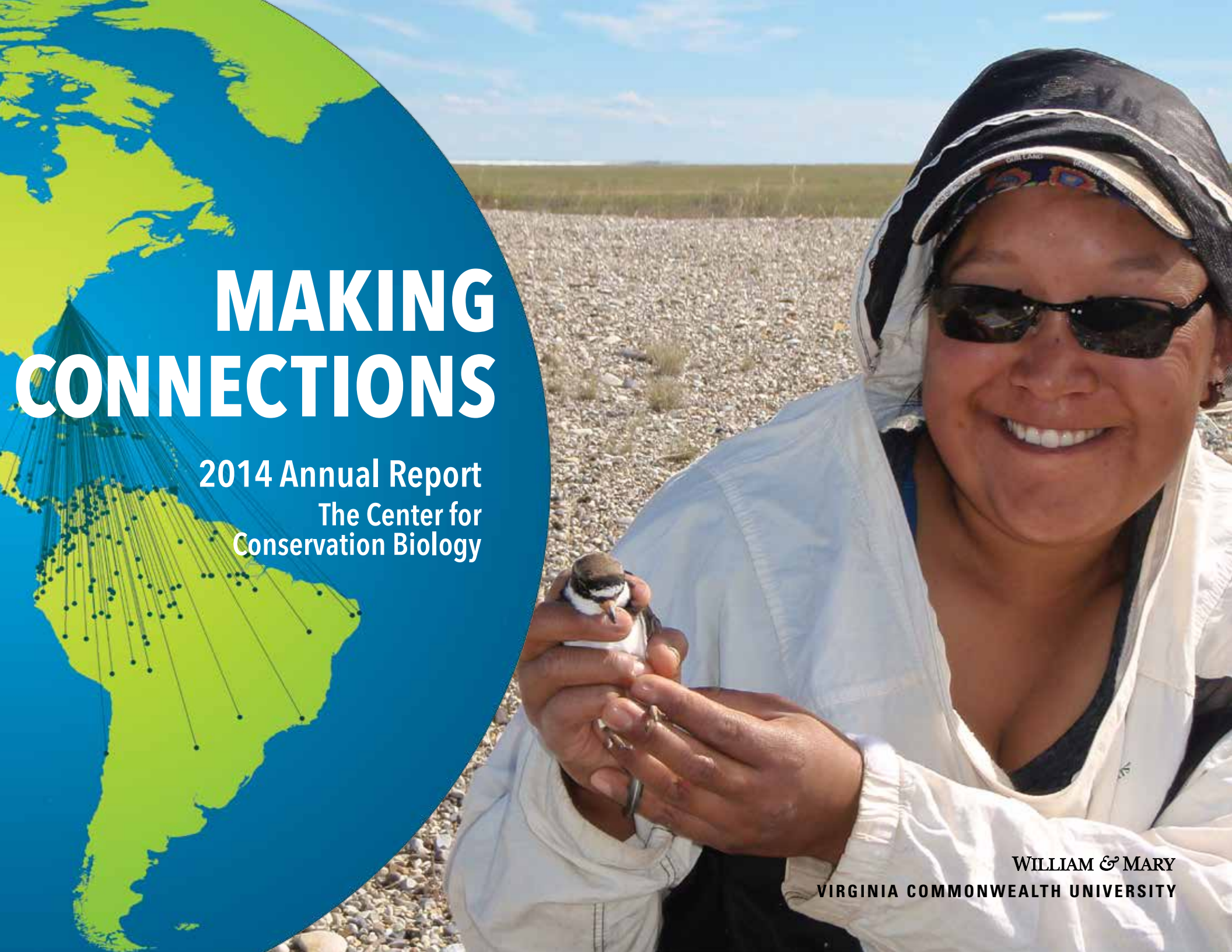


# MAKING CONNECTIONS

## 2014 Annual Report

### The Center for Conservation Biology

WILLIAM & MARY

VIRGINIA COMMONWEALTH UNIVERSITY

# CCB's

## ONGOING MISSION

The mission of The Center for Conservation Biology, through all of its diverse programs, is to provide the global community with the information needed to drive thoughtful, science-based conservation, to educate and train the next generation of conservation scientists, and to make lasting contributions to the natural world through critical thinking, innovation, and ground-breaking research.

The Center for Conservation Biology is a research unit shared by the College of William and Mary and Virginia Commonwealth University. The Center is a part of the VCU Inger and Walter Rice Center for Environmental Life Sciences. Rice Center scientists conduct cutting-edge environmental research on the James River and around the world.

WILLIAM & MARY
CHARTERED 1693

VCU
VIRGINIA COMMONWEALTH UNIVERSITY

***Front Cover: Lisa Bachellier holds a semipalmated plover on the Mackenzie River. Lisa was an Inuit Field Research Assistant with the Canadian Wildlife Service and a key member of the arctic shorebird team working on the Mackenzie Delta. Lisa hails from Cambridge Bay, Nunavut, Canada.***
**Photo by Fletcher Smith.**

# A MESSAGE FROM THE DIRECTOR

When I was 14 years old I banded a Swainson's thrush within the heart of the Appalachians. Just six months later I was notified that the bird had been taken by a hunter near an Andean village in Peru. The experience prompted my first recognition that migrants not only change geographies through the seasons they also change cultures. I was overwhelmed by the thought that the future of these migrants depended on cooperation between peoples that seemed so distant and so different.

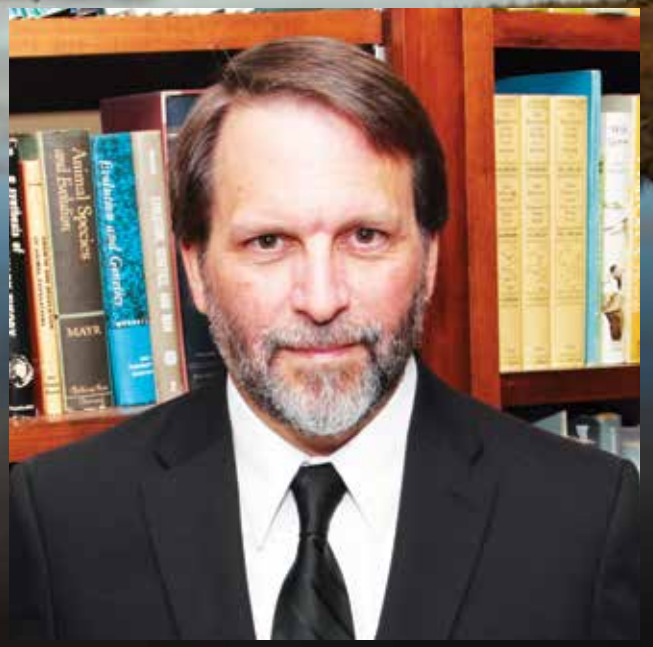
Now, after working in many places, I have come to realize that we are not so different. Children the world over draw birds and wonder what it must feel like to fly. The ability of migrants to journey thousands of miles to arrive in the same tree or creek on the same day year after year astounds us all.

Species that cross international boundaries represent both our collective heritage and a shared responsibility. Recognizing that the osprey nesting on our boat house is the same bird that winters along a tributary of the Amazon is the first step toward the global consciousness required to protect migratory populations.

The Center for Conservation Biology has always worked with migratory birds. I have dedicated this annual report to a few projects that have focused on connecting seasons, geographies and people in the service of full life-cycle conservation. The long term protection of migratory populations is a community endeavor. We invite you to join the mission. Help us to help birds and the environment we all share.

Sincerely,

Bryan Watts




***Bryan D. Watts***
***Mitchell A. Byrd Professor of Conservation Biology***
***Director, The Center for Conservation Biology***
**Photo: Marian Watts**

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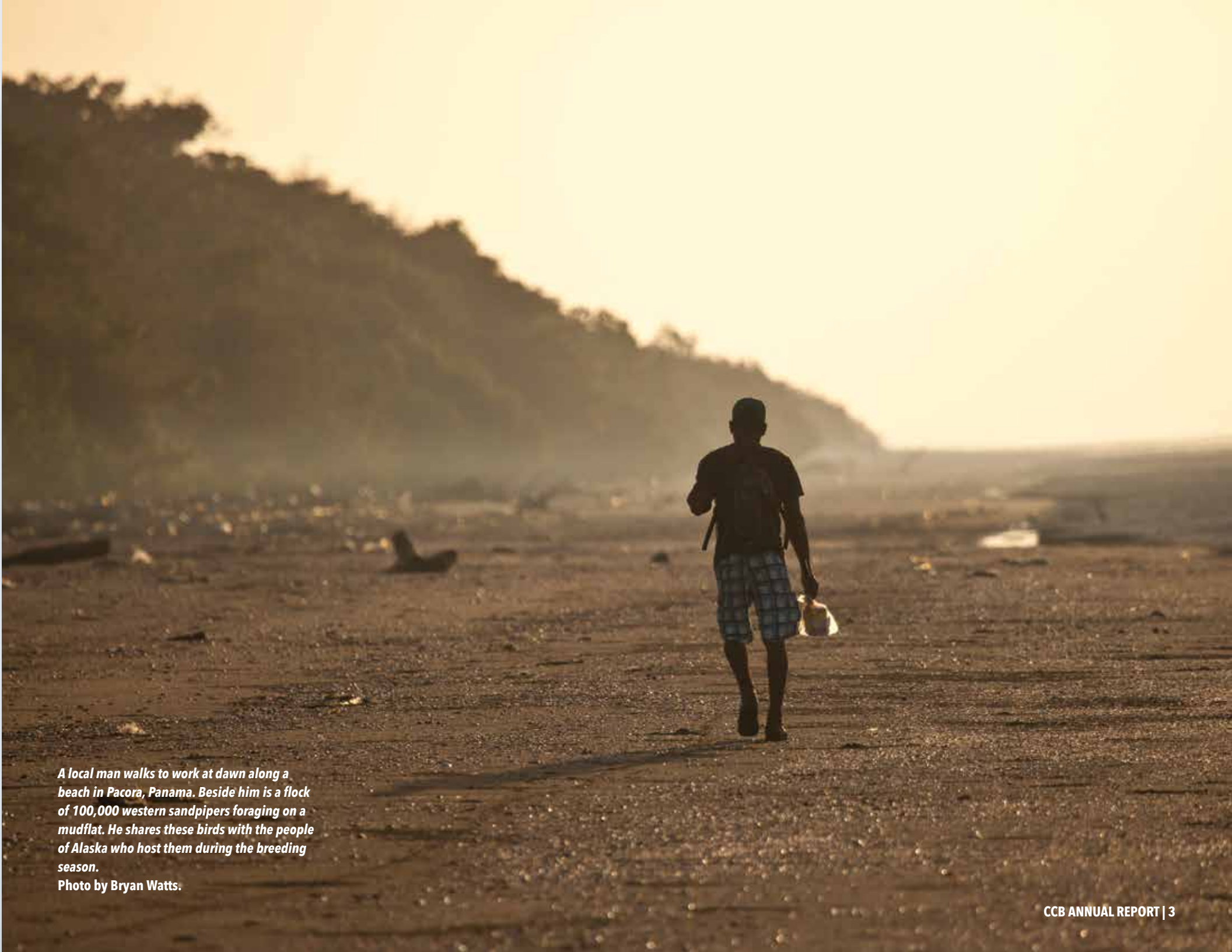
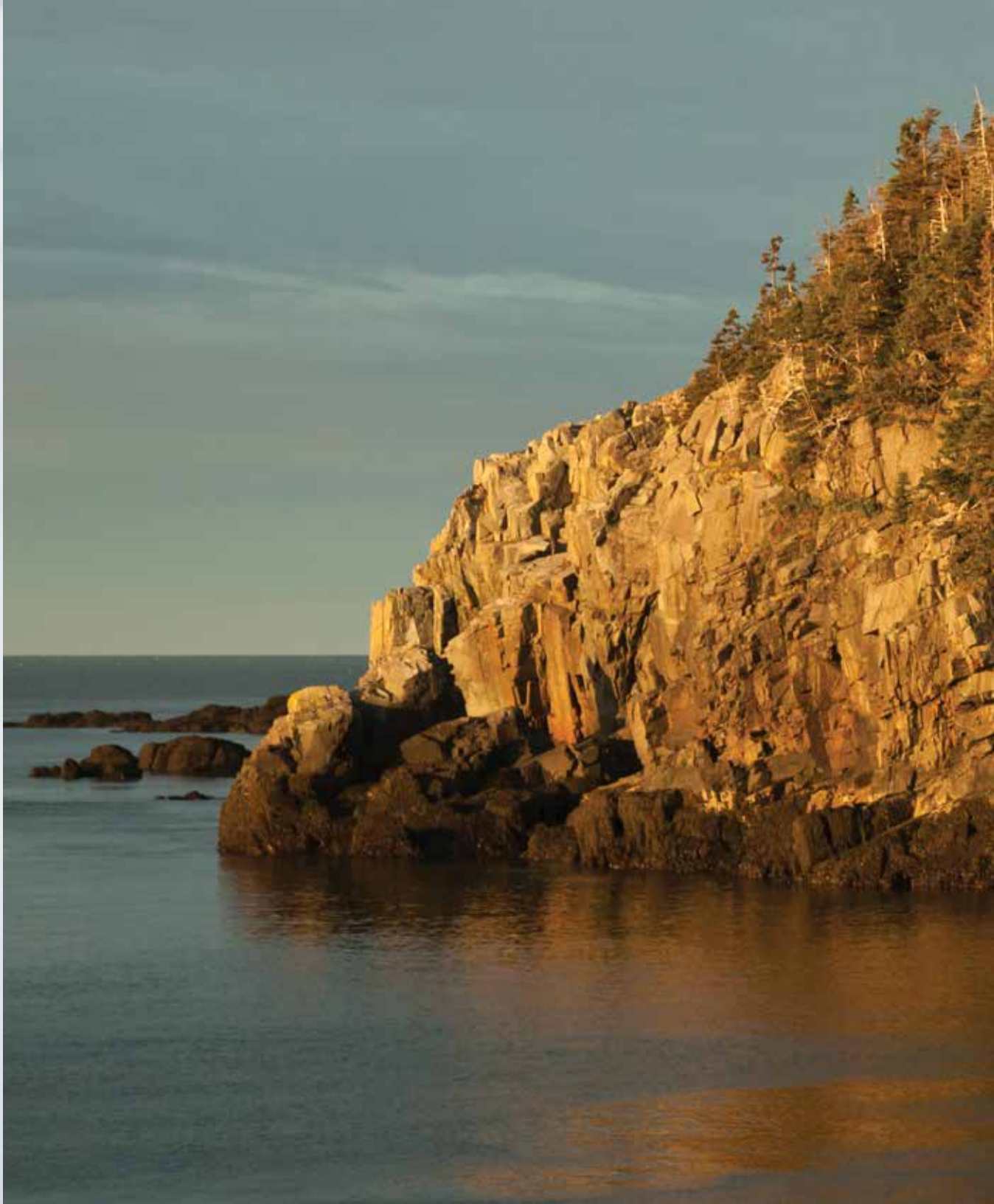


