Summer 2022

Point Blue Quarterly

Conservation science for a healthy planet.

Giving Data Wings

Conservation Science in the Information Age



FROM THE CEO
Giving Data Wings

I recently celebrated my third anniversary with Point Blue—which has been and continues to be an amazing journey—and I've been reflecting on where we have been, where we are today, and where I see us heading. When I arrived at Point Blue, it was clear that I had joined an organization with an incredible history of conservation impact, thanks to the hard work and dedication of our staff and partners over 57 years. Our early days tracking bird populations in West Marin helped us build scientific expertise and forge trusting partnerships, laying the foundation for who we are today: a conservation science powerhouse with programs that reach beyond Marin, beyond California, and even beyond US borders. And through it all, we've focused on conducting top-notch scientific research, using our findings to help resource managers make more impactful and sustainable decisions. But something feels different now.

As you read the stories in this issue of the *Point Blue Quarterly,* I think you'll start to see glimmers of the future we're stepping into. Everywhere there are examples of the incredible momentum driving Point Blue forward. Our board of directors recently approved our highest-ever annual budget, notable not because of the actual dollar amount, but because of the amount of conservation work it represents. You'll read how the Department of Defense recently mandated that all of their installations around the country—representing 27 million acres—use Point Blue's bird data management platform, unlocking the potential to truly transform how conservation science is conducted. And we've recently received numerous large grants and individual donations that signal the increasing levels of trust our partners and supporters have in us. Meanwhile, we're working closely with our state agency partners to achieve ambitious climate goals and protect biodiversity.

I am thankful for the Point Blue staff for their hard work to get us here, but I am also thankful for you, our partners and supporters. Conservation can be slow work, sometimes needing years of funding to bear fruit. Those of you who have supported us for years—or even decades!—have allowed us to grow into the organization we are today.

I hope you enjoy reading how next-level data management is a core part of our strategy and how it sets us apart from others. We believe that all stewardship decisions should be based on sound science and that our datasets are among our most valuable assets. But without a cutting-edge approach to recording, storing, and analyzing that data, there's no way we could have the impact we are having today.

And without your support, none of this would be possible. Thank you!

Sincerely,



Manuel Oliva
Chief Executive Officer



All Together Now
How Uniting People, Data, and Technology Conserves Wildlife

When Dr. Grant Ballard helped bring together more than 2,000 bird-lovers for a conference in 2002, he had no idea it would lead to transforming how bird observations in North America were managed. Now Point Blue's chief science officer, one of Grant's goals for the conference was simply to learn how other scientists were managing their data and using it to achieve conservation impact, and to see how Point Blue could best contribute.

"What I learned is that we had a real problem on our hands," Grant says. "We had lots of people, lots of organizations, and lots of federal and state agencies that were deeply committed to bird conservation. But the data were stored in very idiosyncratic ways, across many different platforms, and far from standardized," Grant says. "For example, some people were measuring wing length in millimeters and others in inches; some were counting birds for 3 minutes per location, others for 5, and others for 10!"

While these may sound like minor differences, discrepancies in how data was logged meant that it was impossible to create apples-to-apples comparisons of, for instance, the population density of Song Sparrows in the Point Reyes National Seashore to that of Song Sparrows in northern Washington.

In partnership with Cornell Lab of Ornithology and Bird Studies Canada, and with some initial funding from the National Science Foundation, Point Blue set out to build a standardized repository for bird data in North America. We consulted with dozens of other organizations to make sure that what we were building would serve their purposes and to ensure that they would actually use it if we built it. Then, slowly and deliberately, we laid the technological foundation for what is now the Avian Knowledge Network (AKN), a collaborative effort between scientists, natural



resource managers, and other stakeholders to advance bird conservation in the Western Hemisphere.

