposium profiled the tremendous progress the Migratory Shorebird Project is making towards its goal of building capacity to inform conservation and management of shorebirds and the coastal wetlands on which they depend.

Improving habitat through management and good governance

Organized by Diego Luna Quevedo, Brad Winn, and Monica Iglecia

Shorebirds face a myriad of threats throughout their annual cycle. Improving conditions for shorebirds at critical sites along the migratory route can require a multi-pronged approach. Shorebird conservation actions can include land and coastal system management, people management, and improving the capacity of local processes to build agreements about land use and habitat conservation. In this symposium we explored the interface between habitat management and good governance and their role in improving habitats for shorebirds. Nine presentations were provided to illustrate these concepts with concrete examples using habitat management, good governance, or both to improve conservation efforts for shorebirds. Our objectives were to:

1. Provide symposium participants with a broad view of conservation actions that are possible at sites.
2. Share lessons learned about habitat management and governance.
3. Explore best practices.
4. Answer common questions and challenges.

The symposium started with an introduction to management techniques to improve shorebird habitat. "Management" comprises the suite of actions that are needed to reverse negative impacts on shorebirds and their habitats at the local, regional, national, and international scales. It includes concepts of "Good Governance" to guide management actions leading to shorebird conservation that

can benefit shorebird conservation efforts at the intersection of government, civil society, and the private sector. Good governance is guided by principles of accountability, transparency, participation, and social justice, without which it fails to function.

Among others talks there were presentations about the development of a Conservation Plan for Shorebirds in Ecuador that included a multi-sector process involving the government, public, and private sectors, and another about an effort to promote and facilitate shorebird conservation at Lagoa do Peixe National Park, Brazil, which illustrated the value of having a good understanding of both the biological resource value at a site as well as the drivers of local stakeholders.

From Argentina, a presentation summarized significant management, governance, and habitat-protection efforts at Bahia de San Antonio. This talk emphasized the value of long term commitments to conservation at a site, and also highlighted the value of partnering with institutions and agencies with similar environmental health goals, including pollution and human health. From Chile, a presentation described governance and site management at Bahía Lomas in Tierra del Fuego. The talk described the site's management plan and the development of an action plan by both public and private partners to address the major threat of oil spills.

There was a presentation from Colombia on the participative process of working with the local fishermen's group to zone the Iscuandé River Delta and facilitate better land management and conservation. This process defined four environmental zone types: strict protection, conservation, sustainable use, and restoration. A second talk from Chile provided an overview of the wetlands and shorebirds on the arid coast of Pacific South America, and efforts to develop a regional and bi-national initiative to conserve the lagoons, estuaries, bays, and river deltas along the coast.

Finally a discussion was held on species management, and the development and application of best management practices, to support American Oystercatcher *Haematopus palliatus* population recovery efforts. A collaborative working group developed a set of practices to address major threats to the species and improve reproductive success. Initiatives include disturbance reduction, predator management, and community education. With over 40 organizations and institutions implementing these practices, the process has been successful.

The entire symposium highlighted the value of good biological information and the participation of government at all stages of the process. An understanding of local biological resources is important to identify the value of an area for species of concern and to assess the potential population level impacts of local threats to species and also local communities. This information can help identify the partners and stakeholders needed to engage in planning processes using a good governance framework. The participation of government at local, regional, and national levels is important to garner support for regulation and enforcement of local laws and international agreements.

Community Engagement for Shorebird Conservation

Organized by Laura Chamberlin and Diego Luna Quevedo

The main objectives were:

1. To share lessons and learning about community engagement.
2. To explore best practices including program design, social research, sample tools and evaluation.
3. To contribute to the development of a community engagement toolkit.

The symposium started with a brief summary of a community engagement toolkit that the Executive Office of the WHSRN is currently developing. This toolkit provides a step-by-step process that will allow site partners to quickly, efficiently, and effectively develop community engagement programs. Case studies, sample tools, and examples from published research will be provided to assist with the development of a program.

Eight community engagement case studies from sites throughout the Western Hemisphere were presented. Each case study focused on how they: 1) identified the threat, 2) defined their audience with barriers and motivators of change, 3) developed a strategy, 4) implemented actions, and 5) evaluated the work. During the presentation each symposium participant was invited to write on a small piece of paper something they want to learn more about and a tool that they would like to access. These notes were compiled for follow-up.

The first case study included experiences from Ecuador, which focused on sharing the results of the objectives related to increasing awareness from the Site Conservation Plan, with a particular focus on youth education. The second reviewed efforts to reduce human disturbance of wildlife from recreation at the Fraser Estuary in Canada, with a focus on the results of the initial social research that was conducted. In Argentina, work focused on how festivals can be used to engage new stakeholders to facilitate conservation and community action. A study carried out in Colombia reviewed the social research process that Asociación Calidris used to understand the needs for protecting habitat, including identifying audience barriers and motivators, evaluation through shorebird populations, and lessons learned. Further work from Argentina reviewed the development of management plans through participatory experiences and other community engagement activities including environmental education, nature centers, and festivals. Also working in Argentina, Asociación Ambiente Sur provided an overview of community engagement activities, including site-based protection at reserves, participation in a campaign to reduce litter, environmental education at a nature center, mascots, and theatrical presentations. In Chile, the case study illustrated the educational program at the Centro Bahia Lomas, which includes guided tours, workshops with students and teachers, scientific fairs, and theatrical plays, all aiming to increase awareness. And finally the initiative Environment for

Americas focused on the wide range of worldwide activities, particularly International Migratory Bird Day, internship programs, and sample materials.

