6 Inside the Food Web: "Forage Fish"
8 The Last Intact Ocean: Ross Sea, Antarctica
10 Seabirds and California's Marine Protected Areas

Issue 4 / Spring 2014 / pointblue.org

Point Blue Quarterly

Conservation science for a healthy planet.

4

CONSERVING OCEAN FOOD WEBS

Left: Ellie M. Cohen. Photo by: Miki Goralsky.

Ellie M. Cohen

PRESIDENT AND CEO OF POINT BLUE CONSERVATION SCIENCE

The Point Blue Quarterly is published quarterly by the Board of Directors of Point Blue Conservation Science (formerly PRBO). Edited by Grant Ballard, PhD, and Claire Peaslee with assistance from other members of the Point Blue staff. Printed on recycled paper (100% post-consumer waste), using agri-based inks.

GIVING MORE TIME FOR MARINE WILDLIFE TO ADAPT

Climate-Smart Ocean Conservation

"It is a curious situation that the sea, from which life first arose, should now be threatened by the activities of one form of that life. But the sea, though changed in a sinister way, will continue to exist: the threat is rather to life itself." – Rachel Carson

As Rachel Carson astutely observed decades ago, the ocean is key to life as we know it. It drives global and regional weather patterns, produces more than half of the oxygen we breathe, supplies the primary source of protein for over a billion people, sustains the the fisheries that employ hundreds of thousands of people globally, and preserves the seabirds, whales, and other marine life that inspire us all.

However, the ocean's ability to sustain life is gravely threatened by human activities including:

- chemical and plastic pollution;
- overfishing (almost 90% of the world's fisheries are being harvested faster than they can reproduce);
- a booming international shipping industry;
- a growing demand for energy (from fossil fuels as well as renewable sources); and,
- increasing greenhouse gas pollution (the ocean is warming as it absorbs almost all of the extra heat in the atmosphere, and it is becoming more acidic as it takes in carbon dioxide from the atmosphere).

Fortunately, there are many climate-smart conservation actions – based on science, adaptive management, and cross-jurisdictional communications – that can reduce human impacts in the rapidly changing marine environment.

At Point Blue, we are collaboratively identifying, prioritizing, and guiding protection of ocean food webs to give marine wildlife and fisheries more opportunities to adapt to accelerating change and to promote long-term sustainability.

As you will read in this Quarterly, Point Blue scientists are working from the California Current to Antarctica to jointly develop innovative management approaches and help reduce conflicts between wildlife and humans in the ocean.

Rachel Carson's insights still hold true today, but Point Blue is ensuring that science-based decisions produce multiple benefits – for seabirds, whales, seals, sea lions, fish, krill, and other marine life, as well as for human communities – through climate-smart conservation approaches.

Contents

4 GUIDING HUMAN USES TO CONSERVE THE MARINE ECOSYSTEM

Ocean Zoning in the California Current

By Jaime Jahnke, PhD

Above: Common Murres and a sport fishing boat cross paths. **By** Mojoscoast Photography.

6 IMPORTANCE OF "FORAGE FISH"

Small species are the vital links for ecosystem-based fishery management.

8 PROTECTION FOR THE ROSS SEA

A call to action for the world's last pristine ocean food web, in Antarctica.

10 SEABIRD INDICATORS

Do California's Marine Protected Areas protect fish populations?

IN THIS ISSUE

2 From the President

12 Partnership

13 Study Sites

14 Meet the Team

15 News Bites

16 Focus

17 Calendar

18 Donor Thanks

20 Conservation Legacy

INDEX

climate change 7, 8, 11, 14, 15

climate-smart 2, 10, 17

ecosystem 4–5, 6, 8, 10–11, 12, 14, 15

food web 2, 4–5, 7, 8–9, 10–11, 14, 15

forage fish 5, 6–7, 10

ocean warming 2, 8, 11

partners / partnerships 4, 11, 12, 13, 14, 15, 17

On The Cover:

Humpback whales and seabirds feast offshore of San Francisco. **Photo by:** Sophie Webb.

Left: Northern anchovies, important "forage fish." **Photo by** Ken Lucas.

Center: Weddell Seal in the icy Ross Sea. **Photo by** Chris Linder.

Right: Monitoring seabirds to assess a Marine Protected Area. **Photo by** Julie Howar, Point Blue.

GUIDING HUMAN USES TO CONSERVE THE MARINE ECOSYSTEM

Ocean Zoning in the California Current

Ocean waters off the California coast are so full of life and so important to people, for varied uses, that effective stewardship is both challenging and crucial. The Gulf of the Farallones and adjacent coastal waters are home to some of the world's most productive ocean food webs. Along with salmon, seals, and great whales that rely on the California Current marine ecosystem, seabirds from across the Pacific fly here to forage alongside birds hatched on the Farallon Islands.

Many human activities on the ocean are sustainable, but some can result in serious threats. These include heavy shipping traffic through the Golden Gate, oil pollution from marine spills, fishing in wildlife-sensitive areas, and future at-sea energy developments – all exacerbated by the increasing impacts of climate change. Ocean acidification has increased throughout the California Current System (the CCS, from British Columbia to Baja California). Fish stocks have declined over recent decades.

For the CCS to sustain wildlife and meet the growing demands of people in our rapidly changing world, well-informed, science-based management is needed. Point Blue brings scientific knowledge to our partners at National Oceanic and Atmospheric Administration (NOAA), U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife, and other public agencies responsible for natural resources in the ocean.

One of Point Blue's newest collaborative endeavors focuses on identifying sites in the ocean for human activities to minimize impacts on the marine ecosystem – an approach called "ocean zoning."

