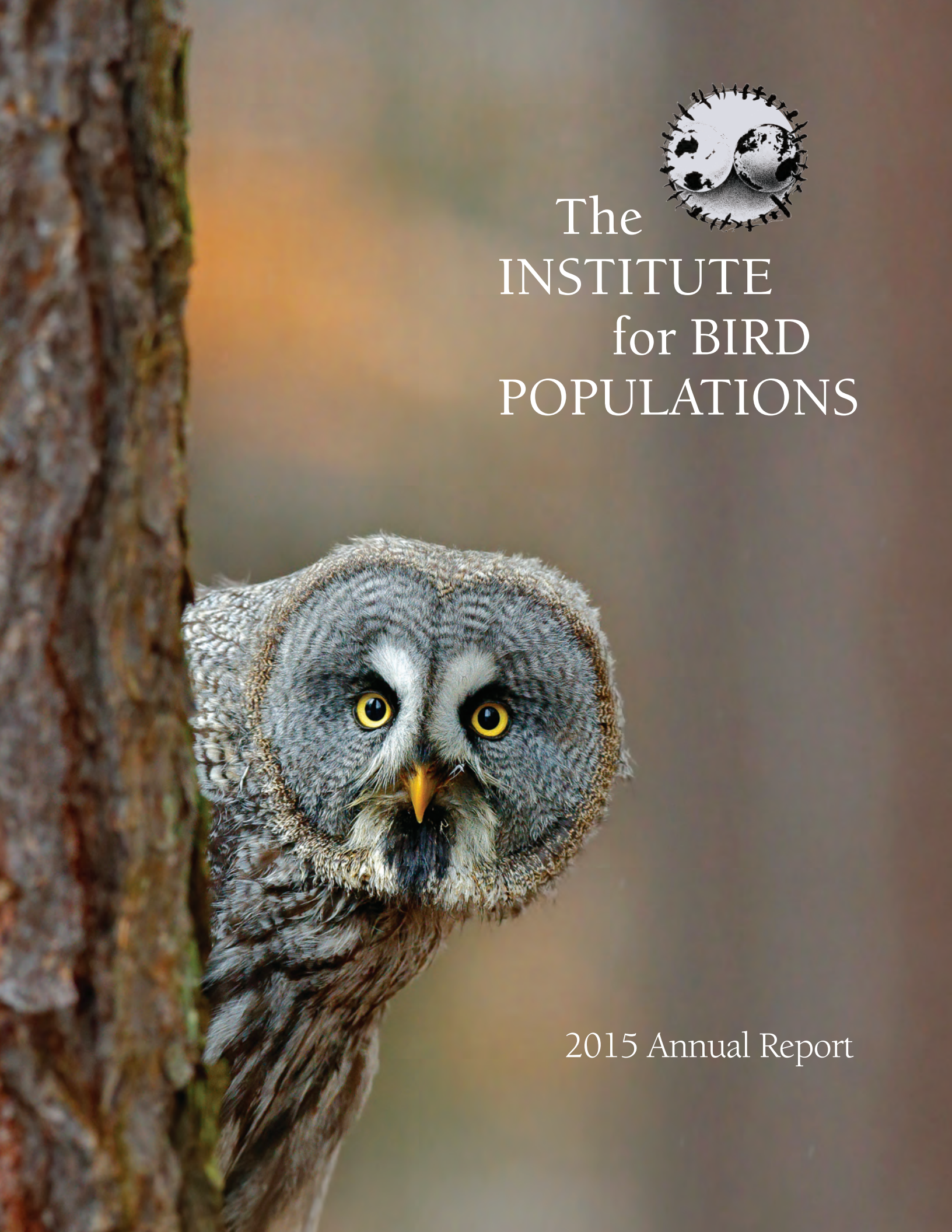

# The INSTITUTE for BIRD POPULATIONS

2015 Annual Report

The INSTITUTE for BIRD POPULATIONS
www.birdpop.org

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*IBP Staff – Front row, L to R: Ruth Lopez, Mandy Holmgren, Helen Loffland, Bob Wilkerson, Joanna Wu, Julie Polasik. Back row, L to R: Farshid Ahrestani, David DeSante, Chris Ray, Peter Pyle, Rodney Siegel, Jim Saracco, Morgan Tingley, Danielle Kaschube, Steven Albert, Lauren Helton. Not pictured: Lynn Schofield, Ron Taylor*

## A Message from IBP's Executive Director:

Despite tight federal and state budgets, IBP has been growing in recent years, and 2015 was our biggest budget-year ever. I believe our growing funding stream reflects that our funders and partners appreciate the quality of our cutting-edge science, and our creativity in applying that science to practical solutions that help conserve birds and their habitats. More funding has meant more research, more staff to conduct that research, and more opportunities to publish results and find other ways to disseminate our findings and conservation recommendations to people who can make change happen on the ground.

In the pages that follow, we highlight some of our accomplishments in 2015. We initiated important new projects, sustained ongoing projects, completed important analyses, and published papers within virtually all of our program areas. None of this would have been possible without the generous support we received from our funders. That support ranged from large government grants to modest donations by individuals, all of which was critical for sustaining our efforts. Equally important was the collaborative engagement of our many colleagues and partners (see page 16), the dedication and hard work of our many volunteers and seasonal personnel (see sidebar), and the brilliant work by IBP's world class scientists.

