IBP enables science-based conservation of species and habitats by studying the abundance, demography, and ecology of birds and other wildlife.

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A Message from IBP’s Executive Director

IBP has a long history of embracing change and progress in ornithology, even as we strive to maintain continuity in long-running programs and long-term data sets. David DeSante (who we tragically lost this year, just as this report was going to production—see page 4), started IBP and the MAPS program more than three decades ago, specifically to address the emerging need to standardize disparate bird banding efforts across North America. Dave recognized that a constant-effort study design and a common protocol that could be shared among far-flung researchers and bird banders would yield great returns and answer important ecological and conservation questions that had not even been asked yet.

The latest fruit of that prescient realization is detailed on page 6 of this report—a study we published this year in *Nature Ecology and Evolution* that uses hundreds of thousands of MAPS banding records to examine how climate change is altering avian body size and morphology.

The drive at IBP to continue advancing and improving bird monitoring efforts continues to this day—a case in point is the recent co-development of the “WRP” system for determining the ages of birds based on their molt cycle (see page 8), a system that is increasing being adopted by MAPS banders and will be greatly facilitated by this year’s publication of Peter Pyle’s revised *Identification Guide to North American Birds* (see page 9). This methodological transition will enable more meaningful comparisons between species and foster greater collaboration among scientists across the globe.

But IBP’s focus on advancing techniques in ornithology is not limited to bird banding. In recent years, we have increasingly focused on the research and monitoring applications of automated recording units (ARUs—see pages 10-11 for a few examples of current projects).

Especially when combined with artificial intelligence-based algorithms for identifying bird vocalizations, this still-emerging technology promises numerous benefits to ornithology and conservation, including vastly expanding the scale at which bird population monitoring is possible.

The challenges posed to bird populations by anthropogenic climate change and other stressors are huge, but IBP’s team of dedicated and innovative scientists are harnessing new technologies and new thinking to meet them with determination and ingenuity.

In friendship,

Rodney Siegel, Ph.D.
In Memoriam: David F. DeSante, Ph. D.

David DeSante, a conservationist, ornithologist, and lifelong birder who devoted his professional life to understanding and addressing causes of bird population declines, died on October 18 in Marin County, California, at age 80. Dave’s long and highly productive ornithological career began as a Ph.D. student at Stanford University in the early 1970s, where he conducted groundbreaking work on bird migration and navigation – focusing on a phenomenon he termed “mirror-image misorientation” that results in a trickle of “vagrant” migratory birds showing up on the central California coast every autumn, thousands of miles off the usual path between their breeding territories in eastern North America and their wintering grounds in Central America and the Caribbean. The last moments of Dave’s life, before he succumbed quickly to a heart attack, were spent in joyful pursuit of seeing an ultra-rare, vagrant Willow Warbler – a small migratory songbird that breeds across much of Europe and winters in sub-Saharan Africa. The species had never before been detected in California, and the bird likely found itself there due to a version of the very phenomenon Dave had studied and clarified many decades earlier.

Born in Akron, Ohio on August 12, 1942, Dave discovered his lifelong love for birds as a child. After briefly pursuing post-graduate studies in materials science at Stanford University in his early twenties, Dave decided to align his career with his passion, and transferred to the biology department, where the illustrious scientist Peter Raven served as his academic advisor. Dave completed his Ph.D. in 1973, and then taught ornithology in a university setting for several years, with appointments at Stanford and Reed College. During this time, he began conducting ornithological fieldwork in California’s High Sierra, igniting a lifelong interest in Sierra Nevada birds, and initiating a multi-decade field study in the Hall Natural Area near Yosemite National Park that would yield important findings and publications on subalpine birds’ ecology, population dynamics, and responses to climate variation. Dave was never happier than when he was counting birds or looking for their nests in the high-elevation meadows, conifer forests, and talus slopes of his long-term study area, where he also cultivated many lifelong friendships with colleagues and field assistants. He especially delighted in bringing his children there to play and explore during the late summers, and journeying throughout California’s remarkable wildlands, sleeping under the stars in high deserts and visiting nature preserves.
methods and published provocative findings about fallout from the Chernobyl nuclear disaster possibly causing bird nesting failures as far away as coastal California. Recognizing a need for more extensive and standardized bird population monitoring that could better document such effects in the future, Dave left the Point Reyes Bird Observatory in 1989 to found a new non-profit, The Institute for Bird Populations, whose flagship project would be the Monitoring Avian Productivity and Survivorship (MAPS) Program, a cooperative, continent-wide bird-banding program designed to study the demographic rates (e.g., annual survival and reproductive output) of landbird species.

Dave was a visionary in recognizing not only the need for demographic monitoring to better understand the causes of changes in landbird populations but also the power of a well-conceived, standardized protocol to facilitate meaningful participation by researchers and bird banders across all of North America. From a small project with just one harried field intern in Yosemite National Park in 1989, Dave led the growth of MAPS into a continent-wide monitoring program, still coordinated by The Institute for Bird Populations, with data collected from well over 1,300 monitoring stations. The data comprise over two million individual bird capture records and are used extensively for scientific research, population monitoring, and conservation planning to benefit bird populations across the continent.