Existing protected areas offshore of central California fall within three NOAA National Marine Sanctuaries – Monterey Bay, Gulf of the Farallones, and Cordell Bank. Point Blue has been actively guiding their management, for example providing science that helped establish state Marine Protected Areas (MPAs, see page 10) and documenting persistent

"hot spots" of biodiversity that may require further safeguards.

Unlike National Parks, National Marine Sanctuaries allow for extractive uses as well as resource protection and enjoyment. And California's MPAs, though pioneering, are also limited: they encompass only small portions of ocean ecosystems and offer no protections outside their boundaries. New approaches are needed to ensure sustained functionality of the entire food web in the context of growing pressures.

For example, how might alternative wind and wave energy infrastructure affect seabirds that breed at the Farallon Island National Wildlife Refuge and need to forage within reach of their colonies? Or species that migrate from across the Pacific to feed in the Gulf of the Farallones? How can humans reap nature's benefits in the California Current System while ensuring that marine wildlife species also thrive there?

Point Blue's research and recommendations to guide ocean zoning take a multiple-use perspective, incorporating ocean food web conservation as well as renewable energy, shipping, government, fishing, recreation, and eco-tourism. The goal is to allocate appropriate space to each key human activity while ensuring the sustainable use of marine resources – managing human uses in order to conserve entire ecosystems.

Left: Blue whale and Common Murres in the Gulf of the Farallones. **Photo by** Sophie Webb.

Above: Fishing, shipping, and alternative energy infrastructure are some of the ways people need and use the ocean. **Photos by** Sophie Webb (left), Mojoscoast (center), Principle Power (right).

To build the scientific basis for effective ocean zoning, Point Blue scientists are working with the information gained in our cooperative, long-term research and monitoring program called ACCESS or Applied California Current Ecosystem Studies. As an example of how this data can support marine conservation, we recently provided the scientific basis for smaller shipping lanes in the Gulf of the Farallones National Marine Sanctuary, protecting 70% of key humpback whale feeding areas (see **accessoceans.org**).

We are now combining our extensive data on key foraging areas for whales and Farallon-nesting seabirds with new analyses of where non-resident seabirds feed – at aggregations of krill and forage fish (see page 6).

Our work with partners to balance human uses with wildlife needs in the ocean, can provide a strong model for ocean zoning elsewhere in the California Current.

Jaime Jahncke, PhD
Director, California Current Group

The leader of Point Blue's marine research, Jaime investigates relationships between oceanographic processes and marine wildlife, to guide conservation efforts.

Co-authors for this article were Brian Huse and Claire Peaslee.

Below: Abundant juvenile rockfish are among the forage fish species in the California Current.

Photo by Greg McFall / NOAA/CBNMS.

INSIDE THE OCEAN FOOD WEB

An Eye on Forage Fish

Big fish eat little fish: this common knowledge imbues much of our folklore and literature. And people have long known that marine birds and mammals also depend on little, schooling fish – the small-sized prey collectively called "forage fish."

Point Blue has been investigating this connection between seabirds and their food for decades – at the Farallones, on Ross Island, Antarctica, and elsewhere. While there are extensive data collected at colonies on what seabirds eat, very little is known about how these predators actually procure their food.

On several research cruises with Pete Adams (recently retired from NOAA's National Marine Fisheries Service) aboard the NOAA vessel *David Starr Jordan* in the 1980s, we both were impressed by how little was known of the fine-scale spatio-temporal (where and when) aspects of foraging by seabirds, mammals, and predator fish (salmon).

We also agreed that managing fisheries just on the basis of saving some portion of fish stocks for the birds, seals, whales, and large fish does not consider the issues involved in predators actually finding fish. "Prey stock biomass" is a totally different thing than prey availability (just ask any fisherman).

The California Current System (CCS) is highly variable at every spatial scale – near and far from the Farallones, for example – and every temporal scale, from days to weeks to years. Predator species have to figure this out in order to survive. The challenge can be even greater when some other factor is constraining a bird to a nest (the needs of its young) or a salmon to a particular watershed (for spawning).

An ecosystem approach

Our perspective some 25 years ago has now captured the interest of fisheries managers and others who favor a new approach called "ecosystem-based fishery management" (EBFM). Because the issue of prey availability is central to this approach, and the need for information is great, Point Blue hosted a workshop that several of us helped organize, in September 2013.

A veritable who's-who of proponents of EBFM for the CCS attended, from both government and private institutions, nationwide and international. Many had conducted research like ours on predator foraging in the CCS, either during multiple years and/or at multiple locations. It was time to pool our perspectives and data. We considered not just seabirds but marine mammals and large fish, as well – 31 species in all, from the Straits of Juan de Fuca, Canada, to Baja California, Mexico.

The first finding that jumped out was that the group of species commonly referred to as "forage fish" (e.g., anchovies, herring, and krill) are just a small part of the CCS preyscape. Those species ranked among the top ten in importance (anchovy was first), but also included were the juveniles of larger species like rockfish, salmon, sanddabs, and hake.

This is an important issue. While managers currently work to regulate the take of adult fishes of the larger species, it is apparent that the forage species upon which they depend merit

David G. Ainley, PhD
Senior Ecological Associate. H.T. Harvey & Associates
Lead Investigator, Penguin Science

David Ainley is a Point Blue Research Associate and accomplished seabird scientist. He co-leads, with Grant Ballard, long-term research in Antarctica. In 1971–1995, on the staff at Point Blue (then PRBO) , David directed the marine research program and Farallon Island studies.

more special attention than they have received to date. Forage fish are the key to keeping major fish stocks healthy, their fisheries sustainable, and other predator species in healthy abundance. Some forage species themselves are harvested by humans, adding to the regulatory complexity.