I hope you enjoy reading about our accomplishments during 2015. If you supported IBP in any way during this past year, please view this Annual Report as an extended thank you letter. If you did not, please consider finding a way to get involved – by collaborating, volunteering, or donating – during the coming year. We need your help to conserve populations of the birds we all love.

In gratitude,

Rodney Siegel, Ph.D.
Executive Director

## IN THIS REPORT

*The Institute for Bird Populations studies the abundance, vital rates, and ecology of bird populations to enable scientifically sound conservation of birds and their habitats.*

On the Cover:
Great Gray Owl
Photo: Ondrej Prosicky

This page:
Common Yellowthroat
Photo: Kenneth Cole Schneider

# The MAPS & MoSI Programs

Baltimore Oriole
Photo: Kathy and Sam

## MAPS Program

The MAPS Program was initiated to fill an important gap in avian science: demographic monitoring. The data collected at MAPS stations – age, sex, reproductive status, and population structure – enable IBP scientists and our colleagues to model or estimate vital rates, such as productivity, survivorship, and recruitment, that are the keys to inferring what is responsible for population change, and perhaps even where that change is taking place, on the breeding and wintering grounds and during migration.

## MoSI Program

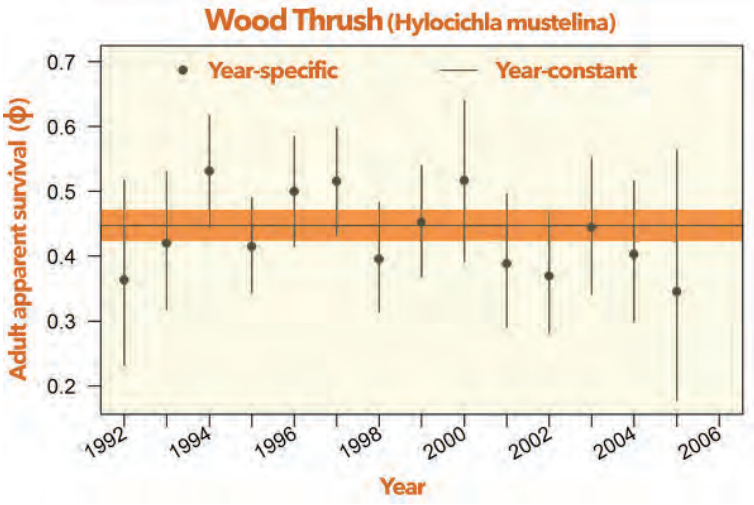
In the last decade, scientists have increasingly recognized the need to study migratory birds during all phases of their annual cycle. In 2002, IBP initiated the Monitoring Overwinter Survival (Monitoreo de Sobrevivencia Invernal, or MoSI) Program to study the vital rates of North American migrant landbirds on their wintering grounds, generally south of the U.S. border, and to learn more about the resident bird species that share those winter habitats.

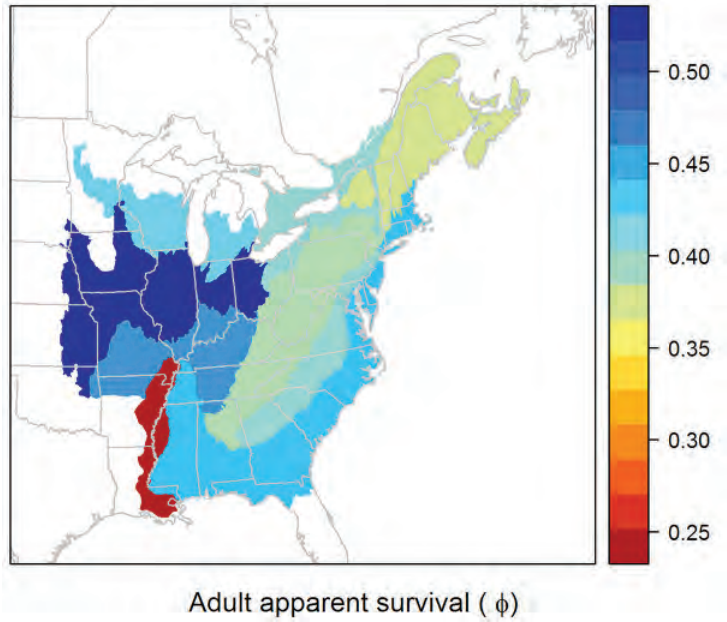
Together, these two programs have collected more than 2 million capture records from birds banded and released at over 1,400 monitoring stations in 16 countries, and provided important information for conserving birds and their habitats throughout their annual cycle.

## New Website Analyzes MAPS Data for 158 Species

Some of the great strengths of the MAPS Program are its continent-wide reach, its longevity, and the extent of its database. In 2015, IBP launched a new website that provides unprecedented estimates of the vital rates of 158 species of North American landbirds, and could significantly improve strategies for reversing the population declines that are occurring in many of these species. Vital Rates of North American Landbirds (www.VitalRatesOfNorthAmericanLandbirds.org) provides estimates of the rates of survival, reproduction, recruitment, and population change for each of these species, and explores temporal and spatial variation in these rates. The data were derived from analysis of nearly one million banding and recapture records collected during 15 years across the U.S. and southern Canada by the MAPS Program.

