



Western Hemisphere Shorebird Group: Fourth meeting, 11–15 August 2011, Simon Fraser University, British Columbia, Canada

The Western Hemisphere Shorebird Group (WHSG) held its fourth meeting at Simon Fraser University, in Burnaby, British Columbia, during 11–15 August 2011, following previous meetings in Boulder (2006), Venezuela (2007), and Mazatlan (2009).

The meeting had a full program with four plenary speakers, 118 oral presentations including those in 11 symposia, 16 posters, two special plenary sessions, plus four associated meetings. A welcome reception, a poster evening, a field trip and a banquet rounded out the activities. Despite a packed agenda, we included enough open time so that people could meet and chat and conduct shorebird business in the corridors. The full meeting program and the abstracts are available online at <http://www.fws.gov/shorebirdplan/Research.htm>.

A particularly important feature of the meeting was its two official languages, Spanish and English. This ease of access for Spanish speakers facilitated a large attendance from Central and South America. As at the previous meeting in Mazatlan, Auturo May and Leo Leal provided simultaneous translation into Spanish or English. We thank them and the numerous helpers who assisted in translation of the abstracts. We hope that future meetings will continue this, perhaps even expanding services to Portuguese and French. We thank Environment Canada, the U.S. Fish and Wildlife Service, the U.S. Forest Service and the U.S. Geological Survey, the Pacific Wildlife Foundation, and Simon Fraser University for the financial and logistical assistance that helped cover the costs for 30 delegates from Latin America and run the meeting.

We heard inspirational talks from four plenary speakers. Erica Nol reviewed her long-term studies of Semipalmated Plovers, Will Cresswell discussed predator shorebird relationships, Brett Sandercock reviewed the demography of shorebirds, and Patricia González described local community

action for Red Knot conservation in Argentina. Symposia titles, organizers and descriptions of each are given below.

A student prize committee chaired by Stephen Dinsmore selected papers by Jesse Conklin (*Carryover effects and compensation: late arrival on non-breeding grounds affects wing moult but not plumage or schedules of departing Bar-tailed Godwits*) and Zachary Monteith (*Assessing the effects of egg harvest on a Netherlands Northern Lapwing population*). The Best Poster Award went to Luciana Musmeci (*Plasticidad en el uso de intermareales por los playeros rojizos en Península Valdés, Patagonia, Argentina: Dieta y selección de presas*). Winners each received a copy of Mark Colwell's new book *Shorebird Ecology: Conservation and Management*, donated by the publisher, the University of California Press.

Two additional prizes were awarded by a one-man committee comprised of Dov Lank. The Cutest Baby Shorebird Picture Award went to the photo Andrea Contreras presented of a Diademed Sandpiper Plover (below). She won a TY Beany Baby snipe.

The Most Surprising Finding Award went to Jesse Conklin (again), for the lack of a carryover effect on moult timing in godwits. He won a novelty gift: a pair of boxer shorts with shorebird pictures printed on them.

We especially thank Connie Smith and Monica Court for the large contributions they made in putting the meeting together, "womanning" the registration desk throughout, and helping in numerous other ways. We thank also the crew of volunteers who helped with projection and a hundred other tasks.

The next meeting is planned for Cali, in Columbia, in 2013. We hope to see you there.

Ronald C. Ydenberg and David B. Lank,
Co-chairs



Diademed Sandpiper Plover. Photo: Luke DeCicco, presented by Andrea Contreras-Sepúlveda.

SYMPOSIA

**Advances in shorebird monitoring:
evaluating the re-distribution hypothesis**

Organized by Mark Drever (*mark.drever@ec.gc.ca*)
and Matthew Reiter (*mreiter@prbo.org*)

Frame bias in shorebird monitoring can occur when the temporal or spatial window of survey effort misses a large fraction of shorebird populations. In the symposium, the sources of frame bias were introduced and reviewed, and two specific case studies of its occurrence during spring migration and the non-breeding period were presented. Frame bias has been presented as an alternate explanation for observed declines in shorebird counts. The main solution for this source of bias is to expand the spatial coverage of monitoring efforts. Recent re-analyses of fall migration counts that encompass all the data from the three major fall migration monitoring programs suggest that declines in counts are not as severe as previously thought based on smaller data sets. However, aerial surveys from French Guyana continue to show strong declines in abundance relative to the 1980s. Alternate emerging solutions to frame bias include habitat-based surveys on the breeding and non-breeding grounds, as well as the expansion of volunteer-driven surveys. Recent advances in data entry online portals will greatly facilitate the participation of large numbers of people and the spatial coverage of the data from these large-scale monitoring programs.