We first built the basic infrastructure to store the data. Then we layered on top a user interface that would allow people from all over the continent to enter data into the platform, then analyze and compare it to data that others had entered. We standardized everything we could, from measurement units to the four-letter code names ornithologists use to refer to birds (BUOW for Burrowing Owl, PIGU for Pigeon Guillemot, etc.), to protocols such as how long you should stand in one spot counting birds to conduct what we call a "point count." We also built in converters so that if you were uploading old data that used different protocols, your data could still be compared apples-to-apples with data that had been collected or entered differently.

Now, more than 20 years after the project was first conceived, the AKN database is the leading repository for scientific bird data on the continent. Martin Magaña, Point Blue's informatics engineering manager, is responsible for making sure that AKN data remains secure and accessible, even as technology changes. "In the past two years," Martin says, "Point Blue's Ecoinformatics team has done so much to upgrade our data management systems, I hardly know where to start." Among many other things, we moved our data from local servers at our Petaluma headquarters to the Point Blue Science Cloud (*see page 4*), enabling easier data entry and increasing accessibility to researchers around the world.

"We also took a huge step forward in data security," Martin says, "by becoming the first and only conservation organization to achieve Federal Risk and Authorization Management Program (FedRAMP) certification." This two-year process resulted in an official designation–a seal of approval, really–that the Point Blue Science Cloud is secure enough for federal agencies like the US Fish and Wildlife Service and the US Forest Service to utilize it as if it were part of the federal government's own cloud infrastructure.

Over the years, we've worked with hundreds of AKN partners who have not only used the platform, but helped shape it along the way. And one of our collaborators has recently committed to using the AKN in a major way.

"When I tell friends that we work closely with the Department of Defense, they're often really surprised," says Michael Fitzgibbon, Point Blue's recently retired chief operations officer (*see page 6 for our send-off tribute*). "Many people don't know that, not only is the DoD the third largest federal land managing agency utilizing 27 million acres of land, but they also have a legal mandate to protect and steward the natural resources they manage."

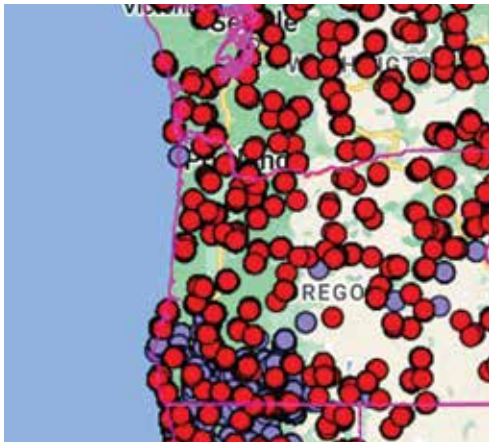
Point Blue has a long history of partnership with the DoD (*see page 7*), which collects ecological data at military installations across the country in order to comply with legislation like the Endangered Species Act and Migratory Bird Treaty Act.

We began working directly with DoD biologists at a few individual installations, training them on how to enter their data into the AKN. Soon, DoD conservation leaders at the regional level saw what a powerful tool the AKN was and asked us if we'd be willing to open it up to other installations and regions. Then, things started to move really quickly. As leadership at the DoD, the US Fish and Wildlife Service, and the Bureau of Land Management saw the potential of the platform to inform conservation decisions, a question emerged: *Would it be valuable if all DoD installations across the country used the AKN to store their bird data*? The answer was a resounding "yes" and we are thrilled to announce that the AKN is now the official avian data repository for all DoD installations!

It's been quite a journey since the AKN was just a glimmer in Grant's eye to where we are today, and we're excited to see where things go next. Because of the huge scale of this new agreement, we now have the opportunity to transform how conservation is accomplished by using the data we collect to help inform decisions. When the Department of Defense sends a public signal that they trust you to securely manage their data, there's a good chance that other agencies will follow suit. And the more data we can make accessible to resource managers, the more powerful our conservation outcomes will be.