By examining vital rates and how they vary across years and regions, the website identifies the extent to which population changes in these species are driven by factors affecting productivity, which occurs during the spring and summer breeding season, versus factors affecting mortality, which primarily occurs during the non-breeding season.



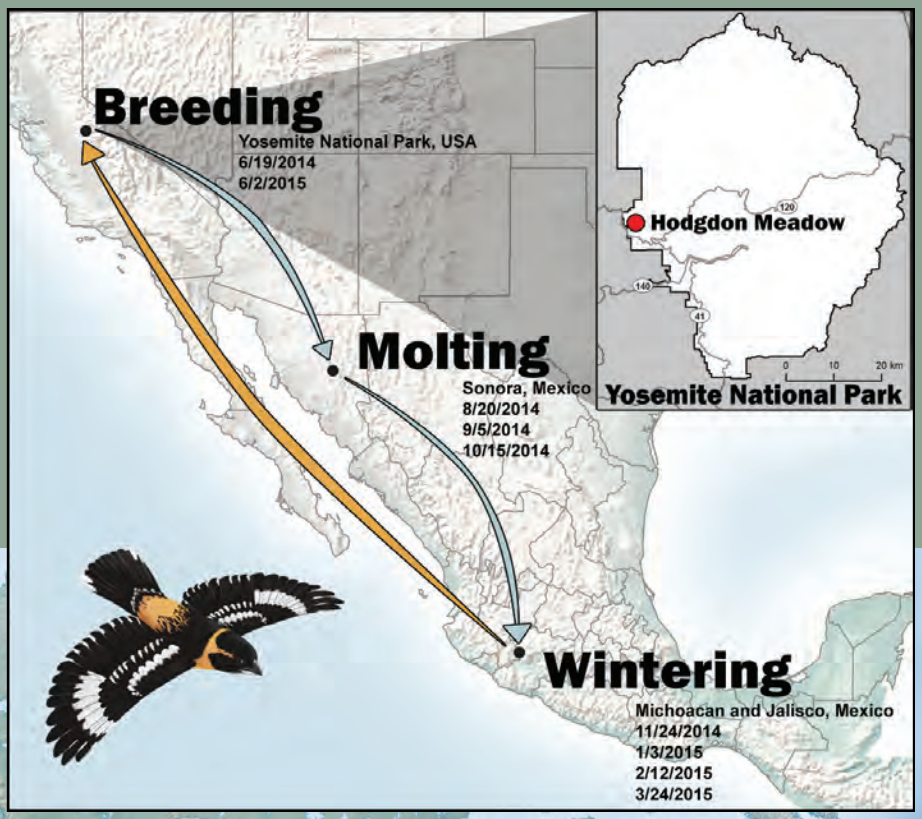

*The figures above, which show temporal (top) and spatial (bottom) variation in rates of adult apparent survival for Wood Thrush between 1992 and 2006, are samples from the Vital Rates of North American Landbirds website.*

*These and other results suggest that population declines in Wood Thrush are likely due to factors operating on the wintering grounds – an important finding that could help target conservation efforts more strategically and cost-effectively. Similar results are available for 158 species of landbirds.*

Wood Thrush
Photo: Juan Zamora

*The figure at right shows the migratory path of a male Black-headed Grosbeak banded in Yosemite National Park in June 2014. The bird migrated to northwest Mexico to molt, continued to southwest Mexico for the winter, and returned to the same breeding area in Yosemite in the spring of 2015.*

*Artwork: Lauren Helton*




MAPS and MoSI operators come from many backgrounds and agencies. Since the programs began, more than 1,400 stations have collected over two million capture records from nearly every state and Canadian province, and 14 countries in Latin America.

- MAPS stations
- MoSI stations

# GPS Tracking Reveals Full Migration Cycle of a Black-headed Grosbeak from Yosemite

Fall molt is a vulnerable time for birds – it is energetically taxing, and may impair flight ability. Recent research indicates many species suspend their southbound migration to molt in the southwestern U.S. and northwestern Mexico, an area of surprisingly green fall vegetation due to summer monsoon rains that may provide ephemeral but abundant insects, seeds, and protective cover.