Before Dave stepped down from his role as Executive Director in 2008, he established several other important bird research and conservation initiatives under the auspices of The Institute for Bird Populations, including the MoSI (Monitoreo de Sobrevivencia Invernal) Program, a cooperative effort among agencies, organizations, and individual bird banders in Latin America and the Caribbean to monitor migratory and resident bird populations, which continues to thrive today. Up until his death this year, Dave continued to serve as President of The Institute for Bird Populations. He also continued to publish, producing more than 80 scientific papers and book chapters, and hundreds of technical reports to government agencies.

Besides being a tireless champion for studying and conserving bird populations, Dave is remembered by family, friends, and colleagues for his huge and loving spirit, his encyclopedic knowledge of the world’s birds, his ability to bring people together to help birds, and his generosity in advising and mentoring younger scientists and birders.

Dave is survived by his adoring family, including his son Forest and daughter-in-law Sara, his daughters Marie and Eve, their mother Eden, and his three beloved grandchildren.

The Institute for Bird Populations and Dave’s family are planning to hold a memorial event for Dave in Marin County in the spring of 2023.
MAPS Data Reveal that Climate Change is Altering the Size and Shape of Birds

The bodies of all living things are shaped by the physical environment, in response to temperature, precipitation, air pressure, and other factors, many of which are shifting due to climate change. Humans—the primary cause of climate change—are able to create artificial environments to evade much of this change, but most wild animals are not so lucky.

Scientists are starting to see the effects of climate change on not only animal abundance, distribution, and behavior, but also on body size and form. For instance, climate change may be shrinking birds.

In a recent paper in *Nature: Ecology and Evolution*, Dr. Casey Youngflesh and colleagues from UCLA and IBP used data collected by the MAPS bird monitoring program between 1989 and 2018 to investigate how temperature and elevation affect the size and shape of birds. Using more than 250,000 banding records from 105 bird species, they found that within species, smaller body size was associated with warmer temperatures over space and time. Individuals breeding at lower latitudes are smaller, and as the climate warms, individuals at a given latitude are getting smaller over time.

The researchers also found that within species, wing length increased in relation to body size as breeding elevation increased.

The 19th Century German biologist Carl Bergmann first posited that animals (particularly birds and mammals) are larger the closer to they live to the North and South Poles. His reasoning was that the environment is generally colder at higher latitudes and larger animals, with their lower surface area to volume ratio, better conserve heat. But does “Bergmann’s Rule” hold up in the real world?

Youngflesh and his co-authors found that within bird species, body size increased strongly with higher latitude (closer to the poles). But contrary to Bergmann’s rationale, they found the strongest effect of latitude on body size in species that experienced warmer temperatures at lower latitudes. This suggests that it is warmer temperatures and the ability to shed heat that drives the relationship between body size and latitude. Youngflesh has a hypothesis as to why warmer temperatures had a greater effect on body size:

*In warm regions, birds might be close to what they find to be a tolerable temperature. That is, when temperature increases in these areas they need to do something about it. In colder regions, birds may be further away from these critical temperatures. So an increase in temperature in these areas might not be as much of a problem. As an analogy, if you’re a human out in 100-degree weather, an increase in temperature of 20 degrees could be quite dangerous. However, if you’re in 60-degree weather, that same increase isn’t going to be much of a problem.*
The researchers also found that body size decreased over the course of the study in most species over the majority of North America. This is remarkable given that the study spanned just 30 years—an extremely brief time from an evolutionary perspective. This may mean that bigger birds are more likely to die at higher temperatures or that, during early developmental stages, individual birds can respond to the warmer environment by not growing as large. The results, while predicted, were still surprising to Youngflesh:

*While we expect that birds should be responding to changes in the abiotic environment, it is always striking (if not surprising) to see that actually be the case. This is particularly true given that there are so many factors simultaneously acting on these animals. The consistent relationship between body size and temperature over both space AND time is not something that has been shown before, so this is quite exciting.*

In addition to temperature, the study also uncovered an interesting relationship between elevation and morphology: wing length within species increases with elevation. This is the first study to show wing length increasing independent of body size. So, it’s not simply that birds that breed at higher elevations tend to be larger and therefore have larger wings (in fact body sizes trend smaller as elevation increases.) Why would elevation affect wing length? Wings generate lift which allows birds to fly, but lift depends on air density which decreases at higher elevations. “We know that wings, whether attached to planes or animals, produce lower lift at higher elevations (due to lower air density there). But it was surprising that we see such a large effect,” said Youngflesh.

These results have conservation implications as well. While species do seem to be adapting their body size to a warmer climate, body size responded more slowly over time than it did over space (latitude). This suggests that birds may not be changing their morphology quickly enough to keep up with the warming climate. “This point should be considered when we are thinking about the long-term persistence of species and how they are likely to cope with future climate change,” said Youngflesh. Populations and species of birds that already live in hot, arid environments may be especially at risk as climate warms because they are closer to their maximum tolerable temperatures.