We also focused on the swings in abundance of forage species. When one prey species becomes hard to find, CCS predators must have the capacity and opportunity to switch to another prey. If fishing or variability due to other factors reduces the prevalence of a certain prey, this sends ripples throughout the food web; predators have to work harder. Consequences of ocean-climate change are now among the factors affecting these relationships, making finely honed management, especially that based on current information, all the more important.

For an illustration of the food-web consequences of a prey species' scarcity, consider the few salmon that now try to find their way up the Sacramento River and its tributaries. Three to four decades ago these salmon filled up on energy-rich fish – first juvenile rockfish and then anchovies – before making the long trip into rivers that contain no food. The forage fish now are severely reduced, so all that the salmon have in abundance these days is krill.

It was with great foresight that various non-governmental organizations, using findings including Point Blue's, persuaded public agencies recently to ban commercial krill fishing off the West Coast. Otherwise it is very likely that krill would have been the target of a new fishery, in a pattern now playing out globally known as "fishing down the food web" – fishing lower and lower in the food web as each level is depleted.

Our workshop demonstrated that small fishes, including the juveniles of larger species and also squid – the forage fish – merit similar consideration.

We hope that the scientific perspective resulting from our conference will guide federal and state fishery managers (many of whom attended), as they wrestle with management of fisheries in the very dynamic California Current System – no small task.

Protecting Earth's Last Sea-Ice Food Web

More than 8,000 miles from Point Blue's headquarters, one of our long-term research efforts focuses on a bird that makes its living in one of the world's great ocean food webs – and on threats to that food web. Since 1972, Point Blue researchers have spent considerable time at Adélie Penguin colonies on Ross Island, in the southern Ross Sea, Antarctica.

We have examined why these colonies fluctuate in size over the years, sometimes quite dramatically. Is this variability related to climate change? For such an iconic representative of frozen ocean, the future might seem uncertain as the planet heats up.

Yet we have recently found that Ross Island populations have rapidly climbed to record high numbers. At the largest of our study colonies, Cape Crozier, our annual ground-counts have become challenging, with the numbers of breeding birds growing to about 540,000 today (from about 300,000 when we started)! In the context of climate change, and the major reductions in Adélie populations in other parts of their range, this growth is remarkable.

The larger context for our study is the Ross Sea itself, the most pristine ocean on the planet. For most of the year it is covered by sea ice, making it largely inaccessible to people. It hosts mind-boggling numbers of animals, particularly top predators such as whales, large fish, penguins, and other seabirds, serving as a reminder of what much of the world's oceans must have been like before humans came along.

Many scientists consider the Ross Sea a "natural laboratory" – a place where we can learn about how healthy ocean food webs are supposed to function and about the range of natural variability – all the more urgent given the effects of climate change on the planet's sea ice.

Sea ice is expanding in the Ross Sea about as fast as it is disappearing from much of the rest of the Earth's polar regions. The complex reasons for this involve increasing wind speeds, caused by warming in the lower atmosphere, and perhaps also the freshening of surface water, due to increasing glacial melting (fresh water freezes more readily than salt water). While temperatures are generally warming globally, in the Ross Sea they have not yet reached the tipping point where it is too warm for ice formation.

On the opposite side of the continent, in the Antarctic Peninsula region, sea ice is disappearing rapidly, due to too much warming of the ocean and air – and Adélie populations are shrinking. These observations are probably linked, since Adélies are sea ice "obligates:" they evolved to exploit an icy environment where very few other species can thrive; and they can't survive without it.

The patterns we are documenting result from a combination of natural environmental variability, climate change, and other human-caused impacts. Since 1997 Adélie Penguins have had increasing amounts of their food – krill and small fish – available to them. This is because one of their main competitors – the Antarctic toothfish, known in the marketplace as "Chilean sea bass" – has been a primary target of fishing boats from New Zealand, South Korea, and several other countries.

The Ross Sea toothfish fishery is regulated under the Convention for the Conservation of Antarctic Marine Living

Resources (CCAMLR, pronounced "cam-el-are"). This international treaty, signed by 24 countries plus the European Union, governs fishing in the Southern Ocean, an area comprising about 10% of the Earth's surface. The official management plan for toothfish in the Ross Sea region is to reduce the spawning biomass by half in the next 15 years.

Scientists and environmentalists are alarmed by this, citing insufficient knowledge of the natural history of toothfish. Where do they breed? How frequently? How many are there? How long do they live? How much do the Weddell seals and other species of the Ross Sea ecosystem depend on toothfish?

These concerns, as well as the importance of the unique natural laboratory in this last pristine ocean, are driving international efforts to establish the world's largest Marine Protected Area (MPA, see page 10) in the Ross Sea. Despite the best work of scientists and conservation organizations across the globe, including Point Blue, CCAMLR to date has rejected this proposal. The next opportunity for the MPA to be established is in October, 2014.

Point Blue continues to improve the scientific basis for protecting the Ross Sea – the place that will be the last refuge on Earth for sea-ice dependent species. Point Blue's long-term data sets, modeling expertise, and extensive field experience in the region are steadily adding to the case, and we hope it is only a matter of time before the MPA is established.

Opponents of the MPA have consistently raised the point that if there were no market for these fish, there would be no conservation issue (and that the market for "Chilean sea bass" is almost entirely in the U.S. and European Union). While that is an oversimplification, it is important to realize the role that economic factors, including our personal choices as consumers, play in conserving ocean food webs.