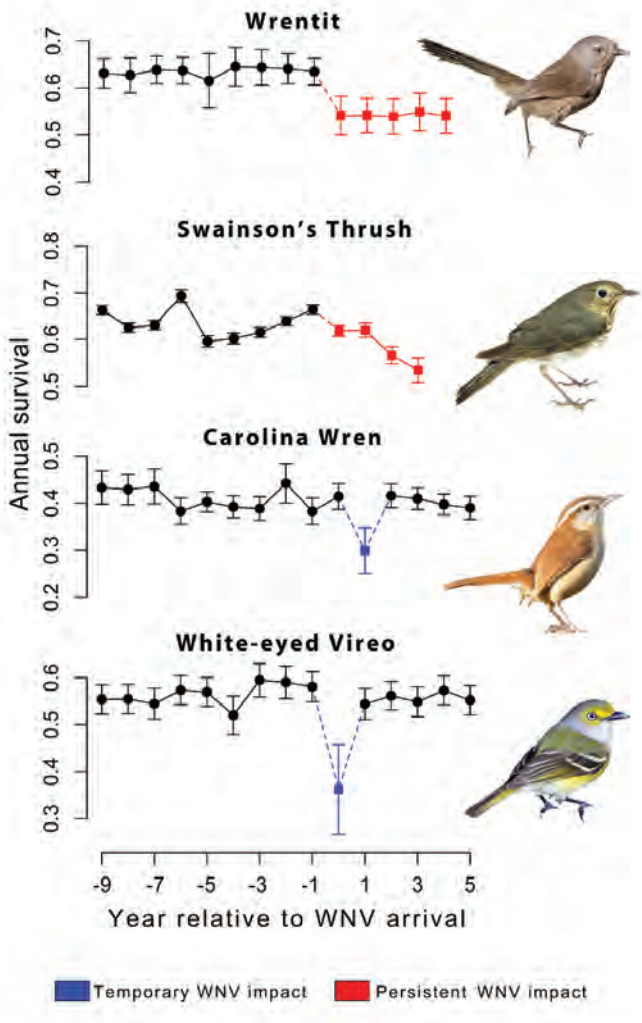
IBP scientists recently partnered with Yosemite National Park to employ micro-GPS units in a study of Black-headed Grosbeaks. Our objectives were to establish links between breeding habitat in Yosemite and Black-headed Grosbeak migratory stopover and wintering areas to the south, and to document "molt migration" in this species. This project was only the second study using tracking technology to document molt-migration in landbirds in western North America, and the first to do so using highly precise GPS.

Black-headed Grosbeak
Photo: Alan Harper

# MAPS Data Reveal Impacts of West Nile Virus on Bird Populations

Since its introduction to North America in 1999, West Nile Virus (WNV) has spread across the continent with far-reaching impacts to birds, other wild and domestic animals, and humans. Identifying what affects the persistence of the disease in host species is critical to mitigating its effects. In a study recently published in the prestigious journal Proceedings of the National Academy of Sciences, IBP scientists and colleagues analyzed a quarter-million bird records from the MAPS program and found that almost half of the 49 species studied were negatively affected.

Interestingly, species appeared to fall into two groups: those for which WNV negatively impacted survival only during initial spread of the disease, and those whose survival rate had not recovered for at least several years. Some species groups, such as New World sparrows, finches, and vireos, were disproportionally affected, suggesting an evolutionary dimension. These findings suggest that effects of an introduced disease, such as WNV, may play an important role in driving avian population dynamics, and must be considered in species conservation efforts.



# IBP's Sierra Nevada Bird Observatory

**IBP's Sierra Nevada Bird Observatory has grown dramatically in recent years, a trend that continued in 2015 (see program highlights from the past year, here through page 11). We collaborate with diverse partners, including state and federal agencies, private industry, and other NGOs, to monitor population trends and study the habitat needs of at-risk species in California's Sierra Nevada mountains. We use our findings to prescribe science-based solutions that help prevent further declines of those species and, where possible, facilitate restoration and recovery of populations.**

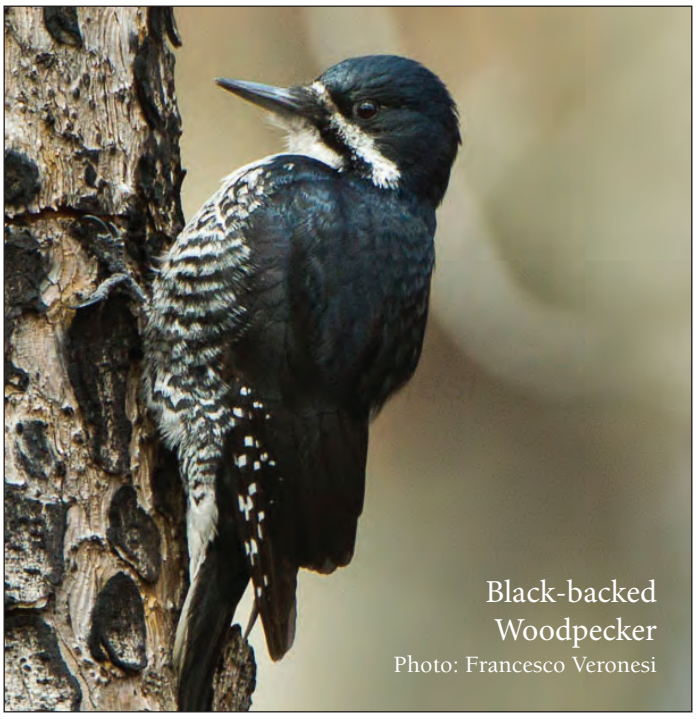
Photo: Tom Grundy

## Black-backed Woodpecker Research and Conservation

IBP and our U.S. Forest Service partners are sustaining our award-winning program of monitoring, research, and conservation planning for Black-backed Woodpeckers in California. In 2015, we initiated or continued multiple field studies to answer lingering questions about the ecology of this species and its response to post-fire forest management.