Studies like this one require long-term datasets that span a broad geographical space and include multiple species. Few wildlife datasets rival that of the MAPS program in terms of duration, geographic scope, and breadth of species studied. Youngflesh explained:

*MAPS represents a critical resource for understanding not only how individual species vary over space but also how species are responding to the pressures of climate change. The program has incredible spatial coverage, spanning a large portion of the North American continent, and provides an incredible time series, dating back several decades. The scale of these data, collected at the individual level, allow us to understand and quantify variation within these species, which was a critical component of this work. MAPS is truly unparalleled in this regard. This research simply would not have been possible without the combined efforts of the many MAPS station operators that contribute to the project and the team at The Institute for Bird Populations.*
A Good Year for Feathers: IBP advances the study of molt and plumage, improves the practice of bird banding

IBP biologist Peter Pyle is passionate about feathers. One of the major themes of his scientific career has been the study of plumage and molt, not only because feathers and their replacement are a fascinating and integral part of a bird’s physiology, but also because they can bring a wealth of information to a careful observer. Feathers provide some of the best clues for determining a bird’s age, and the age of individuals in a population can yield critical insights for ecology and conservation.

2022 has been a particularly busy year for Pyle’s molt and plumage studies, resulting in six published papers. One study examined the link between plumage color and non-native bush honeysuckle plants in Western Tanagers and other North American birds. Another used the Macauley Library, a database of digital bird photography run by the Cornell Lab of Ornithology, to develop a primer for ageing eight North American hummingbirds using plumage and molt characteristics. Molt is typically examined with a bird in the hand during banding or by examining museum specimens, but Pyle has pioneered the use of digital photographs to study molt, and in this paper he lays out a roadmap for others interested in this approach.

Perhaps the most significant publication concerned the application of the WRP, or Wolfe-Ryder-Pyle system for ageing birds using molts and plumages. Most age-coding systems for birds used in North America are based on the human calendar; for example “hatch year” and “second year,” or the seasons of the north-temperate zone. In this paper, published early this year in the journal *Ornithology*, Pyle and co-authors make a case for using the WRP system. Pyle explains why older ageing systems don’t work well across latitudes:

Seasonal-based codes work fine at northern latitudes where breeding seasons are well defined and occur almost universally during the summer months. However, as you make your way toward the equator we increasingly see extended or year-round breeding. At the higher southern latitudes, breeding occurs across our Northern Hemisphere winter. Coding such as “HY” for hatch year or “SY” for second (calendar) year cannot be used effectively for birds that can hatch either side of January 1st, the determining factor for such coding.

Tying an ageing system to this universal physiological cycle makes the system more widely applicable and consistent. Another benefit of the WRP system is that it allows for more meaningful comparison between species and collaboration between scientists across the globe.
The year will culminate in the publication of the second edition of Pyle’s “Identification Guide to the Birds of North America, Part 1” first published in 1997, which has become the unofficial bird banding handbook for North America. The new edition is packed with new information and will help banders apply the new WRP codes (see sidebar.)

Pyle’s willingness to dive deep “into the weeds” of molt and sort through data and details that make most birders’ heads spin is driven by a deep appreciation of the value and privilege inherent in every close encounter with a bird. Whether we are banders who have captured that bird in a mist net, or bird watchers who have captured it in a digital photo, understanding molt and plumages allows us to extract as much data from that encounter as possible, and use that data to improve conservation efforts for birds.

New ID Guide to North American Birds

The second edition of “The Identification Guide to North American Birds, Part 1” will be available to order from Slate Creek Press in early December. An important change from the first (1997) edition is the presentation of revised and consistent molt and plumage terminology, including designations of preformative molts and formative plumages, along with inclusion of “WRP” age and plumage codes (in addition to BBL age codes) that reflect this terminology.

Terminology is now consistent for all North American birds treated in Parts 1 and 2. Other changes include the addition of 21 new species accounts, presentation of measurements in tables for greater ease of comparison, and inclusion of exposed culmen, tarsus, and mass values for each species and sex, and for many subspecies. Fifteen new figures have been added, many of which emphasize “molt clines” for ageing.

Throughout the new edition information has been substantially revised through evaluation of digital images, comments received from hundreds of users since 1997, and the incorporation of over 1,295 additional scientific papers and on-line resources. Finally, recognition of subspecies has been overhauled in an attempt to provide a consistent and practical taxonomy. We have learned a lot since 1997 and this revised edition reflects the progress we have all made!
Bird Monitoring Gets Automated with ARUs and AI:
How Autonomous Recording Units and Artificial Intelligence can expand our bird conservation efforts

New technology is exciting! Scientists love to brainstorm ways they can use the latest and greatest thing to further their research. Autonomous Recording Units, or ARUs, are a great example. As these devices have become more affordable, more ornithologists are embracing them.

These “computer ears” present an opportunity to record bird sounds over long stretches of time, in multiple locations at once, without having to manage the cost and logistics of getting trained human ears out in the field.

But how good is it at identifying bird sounds on ARU recordings? And how can you use the detections BirdNET makes correctly in your statistical analyses? IBP biologist Jerry Cole, along with IBP Executive Director Rodney Siegel, Nicole Michel, Director of Quantitative Science for the National Audubon Society and an IBP alumna, and Shane Emerson of California State Parks, published a study in April in Ornithological Applications that discusses how to optimize BirdNET’s classification performance and demonstrates how to use its output in a real-world application.