For more information about the effort to create a Marine Protected Area in the Ross Sea region, see **lastocean.org** and **antarcticocean.org**.

Above: Adélie Penguins use sea ice to access their foraging areas in the Ross Sea. **Photo by** Annie Schmidt.

Grant Ballard, PhD
Chief Science Officer

Along with leading Climate Change and Quantitative Ecology research at Point Blue, Grant is a principal investigator in our cooperative program in Antarctica.

CLIMATE-SMART TOOLS FOR CONSERVING NEARSHORE OCEAN WILDLIFE COMMUNITIES

California's Marine Pro

Seabirds are a ubiquitous and inspiring feature of coastal California, but their integral role in marine ecosystems is often overlooked. The status of seabird populations mirrors that of the marine fish and invertebrate populations that seabirds rely upon for their survival.

Unfortunately, seabird populations are also heavily impacted by the increasing human activity along our coasts. Important seabird roosting and breeding sites are put at risk by development on land and by rising sea level resulting from climate change. Seabird prey resources are threatened by overfishing, increased frequency of extreme oceanographic events, and the poorly understood impacts of ocean acidification. If seabird and other wildlife populations are to persist, they will need space and time to adapt to our rapidly changing world.

Marine Protected Areas (MPAs) provide one means by which to reduce the negative impacts of human activities on marine ecosystems, with the potential to directly benefit seabirds. Within designated areas of the ocean, MPAs restrict human activities so that biological communities can exist with fewer direct pressures. They contribute to a global strategy[1] to protect at least 10% of Earth's coastal and marine areas by 2020.

In 2013, California completed a statewide network of MPAs – the largest such network in the U.S. and the second largest in the world. It is designed to prioritize ecosystem function, protect species diversity, and encompass all species, not just those that are rare, charismatic, or harvested. Another goal of MPAs is to increase the resilience of all ecosystem components and provide an environment where species can adapt to changes that are both local and global in scale. Additionally, the network is adaptively managed to allow for flexibility in the face of future uncertainty. Adaptive management constantly evolves in response to new information from ongoing scientific monitoring and other research.

As highly visible indicators of ocean food webs, seabirds can help us understand how changing oceanographic conditions affect MPAs over time. Point Blue is contributing to the adaptive management of MPAs by monitoring seabird habitat use throughout California (not just in MPAs) and providing our findings to MPA managers.

Our work has shown that changes in seabird diet and foraging behavior reflect annual changes in the abundance of juvenile fish, vital in the food web (see "forage fish" story, page 6). Seabirds thus can identify areas where high numbers of juvenile fish are present (the ecological process called "recruitment"). This

[1] This is one of the significant targets in the 2010 Japan (or Aichi) protocol, under the Convention for Biological Diversity that was first adopted at the 1992 Earth Summit in Brazil.

Julie Howar
Coastal Program Biologist / GIS Specialist
California Current Group

Based at Point Blue's Vandenberg field station, on the central California coast, Julie conducts field work and also manages data for our California Current group. ● Also contributing to this article was Point Blue Senior Scientist and Coastal Program Leader, Dan Robinette.

tected Areas

information can help scientists develop scenarios of fish recruitment under different oceanographic conditions and allow MPA managers to establish realistic expectations for how quickly change should occur within individual MPAs.

The results of our baseline monitoring in central California show that the network is protecting important seabird breeding sites, but also that many of the birds' key foraging areas lie outside of state MPAs. We know that seabirds feed primarily on smaller, younger fish, so our finding suggests that MPAs may not adequately encompass areas of high juvenile fish recruitment.

In short, our work has shown that appropriately placed MPAs can protect important habitats but also that larger geographic and oceanographic conditions, which influence biological populations, may overshadow their effectiveness.

On the horizon

Two significant challenges moving forward are: to maintain monitoring efforts to support ongoing adaptive management, which responds to growing understanding of biological communities as well as to natural and human-caused environmental changes; and to build public support for the MPA network. A promising approach to address both these challenges is citizen science. Citizen science engages members of the public in the monitoring process, working side-by-side with scientists to provide valuable data that can be otherwise difficult to collect. Such efforts can provide sustainable long-term monitoring while building a group of informed, invested local stakeholders.

Near left: Biologist Steven Tucker conducts a coastal survey for foraging seabirds. **Photo by** Julie Howar.

Far left: Pigeon Guillemot is a seabird often seen near shore. **Photo by** Peter LaTourrette.

facts:

about ocean and climate

50% of atmospheric CO_2 from burning fossil fuels is absorbed by the ocean – moderating climate change impacts for now.

90% of the extra heat trapped in the atmosphere from human-made greenhouse gases over the past 50 years has been absorbed by the oceans.

3° Celsius, or 5.4° F, is the amount of temperature rise per decade that we would experience globally without the ocean's heat storage.

Point Blue has partnered with the Seabird Protection Network and the California Coastal National Monument to develop a citizen-science seabird monitoring program along the California coast. We are training volunteers to use Point Blue's monitoring protocols to collect seabird data in and around their local MPAs. These data will help managers answer questions about the long-term effectiveness of individual MPAs and of the network as a whole.

Volunteers will gain direct knowledge about their regions' coastal resources and develop ideas about how to coexist with marine wildlife on the coast. Creating this open dialogue between scientists and the public is vital to the success of California's MPA network and also integral to Point Blue's mission. It can support the continued development of realistic solutions that reduce human pressures on seabird populations and marine communities as a whole.

To learn more about our MPA research, please visit the Coastal Marine Program at **www.pointblue.org** or search for Point Blue on **www.oceanspaces.org**.