One study we completed this year, to be published in the ornithological journal *The Auk: Ornithological Advances* in 2016, shows that newly burned areas are colonized primarily by young Black-backed Woodpeckers that have not previously bred elsewhere, rather than by older birds with previous breeding experience. We also further developed and tested a model that predicts how many Black- backed Woodpeckers a particular burned area can support, and how that number could be reduced by post-fire logging plans.

The model is now regularly used by the Forest Service to aid in post-fire forest management. A manuscript describing the model and evaluating the accuracy of its predictions will be published shortly in the journal *Methods in Ecology and Evolution*.



Black-backed Woodpecker
Photo: Francesco Veronesi

## Monitoring Bird Populations in National Parks

As part of the National Park Service Inventory and Monitoring Program, IBP works with the Park Service to monitor the distribution, abundance, and population trends of birds in five national parks in the Pacific Northwest (Mount Rainier, North Cascades, Olympic, San Juan Island, and Lewis and Clark) and four national parks in the Sierra Nevada mountains of California (Yosemite, Devils Postpile, Kings Canyon, and Sequoia). In most summers, our field crews conduct point count surveys at nearly 2,000 locations, most of them off-trail, across these nine parks.

Several years of drought in California, and a stunningly active 2015 fire season in the Pacific Northwest, have provided opportunities to study the short-and long-term effects of annual climate variability and by extension, long-term climate change on bird populations in relatively pristine ecosystems where climate effects are not confounded by land use changes.

Mount Rainier National Park
Photo: Mandy Holmgren

## California Spotted Owl Ecology

The California subspecies of the Spotted Owl is currently under consideration by the U.S. Fish and Wildlife Service for listing under the federal Endangered Species Act. Regardless of the ultimate listing decision, conservation of this declining subspecies is already a major driver of forest management policy in the state.

Spotted Owls
Photo: US Fish and Wildlife Service

IBP scientists and our partners have been studying California Spotted Owls for many years, and have published several scientific papers on the apparent resilience of the owls to forest fire. In 2015, we initiated or continued studies of the effects of wildfire on Spotted Owls in Yosemite National Park and within the footprint of the 2014 King Fire on Eldorado National Forest; habitat selection by Spotted Owls nesting on commercial timberlands in the northern Sierra Nevada; and movements and space-use patterns of Spotted Owls before and after prescribed fire.

The ultimate goal of all of our California Spotted Owl research is to provide information that will help policy makers and forest managers ensure the persistence of the subspecies.

Great Gray Owl
Photo: David Mitchell

*Below: Great Gray Owl habitat in the Sierra Nevada*
*Photo: Buff Dawgus*

## Field Studies and Conservation Planning for a Reclusive Predator

In 2015, IBP scientists and our partners completed a ground-breaking study of the California-endangered Great Gray Owl. Nest-site availability has been suggested as a limiting factor for the species in California, but information on nest types and nesting habitat has been based on very few nests.

In collaboration with the U.S. Forest Service, Yosemite National Park, Sierra Pacific Industries, and the California Department of Fish and Wildlife, we collated all known nesting records in the Sierra Nevada since 1973 and revisited most of them to characterize nests and surrounding habitat. We used the data to formulate specific forest management goals for promoting Great Gray Owl nesting habitat in California.

We published the findings from this study in *The Journal of Wildlife Management*, and used them to inform the development of a conservation strategy for Great Gray Owls in California, a joint project between IBP and the California Department of Fish and Wildlife (see 'Partner Spotlight', page 16). The conservation strategy is now undergoing peer review and will be finalized and published in early 2016.

Other Great Gray Owl research efforts by IBP and our partners in 2015 included studies of the effects of wildfire on the species and its habitats in Yosemite National Park, and an in-depth study of Great Gray Owls nesting in low-elevation forests.

## A New Direction for IBP - Bumble Bee Conservation

The decline of European honey bees across North America has received a lot of attention in recent years, but it is less well known that many populations - and even entire species - of native bumble bees are also in trouble. As part of our Protecting Sierra Nevada Pollinators Program, this summer IBP teamed up with the U.S. Forest Service and researchers at San Francisco State University to initiate studies of bumble bees on two National Forests in California. During our pilot field season, we captured, identified, photographed, and released over 1,900 individual bumble bees. Post-fire forest management may be among the most important ways that Sierra Nevada land managers affect bumble bee habitat, so much of our initial work is taking place in recently burned areas. We are also assessing how bumble bee populations respond to ecosystem changes resulting from livestock grazing and riparian restoration. Our studies will ultimately help the Forest Service and other land managers to promote the persistence of these important pollinators.