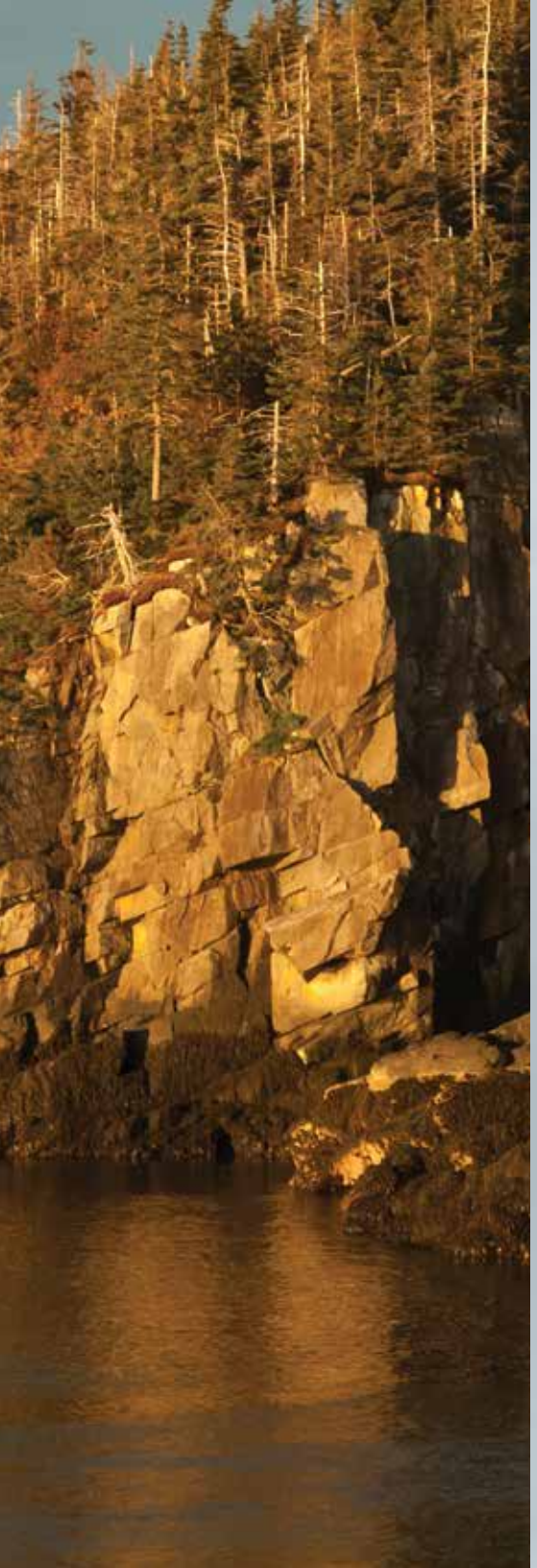
*A local man walks to work at dawn along a beach in Pacora, Panama. Beside him is a flock of 100,000 western sandpipers foraging on a mudflat. He shares these birds with the people of Alaska who host them during the breeding season.*
**Photo by Bryan Watts.**

# TRACKING BIRDS WITH SATELLITES

We live in a time of technology, and technological advances have accelerated the reach of science. Orbiting satellites now allow us to track animal movements virtually anywhere on the planet's surface. This advance is rapidly revolutionizing what we know about migratory birds. Transmitters have evolved from units that communicate with multiple satellites via the Doppler Effect, to units that carry Global Positioning Systems and communicate data via satellite, to units that communicate via the cellular network. Continued miniaturization of transmitters is allowing for their deployment on smaller and smaller birds.

***Right: A grand shoreline within the Maritimes of Canada. Many bald eagles that winter in the Chesapeake Bay breed here and are admired daily by working watermen.***
**Photo by Bryan Watts.**






***Above: School children on a field trip in Nova Scotia, Canada. Children throughout the world are always excited to get outside and learn about the natural world around them.***
**Photo by Bryan Watts.**

# Following Whimbrels

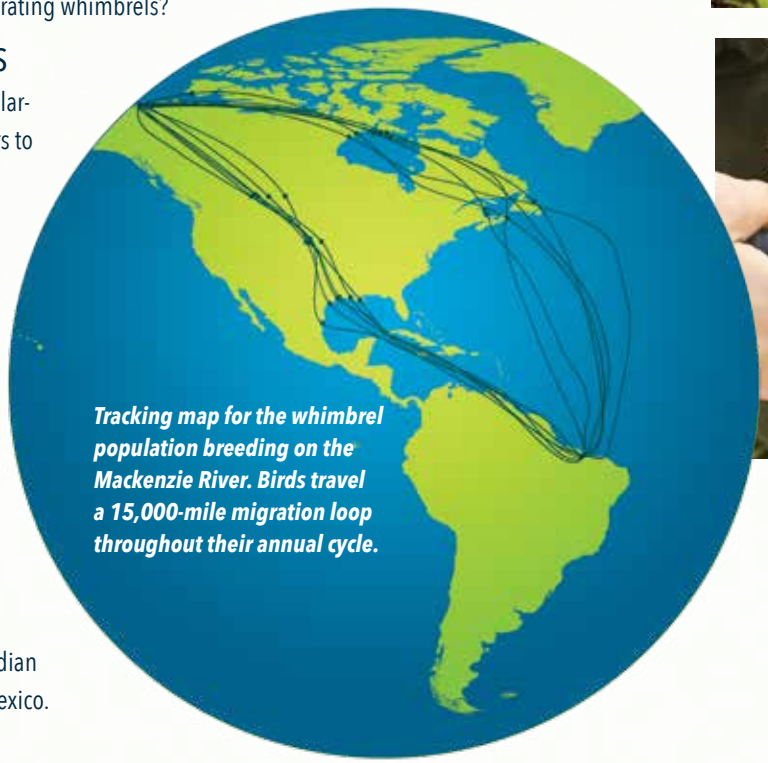
## THE PROBLEM

According to surveys conducted by The Center for Conservation Biology, whimbrel populations using the Atlantic Flyway have declined by 50% since the mid-1990s. Although these declines are precipitous, averaging 4% per year, the underlying causes remain unknown. A primary impediment to identifying causal factors is that we do not know significant areas used by whimbrels throughout their annual cycle and what hazards they face within these locations.

Migratory birds may be exposed to hazards not only on breeding or winter grounds but also within migratory staging sites and during connecting flights. Understanding linkages throughout their annual cycle is a critical first step in identifying risks. Where do whimbrels using the Atlantic Flyway breed and winter? Are there refueling sites that are critical for birds to successfully complete migration? What routes are used by migrating whimbrels?

## MAKING CONNECTIONS

Since 2007, we have used solar-powered satellite transmitters to track whimbrels breeding on the Mackenzie Delta on a 15,000 mile loop migration. The route is broken up into four major flights, including 1) Mackenzie to the east coast of Canada, 2) Canadian coast to Brazil, 3) Brazil to the Gulf of Mexico, and 4) Gulf of Mexico to Mackenzie. In addition to tracing critical routes, the tracking has identified two key refueling sites: the Canadian Maritimes and the Gulf of Mexico.



***Tracking map for the whimbrel population breeding on the Mackenzie River. Birds travel a 15,000-mile migration loop throughout their annual cycle.***

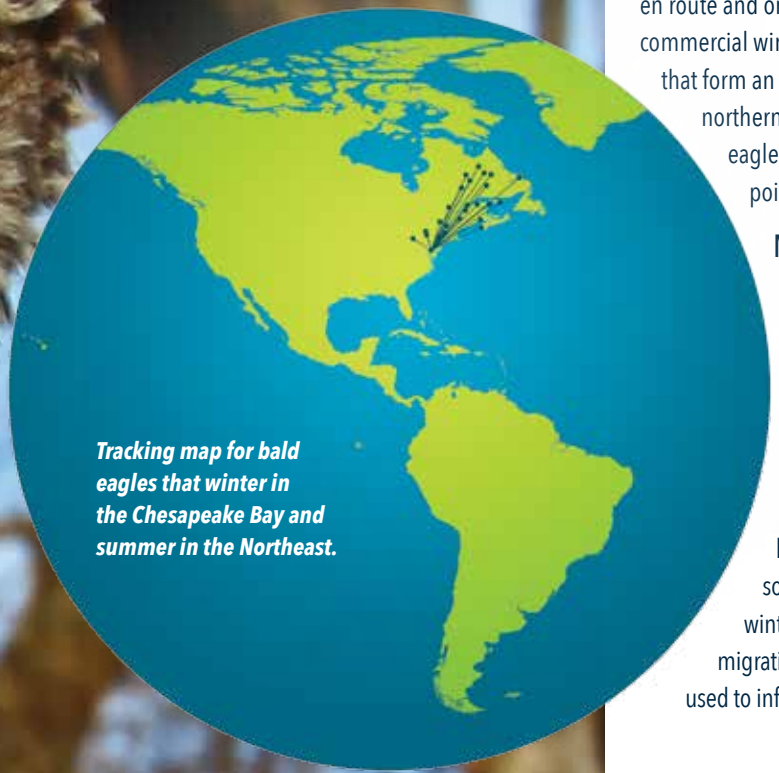
***A commercial blueberry field in New Brunswick, Canada. Whimbrels from the Mackenzie Delta fly across the continent to feed on this fruit before making the transoceanic flight to Brazil.***
**Photo by Bryan Watts.**

***Above: Libby Mojica and Bart Paxton carefully attach a solar-powered satellite transmitter to a whimbrel captured in Virginia. These miniature transmitters have revolutionized what we know about whimbrel migration.***
**Photo by Barry Truitt.**

*A whimbrel on a mudflat. Whimbrel are at home feeding on blueberries in Canada, fiddler crabs and marine worms along the Atlantic coast, and crayfish in Texas. Their diet and foraging strategy shifts throughout the year.*
**Photo by Bart Paxton.**

*Below: This whimbrel chick hatched on the Mackenzie River in western Canada will winter in Brazil and spend part of the spring in Texas. The Mackenzie whimbrels connect cultures along a 15,000-mile loop migration.*
**Photo by Lisa Pirie.**

*A fourth-year bald eagle from the Northeast that was captured during the winter in the Chesapeake Bay. Bald eagles connect the people of eastern Canada to those in the Chesapeake Bay.*
**Photo by Bryan Watts.**



*Tracking map for bald eagles that winter in the Chesapeake Bay and summer in the Northeast.*





# Linking Bald Eagle Ranges

## THE PROBLEM

Like other sea eagles throughout the world, bald eagles generally feed on aquatic prey and depend on open-water habitats for foraging. Throughout the northern portion of their range, fall freeze-over provides an unambiguous habitat change that marks an exodus to lower latitudes. The Chesapeake Bay is a convergence area for eagle populations throughout Eastern North America and is a winter destination for many birds from the Northeast.

Eagles that migrate south to the Chesapeake Bay face hazards en route and on the winter grounds. An increasing number of commercial wind facilities, transmission lines and other structures that form an expanding human infrastructure lie between northern breeding grounds and the Chesapeake Bay. When eagles arrive they face collisions with hazards, lead poisoning, avian cholera and a host of other risks.

## MAKING CONNECTIONS

Linking birds that winter in the Chesapeake Bay to their breeding sites is a critical first step in understanding potential factors that may drive population trends. Since 2007, we have trapped a significant number of bald eagles during the winter period, fitted them with satellite transmitters, and tracked them north to their breeding grounds. We are beginning to identify the source populations that use the Chesapeake during winter. We are using movement information to delineate migration corridors throughout the Northeast that may be used to inform the siting of potential hazards en route.