PARTNERSHIP

U.S. Fish and Wildlife Service – Gerry McChesney

Left: Gerry McChesney at the Farallon National Wildlife Refuge. **Photo** USFWS.

Our Partnership column highlights the people we work with to develop conservation solutions.

Point Blue's long-term studies at the Farallon Islands are made possible through a unique cooperative partnership with the U.S. Fish and Wildlife Service (USFWS), which manages the Refuge. This partnership dates back to 1969, when the South Farallon Islands (where our field station is located) were made part of the Farallon National Wildlife Refuge.[1] For 45 years our cooperative work has been built on a mutual commitment to the understanding, preservation, and restoration of this unique island ecosystem – and on the dedicated efforts of people like Gerry McChesney.

As the manager of the Farallon Islands Refuge for the past seven years, Gerry has played a pivotal role in maintaining and advancing this partnership. But his history with Point Blue and the islands goes back much farther. Gerry first encountered the Farallones on an Oceanic Society boat trip in 1985. "I was fascinated (by the islands) – and by the possibility of an internship there with Point Blue."

Gerry spent the next two summers on the island, learning about seabird ecology and conducting an undergraduate research project on Ashy Storm-petrels. He later worked throughout California on research related to seabird conservation – and always found ways to stay involved with the Farallones. In 2002 Gerry joined the Refuge staff, and in 2008 he took over the post of Refuge Manager.

As Gerry describes, "I've been in love with the Farallones since I first laid eyes on them almost 30 years ago. It is a great privilege to now be in a position where I am able to work for their protection."

And Gerry appreciates our partnership, saying, "By working with Point Blue, we've learned much more about the many components of the Farallon ecosystem and how to protect them than we could ever learn on our own."

Point Blue biologists live year-round on Southeast Farallon Island (see Study Sites, page 13), providing stewardship and conducting research on Farallon wildlife. Information from our research helps the Refuge develop effective strategies for the protection of the islands. In turn, the Refuge helps support our long-term research program and works with Point Blue to make certain that our science is put to the best possible use for conservation. It is a partnership that truly advances the goals of both organizations.

Gerry sums it up this way: "Point Blue has the unique opportunity to study the fascinating Farallon ecosystem. USFWS, and ultimately the public, reap the benefits of being able to understand and respond to conservation issues concerning the islands."

The newest endeavor in our collaborative work with Gerry and USFWS revolves around reducing the impacts of past human activities and restoring the Farallon Islands ecosystem. We look forward to continuing this essential partnership – advancing marine conservation and protecting the Farallones and their wildlife for generations to come.

.

Pete Warzybok Farallon Biologist, California Current Group

On Point Blue's staff since 2000, Pete participates in every aspect of our Farallon Program. His research interests center on seabird population dynamics and environmental variability.

[1] The Farallon Islands were one of the first national wildlife refuges in the United States, established in 1909 to protect the rest of the Farallon archipelago; the South Farallones were inhabited then by lightkeepers and later by U.S. Coast Guard personnel.

STUDY SITES

Southeast Farallon Island

When I stand at the top of Lighthouse Hill on Southeast Farallon Island, I feel far from and close to civilization at the same time. When I look west, this granite piece of continental crust, which shares its origins with the core of the Sierra Nevada Mountains and is slowly moving northward on the Pacific Plate, feels amazingly remote. A raucous throng of tens of thousands of Common Murres is below me in their breeding colonies – and beyond, a vast open sea where the continental shelf drops to great ocean depths within six miles and the next land is Hawaii.

But when I turn east on a clear day, I see the Golden Gate Bridge a mere 30 miles away – and the entire Bay Area beyond it, as far as Mount Diablo. I am reminded that these islands are not geographically very far from San Francisco and that those of us working here, for Point Blue and the U.S. Fish and Wildlife Service, are legally within the city (in the true "Western Addition")!

As a solid spring northwesterly breeze of 25 knots forces me to sway to keep in place, the real staggering fact is that there have been Point Blue biologists here, usually three to seven people, conducting valuable research and monitoring efforts to guide conservation, every single day and night since April of 1968. This includes over 725 volunteer interns.

The extraordinary and invaluable study of this ecosystem would be impossible without our long-term partnership with USFWS. We've come a long way since starting as "the birdwatchers" living among Coast Guard personnel who were still stationed on Southeast Farallon. We have steadily built the scientific foundations of our work, developing comprehensive studies of both the marine and terrestrial ecosystems of the Farallon National Wildlife Refuge.

Our constant presence at this remarkable study site enables Point Blue, through researching and monitoring top predators like seabirds, marine mammals, and white sharks, to detect changes in the California Current marine ecosystem not attributable to normal "background" variability. Along with documenting species recoveries over the years of our stewardship with USFWS, we have identified threats to marine wildlife from climate change. One example was the unprecedented breeding failure of Cassin's Auklets in 2005 due to anomalies in ocean circulation. Our long-term continuous data sets made this discovery possible.

There is much more to learn and to contribute to island conservation and the protection of ocean food webs. On this windy spring day up at the lighthouse, I'm watching a large group of gray whales with calves heading north, a sight that would have been exceedingly rare 45 years ago. But as we look to the future and a changing global environment, the value of Point Blue's Farallon data becomes even greater – and the need to continue our work ever more important.

Russ Bradley
Farallon Program Leader,
California Current Group

From his start as a Point Blue intern in 1998, Russ has become the leader of our Farallon studies. He is an expert on the island and nearby marine ecosystems.

Above: Humpback whales forage in the food-rich waters near Southeast Farallon Island.
Photo by Annie Schmidt.

MEET THE TEAM

Each Point Blue Quarterly spotlights a member of our team.