# View from the Field by Former IBP Intern Jay Love

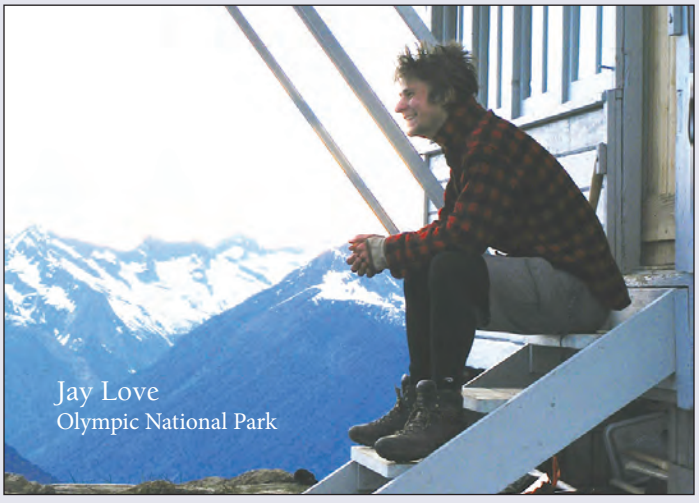
## Graduate research inspired by an IBP internship

*As I hiked uphill in a cold, dark mist through a dense thicket of devil's club, I wasn't weighing the long-term value of my endeavors, nor was I mulling over graduate school research project ideas. I was more concerned with my ability to stay upright on the steep slope. I was conducting off-trail point-counts in Olympic National Park for IBP's Landbird Inventory and Monitoring Project. Yet, it was at that moment that the direction for the next several years of my life began to crystalize.*

*Over the next few minutes, I detected four birds spread equidistantly around me, flitting about the canopy. I soon realized that their songs were a variable mix between the normal Hermit and Townsend's Warbler songs I was so accustomed to that I couldn't confidently identify them. Both confused and intrigued, I lingered and puzzled over the mystery of these birds' interactions and songs. Later that summer, when I began researching the topic, my interest grew as I realized the answers to my questions didn't exist – and that I could be the one to provide those answers.*

*This August, I began my Ph.D. dissertation project at the University of Utah. I'm working in the same mountains, chasing the same species (possibly even the same birds), but with a mission of my own creation: to determine the role of song in the ongoing hybridization between Townsend's and Hermit Warblers.*

*My experience with IBP has been invaluable in developing my sense of purpose and my passion for ornithology. I don't know where I'll land after my research is completed, but one thing's for sure: I will arrive via my own path, and I thank everyone at IBP for leading me off of my doorstep.* – Jay Love



Jay Love
Olympic National Park

Typhoon Soudelor from the International Space Station
Photo: NASA

# The Pacific Islands Program

## Studying Bird Populations in the Northern Mariana Islands and American Samoa

## Typhoon Soudelor

On the night of August 2, 2015, Typhoon Soudelor made landfall on the island of Saipan, where IBP monitors bird populations in cooperation with the government of the Commonwealth of the Northern Mariana Islands. The storm completely dwarfed the island as the eye passed directly over it, blasting Saipan and the neighboring island of Tinian as a Category 4 typhoon with winds exceeding 130 mph, according to analyses done based on the destruction observed to trees and homes after the storm had passed. Buildings were torn apart, tall ironwood pines twisted and snapped at their trunks, nearly every power pole on the island toppled, and the power plant was flooded, leaving many areas without power for over a month. Soudelor was the strongest storm to hit Saipan in decades and, until Hurricane Patricia made landfall in Mexico in late October, it was the world's strongest storm of 2015.

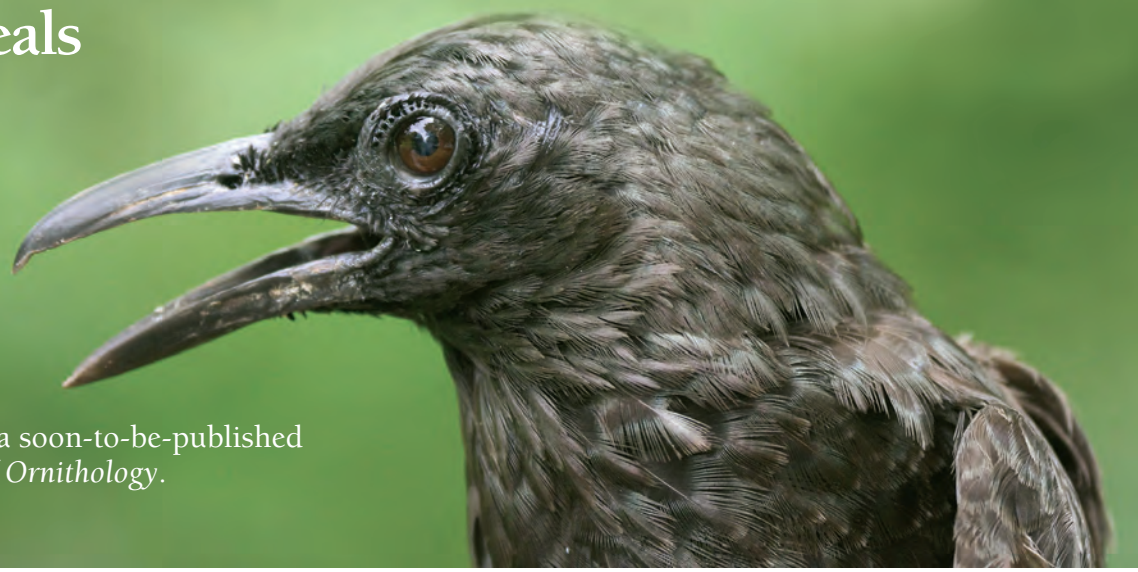
Photo:
Neil & Estela Metran

IBP's bird banding crew arrived October 2 to a battered but recovering island. Signs of the damage were still evident – roofless homes, toppled power lines, snapped and uprooted trees. None of our six banding stations emerged unscathed. Interestingly, though perhaps not surprisingly, hardest hit were habitats in non-native vegetation, while native rainforest trees seem to have weathered the typhoon much better. Many areas once covered with canopy are now exposed to sun, and large parts of the island are blanketed in dense, invasive vines that are thriving in the disturbed areas.