*An adult bald eagle wearing a satellite transmitter in the Chesapeake Bay. Satellite transmitters are helping to link breeding and winter areas and to delineate movement corridors.*
**Photo by Robert Lin.**

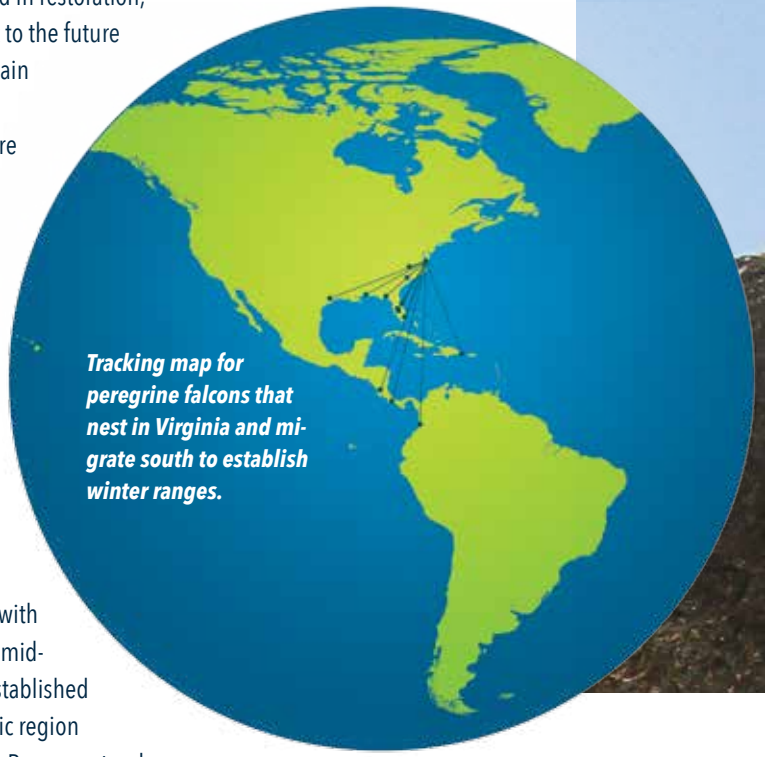
*A second-year bald eagle wearing a hood. We routinely use hoods while banding and fitting transmitters. Hoods calm birds by preventing them from seeing surrounding activity.*
**Photo by Libby Mojica.**

# Migratory Peregrines

## THE PROBLEM

As part of the federal peregrine falcon recovery plan, 312 captive-reared falcons of mixed heritage were introduced into the mid-Atlantic Coastal Plain during the 1970s and 1980s. More than thirty years after the first re-nesting, we still know very little about the ecology of this emerging population. In particular, we know almost nothing about periods of the annual cycle outside of the breeding season. The nonbreeding period includes more than two-thirds of the year and represents a time when the birds face the highest mortality risk.

Given the global breeding stock used in restoration, several questions that are important to the future management of the population remain unanswered. Do birds from the new breeding population migrate? Where do migratory birds spend the winter season? What routes are used for migratory movements? How many birds survive their first year or make it to reproductive age? What are some of the causes of mortality?



***Tracking map for peregrine falcons that nest in Virginia and migrate south to establish winter ranges.***

## MAKING CONNECTIONS

Since 2001, we have used solar-powered satellite transmitters to track 61 young falcons. Birds exhibited a mixed migratory status, with more than half moving south of the mid-Atlantic to spend the winter. Birds established winter ranges over a wide geographic region ranging from western Long Island to Buenaventural Columbia. Birds that fledged near the coast migrated along the coast, whereas birds that fledged from inland sites followed the Appalachians south to the Gulf Coast. The largest source of mortality was predation by raptors. The second largest source was collisions with artificial structures.

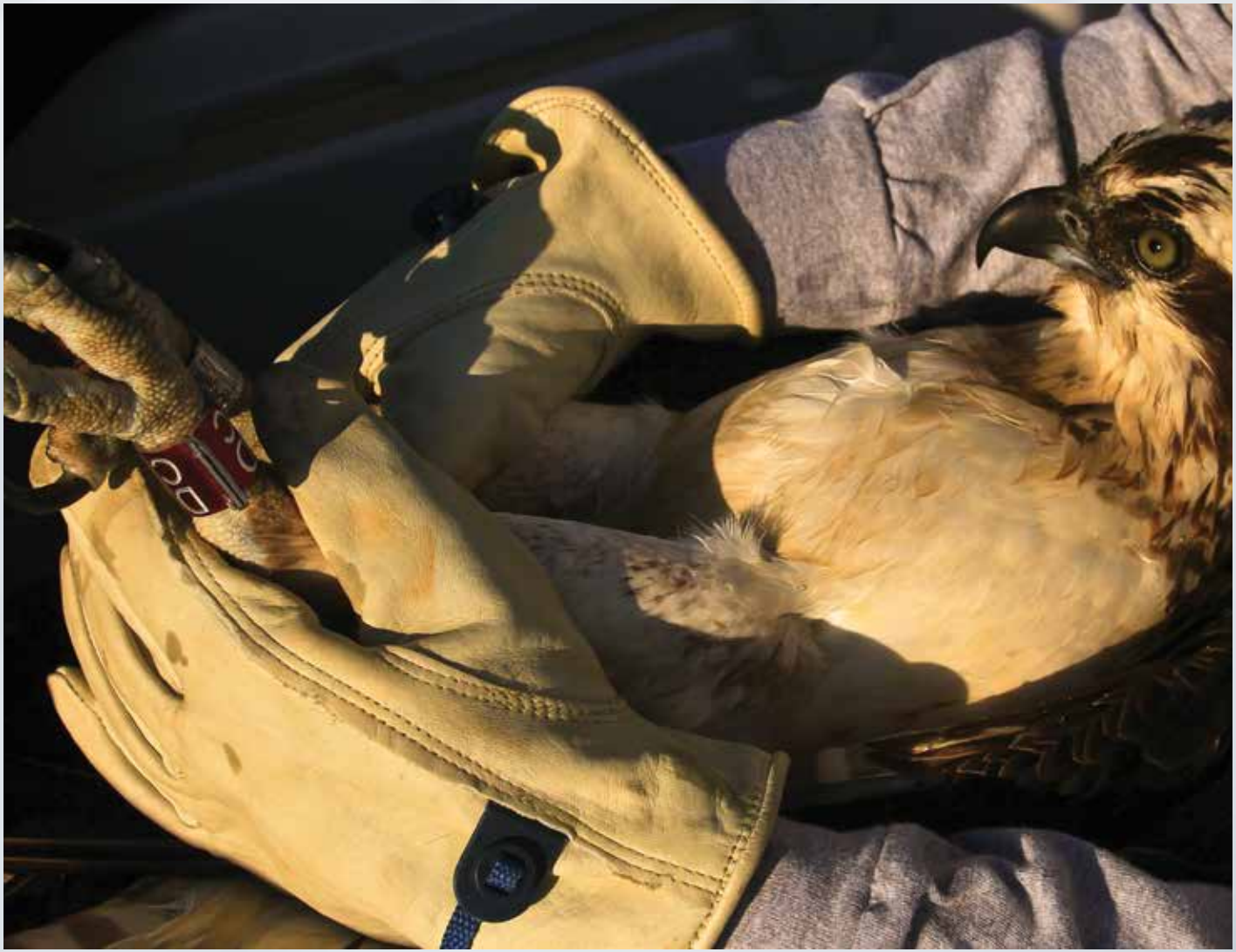
***A male peregrine falcon perched on a 16th century ruin in Panama Viejo. Such coastal areas support large winter populations of peregrines that are likely drawn from the entire North American breeding range.***
**Photo by Bryan Watts.**

*A coastal shoreline in Latin America. Peregrine falcons that migrate to the tropics congregate along coastal shorelines to prey on the high densities of shorebirds supported by these sites.*
**Photo by Bryan Watts.**

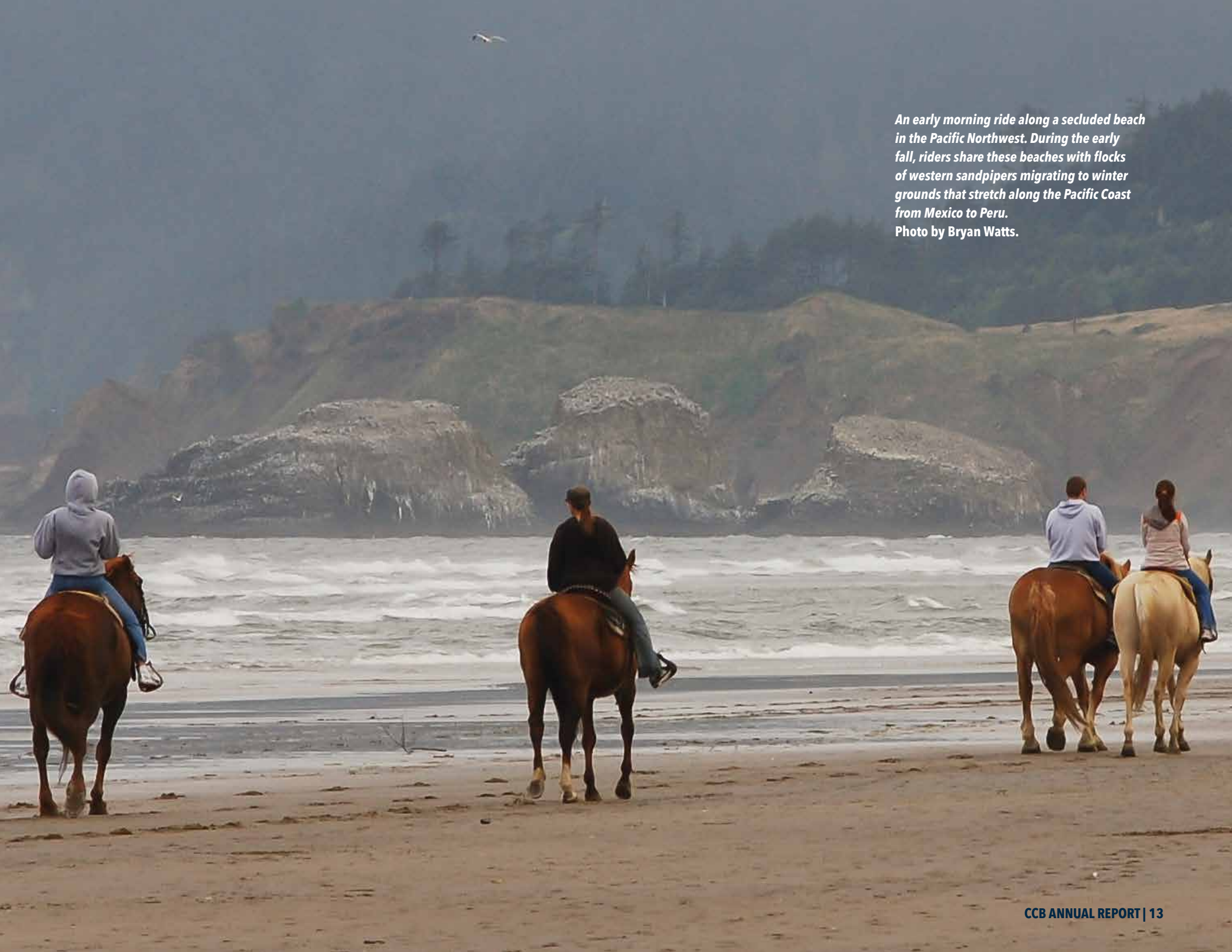
*A young peregrine falcon wearing a solar-powered satellite transmitter. Use of these transmitters has revolutionized what we know about peregrine movements and allowed us to link breeding sites to winter ranges.*
**Photo by Bryan Watts.**

# CONNECTING THROUGH BANDS

Uniquely coded bands have been used to identify individual birds for more than a century. Bands have facilitated research in many areas of avian ecology. For decades, birds with coded bands had to be recaptured or recovered dead in order to read the engraved ID number. In recent decades, we have used auxiliary bands either in unique color combinations or with large, field-readable codes that can be read with binoculars. With the advent of high-quality optics and new band materials, we are now using individually coded leg flags that may be resighted by researchers and the public throughout entire migratory pathways.



***An adult osprey captured and banded in the Chesapeake Bay. Band recoveries have shown that these birds spend the winter months in northern South America with concentrations in Columbia and the Amazon Basin.***
**Photo by Bryan Watts.**



*An early morning ride along a secluded beach in the Pacific Northwest. During the early fall, riders share these beaches with flocks of western sandpipers migrating to winter grounds that stretch along the Pacific Coast from Mexico to Peru.*
**Photo by Bryan Watts.**

# Winter Distribution of Osprey

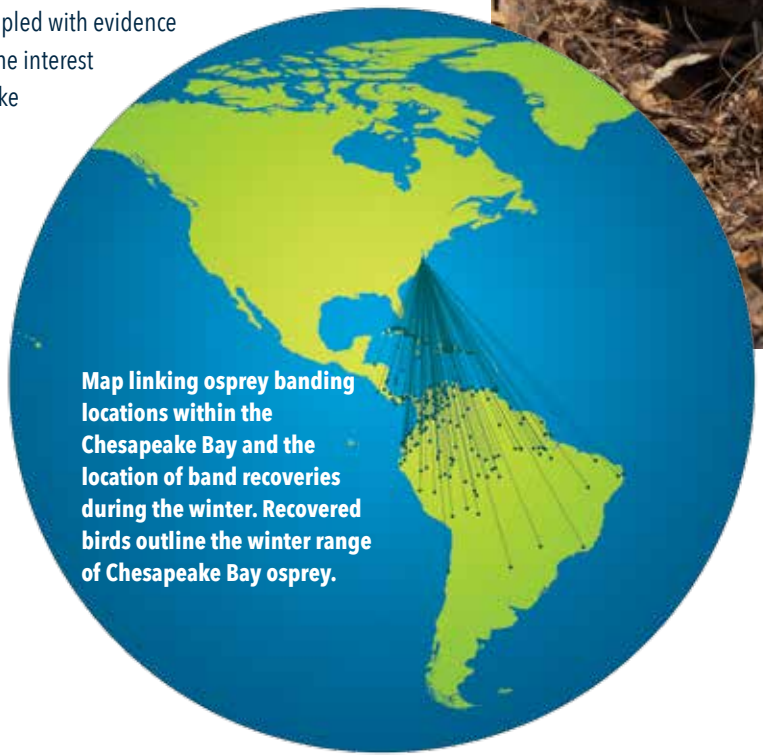
## THE PROBLEM

The Chesapeake Bay supports the largest breeding population of osprey in the world, likely approaching 10,000 breeding pairs. Like other populations throughout the world, the Bay population declined by 80% during the DDT era, reaching a low in the early 1970s. Although osprey have experienced a dramatic recovery in recent years, the world is a changing place and their high position in the food web calls for continued vigilance.