Meredith Elliott – Senior Scientist, ACCESS Program Coordinator, Lab Manager

You have an interesting title! What's included in your job description?

My job entails synthesizing results from our ACCESS[1] ocean research cruises, as well as research in the lab on seabird diets and plankton, to understand the condition of our regional National Marine Sanctuaries and contribute to their conservation.

What's particularly satisfying about your work at Point Blue?

I'm constantly learning about the ocean and its complexity. In recent years, I have learned a lot about the little marine "bugs" called zooplankton, particularly krill and copepods, which are important in marine ecosystems. Working with Point Blue partners, we have been analyzing data to better understand changes in the zooplankton and how they are linked to climate change and other factors affecting the ocean.

What's it like working in the lab, peering through microscopes?

I'm lucky to have a great team in the lab – two full-time interns and several volunteers who are smart, motivated, and love to do intensive microscope work. Sorting through a sample under the microscope can be like unwrapping a gift to see what it holds. And looking at zooplankton, we often wonder where a tiny drifting creature came from and what can it tell us about our ocean. Great discussions happen in the lab.

Why would you say Point Blue's California Current studies matter?

The ocean is not in the forefront of most people's minds but is key to our survival. Unfortunately, we have not been good stewards of the ocean: we pollute it, we take too many resources from it, and we don't fully understand the impacts of our actions. Our work at Point Blue brings attention to the ocean and new understanding of how marine ecosystems work, helping people make better decisions about the use of our ocean so we can better conserve it.

How did you enter into this career?

From a very young age I wanted to be a marine biologist. Right after college, I began studying seabirds with Point Blue, first as a Farallon Island intern, then helping monitor a Least Tern colony in San Francisco Bay. I became very interested in what these birds were eating and how that affected their breeding success. That led to my Masters research and my current science focus.

How does your research at Point Blue contribute to our work to conserve ocean food webs?

My responsibilities for managing and analyzing the data we collect on ACCESS cruises have led me to learn more about climate and the properties of the ocean (such as temperature and salinity) that regulate fish and zooplankton populations.

My impression is that the diet of seabirds (and other wildlife) is often the information ocean scientists and managers need but can rarely collect and analyze themselves. So our work, I believe, provides scientific information that's extremely valuable for conservation.

[1] Applied California Current Ecosystem Studies. In partnership with NOAA's National Marine Sanctuaries we examine ocean health off the California coast. Learn more at **pointblue.org** and **accessoceans.org**.

news bites

Left: An aerial-survey view of San Pablo Bay wetlands. **Photo by** Blake Barbaree.

Below: A Golden-crowned Sparrow in breeding plumage. **Photo by** Tom Grey.

RECOGNITION

Point Blue recently won the prestigious Wings Across the Americas award from the U.S. Forest Service. It recognizes our contribution to the international Migratory Shorebird Project – ten countries cooperating to conserve shorebirds in the face of climate change and other environmental threats.

Point Blue was honored to receive NOAA's National Marine Sanctuary Partner of the Year Award for 2013–14. Our joint research and monitoring advance the protection of all marine life in our region's Sanctuaries.

Our STRAW Program (Students and Teachers Restoring a Watershed) received an Outstanding Environmental Education Program Award from the Sonoma County Conservation Council and Sierra Club Redwood Chapter's Sonoma Group.

This spring Point Blue won a Sonoma County Green Business award for the many ways we have made our Petaluma headquarters environmentally friendly.

SCIENCE PAPERS

Recent publications from Point Blue in scientific journals include papers on:

• the vulnerability of biodiversity hotspots to environmental change, including climate change, in Global Ecology and Biogeography (Sam Veloz, PhD, is a co-author);

• trends in Adélie Penguins from the Ross Sea region, and connections with the Antarctic toothfish fishery and climate change, in PLoS ONE (co-authors include David G. Ainley, PhD, and Grant Ballard, PhD);

• seabird reproductive success and climate change, using our long-term Farallon data, in Marine Ecology Progress Series (a chapter from Annie Schmidt's PhD thesis).

In addition, Dave Shuford spearheaded completion of the 2014 Coastal California Waterbird Conservation Plan, an in-depth and comprehensive document. The entire report can be read by searching online for the title.

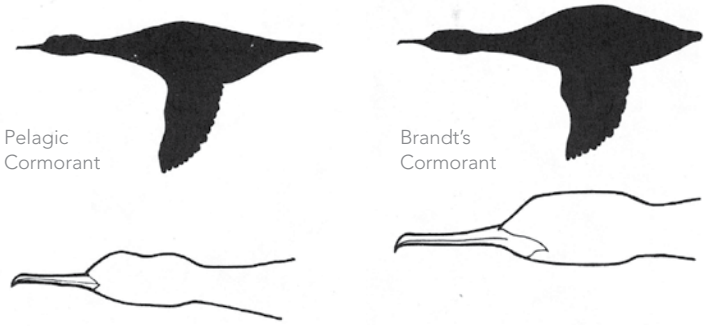
TRACING AVIAN FLIGHT PATHS

Precisely where do migratory birds travel? Which habitats support them? To find out, Point Blue uses technology to track several species' migration and winter movements.

In April, we scanned for 120 wintering Dunlin and Long-billed Dowitchers that carry minuscule transmitters. Point Blue's Blake Barbaree, with the help of a volunteer pilot, conducted aerial surveys that documented (for the first time) Dunlin movements from the Sacramento Valley to San Francisco Bay. We are learning how wildlife refuges, flooded agricultural lands, and private wetlands are interconnected and essential to sustaining shorebird populations in the Pacific Flyway.