This is where another bit of new technology, an “automated classifier” such as BirdNET, comes in. BirdNET, one of the more widely used classifiers, is a freely available comprehensive classifier produced by the Cornell Lab of Ornithology and the Chemnitz University of Technology that uses a convolutional neural network algorithm, a type of artificial intelligence, to rapidly identify a large suite of bird species. BirdNET can listen to all those hours of recordings and process them much faster than a human brain.

Somewhat less exciting is the nitty gritty work of evaluating the quality of the data collected by your new tech, and figuring out how to manage and use that data. ARUs can record hundreds (or thousands, or tens of thousands) of hours of sound with little human effort. But it is possible to have too much of a good thing, because someone has to listen to and identify the birds in all those recordings (also known as annotating.) Instead of spending time out in the field listening to birds, a researcher can be stuck spending even more time at a desk listening to recordings of birds. Suddenly the ARUs are not so exciting.

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That application was a bird monitoring project in Carnegie State Vehicular Recreation Area, in northwestern California. This project employed ARUs and occupancy modeling, a statistical method that estimates how likely a bird or other organism is to use a particular place. This type of modeling is widely used to determine avian habitat associations, population trends, distribution,
and conservation status. Occupancy modeling can account for imperfect detection of a bird—for instance, if a bird is present, but not vocalizing when an observer visits; however, this generally requires repeated visits to a sampling site to estimate detection probability. ARUs are particularly suited to estimating detection probability because they stay on-site as long as needed and can be programed to record at certain hours.

Cole and colleagues found that BirdNET detections generated similar occupancy model outputs to human detections so long as the ARUs were deployed for a long enough period of time (generally requiring a much longer ‘listening’ period than a human observer) and that doing a bit of human validation of BirdNET detections can allow researchers to use more of their detection data and get better results from their occupancy models.

The researchers concluded that there is good reason to be excited about affordable ARUs and automated classifiers like BirdNET. These tools provide ornithologists with a remarkable opportunity to expand bird research and monitoring efforts, especially in poorly-surveyed areas. The data ARUs collect can increase the accuracy and precision of our occupancy, abundance, and population trend estimates.

IBP is currently using ARUs and AI in several projects where remote field sites, the need to minimize disturbance to sensitive bird species or other factors make them advantageous.

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**IBP is using ARU and AI technology in several of our projects. Here are two highlights:**

**Gunnison Sage-Grouse Lek Use**
In partnership with the US Bureau of Land Management, IBP is using ARUs to monitor Gunnison Sage-Grouse leks in western Colorado. In the early spring, male sage-grouse display at these traditional areas to attract mates. Unfortunately, Gunnison Sage-Grouse are declining and, as populations get smaller, lek use becomes erratic and it gets harder to assess populations. The birds are very sensitive to disturbance, so using ARUs can help researchers discreetly detect grouse to help the BLM understand which leks are being used and when. Our ARUs can detect grouse over the entire breeding season to help the BLM understand which leks are being used and when, and help ensure that human observers are in the right place at the right time to get the most accurate grouse counts.

**Changes in Avian Phenology**
In partnership with the National Park Service, we are analyzing new and existing ARU recordings to study the phenology of birdsong in parks of the Pacific Northwest, Sierra Nevada and Southern Colorado Plateau in the Southwest. Phenology is the timing of natural events such as breeding, and as the climate warms, timing can shift. ARUs can record bird sounds over long spans of time and help us figure out which birds are singing and when. This will enable us to make sure our human observers are in the field doing point counts when they can get the most accurate picture of a park’s bird population. It will also help us account for species we might be missing because they are most vocal in the weeks before or after our scheduled point counts. Other project objectives include characterizing how singing phenology varies with elevation, and establishing a baseline for tracking future changes in singing phenology.

A Gunnison Sage-Grouse displaying on a lek
Image: Bob Gress
24 Years and Counting of Monitoring Birds in National Parks to Improve Management and Conservation

IBP has worked on the National Park Service’s Inventory and Monitoring (I & M) Program since its inception and we feel privileged to be part of the effort to learn from, and improve the stewardship of, bird populations in some of the most important habitat in our country- our national parks.

The I & M program is an effort to “gather and analyze information on specific park natural resources—the plants, animals, and ecosystems that can indicate the overall biological health of parks” and use this information to make better management decisions. Birds are a key part of the monitoring program and are considered “vital signs” of the parks because they are near the top of the food chain and are relatively easy to observe, so their abundance can reflect the condition of resources and the effects of ecological stressors.