After the case studies, there was an open discussion on the challenges of community engagement and what is needed to be successful. Among the key challenges that participants highlighted was the need to create protected areas while also conducting community engagement, demonstrating economic benefit and other benefits of shorebird conservation, and the need to address a community's basic human needs first. It was acknowledged that community leaders can create challenges in community engagement by the decisions that they make, and that frequent changes of leaders means projects have to start over with re-engagement of leadership. Funding is always a key challenge with any conservation effort, but is particularly challenging when seeking to work across different sectors for a conservation objective.

Initiative for the conservation of coastal wetlands and shorebirds at the arid Pacific coast of South America: Development of an Action Plan

Organized by Elier Tabilo-Valdivieso, Johannes Burmeister and Cesar Chávez-Villavicencio

The coastal wetlands of the arid coast of the South American Pacific are sites of great ecological value and vital importance for numerous shorebirds. They comprise a chain of river mouths, lagoons, estuaries, and shallow bays, along a coastal stretch of more than 4,000 km between southern Ecuador and central Chile. This is the coastline of the Humboldt Current Large Marine Ecosystem, which has exceptional marine productivity, and a distinctive terrestrial ecosystem. The landscape is dominated by coastal deserts and xeric scrublands, crossed by transverse valleys of the western slope of the Andes. They are particularly fragile sites, subject to tsunamis, the *El Niño*-Southern Oscillation phenomenon, high anthropogenic pressure, and climate change.

The Chilean NGO Centro Neotropical de Entrenamiento en Humedales (CNEH) and the German foundation Manfred-Hermsen-Stiftung (MHS) are committed to jointly promote the protection of fragile and valuable ecosystems in Latin America, including this chain of coastal wetlands. For this reason, we are looking to create a regional initiative, on a scale of this coastal ecoregion, which extends from Chile to Peru and Ecuador, to conserve the chain of coastal wetlands of the South American Pacific, promoted by a network of local stakeholders from the academic, governmental, NGO, and private sectors. The workshop worked on an Action Plan for this initiative to promote an integral approach to coastal wetland conservation with respect to water management, soil use, and adaption to climate change. We hope to establish a multilateral framework at the ecoregion scale for the protection of these coastal wetlands and their avifauna, design a conservation program for the entire chain of wetlands and respective management plans, and support the implementation of relevant international conventions. In the workshop, presentations were given by CNEH and MHS, and by Ben Haase from Ecuador and Daniel Valle Basto from Peru. Subsequently, a draft of the future Action Plan was jointly revised with the group and new elements added.

The main focuses of the draft Action Plan are: 1) to facilitate knowledge about the chain of wetlands, 2) to strengthen their governance, and 3) to improve their management. Future challenges include strengthening the network of stakeholders, coordinating activities with the respective authorities, and creating, jointly with other stakeholders, a program to enhance knowledge and respond to the real needs for conservation of these coastal wetlands and their avifauna along this part of the coast of the Western Hemisphere.

Tools for the conservation of migratory shorebird populations: monitoring physical condition of individuals

Organized by Verónica D'Amico

The conservation of migratory shorebirds presents major challenges related mainly to habitat loss, climate change, risk of acquisition of parasites and pathogens, increasing numbers of predators and changes in the availability of food in the sites they use. These factors are some of those responsible for trends in shorebird populations around the world. While efforts have been made throughout the Americas to conserve habitats and sustain populations of shorebird species in recent years, many populations continue to show serious declines. One of the diagnostic tools of the state of an animal population is monitoring the physical condition of individuals.

Migratory flights are periods of high energy demand, and therefore birds must be in optimal physical condition to be able to face them successfully, to reach the nesting sites and to assure their survival. Birds in poor physical condition may need to stopover at more unknown sites, increasing their exposure to predators and immune-compromised states, which imply that they would be more likely to develop parasitic infections or diseases caused by pathogens during their migrations. Thus, basic data on the general physical condition of shorebirds are key for conservation decisions and the planning of conservation strategies, and consequently for harmonizing natural events with human activities. Therefore, the main objective of the symposium was to highlight current research on the monitoring of the physical condition of migratory shorebirds as a diagnostic tool for determining their population status.

There were presentations related to hematological parameters proposed as indicators of the physical condition of birds during migration, reproduction and over-summering, the risk of acquisition of parasites and pathogens during migration and the ecological and health implications of parasitic helminths. The use of these indicators has gained importance because they can provide early evidence of changes in the status of individuals, even before their reproductive or survival capacity is affected,

thus allowing the problem to be detected sooner and mitigation measures to be taken. In this way they become important tools for the generation of conservation actions by the management entities, in those places where the birds are most vulnerable.

Study of Shorebirds in Peru

Organized by Yaquelin Tenorio

Peru is an important country for shorebirds, supporting around 52 species. More than 20 years ago, the community of Peruvian shorebird researchers recognized a lack of knowledge of these species in the country. This symposium was organized to enable scientists and other interested parties to discuss and share the problems that shorebirds are experiencing in Peru. On the last day of the conference, five talks were presented, each describing studies that were carried out along the coast of Peru. The talks covered general surveys, factors affecting the shorebirds that breed in Peru, the morphological characteristics of calidridines, non-breeding stopover site ecology, and publicizing the importance of the collaboration of work teams to enhance the capabilities of researchers.

All 189 participants from 23 countries at the Seventh Western Hemisphere Shorebird Group meeting, Paracas, Peru, November 2017.

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