2014

Shorebird banding and training within the Upper Bay of Panama Western Hemisphere Shorebird Reserve

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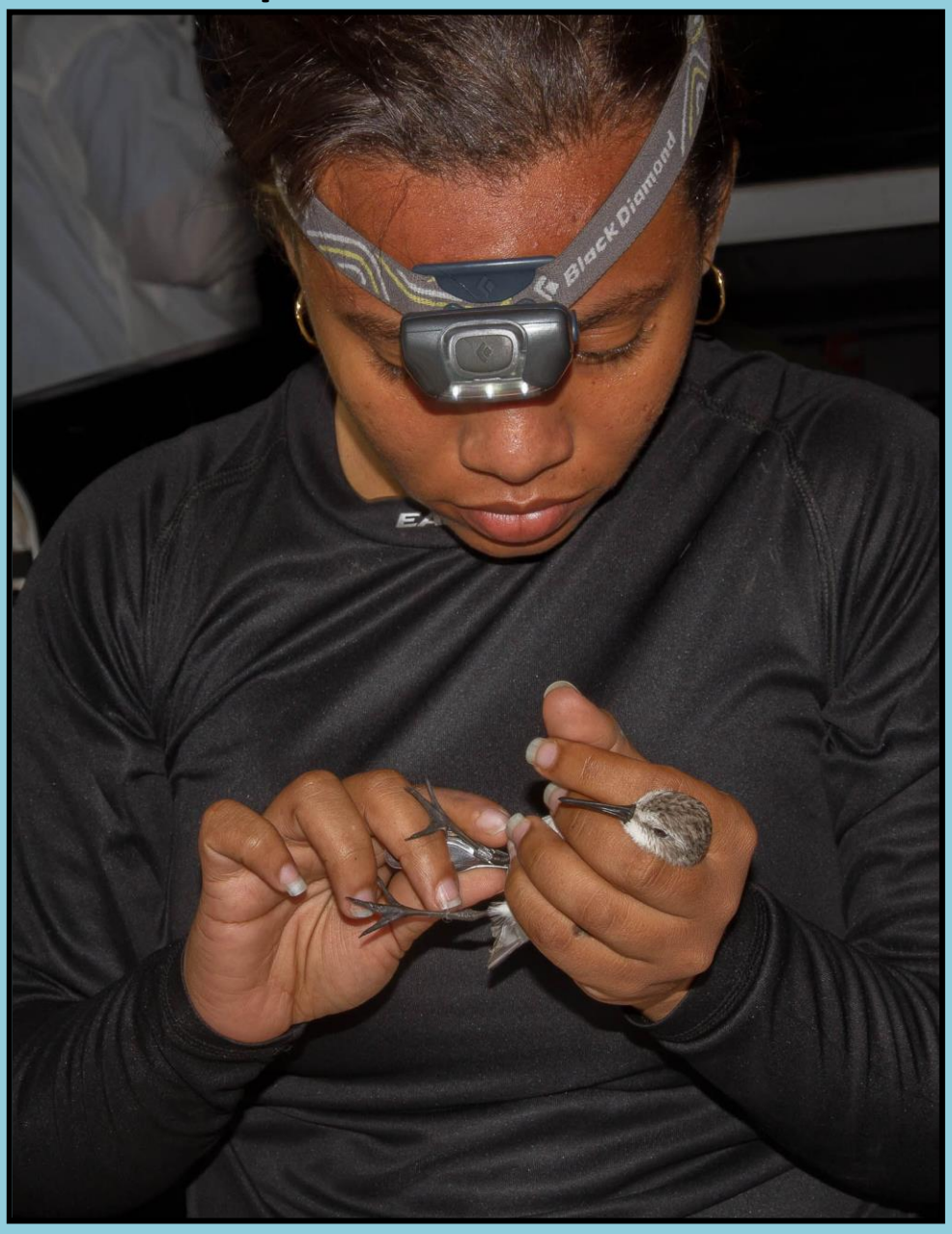

CENTER FOR CONSERVATION BIOLOGY

COLLEGE OF WILLIAM AND MARY

VIRGINIA COMMONWEALTH UNIVERSITY

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Project Partners:
National Audubon Society
Panama Audubon Society
The Center for Conservation Biology

Cover Photo: Stephany Carti banding western sandpiper. Photo by Karl Kaufman.

The Center for Conservation Biology is an organization dedicated to discovering innovative solutions to environmental problems that are both scientifically sound and practical within today's social context. Our philosophy has been to use a general systems approach to locate critical information needs and to plot a deliberate course of action to reach what we believe are essential information endpoints.

INTRODUCTION

Background

Many migratory waterbirds spend as much as three quarters or more of their annual cycle in migration or on the wintering grounds. Their populations depend not only on places to breed but also on the quality and continued availability of habitats within winter areas and along migration routes. The importance of identifying and protecting these nonbreeding habitats has been recognized by conservation organizations throughout the world and represents a formidable international conservation challenge.

The upper Bay of Panama is one of the most significant conservation areas for waterbirds in the Western Hemisphere. The annual cycles of many waterbird species appear to be structured around the resources provided by the Pacific Coast of Panama. The Bahia de Panama, in particular, appears to play a prominent role in the structure of waterbird migration systems throughout the Americas and is a significant wintering site for many species. Protection of habitats and resources within this site is critical to the conservation of waterbirds on a hemispheric scale.

Conservation efforts led by the Panama Audubon Society continue to both educate the public and protect resources within this system. Support and capacity building for these programs is a priority within the broader, international conservation community. One type of capacity building is the training of local biologists in field techniques that will form the foundation of monitoring and other investigations within this important site.

Objectives

Establish Band-resight Program – The resighting of individually marked birds has become a cornerstone field technique for quantifying/estimating several key parameters including population size, movement phenology, site fidelity, and critical demographic rates. Once marked, researchers and the larger bird-watching community has the potential to resight these birds throughout their international range, adding to information on local to hemispheric scales. One of the primary objectives of this project is to deploy individually-coded, field-readable leg flags to help establish a resighting program for the three most abundant shorebird species using the Upper Bay of Panama including western sandpiper, semipalmated sandpiper, and semipalmated plover.

Training – A critical need within the Upper Bay of Panama is to have locally trained teams that are capable of independent field investigations. In order to fully capitalize on mark-resight techniques local teams must be trained on banding techniques to deploy field-readable flags and in resight techniques to survey for bands in an appropriate way. One of the primary objectives of this project is to begin the process of training local biologists in the field techniques needed to operate a successful mark-resight program.

METHODS

Study Area

The 2014 project was conducted along the northern shoreline of the Bay of Panama from Costa del Este east to Pacora (25 January – 6 February, 2014). The upper Bay of Panama experiences a seven meter tidal range that is strongly influenced by both the lunar cycle and frequent winds. This large tidal range in combination with the local geology has resulted in the formation of spectacular intertidal flats that may reach several kilometers in width during low tide periods. These flats are most extensive east of Panama City where the topography forms a narrow coastal plain that gently slopes to the shoreline. Intertidal flats in this area are primarily composed of fine silt and organic components from adjacent mangrove forests. Extensive sand flats are also present, particularly associated with the discharge of large tributaries such as the Rio Pacora. West of Panama City, the topography has much greater relief along the shoreline with intertidal flats alternating with bluffs and rocky cliffs.

Figure 1. Costa del Este mud flat at lower tide. Cracked firm mud in foreground is typically only inundated during the highest tide cycles. Photo by Bart Paxton

The movement of waterbirds within the upper Bay of Panama is dictated by tide stage and the distribution of high-tide roosts. For long-legged waders and some seabirds that roost in trees, on rocky outcrops or offshore islands, the distribution of roosting sites is relatively stable and independent of tide height, resulting in a regular pattern of back-

and-forth movements between feeding and roosting sites. For small shorebirds that roost on the ground, the distribution of roost sites is determined by tide height. During neap tide sequences birds roost in place just above the high tide line around foraging sites. However, as the tide sequence becomes progressively higher advancing toward flood tide, a greater fraction of the intertidal landscape is submerged and birds must move to topographic highs that remain exposed for roosting. Within the upper extremes of the tidal range, very few high bars remain exposed such that birds may fly tens of kilometers to reach suitable roost sites. During the highest tides, birds from foraging sites over a large spatial extent become concentrated within few sites. The dynamic relationship between distribution and tide sequence must be considered when designing monitoring and banding programs within the upper Bay.