Some 38 Golden-crowned Sparrows and 32 Hermit Thrushes carried ultra-lightweight geolocator tags to their breeding grounds and back. To learn where they breed, we need to recapture these overwintering birds a year after tagging them! After trying for four months, Palomarin biologists finally mistnetted a certain Golden-crowned sighted often near Bolinas Lagoon. As the bird prepared to wing its way north again, we learned that its breeding grounds are on the Kenai Peninsula.

focus



Cormorants

Here is an excerpt from the very first Focus column, published in our spring 1982 Newsletter. An introduction to the series, by then staff biologist Dave DeSante, PhD, noted that "In his own kind and casual matter, Rich Stallcup has probably taught birds to more people than anybody in California."

Our journals and archives are full of occurrence records for rare birds, but too often little is said about the abundance and distribution of the common ones.

Correct identification of three species of West Coast cormorants has been undertreated in the literature. Certainly adults in spring are quite easy, fluttering their colorful gular pouches (unfeathered chin and throat) or showing large white flank patches in the case of Pelagic Cormorants. But what about birds flying in the distance, and immature and adults in basic (non-breeding) condition?

Flight Shape: The three species are most easily told apart in flight, and once their distinctive shapes are learned, all individuals should be identifiable at any range.

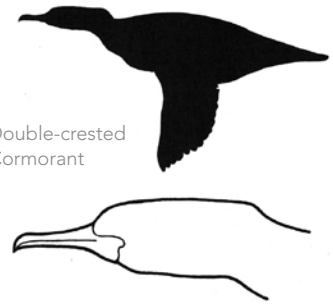
Pelagic Cormorant *(Phalacrocorax peliagicus resplendens)* is the smallest and thinnest of the three and flies with a straight profile. Its bill, mid-body, and tail are well-aligned and almost parallel to the water. The head is slight, barely thicker than the neck, and the bill is unusually thin. In profile, the head has two peaks. Together, the skinny neck, head, and bill give the anterior portion a snake-like appearance. The tail is noticeably longer than that of Brandt's and shorter than that of Double-crested.

Brandt's Cormorant *(P. penicillatus)* is larger and heavier than the Pelagic and is more the size of a Double-crested. Its tail is noticeably shorter than either of the others and in normal flight the neck is straight and the head is carried lower than the back and tail. Compared to the Pelagic, its head and bill are larger and obvious.

Double-crested Cormorants *(P. auritus)* are large, like Brandt's (but actually average lighter in weight) but look more gangly because of their long heads,

Drawings: Silhouettes of three cormorants flying; outlines of their head shapes. **By** Rich Stallcup.

Below left: Pelagic (left) and Brandt's Cormorants in breeding plumage. Photo by Tom Grey / tgreybirds.com.



Double-crested Cormorant

crooked necks and long tails. Unlike the other two species, the neck is always held in an elongated "S" shape with the head carried higher than the body. The head itself is long, and the bill rather short and deep at the base.

. . . .

Nesting: Pelagic Cormorants are not particularly colonial and build their nests on steep predator-proof cliffs on offshore islands, on the outer coast, and even at spots inside San Francisco Bay. Brandt's are colonial (and the most gregarious), preferring gently sloping areas of sand and guano on offshore islands. Double-cresteds are loosely colonial. They have nested on steel power poles, in trees, and on levees, as well as, to a lesser degree, on offshore islands. Spots they have recently chosen are opportunistic, and localities have changed from year to year.

. . . .

We urge readers to pay attention to species compositions within groups of similar common birds [so that] population health, distribution, and subtleties of behavior will become more thoroughly understood.

Rich Stallcup (1944–2012) was a PRBO co-founder and our naturalist extraordinaire. His knowledge continues to deepen our appreciation of all things wild. Read this complete essay and the entire Focus archive online at **pointblue.org** (found under "About Us" and then "News").

POINT BLUE CALENDAR

SCIENCE EVENTS

SOCIETY FOR ECOLOGICAL RESTORATION
MAY 13–15
SANTA ROSA, CALIFORNIA

Field trips to study collaborative restoration will visit many of Point Blue's STRAW restoration sites, with our staff in attendance.

LANDSCAPE ECOLOGY
MAY 18–22
ANCHORAGE, ALASKA

Point Blue scientists will attend a major conference, devoted this year to modeling the effects of climate change.

ECOLOGICAL SOCIETY OF AMERICA
AUG 6–10
SACRAMENTO

We are invited presenters in a session on science at non-profit conservation organizations, titled "Backing It Up."

ORNITHOLOGY MEETING
SEPT 22-28
ESTES PARK, COLORADO

Point Blue will participate at the joint meeting of American Ornithologists Union and Cooper Ornithological Society.

EDUCATION

NO CHILD LEFT INSIDE
MAY 19, SAN FRANCISCO

Laurette Rogers speaks on a panel about connecting children with nature, for Orion Magazine, at Commonwealth Club of California.

MEMBER EVENTS

Point Blue offers visits to our field sites where members can learn about our cutting-edge studies. For details visit **pointblue.org** ("Get Involved") or contact Lishka Arata at 707-781-2555 x 354 or larata@pointblue.org.

BURN ZONE BIRDING
JUNE 8
CHESTER, CA

Learn about species that thrive in recently burned forest habitat, with our Northern Sierra biologists.

FARMING FOR SHOREBIRDS
AUGUST 3
CENTRAL VALLEY, CA

A visit with Point Blue to rice fields that now support migratory birds, thanks to our innovative partnerships.