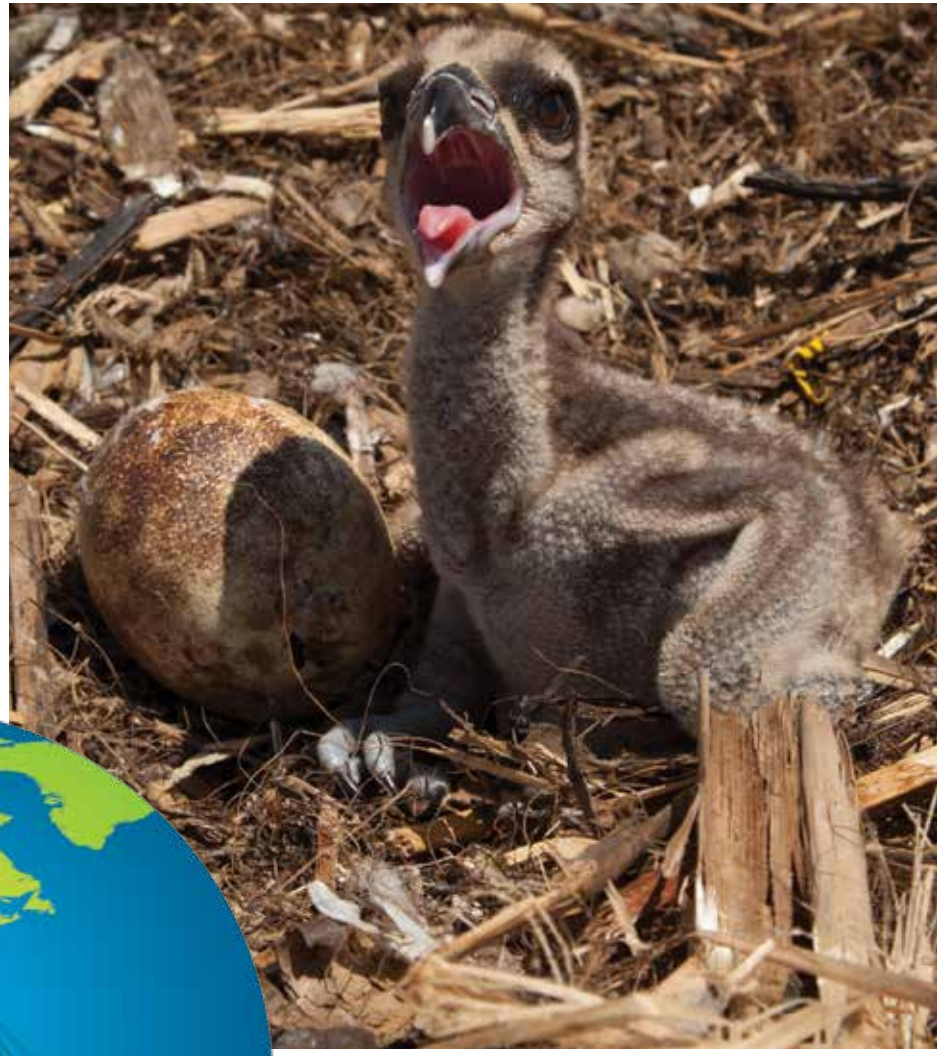
Osprey are fish specialists that capture fish from the water surface or by plunging to a depth of up to three feet. As water temperatures in northern latitudes decline through the fall, fish move to greater depths and osprey, unable to attain prey, are forced to migrate to the tropics. Over the past decade, market share for fish aquaculture has shifted from Asia to Latin America. Protection of farmed fish has included the killing of osprey. This practice coupled with evidence of low return rates for adult osprey has increased the interest in refining the winter distribution of the Chesapeake population.

## MAKING CONNECTIONS

Since the 1960s, thousands of Chesapeake Bay osprey have been banded by The Center for Conservation Biology. A small but significant percentage of these birds have been recovered on the winter grounds, giving a reflection of the important winter locations. High densities of recoveries have occurred on the islands of Cuba and Hispaniola and in the South American countries of Columbia, Venezuela and Brazil. Distribution in Brazil is primarily along the tributaries within the Amazon Basin.



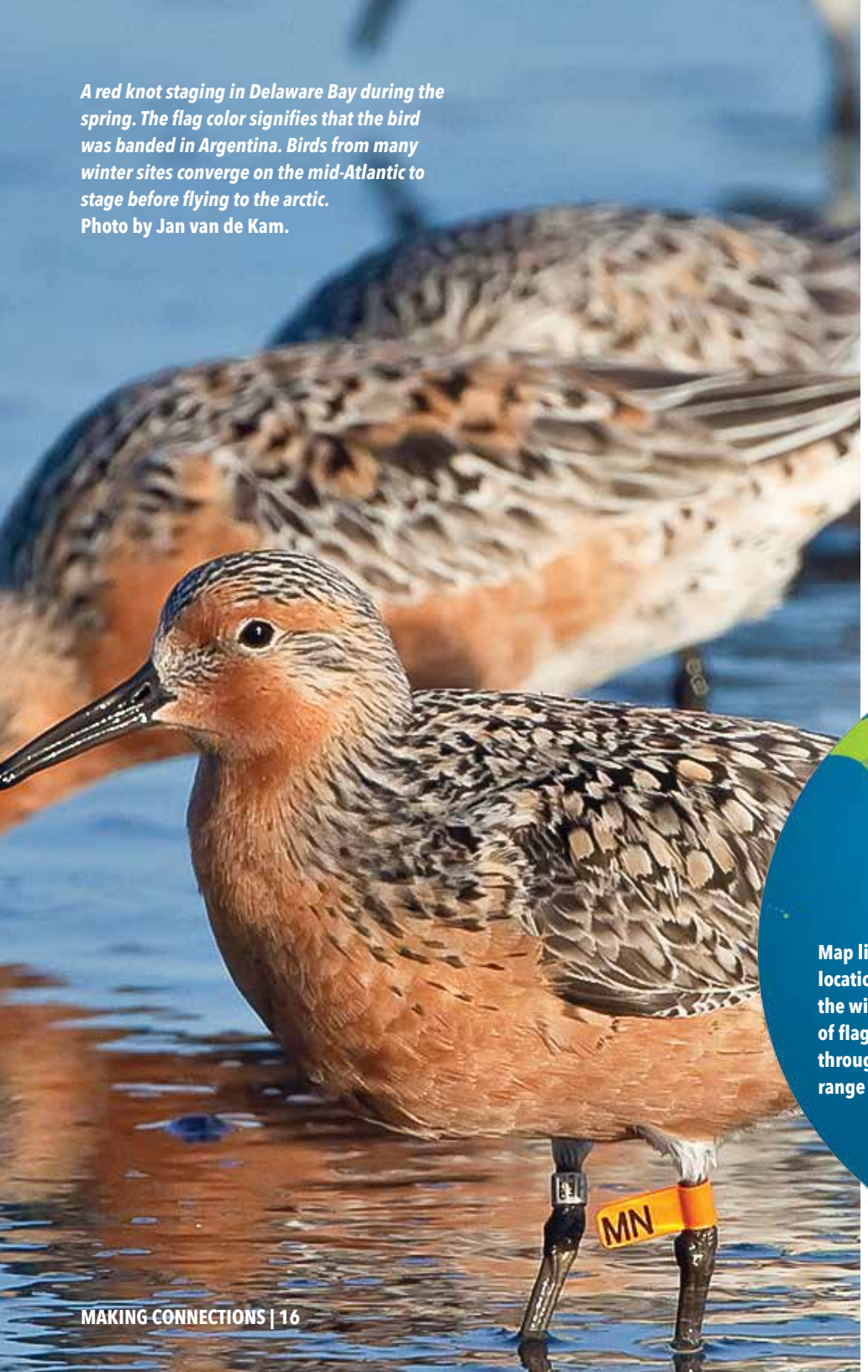
**Map linking osprey banding locations within the Chesapeake Bay and the location of band recoveries during the winter. Recovered birds outline the winter range of Chesapeake Bay osprey.**



***A young osprey in a nest along the James River in Virginia. This bird will eventually migrate to the tropics without the aid of parents and will settle on a winter range to be used throughout its life. Osprey connect the people of the Chesapeake to people of Cuba, Columbia and Venezuela.***
**Photo by Bryan Watts.**

*A female osprey protects a brood along the Rappahannock River in Virginia. Although the Chesapeake Bay population has recovered, we continue to band osprey to monitor return rates from tropical winter sites.*
**Photo by Bryan Watts.**

*Below: A CCB biologist applies a field-readable auxiliary band to an osprey in the Chesapeake Bay. Using these coded bands allows us to identify birds without having to recapture them. Banding is an important part of monitoring demographic rates.*
**Photo by Bryan Watts.**



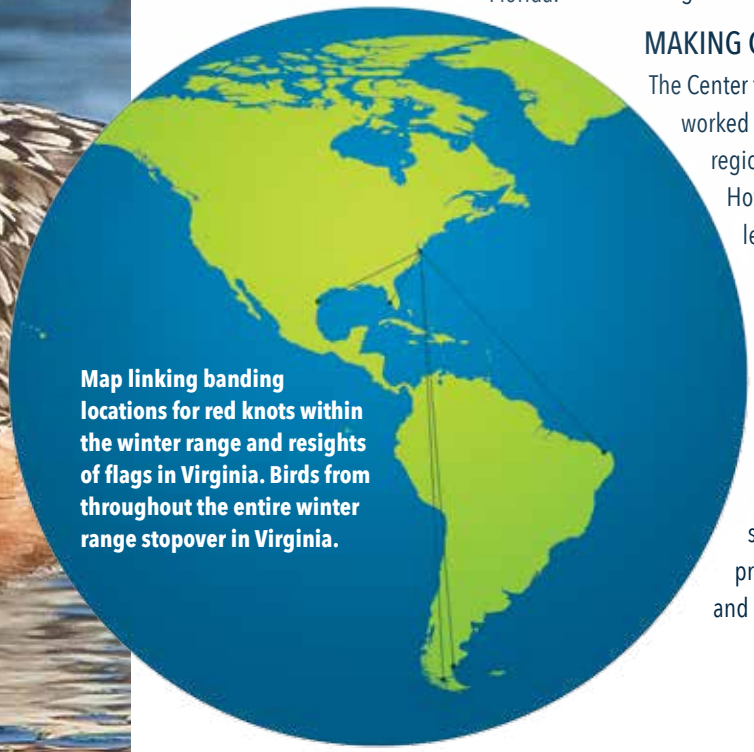

***A red knot staging in Delaware Bay during the spring. The flag color signifies that the bird was banded in Argentina. Birds from many winter sites converge on the mid-Atlantic to stage before flying to the arctic.***
**Photo by Jan van de Kam.**



# Connecting the Knots

## THE PROBLEM

The *rufa* subspecies of the red knot has declined dramatically over the past 30 years and is now a candidate for federal listing as threatened. The population has a complex annual cycle that includes one of the longest migration systems of any shorebird. A portion of the population breeds in the high arctic of central Canada and migrates to Tierra del Fuego on the southern tip of South America. Remaining birds travel shorter distances to northern South America or Florida.

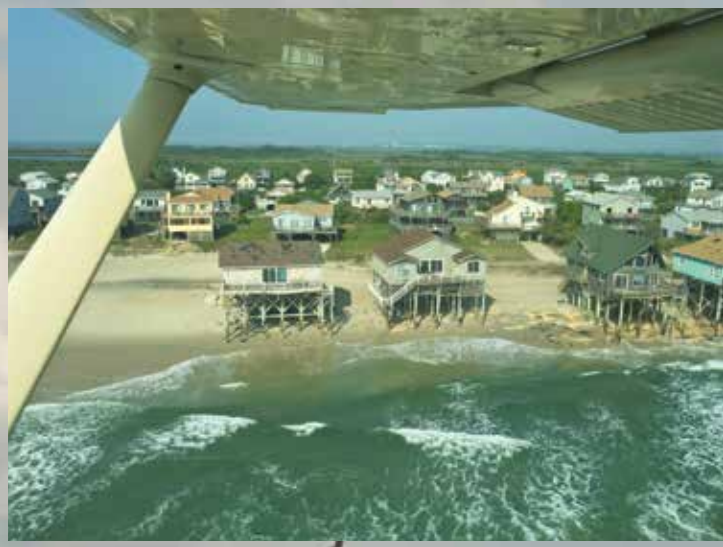


**Map linking banding locations for red knots within the winter range and resights of flags in Virginia. Birds from throughout the entire winter range stopover in Virginia.**

The mid-Atlantic Coast of North America is the last refueling site during spring migration before the birds fly to the high arctic. The area is particularly significant to the population because females must put on enough fat not only to reach the arctic but also to lay their clutch during often inhospitable conditions so that young may take full advantage of the short arctic summer. Linking winter sites and mid-Atlantic staging areas is an important step toward understanding the broader energy budget.

## MAKING CONNECTIONS

The Center for Conservation Biology has worked with red knots in the mid-Atlantic region for more than two decades. However, with the advent of coded leg flags in the early 2000s, the nature of this work has changed. The flags allow observers to read individualized codes that are linked to a specific place and time. A resight program run by the Center has identified thousands of individuals and has linked the staging site to winter banding programs in Argentina, Chile, Brazil, and Florida.