Figure 2. Pacora mudflats at low tide. Photo by Bart Paxton

Field Reconnaissance

Reconnaissance was conducted to examine shorebird behavior with respect to tide and geography prior to the selection of banding sites. An initial four-day period was spent to investigate sites including Panama Viejo, Costa del Este west and east, Juan Diaz, and Pacora. Several factors were considered in deliberations about sites including logistics, access, human disturbance, bird use, and characteristics of the site required to conduct all aspects of capture and banding. In addition to this initial period, reconnaissance activity was conducted daily to inform capture strategy. Most days included nightly banding with follow up reconnaissance activity to plan and set up for the following

nights banding. Constant change was required in order to adjust to the rapidly changing tidal regime.

Figure 3. Shorebirds concentrated on elevated area of the flats. These high spots are the last to be inundated as the tide rises and are used by shorebird prior to retreating to their high tide roosts. Photo by Bart Paxton

Banding Sites

Shorebird banding stations were established along the outer mangrove edge of Costa del Este east (Latitude, Longitude WGS84 decimal degrees site A 9.007901, -79.466306, site B 9.007251, -79.463041) and just east of the mouth of the Rio Pacora (9.021286, -79.261057). Costa del Este site A was along the outer mangrove edge just east of the central canal and was accessed by walking along the edge from the canal bridge. Costa del Este site B was several hundred meters east of the canal along the outer mangrove edge and was accessed from the seaside road via a 300-m trail through the mangrove forest. The Pacora site was along the beach and accessed by the farm road.

Capture and Banding Techniques

Each site consisted of 2-6, 12-m, black mist nets (30-mm mesh) placed along the landward edge of the predicted tide. Banding operations were conducted during the night hours to increase the effectiveness of the mist nets. Nets were opened during the latter stages of a rising tide to intercept birds as they were concentrated by the leading

Figure 4. Shorebirds concentrated on a small beach ridge. These small ridges of sand are less susceptible to the wave action of the rising tide and are used by shorebirds as diurnal roosts during moderate tide cycles. Photo by Bart Paxton

Figure 5. Fletcher Smith hauling mangrove branches, used for the construction of walkways to extend mist nets out into the soft mud. Photo by Bart Paxton

Figure 6. Bryan Watts tests one of the mangrove branch pathsPhoto by Bart Paxton

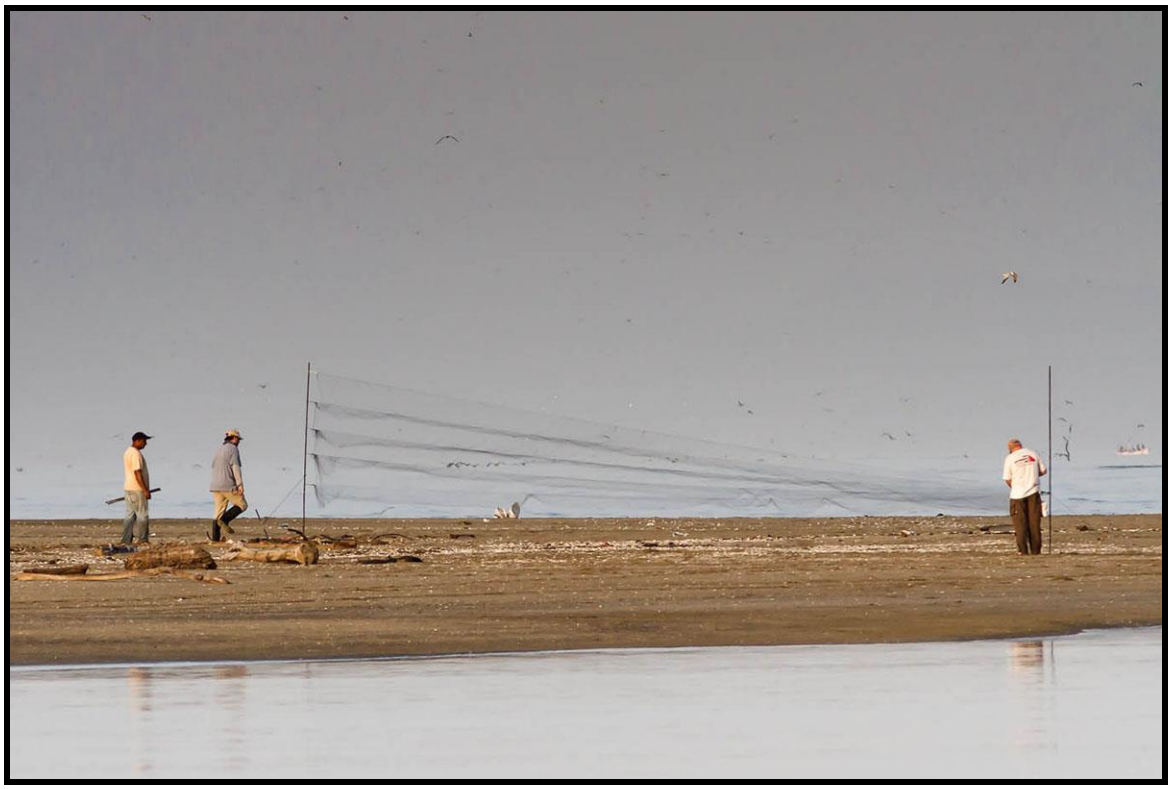

Figure 7. Taking down mist nets from an offshore bar of Pacora beach. These offshore bars are used as nocturnal high tide roosts by shorebirds. Photo by Karl Kaufman

edge of the tide. Once captured, shorebirds were removed from nets and transported in carrying boxes to be stored in a holding facility until they could be processed and released.

Captured birds were measured, weighed, aged, and banded. Morphometric data collected included unflattened wing chord (1 mm units), length of exposed culmen (0.1 mm units), length of tarsus (0.1 mm units), and body mass (0.1 gm units). Unflattened wing chord was measured from the radial-carpel joint to the distal tip of the longest primary using a metric wing ruler. Exposed culmen was measured from the feather line around the base of the bill to the distal tip using dial calipers. Tarsus was measured from the ventral surface of the foot to the proximal end of the tarsus using dial calipers. Weight was measured by placing the bird in a tube on a digital scale. Age was determined as second year (SY) or after second year (ASY) based on the presence of retained buff-tipped, juvenal feathers typically within the inner medial coverts. Birds with retained juvenal feathers were classified as SY and those with only fresh, white-tipped feathers were classified as ASY. Gender in Western Sandpipers was determined by length of exposed culmen. All individuals with culmen length < 24.2mm were considered males and all those with culmen length > 24.8mm were considered females (Page and Fearis 1971). Birds were fitted with USGS aluminum bands on the lower right position, yellow Darvic color band on the upper right position, and a coded flag on the