**Predators, predation danger and the
ecology of shorebirds**

Organized by Ron Ydenberg (*ydenberg@sfu.ca*)

Predators and predation danger have played a generally minor role in thought about shorebird ecology and behavior. But over the past twenty years ecologists have learned that predators likely exert strong effects on many taxa and in many systems. The effects are largely “trait-mediated”, or “fear-driven” (i.e. behavioral adjustments made to reduce predation danger) rather than “density-mediated” or “mortality-driven” (i.e. predators kill prey). This symposium included six contributions that described various effects of predators on shorebird ecology.

Shorebirds on working lands

Organized by Khara Strum (*kstrum@prbo.org*)

The loss of natural habitats is one of the largest threats to shorebird populations. Agricultural landscapes have supplanted the majority of the world’s natural wetlands and these working lands are often viewed as incompatible with wildlife habitat. However, agricultural landscapes can provide critical habitat for breeding and non-breeding shorebirds. The Shorebirds on Working Lands session revealed the importance of rice fields and pasture lands to shorebirds in North and South America and how forging partnerships with farmers and ranchers can enhance these habitats for shorebirds. Richard Johnston described the first surveys of inland rice fields in Colombia where shorebird abundance was highest during spring migration when most rice in this region is being planted. The rice fields of the eastern Llanos harboured more than 100,000 shorebirds and at least five migratory species exceed 1% of hemispheric populations. Kristin Sesser showed that wintering Long-billed Curlews use a variety of agricultural habitats, including alfalfa, rice, and irrigated pasture in California’s Central Valley. Joaquin Aldabe explained how,

working with landowners in coastal Uruguay, they developed a grazing regime to manage for short stature grasslands preferred by Buff-breasted Sandpipers. Khara Strum compared shorebird response to four flooding practices in California’s rice fields in winter including an innovative practice developed in cooperation with the rice growing community. New ways of creating shorebird habitat on working lands are being discovered and their value is assessed with science studies. Evaluating current practices is also an important step in shorebird conservation. Zach Monteith showed that the traditional practice of egg harvesting, though controversial, is not negatively impacting Northern Lapwing populations in the Netherlands. All of the studies presented in this session indicated that shorebirds frequently rely on working lands. The challenge is to develop “shorebird-friendly” practices that balance habitat creation with economically feasible farming practices. With so little natural habitat remaining, partnering to enhance working lands is one way to provide crucial habitat for shorebirds.

Western Sandpipers

Organized by Guillermo Fernández
(*gfernandez@ola.icmyl.unam.mx*)
and Stephen Brown (*sbrown@manomet.org*)

The Western Sandpiper symposium was organized to share information on current research on this species. More than 30 people attended all or most symposium presentations. The WESA symposium was well diversified with six presentations describing large-scale research and survey efforts, as well as more intensive, site-specific research designed to increase knowledge at a local scale. In the first presentation, Guillermo Fernández and his colleagues described the first assessment of body condition in NW Mexico during the nonbreeding season. Next, Ana Álvarez-Sánchez and her colleagues presented an account of the genetic identity and structure of wintering birds in Mexico using microsatellites. In the third presentation, Gabriela Gutiérrez-Morales and her colleagues discussed patterns of habitat use during the nonbreeding season at Guerrero Negro, B.C.S. Next, Eunbi Kwon and Brett Sandercock presented interesting age-specific demography and population dynamic analyses. Then, Brigit Schwarz reported that female Western Sandpipers had specific vocalizations at the breeding sites. The last presentation, by Sam Franks and colleagues, characterized the patterns of migratory connectivity across the species’ range.

As in the WHSG Mazatlan 2009 meeting, a major outcome of the symposium and the meeting is closer integration of northern and southern researchers. The high representation of Latin American participants combined with simultaneous translation, which worked remarkably well throughout the meeting, facilitated scientific communication more strongly than ever before. We hope that this will lead to even closer integration of our work together.