When the I & M program was first rolled out in 1998 in Yosemite National Park, IBP has already been operating MAPS stations in the park for a decade. We conducted the park’s first systematic, parkwide inventory of birds for the new program. Almost 25 years later, we’re still monitoring birds all across Yosemite’s vast landscape and have expanded this partnership to include annual parkwide monitoring efforts in 15 national parks spread across three NPS regions. Birds surveys are conducted by skilled IBP personnel who hike the same backcountry transects most years, stopping at designated locations to do “point counts” in which the observer identifies every bird seen or heard during a 7-minute period.

continued
Sierra Nevada
IBP partners with the NPS to conduct bird surveys in Yosemite, Sequoia, and Kings Canyon National Parks, and Devil’s Postpile National Monument. Transects span the full breadth of plant communities and elevations in these rugged mountain parks, from the foothills to well above treeline. In 2022 we completed another year of surveys, and also published an analysis of bird population trends across the three parks during the past decade. Our analysis revealed that populations of most species have remained stable or increased in Yosemite and Devils Postpile, but many species have declined in Sequoia and Kings Canyon. Across all the Sierra parks, populations of many species tended to be larger after years with warm springs and low snowpack. This somewhat surprising result suggests that, at least in the short term, the historic drought conditions the region is currently undergoing may actually be good for many bird species. More study is needed to understand why this is the case, and to assess whether the effect persists or reverses if drought continues. Image: 2018 crew member, Graham Montgomery

Pacific Northwest
Since 2005, IBP has partnered with the NPS to conduct annual or biennial bird monitoring surveys across Olympic, Mount Rainer, and North Cascades National Parks and San Juan Island and Lewis & Clark National Historical Parks. In 2022 we completed another year of monitoring, comprising over 1,000 point counts, and also initiated data analysis projects to describe individual species’ population trends over the past 18 years, assess changes in their elevation ranges within the parks, and characterize the onset and duration of their singing season using recordings from autonomous recording units deployed in several parks in recent years. Image: 2022 crew member, Fanter Lane

Southwest
Spring of 2022 was IBP’s first season collecting bird population data in six national parks in the Southwest: Grand Canyon, Mesa Verde and Petrified Forest National Parks, and Canyon De Chelly, Bandelier, and Wupatki National Monuments. This was a ‘pilot’ field season to test and hone a revised long-term monitoring protocol we co-developed with the NPS during the previous winter. We also analyzed legacy bird survey data collected across the same parks during the past 15 years, and conducted an inventory of breeding-season birds in Petroglyph National Monument that will help park personnel make decisions about the routing of new trails. Image: 2020 crew member, Jake Bourque
Wildfire, Forest Management and Raptor Conservation in the Sierra Nevada

IBP’s role in a major forest health project on the Stanislaus National Forest

Sierra Nevada forests have long been shaped by wildfires, and the birds and other wildlife that live in these forests have adapted to survive—even thrive—in this ecosystem. But the combined effects of climate change and a history of fire suppression have made wildfires larger and more severe, threatening Sierra wildlife.

For more than a decade, IBP has worked with the US Forest Service to study the relationship between forest raptors and wildfire. IBP is now playing a role in a large new project on the Stanislaus National Forest called Social and Ecological Resilience Across the Landscape (SERAL), a forest health initiative aimed at reducing the risk of mega-fires such as the 2021 Dixie Fire, which burned nearly one million acres in the northern Sierra. The project aims to reduce forest fuels through thinning and prescribed burns with the goal of restoring a natural range of vegetation conditions that make the late successional forest more resilient to wildfire and preserve its ability to support wildlife.

IBP Biologist Lynn Schofield has seen the effects of increasingly severe and larger wildfires on forest raptors such as California Spotted Owls, Great Gray Owls and Northern Goshawks. “An enormous portion of the areas I’ve worked in have experienced significant changes due to wildfire,” she says. “Goshawks appear to be pretty sensitive and we rarely encounter them within the fire perimeters.”

In contrast, the owls appear to be more fire tolerant—to a point. IBP biologist Ramiro Aragon, who is co-leading IBP’s work on this project with Schofield, says that fire severity is a key factor. “Research suggests that Spotted Owls might benefit from frequent, low-severity fires, but tend to avoid large areas burned at high severity, where most of the canopy cover is lost.”

But while reducing the risk of megafires may benefit many wildlife species in the long term, in the short term forest treatments could also be disruptive and even harmful. IBP is partnering with the Forest Service to conduct surveys for Spotted Owls, Great Gray Owls, and Northern Goshawks throughout the SERAL project areas so that the Forest Service can take these species’ needs into account when planning forest treatments. We will also be assessing the impacts of the forest treatments themselves, providing the information needed for successful adaptive management that is compatible with forest raptor conservation.

Schofield expects that the SERAL project will benefit forest raptors. “Forest management can make a huge difference in the characteristics of a forest fire. A well-managed forest, especially one that reflects historic conditions, is more likely to have smaller forest fires that burn at mixed severities across the landscape. These are the types of fires where bird species, including Spotted Owls and other raptors, are more likely to persist and even thrive,” she says. “In addition, the SERAL project provides a platform to study how to mitigate that disturbance from forest treatments while creating conditions that will result in more resilient forests in the future. It’s a win-win.”

Northern Goshawk
Image: Martha de Jong-Lantink
A View from the Field
by Kevin Garcia
Crew Lead, Stanislaus National Forest Owl Monitoring Project

“I found the owl.” These are the words I radio to my peers three hours into a field survey in the central Sierra Nevada. My colleagues arrived minutes later and we followed the owl as it flew off, leading us to its family, where we counted the young. Not one. Not two. We detected three fledglings! We celebrated in silence to avoid any overt disturbance to the family. It was the loudest silent celebration ever. This is why I love working with owls.