"It's hard to overstate how significant a leap forward this is," says Sam Veloz, Ecoinformatics and Climate Solutions director. "Having data from major conservation agencies across the country in one place is completely new. We now have the ability to look at huge amounts of data and identify what's working and what's not, and where limited conservation funding should go. This, I truly believe, is the future of conservation."

by Zachary Warnow, Director of Communications



Clockwise from opposite, top: Manuel Oliva, Point Blue CEO. Photo by Lishka Arata/Point Blue. Avian Ecologist Renée Cormier and former Intern Maria Chavez collect data on a Song Sparrow. Photo by Lonnie Bowling. AKN tools help researchers and resource managers explore different datasets and generate maps like this one, which displays locations where Song Sparrows were observed. Image from data.pointblue.org/multimap.



Ahead in the Cloud

Computing a Greater Conservation Impact

Three Song Sparrows, 23 White-crowned Sparrows, one Golden-crowned Sparrow, two California Towhees, two Red-winged Blackbirds, and one cat near the traps. These banding notations, dated March 1, 1965, mark the first observations captured by biologists at a nascent Point Blue Conservation Science's Palomarin Field Station. The data collected that day were limited—information such as the birds' age and sex would have been logged by hand in a ledger—but it was the seed from which a bounty of scientific knowledge would flourish. There's no record of what became of the curious feline interloper.

Over the decades, Point Blue has gathered vast amounts of detailed scientific information on our natural world. Birds—sentinels of ecosystem health—still figure prominently in our data collections, but you'll also find everything from measurements of soil carbon storage and ocean acidification levels to documentation of the impacts of oil spills on wildlife. And we've become a trusted guardian of our partners' data, safeguarding ecological information from across the Western Hemisphere. This all adds up to more than *one billion* pieces of scientific data in our care.

Ecological intelligence at this scale has the power to make great conservation impact. It paints a detailed picture of the past, lets us monitor changes happening in the present, and informs conservation plans to benefit wildlife and communities in an uncertain future. But how to thoughtfully organize such a vast treasure trove of data and make it easily accessible to researchers, resource managers, and other stakeholders? The answer is in "the cloud."

The Point Blue Science Cloud—a federally secured and authorized web-based computing service—has for more than ten years enabled biologists, resource managers, and other individuals from across the Americas and beyond to safely enter, store, secure, manage, analyze, and share ecological data. And as our scientists require more computing power to run increasingly complicated analytical models, cloud computing is a scalable way to have a powerful computing resource at our fingertips without the considerable cost and carbon footprint of maintaining our own servers.

At its core, the Point Blue Science Cloud is a distributed database of scientific observations, such as those collected by biologists during surveys to estimate avian population dynamics. A suite of tools and applications allows users to explore and visualize data in association with a myriad of projects (*see graphic at right*).

"We wanted the Point Blue Science Cloud to work in service of the scientific process and we built it around how observations are defined, managed, curated, and organized," explains Point Blue's recently retired Chief Operations Officer Michael Fitzgibbon, lead developer of the system. During the design process he shadowed scientists in the field and at their computers—observing the observers, as it were—in order to maximize user functionality.

Another goal was to "free scientists from being data managers," says Michael. "Back then, staff were emailing spreadsheets to each other and trying to keep track of questions like *Do I have all the data? Do I have the latest copy of the data? Have these data been reviewed and approved?"* The new technology empowered scientists to get back to doing science rather than spending time and energy fretting over version control.

One of the earliest adopters of the Point Blue Science Cloud was the Migratory Shorebird Project (MSP), a Point Blue-led cooperative effort to conserve shorebirds and their habitats along the Pacific Coast of the Americas. Launched in 2011, the MSP includes partnerships with geographically-dispersed researchers, agencies, and other stakeholders in all 13 countries that stretch along the Pacific Flyway.

"It really would have been very difficult to do that project without the Point Blue Science Cloud," says Michael. "The MSP team wanted to ask a lot of questions about how shorebirds were doing up and down the entire Western Hemisphere, but the logistics of coordinating with all of those people in all of those different countries were difficult," he explains. "Now the partners have data at their fingertips, and they can ask questions about what's happening in specific places, compare issues about human disturbance to bird populations, and find out how climate change is affecting birds."