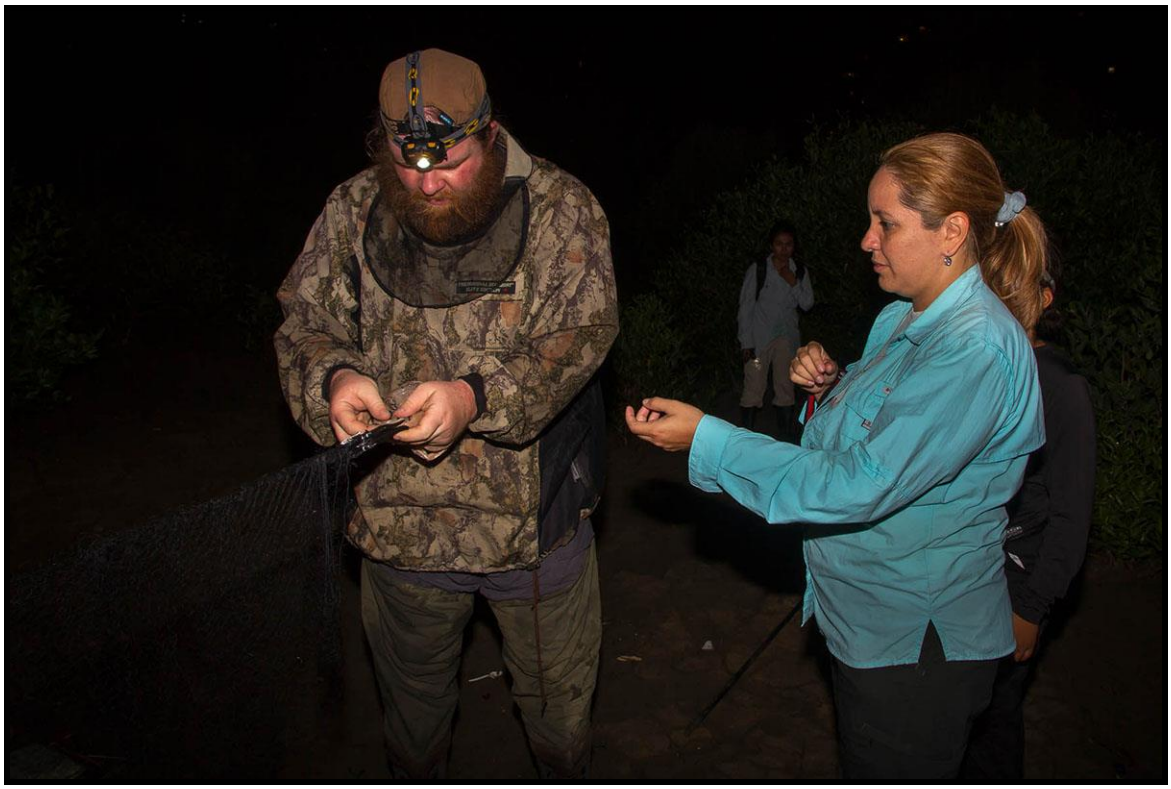

Figure 8. Fletcher Smith and Yenifer Diaz setting up mist nests at Costa del Este. Photo by Karl Kaufman

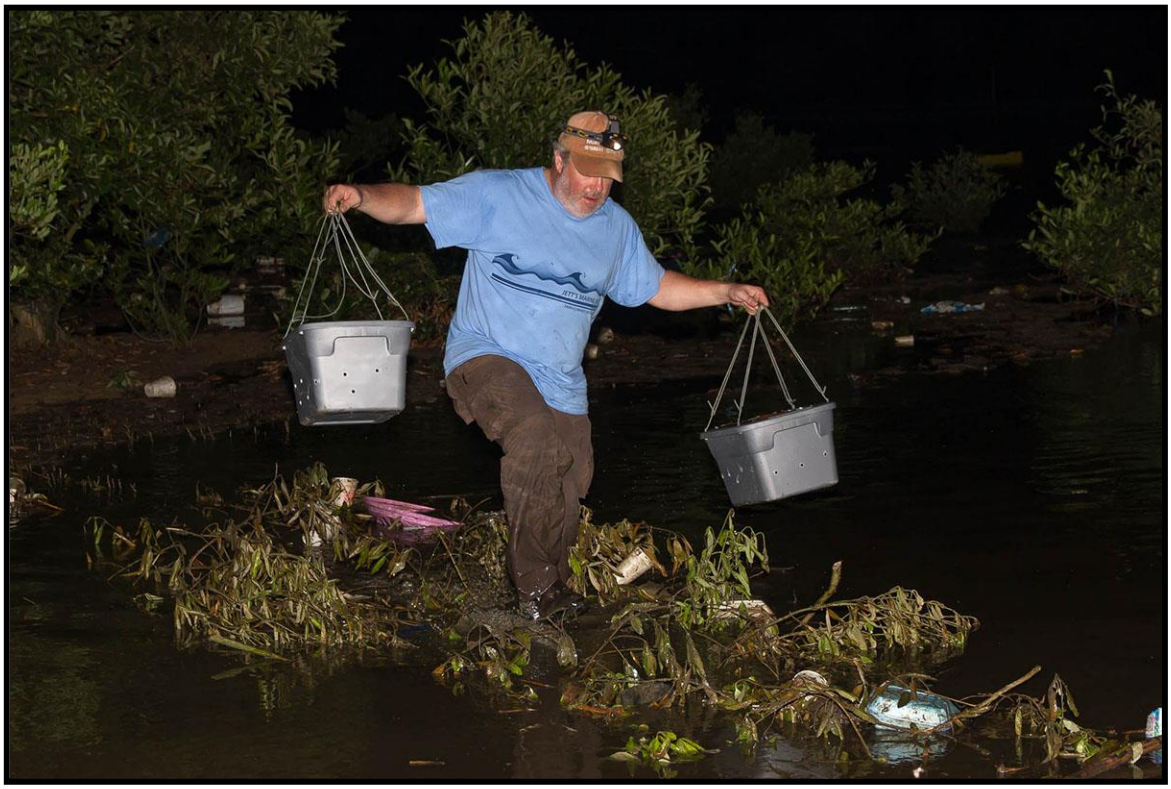

Figure 9. Bart Paxton transporting carrying boxes of shorebirds, across a mangrove branch bridge, to the banding station. Photo by Karl Kaufman

Figure 10. Bryan Watts transfers captured shorebirds from carrying boxes to a temporary holding container. Photo by Bart Paxton

upper left position. Feathers were collected from a subsample of semiplamated sandpipers for contribution to an ongoing connectivity study. Feathers collected from sampled birds included the left and right 6th primary coverts. Feathers were labeled and stored in manila envelopes.

Banding and Resight Training

Training of local biologists in bird handling and banding techniques was conducted during every banding session. Trainees included Panama Audubon personnel, university biologists, agency administrators, and volunteers. Trainees were instructed and observed in bird handling, band application, measurement, aging and recording skills. Limited training was provided in bird extraction skills and in site establishment and site management. Proficiency in bird handling and techniques varies between individuals and is acquired over several sessions of exposure and practice. Proficiency in station management and site establishment requires years of experience and familiarity with target species.

A single training event was held by Panama Audubon Society during International Wetland Day (2 February, 2014) within the Panama Viejo facility to present information to potential volunteers. Approximately 30 students, Audubon members, and individuals from the public attended the event and lectures. Two presentations were given