*Above: The Outer Banks of North Carolina. When knots reach the coast of North Carolina in the spring, they find development and considerable human disturbance. Human pressure along the outer coast is one of the greatest threats to migratory shorebirds.* **Photo by Bryan Watts.**

*A fishing village in tropical America. Red knots migrate extraordinary distances and connect communities throughout the Western Hemisphere. The same birds that visit this beach may be staging in the mid-Atlantic the next week and on arctic breeding grounds the next month.*
**Photo by Bryan Watts.**

# Western Sandpipers along the Pacific

## THE PROBLEM

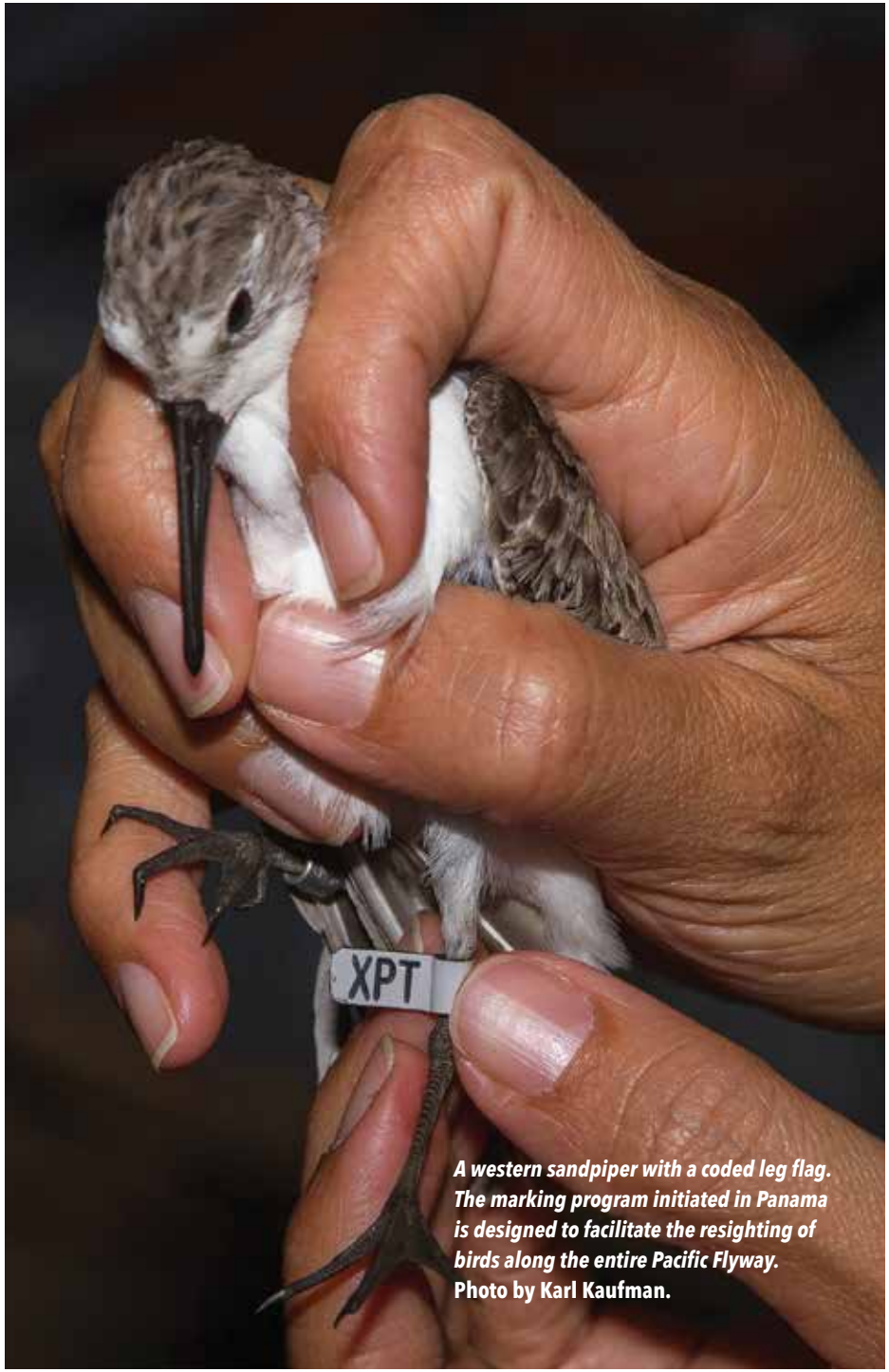
The western sandpiper is an abundant shorebird that breeds in the arctic and spends the winter in the tropics. As with many shorebirds, the western sandpiper depends on coastal sites during most of its annual cycle. The species masses in tremendous numbers in a few coastal sites during migration along the Pacific Coast and on its wintering grounds. These sites are critical to population health.

Work conducted by The Center for Conservation Biology in the 1990s identified the upper Bay of Panama as the single most significant staging and winter site throughout the Western Hemisphere. The site supports 30% of the global population of females. The Center has continued to work with local, national and international partners to better understand the role of the upper Bay and to suggest local actions that may facilitate long-term protection. However, we currently know very little about the relationship between this location and other migratory staging sites along the Pacific Coast.

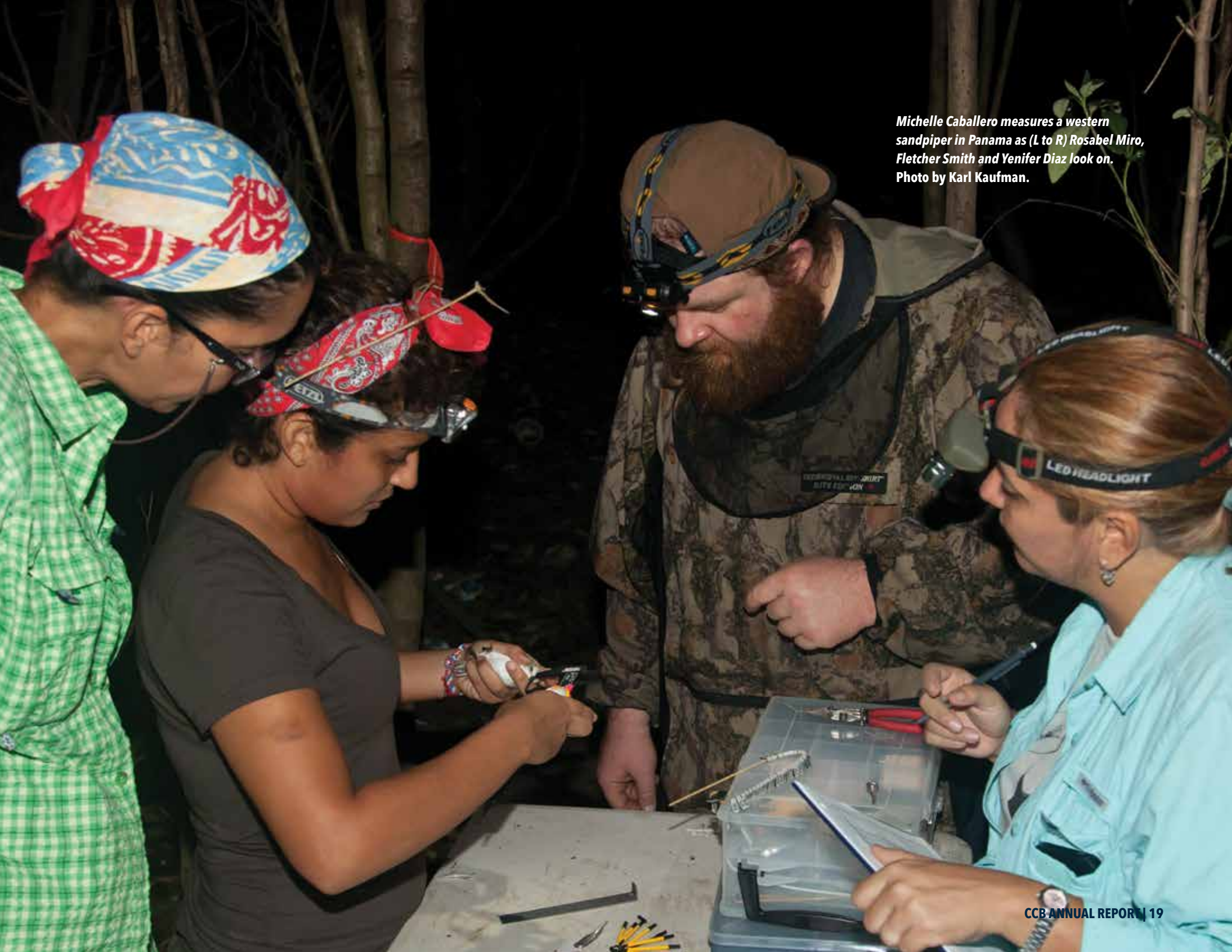
## MAKING CONNECTIONS

In January of 2014, The Center for Conservation Biology along with local and international partners initiated a marking project for western sandpipers in the Bay of Panama. The project is using coded leg flags so that individuals may be identified as they stage within other sites along the Pacific Coast. The project is in the early stages of execution.

***Left: Western sandpipers in winter along the Pacific Coast of Panama. The site supports a significant portion of the global population of this species. These same birds mass in the Copper River Delta in coastal Alaska and have connected the people of these sites for thousands of years.***
**Photo by Bryan Watts.**




***A western sandpiper with a coded leg flag. The marking program initiated in Panama is designed to facilitate the resighting of birds along the entire Pacific Flyway.***
**Photo by Karl Kaufman.**




***Michelle Caballero measures a western sandpiper in Panama as (L to R) Rosabel Miro, Fletcher Smith and Yenifer Diaz look on.*** **Photo by Karl Kaufman.**

# Resighting Oystercatchers

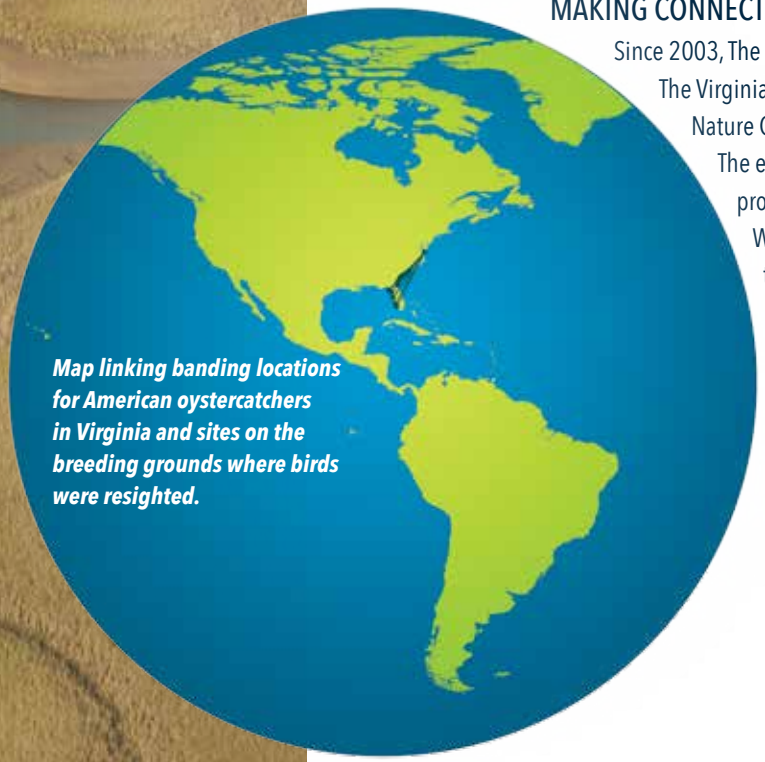
## THE PROBLEM

The American oystercatcher is one of the most charismatic shorebirds along the Atlantic Coast. Once hunted to dangerously low numbers, they recovered only to experience the largest human migration to the coastal zone in history. The population is now estimated to contain 11,000 individuals and is the focus of coordinated conservation efforts.

Their specialized diet of oysters, mussels and clams restricts the American oystercatcher to the saltier waters of the outer coast. The habitats that they require for nesting are vulnerable to sea-level rise and human encroachment. Human disturbance has effectively rendered much of their former breeding range unsuitable. Oystercatchers congregate in large winter groups that are vulnerable to disturbance and habitat degradation. Linking breeding and winter sites is an essential first step toward understanding population-level constraints.