Roselaari Red Knot

Organized by Brad Andres (*Brad_Andres@fws.gov*)

Despite the Red Knot being one of the most studied shorebirds in the world, basic biological information on the western North American population *C. c. roselaari* is generally lacking. This subspecies has been petitioned for listing under the U.S. Endangered Species Act and is already listed as threatened in Canada and endangered in Mexico. Some informa-

tion indicates that *roselaari* may be less numerous than the western Atlantic *rufa* population. This symposium presented recent information collected from the wintering, migration, and breeding areas of *roselaari* Red knots.

For the last several years, colleagues at the Autonomous University in Baja California Sur and Pronatura Noroeste have been capturing, marking, and surveying *roselaari* Red Knots on their wintering grounds in western Mexico. From this work (presented by Nallely Arce), Guerrero Negro has emerged as one of the most important wintering sites for Red Knots along the eastern Pacific coast, with average winter abundance of >4,300 knots. Winter abundance was related to temperature, with more knots present during lower temperatures. Banding studies have indicated that the site is used predominantly by adult males. Re-sighting of knots banded in Guerrero Negro (presented by Victor Ayala Perez) has established links between this site and the upper Gulf of California, California, Oregon, Washington, and Alaska; knots banded in Alaska and Wrangel Island, Russia, have also been observed in Guerrero Negro. Adult knots had a greater fidelity to natural habitats than artificial habitats, although the pattern was opposite for juveniles. The upper Gulf of California (Golfo de Santa Clara) was recently discovered as an important stopover and summering site for Red Knots. Adriana Hernández Álvarez described how adult knots stop there en route to their breeding grounds and gain weight by feeding on the eggs of a spawning fish, the Gulf grunion. Immature knots, identified by plumage and abdominal profile differences, spent their first summer on the Gulf.

Moving northward, Joe Buchanan reported on the knot work he has been conducting for the last few years in coastal Washington, where he observed numerous knots banded at Guerrero Negro. From periodic surveys, peak knot abundance in Washington occurs during the second week of May. Knots shifted their within season use of estuaries, perhaps in response to the availability of their bivalve prey. Using re-sightings of birds banded in Mexico, Jim Lyons presented a mark-recapture/re-sight modelling analysis to estimate population size of knots and stopover duration of Red Knots in Grays Harbor and Willapa Bay, Washington. Assuming all Pacific Coast Red Knots pass through these two sites in coastal Washington, their population could be lower than the western Atlantic *rufa* subspecies.

For the last two years, Jim Johnson and his colleagues have been conducting breeding ground surveys in NW Alaska to estimate densities of breeding knots, collect blood samples for genetic analysis, document their breeding biology, and attach (and recover) geolocators. Preliminary results suggest that the Seward Peninsula is likely the hotspot for Red Knots breeding in Alaska. Over the two years, 10 knot nests were located and 31 geolocators were deployed on adults. Results from this study will provide the most detailed information yet available for knots breeding in Alaska.

Rufa Red Knot

Organized by Larry Niles (larry.niles@gmail.com)

The declining status of the *rufa* red knot was the dominant topic of this symposium. Amanda Dey presented strong evidence of further declines since the publication of the status assessment only 4 years ago. These data, including Guy Morrison's surveys of Tierra del Fuego and the northern coast of South America, suggest that the population of Red Knots migrating the longest distance is in grave danger of extinction. Allan Baker presented on his efforts to genetically differentiate the three main wintering areas and concluded the risk of extinction is heightened by the high probability

that the three wintering populations are breeding in separate areas. Reports from Patricia Gonzalez, Joaquin Aldabe and Veronica D'Amico described important work being carried out to assess and ameliorate the threats knots face in the wintering areas and stopovers in the southern cone of South America. The situation at Rio Grande, Tierra del Fuego, is particularly threatening because of the loss of prime foraging areas. The work of these biologists and those working at Península Valdés point to the importance of a coordinated strategy to conserve the many sites used by knots on both their southbound and northbound flights.

Given the problems *rufa* is facing, it is good news that the Chilean national and provincial governments have embraced the long term protection of Bahía Lomas, the most important wintering area for Red Knots in their entire range. Carmen Espoz described efforts to develop a management plan by a variety of public and private entities including Empresa Nacional del Petróleo, the national oil company. Their efforts are highlighted by the development of a nature centre dedicated to educating the public of the value of this important site. Similar efforts in Argentina led by Patricia Gonzalez will provide a strong basis for protection for decades to come.