Figure 11. Measuring the wing chord of a western sandpiper. Photo by Bryan Watts

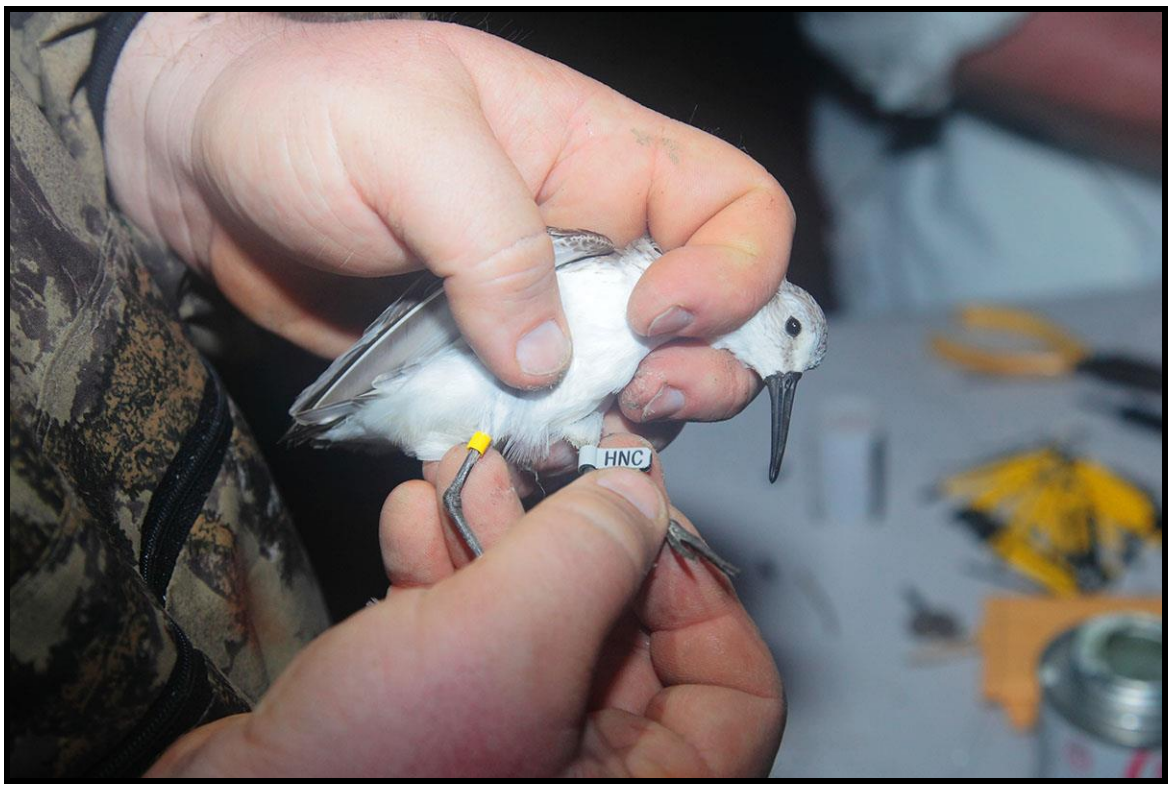

Figure 12. A banded and flagged western sandpiper, showing the yellow color band and the gray alpha-numeric flag. Photo by Bryan Watts

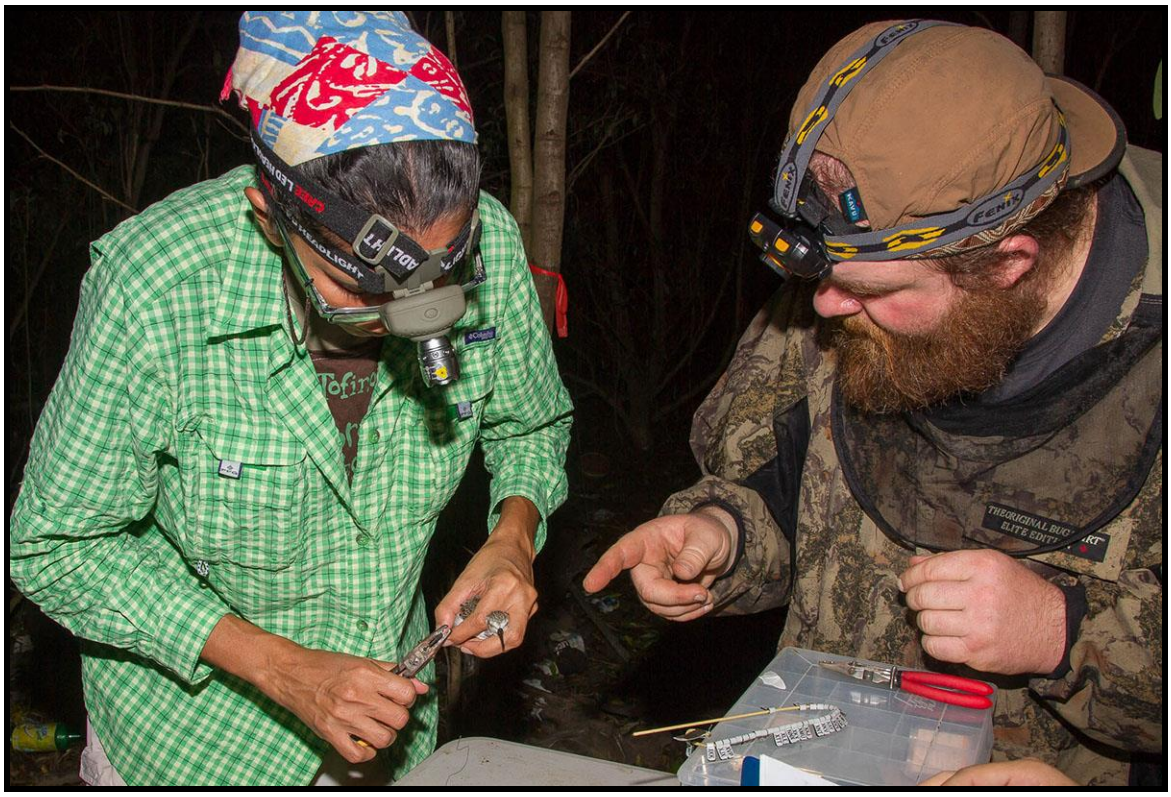

Figure 13. Fletcher Smith instructs Rosabel Miro on proper banding techniques. Photo by Karl Kaufman

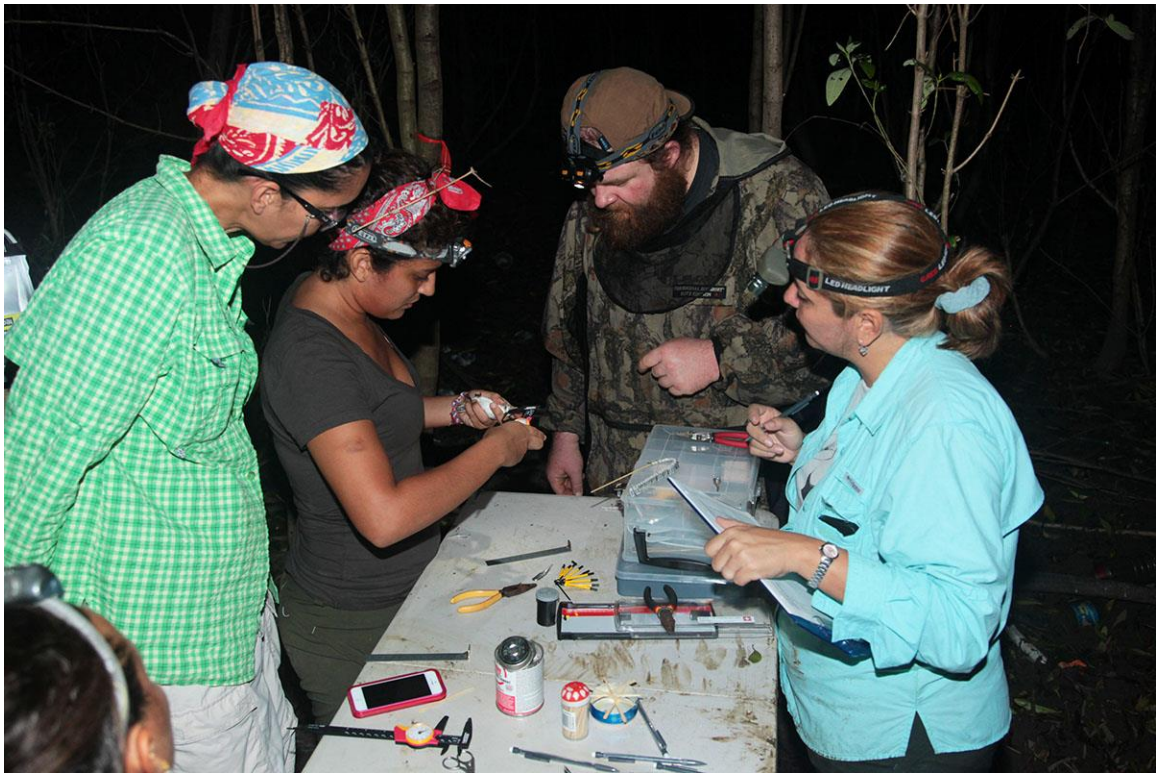

Figure 14. Fletcher Smith coaches Michelle Caballero on culmen measurement. Photo by Bryan Watts

including 1) an overview of shorebirds within the upper Bay of Panama that discussed the international significance and conservation context of the site and 2) an overview of resighting techniques, equipment, data forms, and structure. Following the presentations, there was a broad discussion about the establishment of a resighting program within the Upper Bay and general questions about resighting techniques and protocols were answered. In the days following the event, staff from the Panama Audubon had the opportunity to practice resighting techniques with spotting scopes. The number of leg flags currently deployed within the region is not adequate to warrant a full-scale resighting program.