After serving as a volunteer in 2021, I returned to the Spotted Owl project again in 2022 – this time as a seasonal employee and crew lead. The elevated position came with higher expectations. I learned to coordinate the project from the start, and I was responsible for training technicians, writing out our work plans, and co-leading meetings. Plus, I was able to go out to conduct surveys every night.

What a dream.

The season was a success. This was not a coincidence. When you work with IBP Biologist Ramiro Aragon, you quickly realize that the key to having a great season is to plan diligently. Some of my favorite moments involved planning outings with Ram and celebrating after hearing the success stories from our technicians. I am very thankful to work with a passionate and hard-working supervisor. Ram is very inspiring.

I am proud of our season. We detected many Spotted Owls, nests, and fledglings, and several Great Gray Owls – a rare species in the study region. This job is full of thrilling moments.

These experiences helped me improve as an owl biologist and it also provided me the opportunity to develop leadership skills. This season also helped me solidify my goals for my career. I want to continue working as an owl biologist to protect the Spotted Owl and its habitat, and to inspire others to value and care for the species.

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Riparian habitats, such as wet meadows and deciduous woodlands along creeks and streams, are hot spots for wildlife. They’re also magnets for humans, and over time human activities have degraded much of the riparian habitat in California’s greater Sierra Nevada region. Over the last several decades a lot of effort has gone into restoring these habitats. But how do we know if restoration is working? It might be a good idea to ask the birds and the bees.

Why ask birds and bees? Because these groups are great indicators of habitat health. For over a decade, IBP has been monitoring birds, and sometimes bees, to help land managers in the Sierra gauge the success of riparian habitat restoration. Led by IBP biologist and meadow specialist Helen Loffland, we are now partners in almost a dozen restoration projects in the region, where we are monitoring bird species, including species like the Willow Flycatcher—which is endangered in the state of California—and bumble bee species.

Bumble bees offer a very useful perspective on habitat quality. These native bees are particularly important pollinators at higher elevations and latitudes because they are able to fly and forage at colder temperatures than introduced honey bees or smaller native bee species. “Bumble bees give us insight into the more fine-grained world of meadow microclimates and the specific flowering plants that grow there,” says Loffland. “They are also relatively easy to survey because they are readily identifiable.” She uses a catch and release technique in which the captured bees are briefly chilled in a cooler so that they can be handled for identification and released unharmed.

IBP’s bird monitoring at restored wet meadows has shown that, yes, restoration does bring many species of birds back, and it has provided important information about which restoration methods work best and when additional actions might be beneficial. These efforts with our many partners will help restore these important habitats that are essential to the conservation of birds and other wildlife in the region.
Upper Truckee Restoration Monitoring

IBP is partnering with Tahoe Conservancy, the US Forest Service, California State Parks and the Tahoe Regional Planning Agency to conduct long-term monitoring of birds and bumble bees in meadows near South Lake Tahoe and Meyers, CA. This monitoring will allow land managers to compare bird and bee communities before and after restoration, as well as with regional trends, to help guide long term conservation efforts.

Upper Mokelumne Aspen Restoration Planning

IBP is mapping and surveying the conditions of aspen stands throughout the Upper Mokelumne watershed in the Central Sierra in partnership with the Upper Mokelumne River Watershed Authority, Landmark Environmental and the US Forest Service. Assessments include not only the condition of the aspen stands themselves, but also bird and bumble bee diversity and abundance. The data gathered will provide important input for restoring 300 acres of priority habitat.

Sneak Preview: Conserving Wildlife at an Important Wetland in Southeast Oregon

Warner Wetlands, a large, interconnected chain of lakes and wetlands in the high desert of southeastern Oregon, provides habitat for hundreds of species of resident and migratory birds. The US Bureau of Land Management (BLM), which administers the area, has designated Warner Wetlands an Area of Critical Environmental Concern and a Special Recreation Management Area, and the Warner Basin has been identified by the State of Oregon and the National Audubon Society as an Important Bird Area. Nearly a dozen sensitive bird species are known to use the area or have been documented nearby.

Managing the area for multiple uses requires up to date information on the condition and trends of the wetland ecosystem and its wildlife populations; this is especially important during times of drought and climate change, when adaptively managing complex sites presents many challenges. Over the next four years, IBP, the BLM and several partners will be working together to study the wetland’s birds and ecological condition, and help the BLM develop management plans to protect and manage the site.
The phrase “implementation gap” has been used to describe the gulf between what we know needs to be done for effective conservation and bringing those ideas to fruition. Since its inception, the primary goal of the Monitoreo de Sobrevivencia Invernal (MoSI) program has been to provide conservation-relevant data on non-breeding season data on demographics, movement, and physical condition of Neotropical migrant birds. While this remains the centerpiece of the MoSI program, the current crisis in bird conservation, including the recently documented loss of one third of North America’s breeding avifauna, has impelled IBP to seek ways in which we can do more to support the direct conservation actions of our MoSI cooperators.

In partnership with the March Conservation Fund, this year, we initiated a new program, MoSI Conservation Grants, to assist MoSI station operators with using MoSI data in support of their efforts to conserve migratory and tropical resident birds and habitats. In 2022, we awarded five grants of up to $10,000 to the following groups.