## MAKING CONNECTIONS

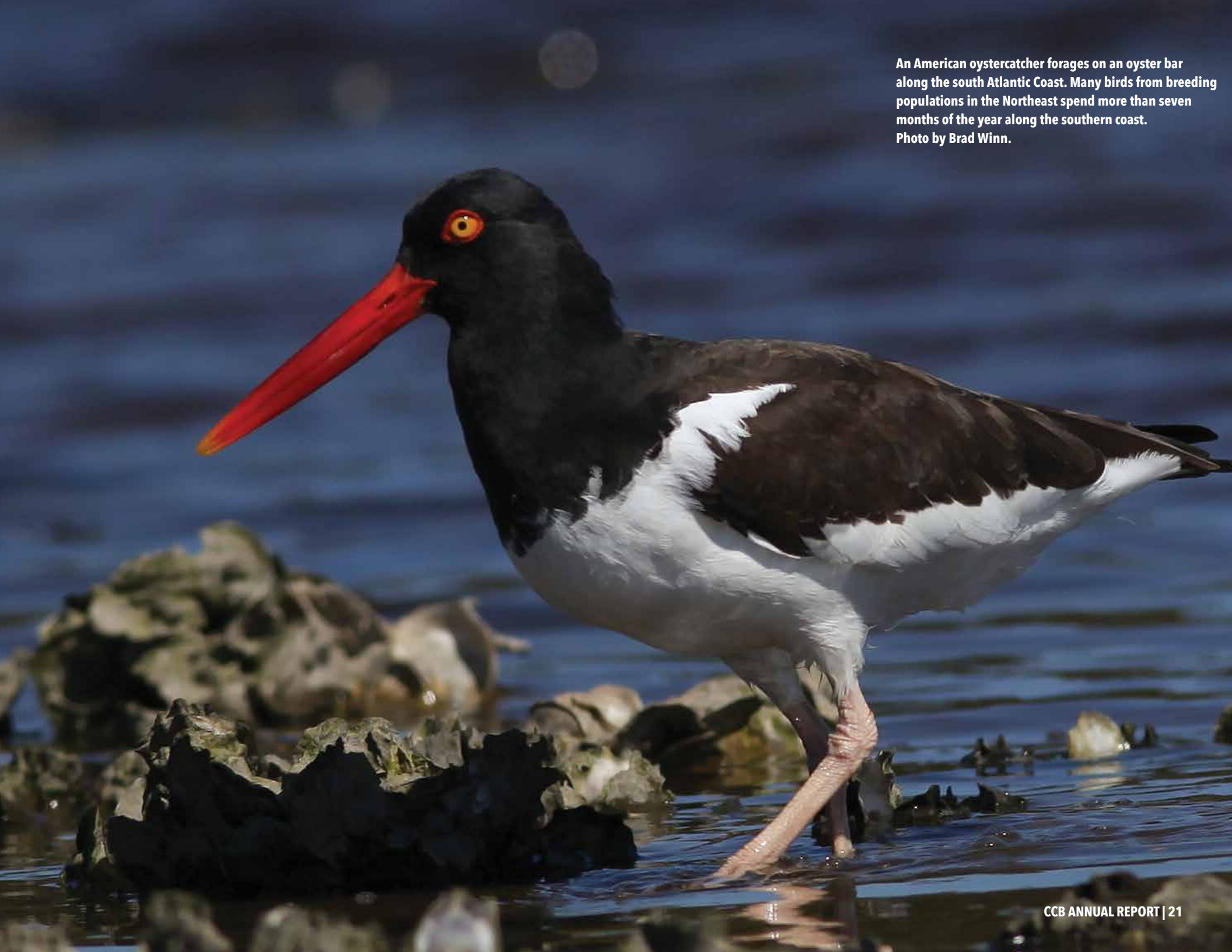
Since 2003, The Center for Conservation Biology has worked with The Virginia Department of Game & Inland Fisheries and The Nature Conservancy to mark oystercatchers in Virginia. The effort is now part of a marking and resighting program coordinated by the American Oystercatcher Working Group that has linked hundreds of locations throughout the species' range.



***Map linking banding locations for American oystercatchers in Virginia and sites on the breeding grounds where birds were resighted.***

***Above: A brood of American oystercatchers just after hatching on the Virginia Barrier Islands. Young are precocial and are mobile within a short time after hatching. Virginia supports the largest breeding population.*** **Photo by Alex Wilke.**

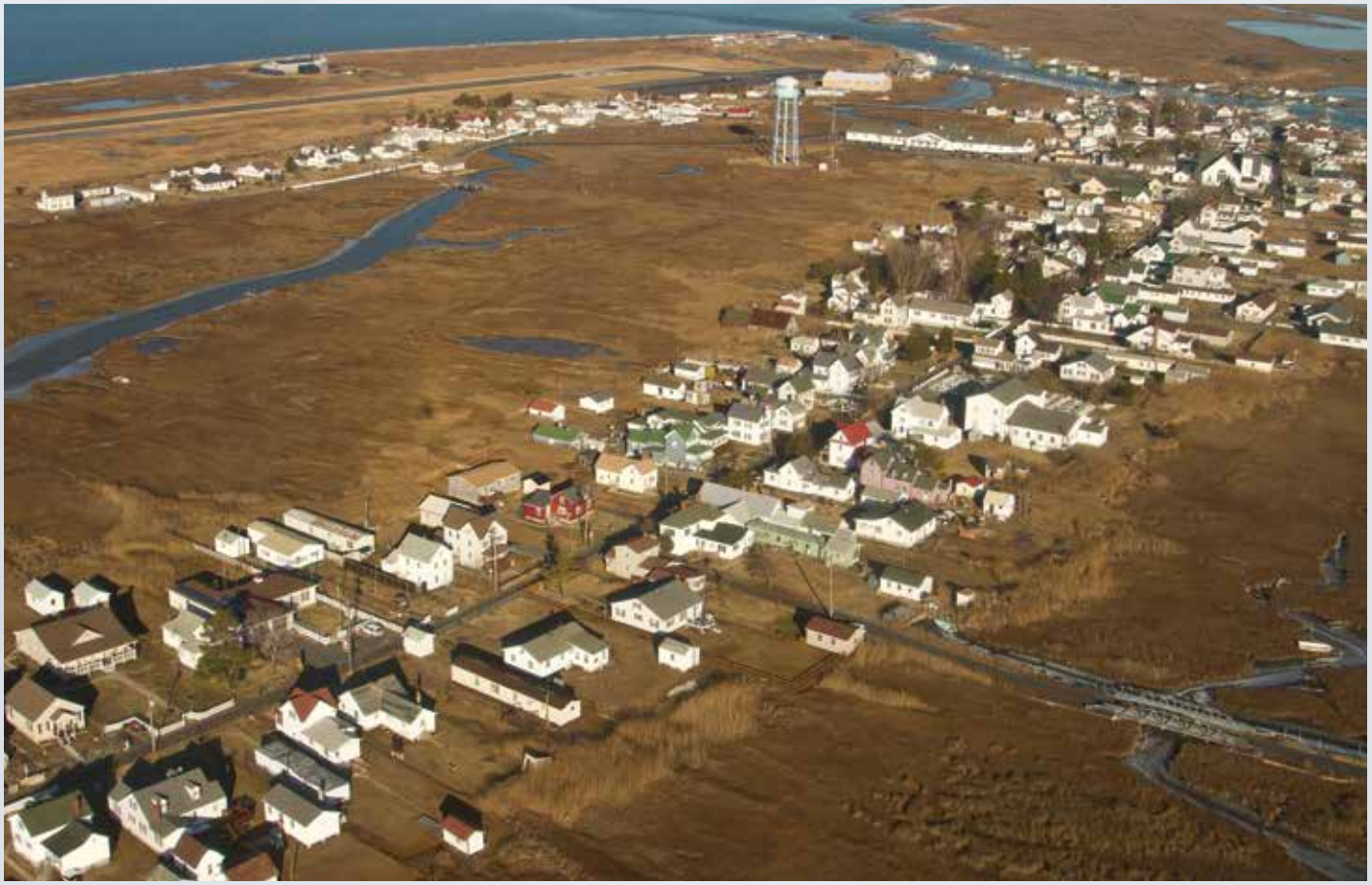
***Tidal marsh habitat along the south Atlantic Coast. The extensive marshlands from South Carolina through Florida represent significant winter habitat for American oystercatchers breeding in Virginia.***
**Photo by Bryan Watts.**



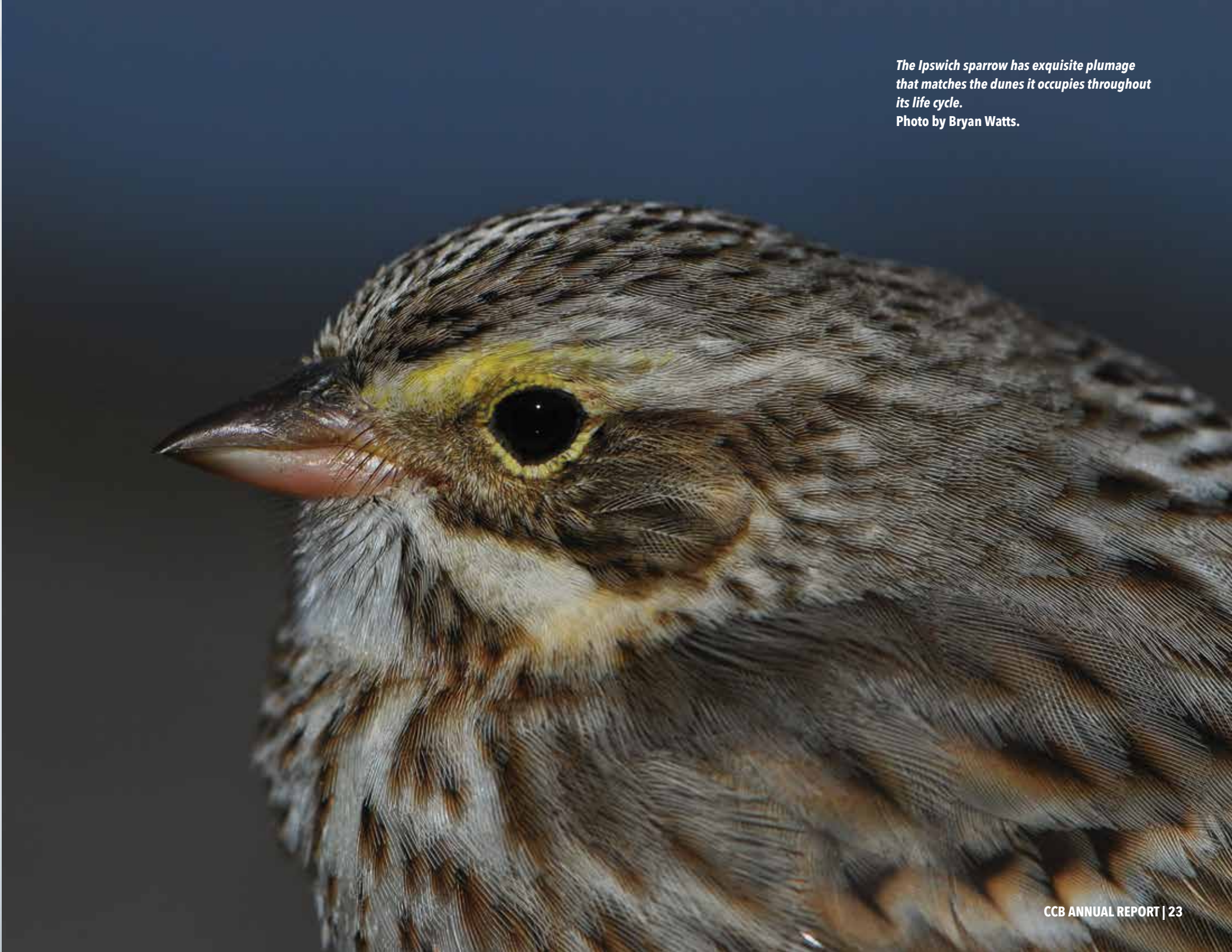
**An American oystercatcher forages on an oyster bar along the south Atlantic Coast. Many birds from breeding populations in the Northeast spend more than seven months of the year along the southern coast. Photo by Brad Winn.**

# SURVEYING FOR DISTINCTIVE POPULATIONS

Bird species often have populations that are designated as subspecies or races. Because many such forms exist as small, isolated populations, they are frequently vulnerable and attract high concern from the conservation community. Some forms may be identified by plumage or song. For these birds, careful survey efforts may be adequate to connect breeding and winter ranges and to delineate migration corridors.



***The community of Tangier on Tangier Island in the Chesapeake Bay. Situated on a low ridge within the marsh, residents share the same vulnerabilities to sea-level rise as the sharp-tailed sparrows that depend on the island during the winter months.***
**Photo by Bryan Watts.**



***The Ipswich sparrow has exquisite plumage that matches the dunes it occupies throughout its life cycle.***
**Photo by Bryan Watts.**

# Convergence of Sharp-tailed Sparrows

*A Nelson's sparrow in winter. This form breeds in the Plains of the upper Midwest and migrates to the Atlantic coast where it shares winter habitat with the other four subspecies in the group.*
**Photo by Bryan Watts.**



*Map linking breeding ranges of the five sharp-tailed sparrow forms to their coastal winter range. All of these forms converge and co-occur on the outer coast during the winter months.*

## THE PROBLEM

The sharp-tailed sparrow complex is a superspecies that includes two species (Nelson's and saltmarsh sharp-tailed sparrows) and five subspecies. The subspecies have distinct breeding ranges and include the "Acadian" sparrow that nests from Quebec to Massachusetts, the "James Bay" sparrow that nests along the southwestern margin of James Bay, the "Nelson's" sparrow that nests in the northern Great Plains, the "north-Atlantic" saltmarsh sparrow that nests along the coast from Maine to New Jersey, and the "mid-Atlantic" saltmarsh sparrow that nests along the coast from New Jersey to Virginia.

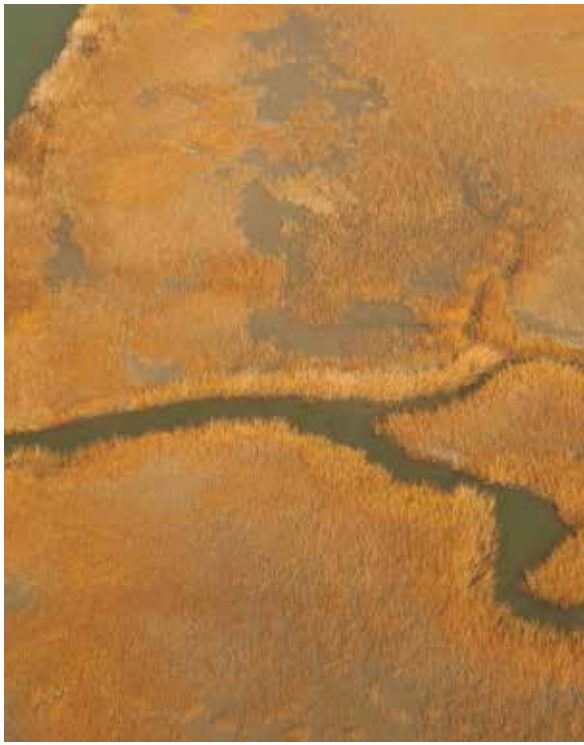
Linking the breeding populations to the winter grounds is of particular interest because all forms are saltmarsh obligates during the winter and as such are confined to a thin veneer of habitat that is being subjected to increasing threats from sea-level rise.