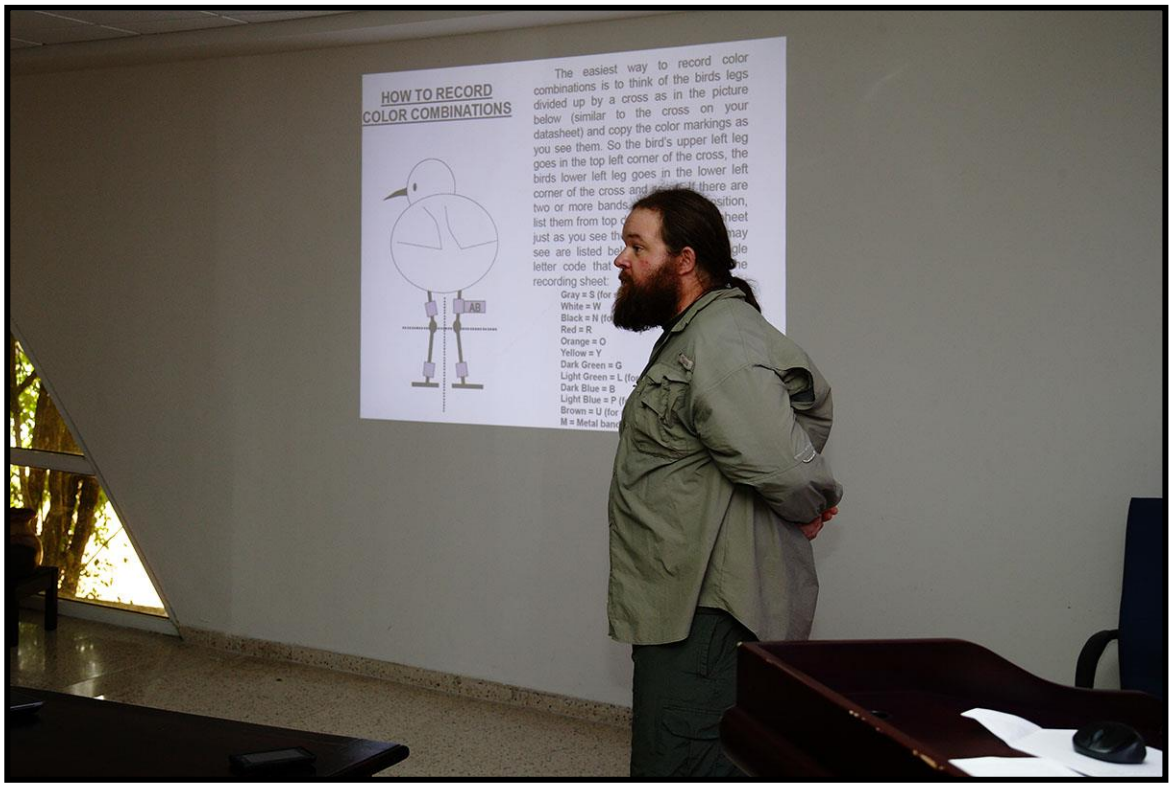

Figure 14. Fletcher Smith teaches resighting protocols and techniques to volunteers. Photo by Bart Paxton

RESULTS

Shorebird Banding

The banding team completed 9 night banding sessions between 26 January and 6 February each with associated setup and break down periods. Sessions required moving daily to adjust to the rapid change in tide stage. A total of 238 birds of 10 species and 4 bats were captured during banding periods (Table 1). Banding activities were focused on only 3 species including western sandpiper, semipalmated sandpiper, and semipalmated plover. Samples for these species included 152, 31, and 13 respectively. A full accounting of band/flag codes, morphometrics, and demographics is presented in Appendix I.

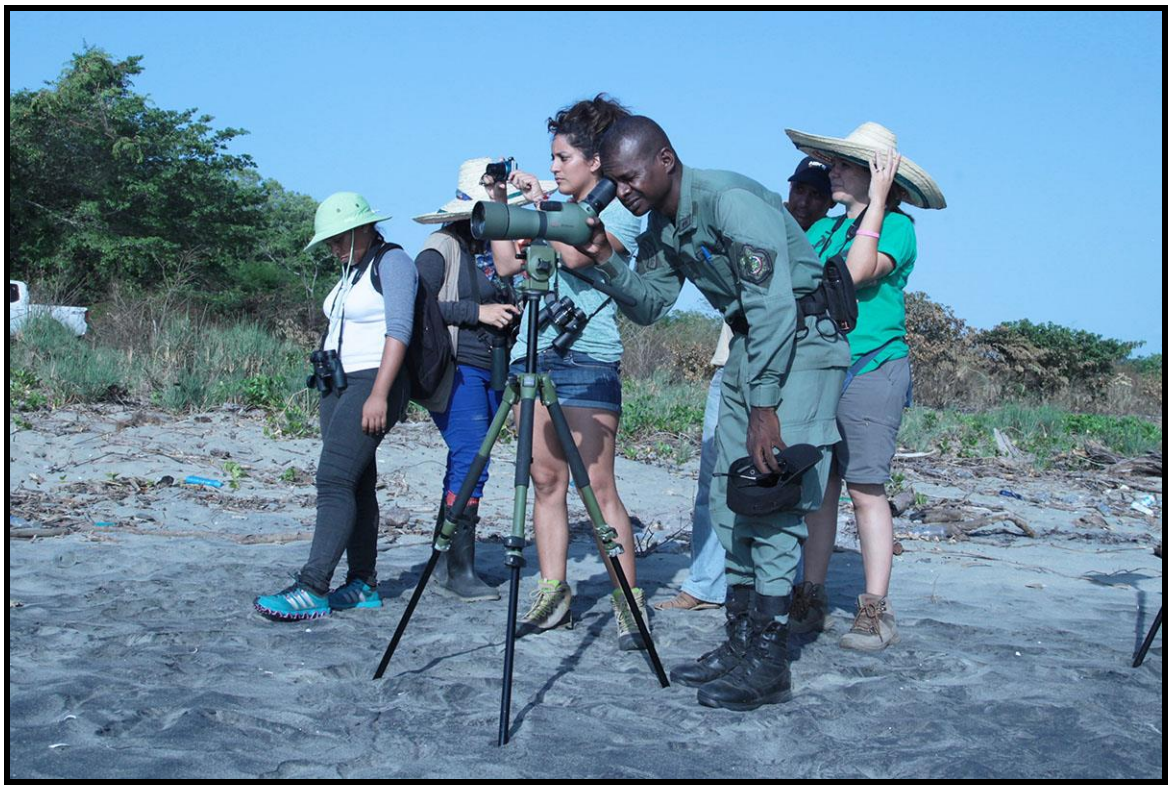

Figure 15. Our police escort scans a flock of sandpipers for marked individuals. Photo by Bryan Watts

Table 1. Mist-net captures by species within the upper Bay of Panama (1/26/14 – 2/5/14)

Species	Total
Laughing Gull	1
Yellow-crowned Night Heron	1
Semipalmated Plover	13
Wilson's Plover	7
Willet	2
Spotted Sandpiper	19
Long-billed Dowitcher	5
Western Sandpiper	152
Semipalmated Sandpiper	32
Least Sandpiper	6
Bat spp.	4

For both western and semipalmated sandpipers, the majority of birds captured were adults (after second year) (66 and 87% respectively). For western sandpipers, gender was determined for most (92%) individuals sampled. The known-gender sample was composed of mostly (72%) females (Table 2). Interestingly, males account for

proportionally fewer young (second year) birds compared to adult (after second year) birds (G-statistic = 5.65, df = 1, $p < 0.05$).

Table 2. Age and gender summary for western sandpipers banded within the upper Bay of Panama (1/26/14 – 2/5/14).

Gender	Second year	After second year
Female	38	63
Male	8	31
Unknown	5	7

Training

Several individuals from the local academic and conservation community and one individual from Nicaragua participated in banding activities (Table 3). Individuals were trained in bird handling skills and banding techniques. All individuals had the opportunity to gain first-hand experience in field techniques. With additional training, staff of Panama Audubon and local students will be capable of processing birds on their own.