Research Director of Point Blue's Pacific Coast and Central Valley Group and MSP Steering Committee Chair Matt Reiter, PhD, concurs that the Point Blue Science Cloud has been a boon to protecting species such as the Western Sandpiper. These shorebirds—a focal species of the project—gather in high concentrations at key stops during their migration from Alaska to wintering areas on both coasts of North and South America. "Because we are collecting data at these different sites in a very structured, standardized way and we have all this data in one place, we can not only see if populations are declining, but we can see where those hotspots of decline are."

And that sort of detailed output from the Point Blue Science Cloud translates into tangible conservation action. "Our data have been used to help designate one Ramsar site—a wetland site designated to be of international importance—and four Western Hemisphere Shorebird Reserve Network sites," says Matt. This includes Delta del Estero Real, the first such site in Nicaragua and the second in Central America. Data demonstrated that this area of intertidal mudflats, shrimp ponds, and mangroves supports more than 10% of the biogeographic population of Wilson's Plover, making it an important site for protection.

English-Spanish functionality of the Point Blue Science Cloud has also made access to MSP data more equitable and useful for on-the-ground conservation efforts. "For our partners in Central and South America to be able to get local agencies and other folks to use the tool, having it in Spanish has been really helpful," says Matt. "Pulling those stakeholder groups together builds our conservation vision for shorebirds in those places, which is to me really important."

Both Michael and Matt are excited about the data analysis potential of future iterations of the Point Blue Science Cloud. "The next frontier is going to be helping scientists not just collect and share observations, but to answer questions collaboratively using this rich, scientific data," says Michael. He also envisions the system working seamlessly with powerful cloud computing services offered by Google, Amazon, and the like, which many of our scientists already use to run data-intensive analyses.

"The Cloud is leading to super high efficiency," Matt observes. "We're more and more moving to a model of full open data sharing, and hopefully we'll be there in the next year or two." The result will be more "pure, raw data"—the underpinning of peer-reviewed scientific papers, which advance knowledge and inform conservation decisions. "We're going to publish more. We're going to publish faster," he predicts. Because we can't afford to just keep pace with rapid environmental change—we need to get ahead... in the cloud.

by Stacey Atchley-Manzer, Editor

Above, left: A flock of Western Sandpipers, a focal species of the Migratory Shorebird Project. Photo by macs.

CLOUD-POWERED CONSERVATION

Our scientists and partners are making a greater conservation impact thanks to Point Blue Science Cloud tools and applications like these.

RAPID AVIAN INFORMATION LOCATOR

Allows users to view a wealth of information about birds in a chosen geographic area, including conservation status and population size.

WATER TRACKER

Displays surface water across California's Central Valley in near real-time, informing migratory bird conservation actions.

WHALE AWARE

An interactive map shows crowd-sourced whale sighting data, informing coastal managers on where to adjust shipping traffic in order to prevent whale strikes.

BORDERLANDS AVIAN DATA CENTER

Improves bird and habitat conservation in the southwestern US and northern Mexico through partnerships that make data and analyses accessible to all.

CHAMPIONS OF CONSERVATION

Michael Fitzgibbon: Blazing the Ecoinformatics Trail

Growing up in a small military town in Ohio in the 1960s, experiencing nature first-hand was an abstract concept for Michael Fitzgibbon, Point Blue's recently retired chief operating officer. "The idea of there being a trail somewhere that you could go for a hike on... this was just something that I didn't even know was possible," he says. "I thought lakes were man-made, and that it was normal for rivers to catch fire," he recalls, referring to a 1969 pollution-fueled blaze on the Cuyahoga River that would become a touchstone of the burgeoning environmental movement.

As more of the nation became attuned to the ecology zeitgeist of the 1970s, Michael's thinking about the natural world was shifting. He spent summers in Portland, Oregon, with his brother, and seeing the rushing rivers, waterfalls, and forests there was an epiphany. "The thing that struck me the most was watching my brother take a cup, dip it into a waterfall, and take a drink," Michael remembers. "I thought, *You can do that? Wow!*" In college, he found further inspiration in the writings of Rachel Carson and Aldo Leopold, and he campaigned for environmentally progressive politicians.