The *rufa* subspecies of the Red Knot is one of the most studied shorebirds in the world, but new data from geolocators are rapidly expanding our understanding of its migratory ecology. The recovery of 21 units has increased the number of known wintering and stopover sites, especially for birds wintering in the eastern U.S. and the Caribbean. Eight knots with geolocators recovered in Cape Cod, wintered at seven different sites, most previously unknown. Nearly all of 21 recovered geolocators show birds using stopovers in Hudson Bay, including those using the Central Flyway as reported by David Newstead. These new data as well as an expanded understanding of the plasticity of prey and habitat presented by Veronica D'Amico, María de los Angeles Hernández and Luciana Musmeci suggest *rufa* knots may be more resilient than previously thought.

Shorebird hunting in the Caribbean

Organized by Brad Andres (Brad_Andres@fws.gov)

Legal and illegal hunting of some shorebirds breeding in North America occurs throughout their annual ranges. However, shorebird biologists generally lack adequate information to determine if hunting pressure could negatively affect shorebirds at a population level. To begin to unravel this complex question, we sought information on shorebird hunting throughout the island and continental nations, countries, commonwealths, and territories of the Caribbean Basin.

During the early summer of 2011, a SurveyMonkey® questionnaire was developed, and information was solicited from partners throughout the Caribbean Basin. Preliminary results were discussed at the annual meeting of the Society for the Conservation and Study of Caribbean Birds (SCSCB), held in July 2011, and presented at the Vancouver meeting. By this meeting, nine countries/islands had responded, and those where hunting was perceived as a threat included: Barbados, Guadeloupe, Martinique, Puerto Rico, and Trinidad and Tobago.

In this informal workshop, we reviewed the information collected through the SCSCB questionnaire for the Caribbean Basin, reviewed harvest of shorebirds in other U.S. states, Canada, Suriname and French Guiana. Participants in the workshop generally agreed that shorebird harvest had the potential to have a population-level effect on some species and immediate actions were identified that generally included: 1) pressuring governments to close seasons on shorebirds of

conservation concern where appropriate, 2) conduct assessments of the shorebird harvest where little is known about the numbers taken, 3) find resources to increase outreach and enforcement of existing laws where shorebird hunting is illegal, 4) develop more sustainable regulations where hunting is legal and generally only defines the season, 5) increase outreach to hunters about the conservation status of many hunted shorebirds, and 6) highlight cases where shorebird hunting is balanced with conservation ethics.

Since the workshop, two satellite-tagged Whimbrels were shot on Guadeloupe after they had circumnavigated a hurricane and tropical storm. This event rapidly increased awareness of the shorebird hunting issue in a number of lay and professional audiences and accelerated the implementation of several actions identified in the workshop. A full summary is available from Brad Andres at the address above.

Boreal shorebirds

Organized by Jennie Rausch (jennie.rausch@ec.gc.ca)

The boreal forest spans across central and southern Alaska through northern and central Canada to Canada's east coast and is covered by the North American Bird Conservation Initiative's Bird Conservation Regions 4, 6, 7 and 8. With thick spruce forest, floating peat, and dense shrubs, the wetlands of the boreal forest are an incredibly difficult habitat to work in. As a result, almost all aspects of the breeding ecology of boreal shorebirds are poorly documented. Research on and monitoring of boreal shorebirds (at least in Canada) has been sporadic and localized and we have not yet taken full advantage of opportunities to cooperate with partners who work on these species at other points in their life cycle. The goal of the symposium was to bring together biologists and scientists working on shorebirds that breed in North America's boreal forest so we could determine how best to approach future work on these species. There were three presentations: (1) a species-specific look at breeding surveys (Whimbrel in interior Alaska; C. Harwood), (2) results from multi-species survey methodologies testing in the Northwest Territories (J. Rausch), and (3) an examination of the potential usefulness of migration surveys for monitoring boreal-breeding species (P. Smith). The brief discussion following the presentations highlighted the general consensus that breeding surveys in the boreal are extremely challenging. While there were no presentations from the non-breeding grounds in this symposium, presentations in other symposia showed that data are being collected on boreal-breeding species in Central and South America. So, did we come up with a solution to our boreal problem? Not yet! But the conference definitely highlighted that strengthening partnerships between the breeding and non-breeding grounds will be an important component of answering our shorebird questions, especially for those that breed in the boreal forest.