La Asociación Mexicana para la Conservación de las Aves y Sus Hábitats (AMCAH), is working to strengthen protection of native habitats on Isla Contoy National Park, a small island off the coast of the Yucatán Peninsula, Mexico. AMCAH will hire two local park rangers to deter poaching and disturbance of the migratory and native birds on the island. These efforts are expected to benefit Prairie, Cape May, and Black-throated Blue Warbler, along with dozens of other migratory and resident species.

Círculo Interdisciplinario por la Naturaleza y la Comunidad A.C., (Chicatana) is working with local communities in the Mexican state of Oaxaca to promote soil and vegetation conservation practices on coffee plantations and small farms in areas where the MoSI program is monitoring local bird populations. Species expected to benefit from these practices include migratory Rufous and Ruby-throated Hummingbird, Black-capped Vireo, Indigo Bunting, and many species of warblers; and White-tailed Hummingbird and other resident species.

Kiekari Bird Reserve protects important cloud forest habitat in the Mexican state of Veracruz. Kiekari’s managers will use their MoSI Conservation Grant to conserve and restore cloud forest areas by replanting native trees, constructing exclosures to eliminate livestock grazing in restored areas, and
creating a native plant nursery. Species expected to benefit from these practices include migratory species like Golden-winged Warbler, Golden-cheeked Warbler, Canada Warbler, and Olive-sided Flycatcher; and Mexican endemic species such as Hooded Yellowthroat, Bumblebee Hummingbird, and Blue Mockingbird.

The Richland Center-Santa Teresa Sister City Project was established to promote people-to-people relationships between the communities of Richland Center, Wisconsin and Santa Teresa, Nicaragua. With their grant funding, this group will improve understory forest condition at their MoSI station and at local farms, and to re-forest an area near the school in the community of El Papalón while engaging students and teachers to help with the work. Migratory and resident birds expected to benefit from this work include Wood Thrush, Gray-cheeked Thrush, Great-crested Flycatcher, Painted Bunting, Summer Tanager, and Western Tanager, and several species of warblers and orioles.

Toucan Ridge Ecology and Education Society (TREES), encourages the creation of social, environmental, and cultural networks by promoting partnerships within Belize and internationally. The group will use their MoSI Conservation Grant to build local capacity for avian research through the recruitment of new bird banders within Belize. They will improve the management of wetland, grassland, and orchard habitats surrounding the MoSI station, and conduct environmental education with local schools. Migratory and resident species expected to benefit from this work include Wood Thrush, Gray-cheeked Thrush, Willow Flycatcher, Painted Bunting, Bare-throated Tiger Heron, Golden-hooded Tanager, Great Curassow, and many species of migratory warblers.
Fiscal Year 2021 Program Revenue & Expenditures

Program revenue and expenditures for 2021 are shown below. IBP’s fiscal year runs from January 1 to December 31. Final figures for 2022 were not available at the time this report went to press.

2021 Revenue

- US state and federal government 78%
- Private grants and contracts 17%
- Donations 4%
- Other programs 1%

Total: $1,896,571

2021 Expenditures

- Sierra Nevada Science and Conservation 46%
- Program Administration 23%
- MAPS Program 17%
- Pacific Northwest Science and Conservation 5%
- Southwest Science and Conservation 4%
- MoSI Program 3%
- Molt & Plumage Studies 1%
- Bird Bander Training & On-Demand Analysis 1%
- Pollinator Ecology & Conservation >1%

Total: $1,896,571

Spotted Owl fledgling in the Sierra Nevada. Image: 2021 crew member Zachary Bordner
As part of our effort to disseminate our scientific findings widely, IBP scientists frequently publish results in peer-reviewed scientific journals. In 2021-2022, IBP staff produced more than 40 scientific articles, most of which are available in our searchable database of more than 800 publications at birdpop.org.


Bedoya-Duran, M. J., H. Jones, K. Malone, and L. Branch. In Review. Continuous forest at higher elevation plays a key role in maintaining bird and mammal diversity across an Andean coffee-growing landscape.


Peer-reviewed Publications

continued


In the national parks of the Pacific Northwest, one can scramble along a wild-flowing river to observe wintering bald eagles, saunter down a silent rainforest path to listen to the joyous outbursts of wrens, stand on an island overlooking the salt water to see the colorful flash of puffins, or perch at the edge of an alpine lake and watch Gray-crowned Rosy-finches forage. These are scenes to be savored; bird encounters to experience again and again.

But will that be possible? Changes to the systems upon which these birds depend are afoot. The shrinking of Washington’s glaciers, which are expected to be gone in fifty years, is obvious. However, changes to all of Washington’s physical processes, from temperature extremes to precipitation levels—and the biotic habitats they shape—are occurring. The question is, how is it all impacting the birds?

By partnering with The Institute for Bird Populations, PNW parks have monitored birds for almost two decades. To date, data indicates that the populations of birds using the PNW parks are stable. These results both emphasize the importance of park protection and the urgent need for cooperative conservation work, as national trends show birds in steep decline.