Table 3. List of banding students participating in shorebird training during the 2014 season within the Upper Bay of Panama.

Band Trainee	Affiliation
Victorio Alcazar	Pacora - local guide
Jailene Alfaro	Volunteer
Alberto Bethancourt	University of Panama
Michelle Caballero	Panama Audubon
Stephany Carti	Maritime University
Yenifer Diaz	Panama Audubon
Karl Kaufman	Panama Audubon
Rosabel Miro	Panama Audubon
Rosa Montanez	Fundacion Natura
Salvadora Morales	Nicaragua
Ruth Pierson	Volunteer
Zuleika Pinzon	Fundacion Promar

ACKNOWLEDGMENTS

We would like to acknowledge all of the great staff of the Panama Audubon Society who were willing to work in the field under difficult conditions. This project would not have been possible without their efforts. Matt Jeffrey from the National Audubon Society supported the project from the outset and was instrumental in securing the funds for the 2014 season. We thank the Smithsonian Tropical Research Institute for providing housing in Gamboa. Orelis Arosemena provided logistical support. Erica Lawler from the College of William and Mary provided expert financial management for the project. Funding for this project was provided by the Packard Foundation, the Center for Conservation Biology, Panama Audubon Society, and the National Audubon Society.

Appendix I: Banding data collected within the Upper Bay of Panama (1/25/14 – 2/5/14). See methods for techniques used to measure morphometric parameters. Age (SY = second year, ASY = after second year). Sex (F = female, M = male, U = unknown).

Species	Date	Band Number	Flag Code	Color Band	Age	Sex	Wing Chord	Bill Length	Tarsus Length	Weight	Feather Collection
SEPL	1/28/2014	242101401	XYH	Yellow	SY	U	117	11.4	28.4		N
WESA	1/28/2014	244164601	XYT	Yellow	SY	F	96	25.6	24.1	22.7	N
WESA	1/28/2014	244164602	XJV	Yellow	ASY	F	94	25.2	25.6	26.8	N
SESA	1/28/2014	244164603	XJJ	Yellow	ASY	U	95	18	23.5	22.3	Y
WESA	1/28/2014	244164604	XUM	Yellow	ASY	M	90	21.6	24.9	23.4	N
WESA	1/28/2014	244164605	SMH	Yellow	ASY	F	97	26.6	28.4	27.6	N
WESA	1/28/2014	244164606	XLM	Yellow	SY	F	91	26	24.5	23.4	N
WESA	1/28/2014	244164607	SKU	Yellow	ASY	F	96	26	25.1	25.2	N
SESA	1/28/2014	244164608	SPA	Yellow	ASY	U	96	19.1	23.5	27.3	N
SESA	1/28/2014	244164609	XHM	Yellow	ASY	U	89	17.5	23.3	26	Y
WESA	1/28/2014	244164610	XXH	Yellow	ASY	F	95	27	26.2	23.4	N
SESA	1/28/2014	244164611	XHU	Yellow	ASY	U	88	16.6	22.6	24.2	Y
WESA	1/28/2014	244164612	XTN	Yellow	SY	F	96	25.9	24.2	22.8	N
WESA	1/28/2014	244164613	XDL	Yellow	SY	M	94	22	23.2	21.4	N
WESA	1/28/2014	244164614	XAM	Yellow	SY	U	93	24.5	25.5	23.4	N
WESA	1/28/2014	244164615	XHT	Yellow	ASY	F	95	25.7	25.5	26.7	N
WESA	1/28/2014	244164616	XLP	Yellow	SY	U	90	24.4	25	22.4	N
WESA	1/28/2014	244164617	XVU	Yellow	ASY	F	97	26.2	25.5	27.1	N
SESA	1/28/2014	244164618	XHA	Yellow	ASY	U	90	17.6	24.8	24.4	Y
WESA	1/28/2014	244164619	XVA	Yellow	ASY	M	92	23.9	23.9	21.8	N
SESA	1/28/2014	244164620	XHV	Yellow	ASY	U	95	16.9	24	24	Y
WESA	1/28/2014	244164621	XEE	Yellow	SY	F	98	27.6	27.4	24.2	N
WESA	1/28/2014	244164622	XUK	Yellow	SY	F	92	26.5	25.4	23.2	N
WESA	1/28/2014	244164623	XUP	Yellow	ASY	F	97	25.5	23.8	25.3	N
WESA	1/28/2014	244164624	XYN	Yellow	SY	U	96	24.4	25.2	23.8	N
WESA	1/28/2014	244164625	XJH	Yellow	SY	F	91	25.6	24.1	22.2	N
SESA	1/28/2014	244164626	XUE	Yellow	ASY	U	91	16.1	21.9		N
SESA	1/28/2014	244164627	XUH	Yellow	ASY	U	90	16.9	22.2	24.1	Y
WESA	1/28/2014	244164628	XEK	Yellow	SY	F	94	26.1	22.9	24.1	N
WESA	1/28/2014	244164629	XVT	Yellow	ASY	M	94	22.4	23.6	22	N
SESA	1/28/2014	244164630	XHP	Yellow	ASY	U	93	16.5	23.5	22.1	Y
WESA	1/28/2014	244164631	XKE	Yellow	SY	F	91	25.2	24	25.8	N
WESA	1/28/2014	244164632	XVN	Yellow	ASY	F	94	25.2	25.4	24.6	N
WESA	1/28/2014	244164633	XCC	Yellow	ASY	M	92	20.6	24	21.9	N
WESA	1/28/2014	244164634	XKP	Yellow	ASY	F	94	26.6	23.6	24.6	N
SESA	1/28/2014	244164635	XJE	Yellow	ASY	U	90	18.4	25.7	24.7	Y

Appendix I – continued.

Species	Date	Band Number	Flag Code	Color Band	Age	Sex	Wing Chord	Bill Length	Tarsus Length	Weight	Feather Collection
SESA	1/28/2014	244164636	XYX	Yellow	ASY	U	89	16.9	22.7	22.7	Y
WESA	1/28/2014	244164637	XHL	Yellow	SY	F	95	26	26.4	25.7	N
WESA	1/28/2014	244164638	XPV	Yellow	ASY	F	96	25	25.8	24.7	N
WESA	1/28/2014	244164639	XPJ	Yellow	ASY	M	91	22.5	23.7	21.3	N
SESA	1/28/2014	244164640	XPA	Yellow	ASY	U	88	18	23		Y
WESA	1/28/2014	244164641	XCK	Yellow	ASY	U	94	24.7	24.8	23.8	N
WESA	1/28/2014	244164642	XXE	Yellow	SY	F	92	26.5	24.8	24.1	N
WESA	1/28/2014	244164643	XXU	Yellow	SY	F	93	25.6	25.2	23.9	N
WESA	1/28/2014	244164644	XUT	Yellow	ASY	F	93	26.4	25.1	24	N
SESA	1/28/2014	244164645	XLU	Yellow	ASY	U	93	19.9	24.8	21.7	Y
WESA	1/28/2014	244164646	HCY	Yellow	ASY	F	95	26.4	25.9	24.7	N
SESA	1/28/2014	244164647	XKY	Yellow	ASY	U	91	16.4	23.2	22	Y
WESA	1/28/2014	244164648	HPN	Yellow	ASY	F	95	27.7	23.8	24.2	N
SESA	1/28/2014	244164649	XUY	Yellow	ASY	U	88	17	23.6	22.5	Y
WESA	1/28/2014	244164650	HHC	Yellow	ASY	F	91	28	24.8	26.6	N
WESA	1/28/2014	244164651	HYK	Yellow	ASY	F	94	25.8	23.8	24.8	N
SESA	1/28/2014	244164652	XTA	Yellow	ASY	U	90	18	25.1	24.4	Y
WESA	1/28/2014	244164653	HLU	Yellow	ASY	F	94	25.5	24	24.5	N
SESA	1/28/2014	244164654	XHE	Yellow	ASY	U	89	19.3	23.5	25.7	Y
WESA	1/28/2014	244164655	HEL	Yellow	ASY	M	91	21.8	23.6	23	N
WESA	1/28/2014	244164656	XET	Yellow	ASY	F	94	25.9	25.6	23.5	N
WESA	1/28/2014	244164657	HKJ	Yellow	ASY	F	93	26.6	25.5	26	N
WESA	1/28/2014	244164658	HKE	Yellow	ASY	F	94	27	25.2	23.7	N
WESA	1/28/2014	244164659	HJE	Yellow	ASY	F	95	26.3	23.2	26.1	N
WESA	1/28/2014	244164660	HHP	Yellow	ASY	M	95	23.8	24.7	25.3	N
WESA	1/28/2014	244164661	HVX	Yellow	ASY	F	94	25.4	25.4	25.5	N
WESA	1/28/2014	244164662	HYLM	Yellow	ASY	M	91	22.8	21.7	22.9	N
WESA	1/28/2014	244164663	HHT	Yellow	ASY	F	97	25.8	26.6	26.4	N
WESA	1/28/2014	244164664	HPE	Yellow	ASY	F	95	26.1	25.3	27.6	N
WESA	1/28/2014	244164665	HJA	Yellow	ASY	F	97	25	23.8	23.5	N
WESA	1/28/2014	244164666	HPA	Yellow	ASY	U	93	24.2	23.6	24.9	N
SESA	1/28/2014	244164667	HJY	Yellow	ASY	U	91	17.9	23.1	24	Y
WESA	1/28/2014	244164668	HKK	Yellow	ASY	M	94	22.6	22.8	21.9	N
WESA	1/28/2014	244164669	HJC	Yellow	ASY	F	98	26.2	24.6	22.2	N
WESA	1/28/2014	244164670	HMK	Yellow	ASY	M	96	23.7	23.7	23.7	N
WESA	1/28/2014	244164671	MTK	Yellow	ASY	M	93	21.8	25.8	24.4	N
WESA	1/28/2014	244164672	HNX	Yellow	ASY	F	99	27	25.9	24.2	N
WESA	1/28/2014	244164673	HVV	Yellow	SY	F	93	26.1	25.5	24.6	N