At this writing, we have only just begun to clear our banding stations of debris and vines. It's going to take a great deal of work, but we're dedicated to getting the nets up and the birds banded again – and especially to seeing how many birds banded in previous years survived the storm, and in what condition. Historically, island bird species have gone extinct due to human-caused changes, including the spread of invasive species, at a much higher rate than their mainland counterparts, so they pose particular conservation challenges. Because most of the species we capture are endemic to the Northern Marianas Islands in general or Saipan in particular, it's very important to understand how they respond to extreme weather events like Typhoon Soudelor.

*Left: Saipan residents cleaning up debris from Typhoon Soudelor, which toppled trees and caused significant damage across the island, including to IBP's bird monitoring stations.*

# New Study Reveals Molt Patterns and Strategies in Samoan Landbirds



A Samoan Starling, one of several species whose molt is described for the first time in a soon-to-be-published paper in *The Wilson Journal of Ornithology*.

Photo: Sam Jones

Molt and plumage studies contribute to our understanding of avian ecology. Fresh feathers are critical to a bird's survival, breeding, and communication, but the process of growing new feathers is energetically taxing. Understanding the physiological tradeoffs a bird makes can help scientists understand how the various stages in its life history interact, and, ultimately, identify environmental factors that may drive population trends.

IBP is a recognized leader in investigating molt strategies, and not just in North America: in a soon-to-be published paper, IBP scientists and colleagues describe patterns of molt in Samoan birds, where breeding can occur year-round, leading to different molt-breeding dynamics than are found in temperate counterparts. For example, the familiar inserted alternate (often called "breeding") plumages of most adult temperate songbirds and waterfowl are relatively rare in tropical birds and were not found in any Samoan species. Suspended molts were recorded in several species and ***staffelmauser*** (stepwise molt) that some large birds undergo in order to maintain flight during molt was recorded in two species, including Samoan Starling - the first report of this molt strategy in a passerine.

Molt-breeding overlap was found extensively at the population level but not at the individual level. Findings of this study suggest that the timing of molt is more fixed than the timing of breeding, and that molt can suspend when environmental conditions shift to facilitate successful reproduction during the course of a complete prebasic molt.

Willow Flycatcher
Photo: Kelly Colgan Azar

## 2016 Sneak Preview

In 2016, IBP will begin an innovative experiment to boost Sierra Nevada populations of Willow Flycatcher, a California endangered species. Through automated broadcasting of Willow Flycatcher songs, we hope to encourage Willow Flycatchers to colonize unoccupied but restored meadows. Willow Flycatchers are semi-colonial, usually nesting in loose aggregations of several to many pairs. Restored meadows may not have yet been colonized simply because birds passing through need the cue of other singing Willow Flycatchers to identify an area as nesting habitat. Broadcasting recorded vocalizations may convince the birds to stay and breed in newly restored habitat.

# Peer-Reviewed Publications

Publishing our first-rate conservation science in peer-reviewed journals is a cornerstone of IBP's work. Our scientists have produced hundreds of peer-reviewed journal articles, and hundreds more reports to federal, state, and other land management agencies. During 2014 and 2015, we published the work listed below. Our website, www.birdpop.org, includes a searchable database listing these and nearly 500 other publications by current and former IBP staff and partners, and provides downloadable versions of many of them.

**Albert, S.K., D.F. DeSante, D.R. Kaschube, and J.F. Saracco**. In review. Monitoring Avian Productivity and Survivorship (MAPS) data provide inferences on demographic drivers of population trends for 158 species of North American landbirds.

**Albert, S.K., D. DeSante, R. Siegel, D. Kaschube, and J. Saracco.** In review. Monitoring landbirds in national parks: understanding populations, migratory connectivity, and climate change.

**Aslan, A., P., J. Hart, J. Wu, and C.E. Aslan.** 2014. Evaluating the qualitative effectiveness of a novel pollinator: a case study of two endemic Hawaiian plants. *Biotropica* 46:732-739.

**Casas-Planes, A., M. Garcia, R.B. Siegel, C. Ramirez, A. Koltunov, and S.L. Ustin.** In review. Burned forest characterization with airborne laser scanning for wildlife habitat assessment.

**Clark, W.S., and P. Pyle.** In press. A recommendation for standardized age-class plumage terminology for raptors. *The Journal of Raptor Research.*

**DeSante, D.F., D.R. Kaschube and J.F. Saracco.** In review. Using MAPS (Monitoring Avian Productivity and Survivorship) data to estimate population change (lambda) for landbird species in western North America, and to make inferences regarding the demographic drivers of those changes.

**DeSante, D.F., D.R. Kaschube, and J.F. Saracco.** 2015. Vital Rates of North American Landbirds. www.vitalratesofnorthamericanlandbirds.org.