Thankfully, IBP’s work goes well beyond the PNW, as it conducts research on stopover and wintering grounds as far south as Nicaragua. Through its research, IBP is learning where bird conservation is needed most, what should be done, and developing the partnerships to make it happen.

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

Alberta Biodiversity Monitoring Institute, Canada
Alpine Watershed Group, CA
Alpine Watershed Group, CA
Amador Calaveras Consensus Group, CA
AMCAtl, Mexico
American Bird Conservancy
American Birding Association
American Rivers
Amigos de la Tierra
Asoc. Mexicana Para La Conservacion de las Aves Asociación CAMBIO
Association of Fish and Wildlife Agencies
Audubon Chapter of Minneapolis, MN
Avinet, Inc.
Banderier National Monument, NM
Belize Audubon
Bernice P. Bishop Museum, HI
Big Bluestem Audubon Society, IA
BIOMETEPE, Nicaragua
Birds Caribbean
Burrowing Owl Preservation Society, CA
Cal Poly Pomona, CA
Calaveras Healthy Impact Product Solutions (CHIPS)
California Academy of Sciences
California Department of Fish and Wildlife
California Dept. of Parks and Recreation, OHMV Rec. Div.
California Tahoe Conservancy
Chicatana, Mexico
Chile—California Council
Colorado State University
CONABIO, Mexico
Cornell Lab of Ornithology, NY
Council of Ohio Audubon Chapters
Devils Postpile National Monument, CA
Div. of Fish and Wildlife, Comm. of the N. Mariana Isl.
Eastern Bird Banding Association
Eco Kaban, Mexico
Eldorado National Forest, CA
Environment and Climate Change, Canada
Evanson North Shore Bird Club, IL
Evansville Audubon Society, IN
Farallones Marine Sanctuary Association, CA
Florida Museum of Natural History
Fundacion Ara Macao, Venezuela
Green Mountain Audubon Society
Gulf of the Farallones National Marine Sanctuary, CA
Guyra, Paraguay
Humboldt-Toiyabe National Forest, CA/NV
Indiana Audubon
Inland Bird Banding Association
Kiekti Bird Reserve, Mexico
Klamath Bird Observatory, OR
Knobloch Family Foundation
Landmark Environmental, CA
Lewis and Clark National Historical Park, OR/WA
March Conservation Fund, CA
Minneapolis Audubon, MN
Montana Department of Fish, Wildlife and Parks
Mount Rainier National Park, WA
Museum of Vertebrate Zoology, UC Berkeley, CA
National Audubon Society
National Park Service Southern Colorado Plateau
I&M Network
National Park Service, National Inventory and Monitoring Program
National Park Service, North Coast and Cascades Network, WA and OR
National Park Service, Sierra Nevada Network, CA
North American Bird Conservation Initiative
North Cascades National Park, WA
Olympic National Park, WA
Oregon Natural Desert Association
Oregon State University
Osa Birds, Costa Rica
Owl Moon Environmental, Inc., Canada
Partners in Flight
Petroglyph National Monument, NM
Plumas Corp. CA
Plumas National Forest, CA
Point Blue Conservation Science, CA
Red de Observadores de Aves y Vida Silvestre de Chile
Reserva El Jaguar, Nicaragua
Richland Center-Santa Teresa Sister City Project, WI
Runaway Creek Nature Reserve, Belize
Saint Paul, MN Audubon Society
San Fernando Valley Audubon Society, CA
San Juan Island National Historical Park, WA
SELVA, Colombia
Sequoia and Kings Canyon National Parks, CA
Sierra Foothills Audubon Society, CA
Sierra Meadows Partnership, CA
Slate Creek Press, CA
Smithsonian Migratory Bird Center, Washington DC
Southern Sierra Research Station, CA
St. Paul Audubon, MN
Stansislaus National Forest, CA
Stillwater Sciences, CA
Tahoe Conservancy, CA
Tahoe National Forest
Teton Raptor Center, WY
The Sierra Meadows Partnership, CA
Tiera de Aves, Mexico
Toucan Ridge Ecology and Education Society, Belize
Tracy Aviary, UT
Truckee Donner Land Trust, CA
Truckee River Watershed Council, CA
Tulane University, LA
Un Poco de Choco, Ecuador
Universidad ICESI, Cali, Colombia
Universidad Nacional de Colombia— sede Medellin
University of Belize Environmental Research Institute
University of California, Davis
University of California, Los Angeles
University of Minnesota
Upper Mokelumne River Watershed Authority
Upper Mokelumne River Watershed Authority, CA
US Army, Fort A.P. Hill, VA
US Army, Fort Bragg, NC
US Bureau of Land Management
US Fish and Wildlife Service, Div. of Migratory Birds
US Fish and Wildlife Service, Region 3
USDA Forest Service Pacific Southwest Research Station
USDA Forest Service Region 5
USGS Bird Banding Laboratory
Wabash Valley Audubon Society, IN
Western Bird Banding Association
Western Field Ornithologists
Wolf Ridge Environmental Learning Center, MN
Yosemite Conservancy, CA
Yosemite National Park, CA
Zamorano University, Honduras
Zumbro Valley Audubon, MN

IBP is also very grateful to independent contributors of MAPS and MoSI data (too numerous to list here)!

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