Ecological and evolutionary processes between shorebirds and their prey

Organized by Luis Oscar Bala (luis@cenpat.edu.ar)

Shorebirds are highly specialized for long-distance movements and rely upon available food at migratory stopover sites. The latter are usually very productive areas that receive, during a narrow time window, pulses of high concentrations of shorebirds. This leads to an intensive predatory burden, which in turn acts as an evolutionary mechanism. For each of the wetlands used as a stopover site, there is a specific timing in which food quality and quantity is maximized. Birds

recognize not only optimal sites, but also the timing in which the benefits of migration and foraging are above the energy costs that it requires. Beyond the ecological processes that occur in predator-prey relations, these interactions could, over time, shape co-evolutionary process. Consequently, shorebirds have adaptations that optimize the capture of prey while prey species are adapted to avoid capture. The objective of this symposium was to provide different observations and experiences from specialists about the interactions between birds and their prey and speculate about the ecological and co-evolutionary processes related to them.

The session had five contributions from the entire length of the Americas, from Churchill (Manitoba) in the Arctic to Península Valdés in Patagonia, and including tropical French Guiana. The contributions covered birds in different stages of their life cycle: breeding, wintering and migration. Also the preys involved were as diverse as insects, crustaceans and molluscs, and not forgetting biofilm.

The studies presented unveiled a spectrum of new information. They included possible synchronization between the hatching of *Charadrius semipalmatus* eggs and the increase of insect biomass at the foraging site. We learned that the arrival of birds at a site could be adjusted to match the best quality and quantity of their favourite prey. And it was shown that *Calidris pusilla* has the ability to change the way of searching for prey at night, or how important a "prey" that is invisible to our eyes (biofilm) can be when other food is in short supply.

The topics covered in the symposium are gathering importance in WHSG meetings, and I foresee that studies on predator-prey relations will continue to gain attention in the research agenda in the Americas. Thus, we will have more tools to describe the health of environments that are home to migratory birds.

Plovers

Organized by Clemens Kuepper
(ckuepper@oeb.harvard.edu)

The Plover Symposium was held to celebrate the diversity of this group of often neglected shorebirds. A geographically diverse mix of contributors informed us about recent advances in studies on their demography and distribution, reproductive biology, genetics, migration and conservation of coastal and inland populations. The diversity of the ploverologist community was also reflected by the range of methodologies used by different research and conservation groups. Approaches included long term monitoring of local populations to infer population trends, demographic modelling, GIS informed inference of habitat use and molecular genetics to investigate gene-flow across the species distribution. Despite the visible dominance of talks on relatively well studied species with long standing conservation interest in North America such as Snowy Plover *Charadrius nivosus* and Piping Plover *C. melodus* the lively symposium talks covered aspects of ten of the 18 species that reside in the Western Hemisphere. I would like to thank the organizers for the splendid job they did in bringing us all together and all contributors for their insightful presentations and the lively discussion. I especially would like to thank Medardo Cruz-Lopez who provided a presentation on a long term study of Snowy Plovers in Mexico despite being denied a visa for Canada and Carlos Ruiz-Guerra who delivered two excellent presentations on the status of Colombian plovers from his hospital bed after being involved in a car accident shortly before the symposium.

Black Oystercatcher

Organized by Peter Clarkson (*Peter.Clarkson@ec.gc.ca*)

The “Boystercatcher” symposium brought together a cross section of researchers and managers representing regions and agencies throughout the species range. Presentation topics included monitoring strategies and techniques, local population trends, winter dispersal and associated conservation issues, habitat mapping and modelling the effects of climate change. The symposium led into a raucous and appropriately named

“Boystercatcher” working group session that discussed a variety of topics including: the positive and negative aspects of using citizen science for monitoring; the positive and negative aspects of monitoring chick survival to measure productivity; capture techniques and banding protocol; and whether BOLD or ABOY is the appropriate nomenclature. Rumours were also circulating that Brad Andres will soon be updating the BLOY BNA account. Finally, the Canadian delegation’s recommendation to rename the species as the “Can-Am” Black Oystercatcher was turned down by the clearly pro-American crowd.