After earning a Master's Degree in Environmental Planning from the University of California, Berkeley, Michael entered the commercial software world, focused primarily on Geographic Information Systems. At prominent companies such as Autodesk and Intuit, he held many leadership roles over the years, including what he describes as a "great job" overseeing the architecture of a flagship software product line. "But really it was not what I was interested in doing," Michael says. "I wanted to take the skills that I developed over the years doing software, but do it in an application that was closer to what I had studied in graduate school."

That led Michael to Point Blue in 2006. He was already familiar with the organization—his wife Wendy's grandfather was an early



Michael Fitzgibbon. Photo by Julie Chase Baldocchi.

member, and his father-in-law, Ted Eliot, had been on the board of directors—and he was drawn to the mission. Michael made an impact right away, leading the strategic planning process for what was then a new team working to apply information technology to conservation science. It was a critical step toward Point Blue becoming the ecoinformatics powerhouse we are now.

Michael served in numerous Point Blue leadership roles, including chief technology officer and chief operating officer, and he was a key member of the management and executive teams. His contributions to Point Blue are too numerous to list in their entirety, but they include the design and build of many systems, tools, and applications that transformed the way our scientists and partners do their work, including the Point Blue Science Cloud (*see page 4*), California Avian Data Center, Our Coast Our Future, and Whale Alert.

"I am grateful for Michael's many years of wonderful service to Point Blue and to advancing the conservation of our natural world," says Point Blue CEO Mani Oliva. "His vision and hard work helped Point Blue earn our position as a leader in ecoinformatics that allows us to better use our decades of ecological data and significantly increase the impact of our science. I am deeply appreciative of Michael's leadership, optimism, and terrific sense of humor."

Michael says he is equally thankful to have worked with his talented Point Blue colleagues. "They are some of the best coworkers and staff I've had the opportunity to work with over my career!"

As he reflects on his accomplishments, there are a few that stand out. One was leading the FedRAMP process (*see page 3*), making us the first NGO in the environmental sector to achieve the authorization. "That one was really difficult," laughs Michael, "because the team had no experience in security standards and we all had to become security experts." He also thinks about the many partnerships he helped forge. "Our partnership with the DoD is something that I worked on a lot, and I am proud of that," he says. There's a more workaday success story that comes to mind, too. "I built an application called Project Leader, which manages the metadata in the Point Blue Science Cloud," he explains. "More than ten years later, it's still the workhorse of the system and I'm proud it's been used by people every day for such a long time."

Ultimately, Michael's work has helped conservation decision makers get a better view of the world through Point Blue's rigorous science. As he puts it, "They're going to make decisions whether they have that information or not. Giving people better information—especially data that will help nature and communities prepare for climate change—that's the part that I think is the promise of ecoinformatics."

Michael has come a long way from that kid who couldn't conceive of taking a hike through the woods. "We just returned from a seven-day backpacking trip to Humphrey's Basin in the John Muir Wilderness," he reports. Next, he and Wendy are off to Wyoming for more camping and hiking. We wish him a retirement full of adventures along the trail, with many opportunities to drink nature in.

by Stacey Atchley-Manzer, Editor

PARTNERSHIP

Elizabeth Neipert, Department of Defense

The United States Department of Defense (DoD) manages approximately 27 million acres of land encompassing a vast array of ecologically important habitats. Dual mandates require that these lands support military needs while also preserving, improving, and enhancing ecosystem integrity. Point Blue has a long history of informing conservation management at DoD sites such as Vandenberg Air Force Base, where our scientists have been monitoring seabirds and shorebirds since the 1990s. We spoke about our collaboration around the Avian Knowledge Network (AKN) with Elizabeth Neipert, research wildlife biologist for the US Army Engineer Research and Development Center and program director for DoD's AKN program.

What role does DoD play in protecting sensitive habitats and biodiversity, and how do you balance those conservation needs with military objectives?