## MAKING CONNECTIONS

Sharp-tailed sparrow subspecies may be identified in the hand by subtle variation in plumage characteristics. Since 2007, The Center for Conservation Biology has captured more than 1,000 sparrows during the winter to determine the composition of birds in order to investigate linkages to the breeding grounds. Results demonstrate that all subspecies converge within tidal salt marshes along the middle to south Atlantic Coast, reinforcing the conservation significance of these habitats.

*Left: Laura Duvall examines the plumage of a Nelson's sparrow to determine age. The ongoing banding program has successfully linked the winter community of marsh sparrows to source breeding populations and has demonstrated year-to-year swings in age ratios that may provide insight into productivity patterns.*
**Photo by Bryan Watts.**

*Below: Salt marsh habitat in winter along the Delmarva Peninsula in Virginia. This is the primary habitat used by the sharp-tailed sparrow complex and is under imminent threat due to sea-level rise.*
**Photo by Bryan Watts.**



# Ipswich Sparrow Geography

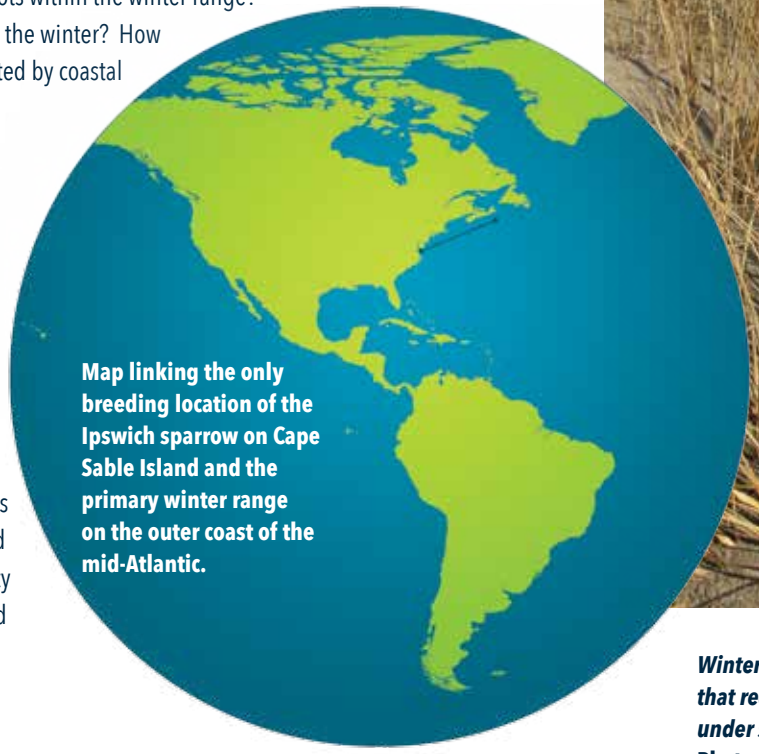
## THE PROBLEM

The Ipswich sparrow is a geographically isolated subspecies of the savannah sparrow. The breeding range of the form is restricted to Sable Island off the coast of Nova Scotia, Canada, where it nests in dune and heath habitat. The global population is estimated to be 6,000 individuals. The Ipswich is a true coastal sparrow, spending its entire life cycle in dune habitat along the Atlantic Coast. Although a considerable body of research has been completed on the breeding grounds, very little is known about the winter ecology of this unusual bird.

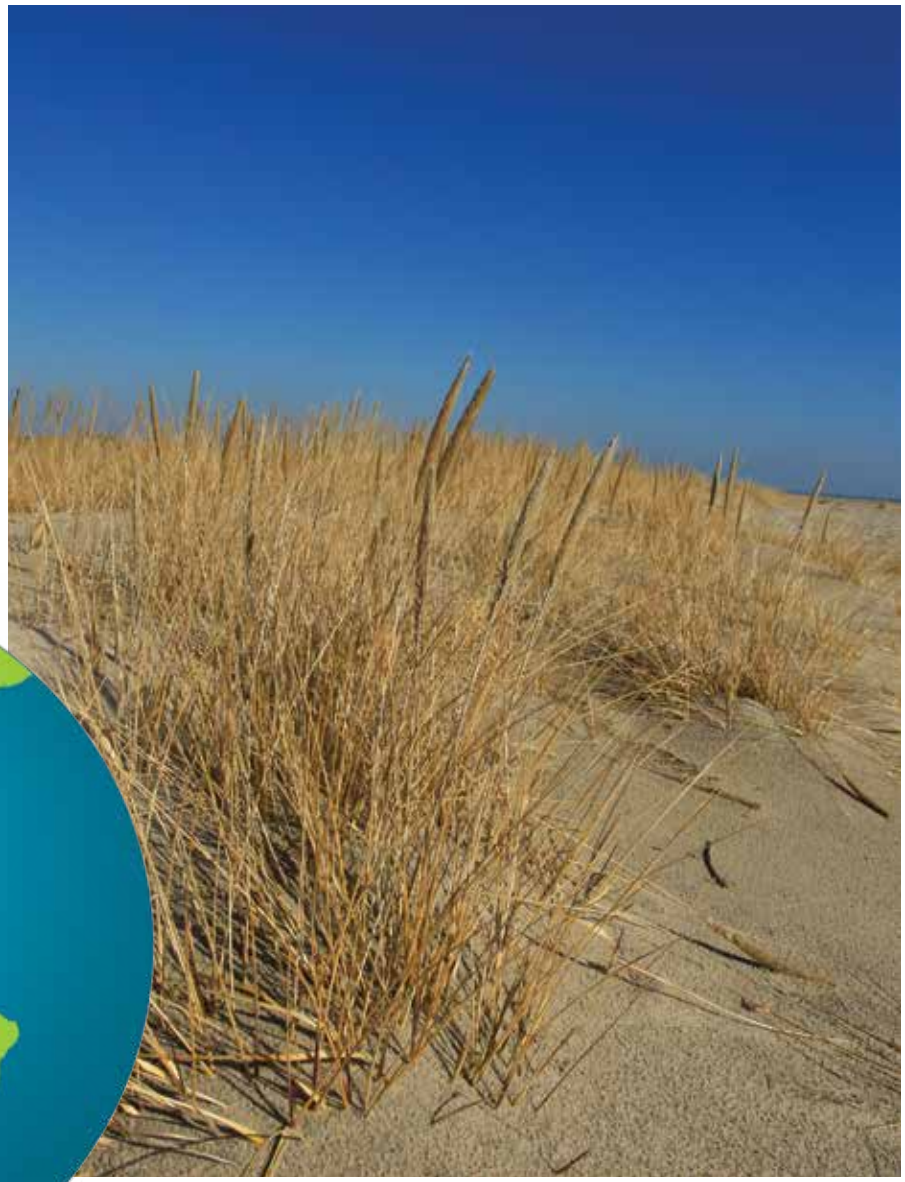
The primary winter range of the Ipswich sparrow includes coastal barriers and beaches from North Carolina north to New Jersey, with the highest densities occurring in Virginia. Habitat for this specialized sparrow is threatened by sea-level rise, coastal erosion and human-related disturbance on beaches. Several questions that are important to the future of this population remain unanswered. Where are geographic hotspots within the winter range? Which habitat attributes are critical during the winter? How may critical habitat components be impacted by coastal erosion? How high is site fidelity?

## MAKING CONNECTIONS

The distinctive plumage of the Ipswich sparrow has allowed the link to be forged between breeding grounds on Cape Sable and the winter range in the mid-Atlantic. Both ranges are geographically restricted and vulnerable. In 2012, The Center for Conservation Biology conducted a systematic survey for the sparrow throughout coastal Virginia. The survey was a first step toward a collaborative, bookend marking program to investigate site fidelity and survivorship on both the breeding and winter grounds.



**Map linking the only breeding location of the Ipswich sparrow on Cape Sable Island and the primary winter range on the outer coast of the mid-Atlantic.**



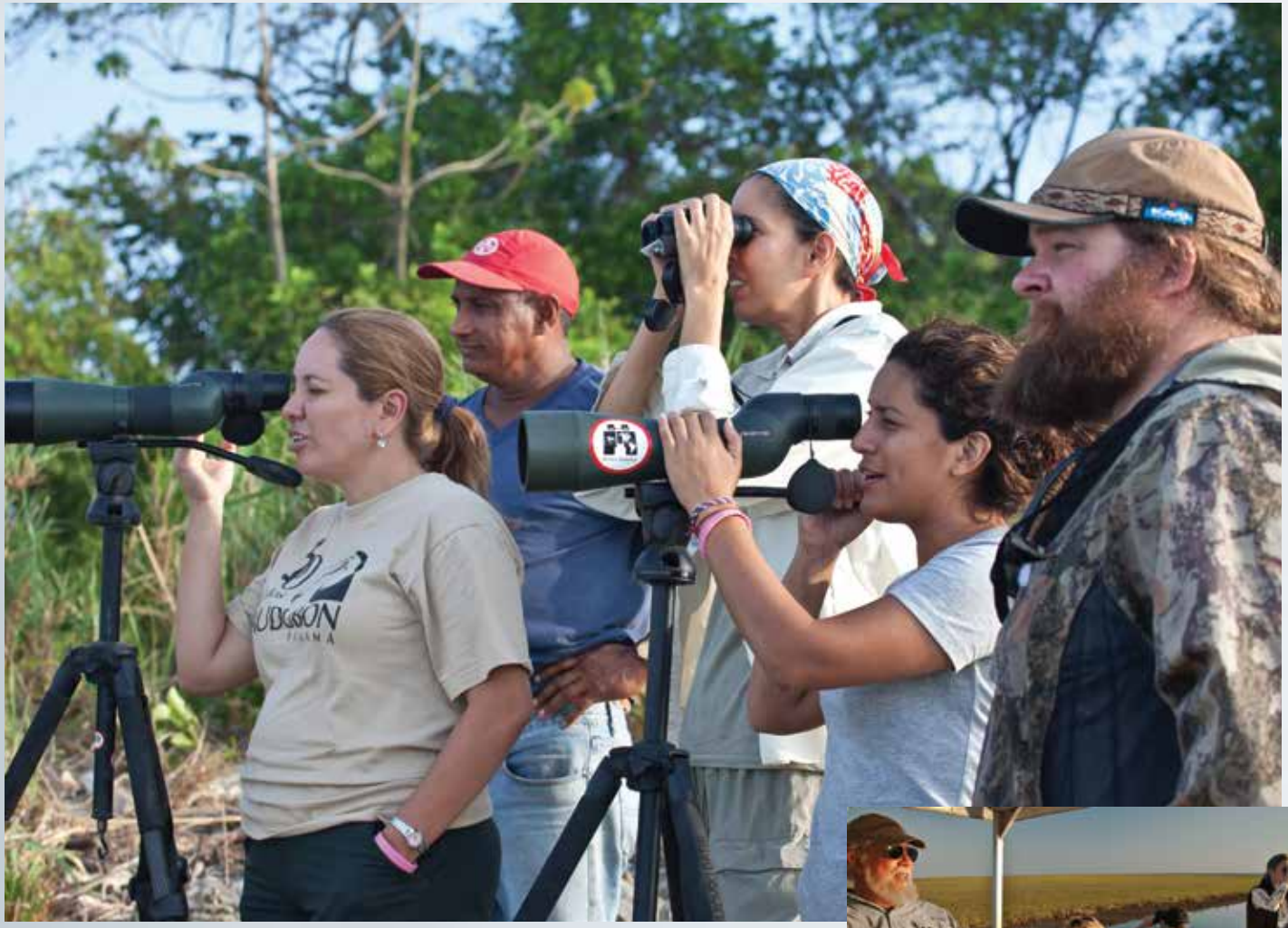
***Winter habitat for the Ipswich sparrow. The Ipswich sparrow is a habitat specialist that requires pristine dune communities throughout its life cycle. This habitat is under siege from both human encroachment and sea-level rise.***
**Photo by Bryan Watts.**

*Ipswich sparrows are restricted to Cape Sable Island off the coast of Nova Scotia, where they nest among high wind-swept dunes.*
**Photo by Bryan Watts.**

*Two Ispwich sparrows in the hand, illustrating the sand-colored plumage and the variation in the extent of yellow in the lores.*
**Photo by Bryan Watts.**