COLOR AND ENGRAVED BAND COORDINATION AND RESIGHTING OF SHOREBIRDS WORKSHOP

Organizer: Richard B. Lanctot (*richard_lanctot@fws.gov*)

Panel: Cheri Gratto-Trevor (*cheri.gratto-trevor@ec.gc.ca*), Lesley-Anne Howes (*Lesley-anne.howes@ec.gc.ca*), David Mizrahi (*david.mizrahi@njudubon.org*), Bruce Peterjohn (*bpeterjohn@usgs.gov*)

Marking of shorebirds for conducting studies of breeding ecology, demography, and migration connectivity has expanded exponentially in recent years. This expansion presents difficulties with coordinating banding efforts within a species, especially in situations where numerous researchers are studying the same species and when a species crosses international boundaries. Additional difficulties arise when reporting how birds are marked initially and when birds are resighted, frequently thousands of kilometers from their initial banding site. A panel of experts explored these issues and offered potential solutions to remedy them, with a focus on work being conducted within the Western Hemisphere.

Cheri Gratto-Trevor opened the workshop by discussing her experiences coordinating the Pan American Shorebird Program (PASP) between 1996 and 2006. PASP assigned unique flag colors to individual countries, with the mandate that their assigned colored flag be placed on all shorebirds ringed in that country. She discussed difficulties with researchers not thinking about what they really wanted or needed in a banding program, what band colors to use and where to place them on their species, and the reluctance of people to use flags. She expressed the potential of having a web-based system for administering engraved flag combinations, but felt such a system would be difficult for administering color bands.

Lesley Howes, serving as the current coordinator of PASP, spoke about the challenges of administering the program such as the outlined protocol for marking is not always followed, colour combos used are not always reported to the banding offices or PASP, varying coding syntax used by researchers and errors in reporting that makes coordination and management extremely time consuming and often leads to unresolved sightings. Reports of resighted shorebirds are seldom reported to the banding offices due to the presence of other websites for reporting marked shorebirds. She noted that the number of countries and researchers wanting to mark shorebirds is increasing and she discussed several ways of improving PASP, advised the use of engraved flags when possible and recommended development of a guidance document with species-specific information related to banding and marking.

Next David Mizrahi discussed the issues he faces as a researcher banding large numbers of individuals of a given species. He described banding of Red Knots and Semipalmated Sandpipers and how he and his colleagues are faced with running out of unique engraved color flag combinations (despite having >15,000 codes). He suggested that we consider assigning flags colors to researchers regardless of country. Another option would be to consider more flex-

ibility based on a species’ distribution. For example, orange flags (the color assigned to Argentina) could be assigned to a researcher marking Semipalmated Sandpipers outside of Argentina, as the species is not known to occur in this country. He also discussed the need for centralized coordination throughout the hemisphere, orchestrated by existing federal agencies or possibly third party groups. Finally he described *bandedbirds.org* – a web-based program for reporting resightings of engraved flagged birds – and how modifications to this program might serve the shorebird community for reporting resightings.

Finally, Bruce Peterjohn discussed the latest changes in the U.S. Geological Survey’s Bird Banding Laboratory, including *reportband.gov*, a web-based program for reporting resightings of all bird species, how color-marking data is now obtained through BANDIT (federal band reporting program), and an in-house system for tracking coded marker assignments. He finished by advocating continued use of the PASP but with some modifications for resident or short-distant migrants, the need for coordination with other hemispheric marking systems, and some thorny marking issues (e.g., limits on number of unique codes assigned to researchers, how many birds to mark, how many markers to put on birds).

The workshop ended up establishing a Shorebird Mark and Resight Committee that will address the following questions in the coming year:

1. Should we continue to use the PASP for all shorebird species banded in the Western Hemisphere?
2. How do we make any coordination system widely used, sustainable, and enforceable?
3. Where should researchers report band combinations applied to birds?
4. Where should resightings of color band/engraved codes be reported?
5. Can we identify a process for coordinating and assigning color schemes for individual shorebird species to master banders?
6. How can we resolve technical problems with reporting bands applied to birds and resightings of shorebirds?
7. Can we develop a centralized system for coordinating bands, reporting bands applied to birds, and reporting resightings of banded shorebirds?

These complex questions will require consideration by this committee, and coordination with and participation of the community of shorebird biologists, to create reasonable solutions that will promote future shorebird research activities and the conservation of these species.