Appendix I – continued.

Species	Date	Band Number	Flag Code	Color Band	Age	Sex	Wing Chord	Bill Length	Tarsus Length	Weight	Feather Collection
WESA	1/28/2014	244164674	HKV	Yellow	ASY	M	90	23.8	23.5	21.4	N
SESA	1/28/2014	244164675	HAC	Yellow	ASY	U	90	16.8	23.6	24.2	Y
WESA	1/28/2014	244164676	HYT	Yellow	SY	F	94	26.2	25	25.3	N
WESA	1/28/2014	244164677	HPU	Yellow	ASY	M	93	23.4	24.3	22.2	N
WESA	1/28/2014	244164678	HHV	Yellow	ASY	M	94	23.8	25	22.2	N
WESA	1/28/2014	244164679	HHA	Yellow	ASY	M	91	21.8	23.1	23.2	N
WESA	1/28/2014	244164680	HTL	Yellow	ASY	M	92	23.3	26.5	22.2	N
WESA	1/28/2014	244164681	HHL	Yellow	ASY	F	99	27.1	28	25	N
WESA	1/28/2014	244164682	HLY	Yellow	SY	F	92	27	26	22.9	N
WESA	1/28/2014	244164683	HCM	Yellow	ASY	M	95	23.1	22.2	22.8	N
WESA	1/28/2014	244164684	HLX	Yellow	ASY	F	97	26.1	25.5	25.4	N
WESA	1/28/2014	244164685	HCE	Yellow	ASY	F	100	27.6	26.9	24.1	N
WESA	1/28/2014	244164686	HHK	Yellow	ASY	M	92	23.2	22.4	23.1	N
WESA	1/28/2014	244164687	HYP	Yellow	SY	F	88	25.3	23.5	22.8	N
WESA	1/28/2014	244164688	HPY	Yellow	ASY	M	93	20.4	22.6	24.3	N
WESA	1/28/2014	244164689	HUK	Yellow	SY	F	96	29.2	28.1	25.7	N
WESA	1/28/2014	244164690	HPL	Yellow	ASY	F	95	24.9	25	24.6	N
WESA	1/28/2014	244164691	HJJ	Yellow	ASY	F	94	26	25	23	N
WESA	1/28/2014	244164692	HJL	Yellow	SY	F	95	25.8	24.6	24.1	N
SESA	1/28/2014	244164693	HXT	Yellow	ASY	U	92	17.9	23	22.6	Y
WESA	1/28/2014	244164694	HYX	Yellow	ASY	F	96	25.6	25.4	24.1	N
SESA	1/28/2014	244164695	HMJ	Yellow	ASY	U	95	18.5	24.1		N
SESA	1/28/2014	244164696	HCX	Yellow	ASY	U	92	17.9	23	24.3	Y
SESA	1/28/2014	244164697	HJA	Yellow	ASY	U	89	17	23.9	24.1	Y
WESA	1/28/2014	244164698	HNC	Yellow	SY	F	93	26.5	23.8	23.5	N
SESA	1/28/2014	244164699	HLM	Yellow	ASY	U	93	16.8	23.4	22.8	N
WESA	1/28/2014	244164700	HJM	Yellow	ASY	F	94	26.8	26.6	25.4	N
WESA	1/28/2014	244164701	HHY	Yellow	ASY	M	94	22.5	25.3	24	N
WESA	1/28/2014	244164702	HYY	Yellow	ASY	F	94	26.5	24.5	25.8	N
SESA	1/28/2014	244164703	HEX	Yellow	ASY	U	93	16.5	23.1	22.1	Y
WESA	1/28/2014	244164704	HUL	Yellow	SY	F	94	26	26.5	26.6	N
WESA	1/28/2014	244164705	HKL	Yellow	SY	F	89	26.1	25.4	23.8	N
WESA	1/28/2014	244164706	HTY	Yellow	ASY	F	94	26.6	22.8	24.2	N
WESA	1/28/2014	244164707	HKX	Yellow	ASY	M	96	23	25.5	23.9	N
WESA	1/28/2014	244164708	HEH	Yellow	ASY	F	92	25.3	23.5	24.4	N
WESA	1/28/2014	244164709	HXV	Yellow	ASY	F	89	26.4	25.8	24.2	N
WESA	1/28/2014	244164710	HEC	Yellow	SY	F	91	25.8	24.4	25.4	N
WESA	1/28/2014	244164711	HHH	Yellow	ASY	F	91	26.5	27.5	25.5	N