**George, T.L., R.J. Harrington, J.A. LaManna, D.F. DeSante, J.F. Saracco, and T.B. Smith.** 2015. Persistent impacts of West Nile virus on North American bird populations. *Proceedings of the National Academy of Sciences. Published online before print November 2, 2015.*

**Guallar, S., A. Ruiz-Sanchez, R. Rueda-Hernandez, and P. Pyle.** 2014. Moult topography and its application to the study of partial wing-moult in two Neotropical wrens. *Ibis* 156:311-320.

**Guallar, S.X., A. Ruiz-Sánchez, R. Rueda-Hernández, and P. Pyle.** In review. Molt strategies of ten Neotropical passerine species.

**Howell, S., and P. Pyle.** 2014. Use of "definitive" and other terms in molt nomenclature: a response to Wolfe et al. *The Auk* 132:365-369.

**Jones, S.E.I.** 2014. A first documented record of Black-naped Tern (Sterna sumatrana) for Tutuila Island, American Samoa. *Notornis* 61:113-115.

**McKee, T., P. Pyle, and N. Moores.** 2014. Vagrancy and identification in first cycle Slaty-backed Gulls. *Birding* 46:38-51 plus 51A-J.

**Ortiz-Pulido, R., J.L. Alcántara-Carbajal, H. de la Cueva, J. Martínez-Gómez, P. Escalante Pliego, S.M. de la Parra Martínez, P. Feria, and Albert, S.K.** In review. Conservación de aves en México: una instantánea del año 2015.

**Polasik, J.S., J.X. Wu, K. Roberts, and R.B. Siegel.** In review. Great Gray Owls nesting in atypical, low-elevation habitat in the Sierra Nevada, California.

**Pyle, P.** 2014. Plumages of second-basic and older Northern Harriers: a circular Circus? *Birding* 46:46-53.

**Pyle, P., R. David, B.D. Eilerts, A.B. Amerson, A.B. Borker, and M. McKown.** 2014. Second record of Bryan's Shearwater, Puffinius Bryani, from Midway Atoll, with notes on habitat selection, vocalizations, and at-sea distribution. *Marine Ornithology* 42:5-8.

**Pyle, P., A. Engilis Jr., and D.A. Kelt.** 2015. Manual for ageing and sexing landbirds of Bosque Fray Jorge National Park and north-central Chile, with notes on occurrence and breeding seasonality. Special Publications of the Louisiana State University.

**Pyle, P., A. Engilis Jr., and D.A. Kelt.** 2015. Manual para estimar edad y sexo en aves del Parque Nacional Bosque Fray Jorge y Chile central, con notas sobre rangos de distribución y estación reproductiva. Special Publications of the Louisiana State University.

**Pyle, P., R. Keiffer, J.L. Dunn, and N. Moores.** In press. The Mendocino shrike. *North American Birds*.

**Pyle, P., and M. Reid.** In press. Molts and plumages in the Long-tailed and other jaegers: an alternate explanation for non-breeding plumages? *Western Birds.*

Chestnut-sided Warbler
Photo: David Inman


**Pyle, P., K. Tranquiilo, K. Kayano, and N. Arcilla.** In press. Molt patterns, age criteria, and molt-breeding overlap in American Samoan landbirds. *The Wilson Journal of Ornithology.*

**Rowan, E., R.B. Siegel, D.R. Kaschube, and S. Stock.** 2014. North American longevity records for nine landbird species monitored at Yosemite National Park's MAPS stations. *North American Bird Bander* 39:153-159.

**Ruegg, K., E. Anderson, K. Paxton, V. Apkenas, S. Lao, R.B. Siegel, D.F. DeSante, F. Moore, and T. Smith.** 2014. Mapping migration in a songbird using high-resolution genetic markers. *Molecular Ecology* 23: 5726–5739.

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## **Partner Perspective:** Chris Stermer

California Dept. of Fish and Wildlife


*The partnership that began when IBP agreed to take on the daunting task of developing a statewide conservation strategy for the Great Gray Owl was successful far beyond my expectations. While working with a small budget from a federally-administered State Wildlife Grant, IBP collaborated with 23 scientists from multiple government and private entities to produce the much needed strategy. The Great Gray Owl occupies forested habitat, often in proximity to montane meadows, which are often subjected to multiple management activities.*

*The wide range of professional input and partnerships IBP was able to gather guarantees that the strategy has encapsulated all the issues and management recommendations that will help the Great Gray Owl persist in California. As part of the same State Wildlife Grant, IBP also developed partnerships with other Great Gray Owl researchers to examine the nesting habitat for the species, the results of which were published in The Journal of Wildlife Management. Success of conservation efforts such as this often depends on forming excellent partnerships, and partnering with IBP was certainly an excellent choice.*

## IBP is grateful to our many partners for helping to make our work possible.

American Bird Conservancy
American Museum of Natural History, NY
American Rivers
Audubon Canyon Ranch, CA
Avocet Research Associates, CA
Burrowing Owl Preservation Society, CA
California Academy of Sciences
California Cooperative Ecosystem Studies Unit
California Department of Fish and Wildlife
California Partners in Flight
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Environment Now, CA
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