A lot of people think that you can't support the military mission and conserve natural resources. But that really can be done simultaneously, and when you get to do that, it's exciting. DoD has some of the last remaining examples of certain habitat types in the nation, we manage more threatened or endangered species than any other federal agency, and we have 60 species that exist only on military land. So that's a testament to our conservation load and our conservation efforts. We take our dual mandate very seriously—we spend considerable resources conserving species and habitats. We often have to think critically and outside-the-box to find solutions for species, habitats, and training. Partnerships like DoD's with Point Blue make these solutions even easier with data-driven decisions.



Elizabeth Neipert. Photo by Dan Wozniczka.

The AKN, which is powered by the Point Blue Science Cloud, has now been adopted as the primary clearinghouse for bird monitoring and research data across all 500+ DoD installations. What is the advantage of having a central repository of conservation data, collected in a standardized way?

It's game-changing to have one centralized, secured depository of information. Until now, each installation has been collecting bird data in various forms. Having it all in one place will allow us access for regulatory requirements, environmental analysis and planning, and it will give us visibility of species, population trends, and management, and let us know if what we're doing is working. For instance, if we were looking at a species like the Pinyon Jay, which is being considered for protection under the Endangered Species Act, we had no easy way of pulling together data on that species across installations. We had to go to each branch of military service, and then have them go out to the installations and say, *Do you have this species? Where is it? How many?*, and then send that information back up the chain. Point Blue offers tools within AKN that allow us to do our work more efficiently and effectively. Being able to have that data at our fingertips for those environmental reviews and not having to dig it out of a file is going to save immeasurable time and resources.

How does climate change factor into DoD's conservation efforts, and how is the AKN partnership with Point Blue helping address those issues?

Climate change is a massive threat to national security. If you have an enemy, you can defend against it. But how do you adapt when your whole environment is changing? Species are shifting, sea levels, rising; there are increases in drought, fire, invasive species, and flooding. So we have to figure out what the landscape looks like in that changing environment, and we have to build more resilient infrastructure and more resilient installations. DoD has a climate adaptation plan and is responding to not only enhance resilience, but also to mitigate climate change effects and reduce greenhouse gas.

Predictive modeling helps inform those decisions, so Sam Veloz (Point Blue's Ecoinformatics and Climate Solutions director) and I are working on a proposal for a climate adaptation tool. We plan to use DoD and partner data within the AKN to build bird distribution models that would inform management in response to habitat and species shifts in the face of climate change.

The DoD-wide adoption of AKN will potentially have a far-reaching conservation impact. What about that excites you most?

Simply put, access to good data means more informed decisions. Once we upload all of the DoD data, we're going to be able to ask both simple and complex conservation questions. We will be able to visualize our conservation actions. We're hoping that other federal agencies will come onboard. Getting other partners to input their data and share it only makes the partnership stronger, the data more robust, and the tools more informed. Imagine being able to pool all federal agency bird data across the country. That really would change the landscape of conservation and management nationwide. Our partnership is extremely excited about these first steps and the direction the AKN is heading.

Point Blue
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Join CEO Mani Oliva, Chief Science Officer Grant Ballard, and fellow Point Blue supporters on a once-in-a-lifetime expedition to Antarctica. Marvel at the seventh continent's windswept expanses, snow-shrouded peaks, and abundant wildlife while learning about this special place directly from scientists and naturalists. You'll even have an opportunity to participate in three community science projects! Your air-cruise adventure includes upscale accommodations aboard Antarctica21's intimate expedition ship *Magellan Explorer*.

To secure your place, contact Director of Philanthropy Nancy Gamble at ngamble@pointblue.org or 415.342.9776.

Top: Barn Swallows. Photo by Volodymyr Kucherenko. Above: Adélie Penguins on an iceberg near the Ross Sea, Antarctica. Photo by Annie Schmidt/Point Blue. Cover: Senior Avian Ecologist Kristin Sesser measures a Long-billed Dowitcher with calipers as part of a study to help manage water in the Central Valley to benefit waterbirds as we move into a future with more drought. Photo by Jak Wonderly Photography.

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