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Species	Date	Band Number	Flag Code	Color Band	Age	Sex	Wing Chord	Bill Length	Tarsus Length	Weight	Feather Collection
WESA	1/28/2014	244164712	HUM	Yellow	ASY	F	94	27.4	26.5	24	N
WESA	1/28/2014	244164713	HHT	Yellow	ASY	F	96	26.5	27.9	26	N
WESA	1/28/2014	244164714	HNU	Yellow	SY	F	94	26.8	25.7	23.6	N
WESA	1/28/2014	244164715	HHM	Yellow	ASY	M	90	21.3	24.5	22	N
WESA	1/28/2014	244164716	HCK	Yellow	SY	F	93	27	26.1	22.6	N
WESA	1/28/2014	244164717	HLH	Yellow	ASY	F	99	25.7	25.9	23.8	N
WESA	1/28/2014	244164718	HYN	Yellow	ASY	F	93	27.5	26.5	23.7	N
WESA	1/28/2014	244164719	HXL	Yellow	SY	F	93	28	25.4	22.2	N
SEPL	1/30/2014	242101402	XHV	Yellow	SY	U	117	13.7	25	37.1	N
SEPL	1/30/2014	242101403	XUM	Yellow	ASY	U	115	12.1	27	38.3	N
WESA	1/30/2014	244164720	XTK	Yellow	ASY	U	93	24.8	26.4	22.8	N
WESA	1/30/2014	244164721	SVE	Yellow	ASY	F	93	26.1	23.3	27.4	N
WESA	1/30/2014	244164722	XHJ	Yellow	ASY	U	95	24.6	28.4	27.3	N
WESA	1/30/2014	244164723	XAU	Yellow	ASY	F	95	30	26.1	26.5	N
WESA	1/30/2014	244164724	XTM	Yellow	ASY	F	97	25.3	25.2	27.6	N
SESA	1/30/2014	244164725	XTC	Yellow	SY	U	90	20	24.4	27.6	N
SESA	1/30/2014	244164726	XUL	Yellow	ASY	U	92	17.2	22.9	24.5	N
WESA	1/30/2014	244164727	XLC	Yellow	SY	F	94	27.9	25.1	26.4	N
WESA	1/30/2014	244164728	XNK	Yellow	SY	F	94	28	24.8	25.8	N
WESA	1/30/2014	244164729	XAE	Yellow	SY	M	89	22	22.2	22.2	N
WESA	1/30/2014	244164730	XPT	Yellow	ASY	F	95	27.4	24.6	26.4	N
WESA	1/30/2014	244164731	XUU	Yellow	ASY	F	97	26.2	25.2	26.8	N
WESA	1/30/2014	244164732	XJP	Yellow	ASY	F	98	27.1	26.4	26.4	N
WESA	1/30/2014	244164733	XLL	Yellow	ASY	M	90	21.8	22.6	21.7	N
SESA	1/30/2014	244164734	XVJ	Yellow	SY	U	93	18.6	24	26.9	N
WESA	1/30/2014	244164735	XJT	Yellow	SY	F	93	26.5	24.8	25.4	N
WESA	1/30/2014	244164736	XEU	Yellow	ASY	F	97	26.5	26.4	27.3	N
WESA	1/30/2014	244164737	XKH	Yellow	SY	M	96	22.4	23.4	23.4	N
WESA	1/30/2014	244164738	XTJ	Yellow	ASY	M	93	21.3	25	22.9	N
WESA	1/30/2014	244164739	XHK	Yellow	SY	U	95	24.3	23.9	23.4	N
SESA	1/30/2014	244164740	XXM	Yellow	SY	U	89	17.6	22.8	22.4	N
SESA	1/30/2014	244164741	XPN	Yellow	SY	U	88	18.2	22.4	23.8	N
WESA	1/30/2014	244164742	XYL	Yellow	ASY	F	93	27.6	26	27	N
WESA	1/30/2014	244164743	XAT	Yellow	ASY	M	92	22.3	24.9	24.4	N
WESA	1/30/2014	244164744	XEC	Yellow	SY	F	93	26.3	26.4	26.3	N
WESA	1/30/2014	244164745	SMC	Yellow	SY	F	94	25.2	26	27.9	N
WESA	1/30/2014	244164746	XAK	Yellow	SY	F	91	26.3	23.6		N
WESA	1/30/2014	244164747	XVY	Yellow	SY	F	93	26.3	25.8	25.3	N

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Species	Date	Band Number	Flag Code	Color Band	Age	Sex	Wing Chord	Bill Length	Tarsus Length	Weight	Feather Collection
WESA	1/30/2014	244164748	XAY	Yellow	SY	F	90	25.7	24.1	25.1	N
WESA	1/30/2014	244164749	XNT	Yellow	SY	F	95	26	26.1	24.3	N
WESA	1/30/2014	244164750	XKV	Yellow	SY	M	87	22.9	23.5	22.5	N
WESA	1/30/2014	244164751	XXJ	Yellow	ASY	F	94	26.5	24.5	25.4	N
WESA	1/30/2014	244164752	XJN	Yellow	SY	F	94	25.2	25.4	24.4	N
SEPL	2/3/2014	242101404	XLJ	Yellow	ASY	U	113	12.2	28.8	37.3	N
SEPL	2/3/2014	242101405	XHE	Yellow	ASY	U	114	11.5	25.6	23.9	N
SEPL	2/3/2014	242101406	XJU	Yellow	ASY	U	117	13.4	25.5	37.5	N
SEPL	2/3/2014	242101407	XMM	Yellow	ASY	U	120	13.5	22.7	35.7	N
SEPL	2/3/2014	242101408	XEJ	Yellow	ASY	U	118	12.3	26.5	38.1	N
SEPL	2/3/2014	242101409	XAC	Yellow	ASY	U	112	13.8	27	35.2	N
SEPL	2/3/2014	242101410	XKN	Yellow	SY	U	115	13.8	25.2	36.2	N
SEPL	2/3/2014	242101411	XCM	Yellow	SY	U	112	11.6	27.5	36.2	N
SEPL	2/3/2014	242101412	XHH	Yellow	SY	U	140	12.5	27.2	35	N
SEPL	2/3/2014	242101413	XPY	Yellow	ASY	U	122	12.5	24.5	38.3	N
WESA	2/3/2014	244164753	HHU	Yellow	ASY	F	86	25.4	26.7	23.3	N
WESA	2/3/2014	244164754	HLN	Yellow	ASY	F	89	25.6	24.2	24.2	N
WESA	2/3/2014	244164755	HEP	Yellow	SY	F	95	26.6	25.6	23.9	N
WESA	2/3/2014	244164756	HVN	Yellow	SY	F	96	25.2	27.3	27.3	N
WESA	2/3/2014	244164757	XMU	Yellow	ASY	F	95	26.4	25.5	24.8	N
WESA	2/3/2014	244164758	XNN	Yellow	ASY	U	98	24.5	24.6	25.2	N
WESA	2/3/2014	244164759	XKX	Yellow	SY	F	91	26.1	24.9	23.4	N
WESA	2/3/2014	244164760	XLE	Yellow	SY	M	93	21.1	24.2	22.4	N
WESA	2/3/2014	244164761	XTT	Yellow	ASY	F	99	26.5	24.9	25.8	N
WESA	2/3/2014	244164762	XPC	Yellow	ASY	F	91	26.2	25.8	25.7	N
WESA	2/3/2014	244164763	XUC	Yellow	ASY	M	97	19.4	21.2	20.3	N
WESA	2/3/2014	244164764	XAA	Yellow	ASY	F	99	28	25	22.9	N
WESA	2/3/2014	244164765	XPU	Yellow	ASY	F	99	27	27.6	24.7	N
WESA	2/3/2014	244164766	XKA	Yellow	ASY	F	95	26.4	26.1		N
WESA	2/3/2014	244164767	XKN	Yellow	SY	M	94	21.1	27.2	24.3	N
WESA	2/3/2014	244164768	XTY	Yellow	ASY	F	93	26.6	25.1	25	N
WESA	2/3/2014	244164769	XVP	Yellow	ASY	M	97	23.8	25.2	26.4	N
WESA	2/3/2014	244164770	XJX	Yellow	SY	M	96	23.4	23.1	25.2	N
WESA	2/3/2014	244164771	XKK	Yellow	ASY	F	98	27	26.7	27.3	N
WESA	2/5/2014	244164772	HJK	Yellow	ASY	F	102	27	25.7	24.5	N
WESA	2/5/2014	244164773	XMP	Yellow	SY	F	98	25.5	26.3	25.5	N
SESA	2/5/2014	244164774	HLJ	Yellow	ASY	U	88	16.8	22.5	21.5	Y
WESA	2/6/2014	244164775	HTM	Yellow	ASY	U	95	24.2	26.4	23.9	N

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Species	Date	Band Number	Flag Code	Color Band	Age	Sex	Wing Chord	Bill Length	Tarsus Length	Weight	Feather Collection
WESA	2/6/2014	244164776	HCL	Yellow	SY	M	94	20.8	22.1	22.1	N
WESA	2/6/2014	244164777	HNM	Yellow	ASY	M	101	24.1	22.6	22.8	N
WESA	2/6/2014	244164778	HNL	Yellow	SY	U	93	24.4	25.6	24.4	N
WESA	2/6/2014	244164779	HPJ	Yellow	ASY	M	93	22.3	22.2	21.5	N
WESA	2/6/2014	244164780	HHE	Yellow	ASY	M	94	22.8	24.8	20.9	N
WESA	2/6/2014	244164781	HXE	Yellow	ASY	U	99	24.3	24.4	23	N
WESA	2/6/2014	244164782	HCP	Yellow	ASY	F	95	26.1	24.8	23.9	N
WESA	2/6/2014	244164783	HLE	Yellow	ASY	M	95	21.5	22.4	23	N