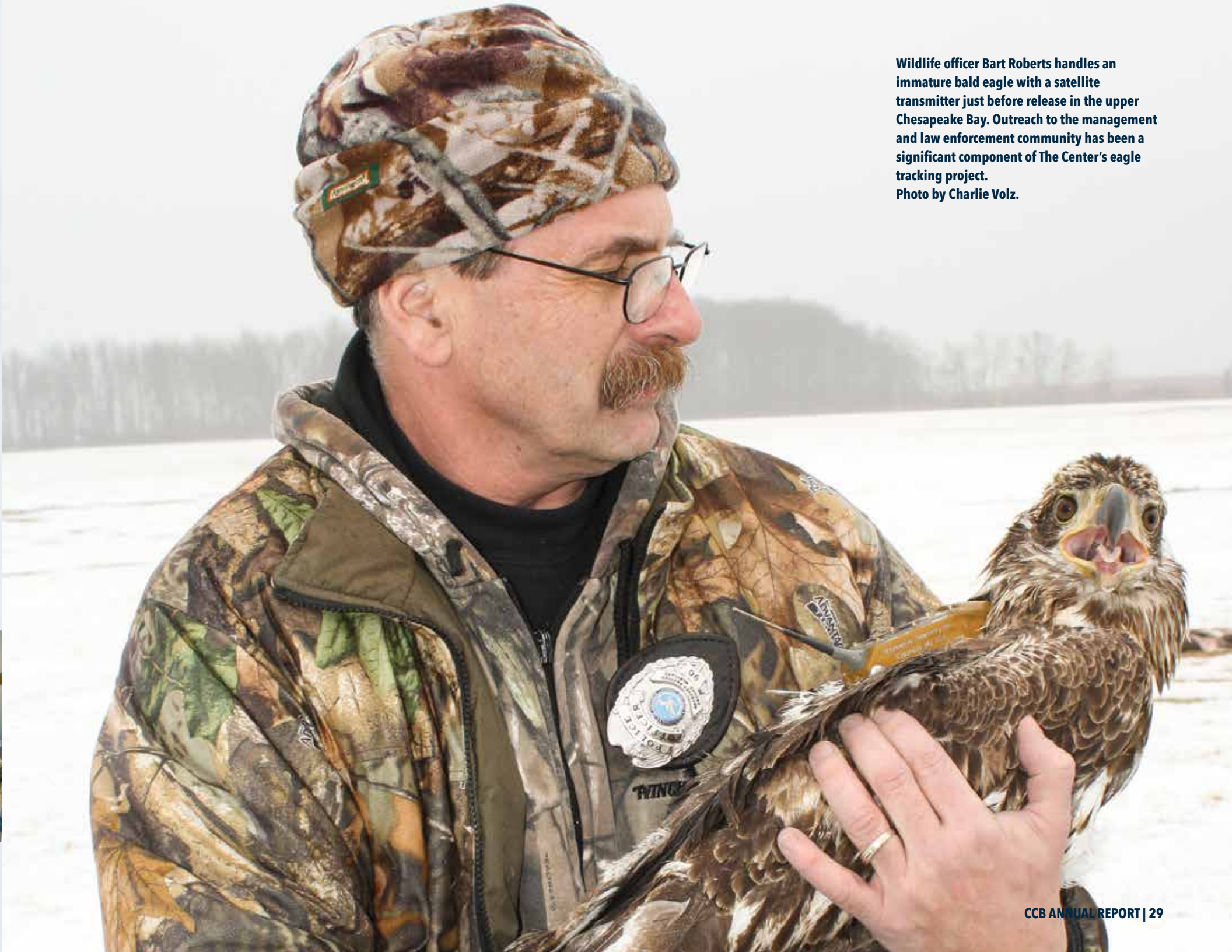
# REACHING OUT

Progress in conservation is short-lived without a strong foundation in education. Education provides the opportunity for understanding and ultimately for the informed decision making that leads to the wise use of limited resources. Nowhere in conservation is the need for education more urgent than in the protection of migratory birds. Protection of migratory populations begins with an understanding of shared purpose and responsibility. The Center for Conservation Biology believes that the key to this understanding is engagement. Whenever possible, we provide domestic and international opportunities for biologists and the public to engage with species of conservation concern.

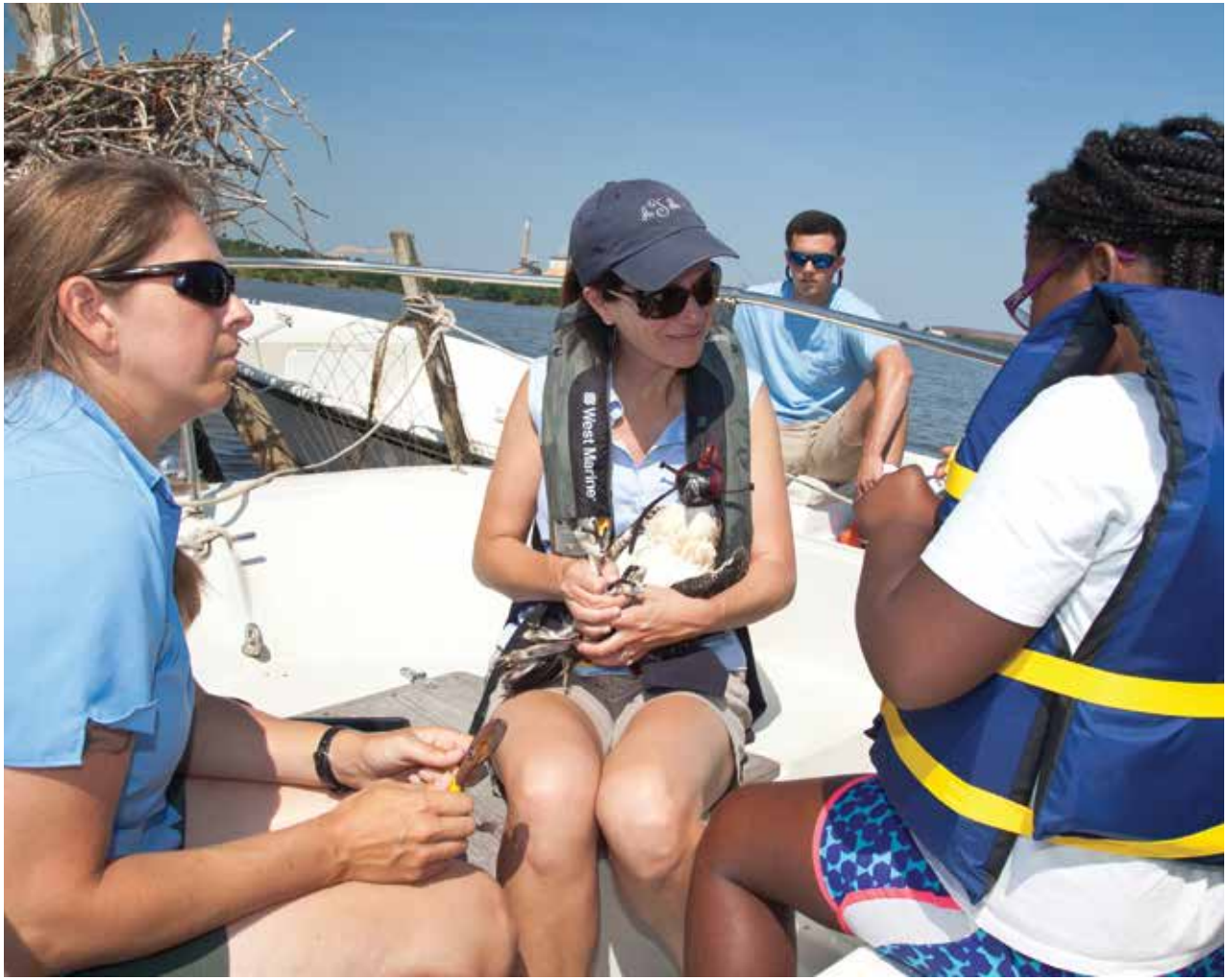


***Above: Fletcher Smith (R) instructs Panama Audubon staff (L to R) Yenifer Diaz, Rosabel Miro and Michelle Caballero on shorebird resighting techniques along the beach in Pacora. The crew is playing an increasingly important role in shorebird monitoring and education within the Upper Bay of Panama.***
**Photo by Bryan Watts.**

***Right: Whimbrel Watch crew including (L to R) Barry Truitt, Jane Batten, Talbot Jordan, Roberta Kellam and Polk Kellam on a boat along Elkins Marsh. Each spring for ten days, groups of watchers come to the Eastern Shore to help count whimbrels that are taking off in the evening for arctic breeding grounds.***
**Photo by Bryan Watts.**



**Wildlife officer Bart Roberts handles an immature bald eagle with a satellite transmitter just before release in the upper Chesapeake Bay. Outreach to the management and law enforcement community has been a significant component of The Center's eagle tracking project.**
**Photo by Charlie Volz.**




# Reaching Out

## THE PROBLEM

Society in general and children in particular are more detached from the natural world now than during any other time in human history. The consequences of this detachment are profound. For migratory birds, people must understand that local actions have consequences on a grand scale beyond the locality. Their location is just one link in a much longer chain. Instilling the sense of international community is critical to success.

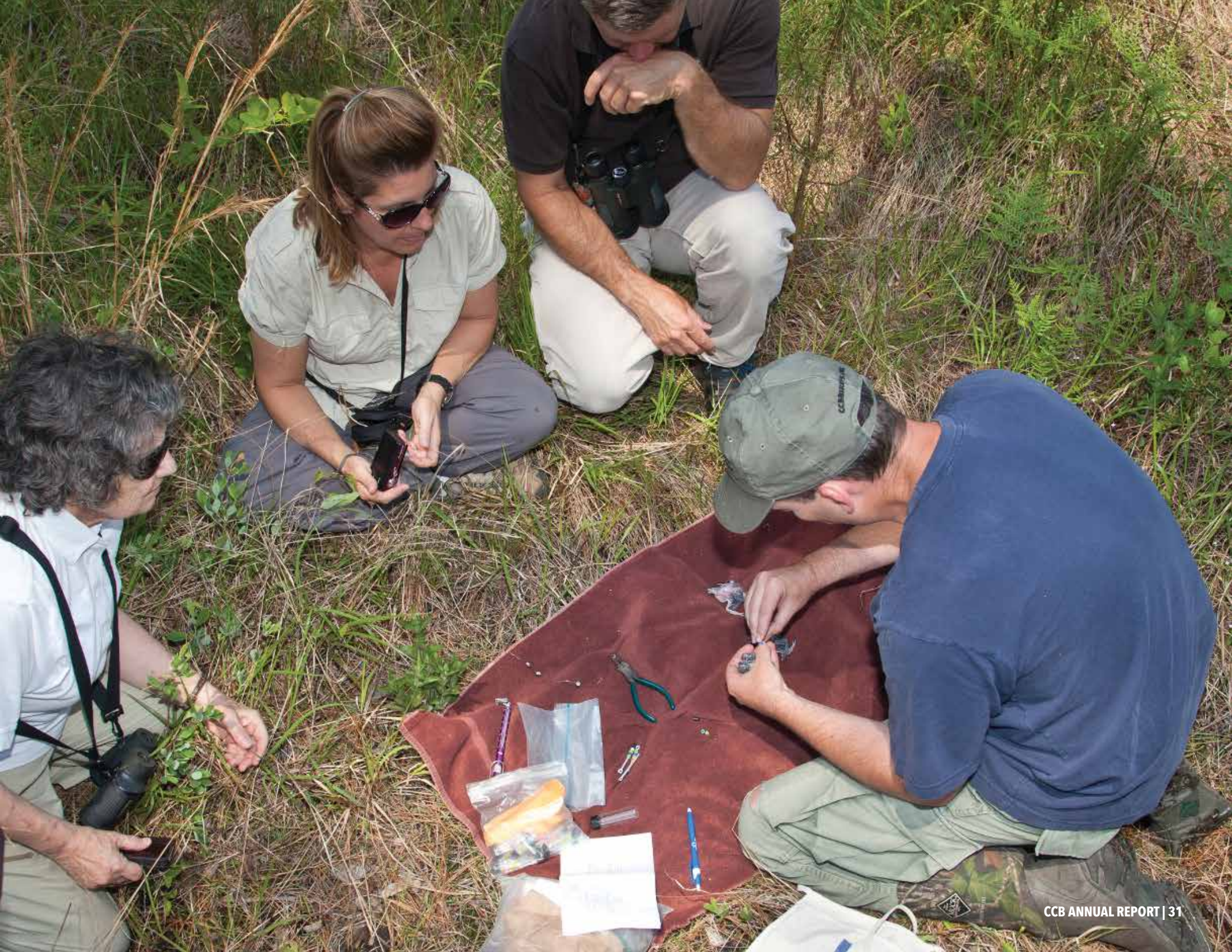
One of the central challenges in combating the human-to-nature disconnect is to find ways of engaging people with the species around them. By observing other species on a regular basis, people learn about their ecology and in so doing become more concerned about their welfare. Continued exposure and familiarity is one key to the social side of conservation.

## MAKING CONNECTIONS

Linking together locations and cultures that are important to migratory birds allows people to see how their locality and actions fit into the larger conservation puzzle. Engaging people with the species directly allows them to identify with the challenges that migrants must confront on an annual basis. Many projects conducted by The Center for Conservation Biology that are focused on migrant populations have an outreach component.

***Above: Libby Mojica (left) teaches Ann-Marie (center), Jack (center right) and Maya (far right) Trepp how to handle, band and measure young osprey on the James River.***
**Photo by Bryan Watts.**

***Right: Mike Wilson demonstrates how to band woodpecker chicks on The Nature Conservancy's Piney Grove Preserve. Every year, small groups of visitors are able to observe biologists from The Center working with this endangered species.***
**Photo by Bryan Watts.**



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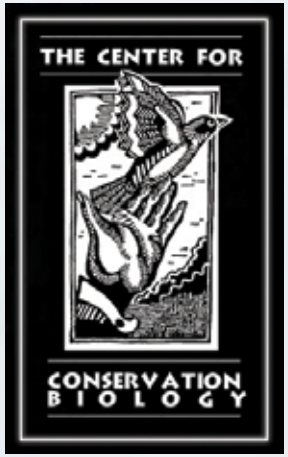


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