FIRE & WATER
SEPTEMBER 6
POINT REYES
MARIN COUNTY, CA

In the heart of a 1995 burn zone, where Point Blue monitors bird responses, healthy habitat has regenerated.

MISTNETTING AND MORE
OCTOBER 5
PALOMARIN FIELD STATION
MARIN COUNTY, CA

See songbirds up close, meet some of our intern biologists, and learn about the long-term bird monitoring that drives our climate-smart conservation work.

Point Blue Annual Meeting • Sunday, May 18th

Please join us for Point Blue's Annual Membership Meeting on Sunday, May 18, 2014, from 9 AM to 1 PM, in Bolinas, California. Take a guided bird and conservation walk on Bolinas Lagoon. Learn about our international work to protect coastal habitat and shorebirds in the Pacific Flyway. Enjoy a complimentary lunch. And more! RSVP required: aromano@pointblue.org or 707.781.2555 x320. We hope to see you there!

Thank You For Your Support

Point Blue is deeply grateful to Point Reyes National Seashore, the Farallon National Wildlife Refuge, and Cordell Bank and Gulf of the Farallones National Marine Sanctuaries for providing facilities and field stations where we work.

Your gifts make it possible for Point Blue Conservation Science to reduce the negative impacts of changes in land use, climate, and the ocean on birds and ecosystems.

MAJOR DONORS AND FOUNDATIONS We are very grateful to the following supporters for gifts of $250 and more (January 1 to March 31, 2014):

Anonymous (8)
Arntz Family Foundation
Sarah Baum
Katie Beacock
Dale Berner and Cheryl Ishida
Jerome and Judy Blackman
Margaret and Thomas Blankenship
Dix and Didi Boring
Ruth H. Brandt
Susan Caldwell
California Native Plant Society - Marin Chapter
George Chrisman
Everett Clark
Terry and Zeo Coddington
Megan Colwell and Bonnie Stewart
Martha Ehmann Conte
Carole E. Deitrich
Brooke Doverspike
Elinor Patterson Baker Trust
Robert J. Erickson
Myriam and Joel Fontaine
William and Karen Foss
Richard and Luisianna Gale
George & Ruth Bradford Foundation
Hanford Arc
Richard Honey and JoAnne Kipp
Stuart Jacobson and Andrea Sandvig
Carolyn Johnson and Richard Theis
Robert and Linda Judd
Karen A. & Kevin W. Kennedy Foundation
Patricia Kelso
Howard Lasky and Sarah King
Mr. and Mrs. Jack Lemein
Anne Leugers and Elmer Lipp
Ewan Macdonald and Kirsten Walker Macdonald
March Foundation
Marin Community Foundation
Marisla Foundation
Helene Marsh
Jennifer L. Matkin
Timothy McKeever
Bryan and Tara Meehan
Purple Lady / Barbara J. Meislin Fund
Microsoft Matching Gifts
Moore Family Foundation
Motorola Matching Gifts
James L. Murphy Jr.
Nikon Precision Inc.
George S. Peyton Jr.
James F. Quinn, PhD and Flossie Hoffman
Resources Legacy Fund Foundation
Robert Righter
Jacqueline Robertson
Stephanie Robinette
John Rotenberry, PhD
Arthur and Lois Roth
William Roth
San Francisco Day School
Schrader- Robertson Family Fund
Martin and Karen Shore
Robert and Joni Shwarts
Sonoma Custom Tile
Sonoma-Marin Area Rail Transit SMART
Alice Stauffer
Langdon Stevenson and Mary Farr
Hope Stewart
Richard Taylor
David and Nonnie Thompson
Samuel Thoron
Cynthia Wayburn
Marian and Carl Wilcox
Linda Zimmerman

GIFTS HONORING We are grateful for the following memorial and honoring gifts (January 1 to March 31, 2014):

IN HONOR OF

Jeff Cann: Linda Zimmerman
Ellie M. Cohen: Katherine Beacock
Megan Colwell and Bonnie Stewart: Norman Allen; Sarah Baum: Richard Bohling: Chubb & Son; David and Claire Cunningham: Barbara Davis: Hilary Drake: Linda and John Ellwood: Wendy Jacobsen: Pamela Jester: Elizabeth Keene: Rev. Virginia McNeely: Marlene Merwarth: Donna Moser: Carolyn Polikoff: Melody Silberstein: Mary Sklarski; Sandra Sommer; Renee P. Toomire
William Conte: Martha Ehmann Conte
Ryan DiGaudio: Anonymous
Lizzy Eichorn: Janie Rommel-Eichorn and Peter Eichorn
Lena Geupel: Geoff Geupel and Janet Kjelmyr
Totton Heffelfinger: William Chenoweth and Joan Heffelfinger
Jaime Jahncke and Point Blue Marine Staff: Ellie M. Cohen and Miki Goralsky
Khara Strum: Anonymous
Anna Stunkel: Karen Fimbel Stunkel
Ricky Warriner: Philip E. Persons

IN MEMORY OF

Marilyn Cameron: Claudia Hein; Giovanna G. Kampmeyer; Michael and Jane Larkin; Janet Wessel
Johnny Daniels: Claire Blotter
Annemarie Manley: Richard and Louise Wagner
Elaine Emiko Melin: Ronnie Melin
Rich Stallcup: Bryant T. Bainbridge; Hugh Cotter; Leslie Endicott: Claudia Hein
Gordon Stewart: Hope Stewart
Nancy Swadesh: Robert J. Erickson
John S. Warriner: Philip E. Persons

Point Reyes Bird Observatory Fund

To honor our history and sustain our commitment to bird conservation, we established the **Point Reyes Bird Observatory Fund**.

Donations to the Fund support our long-term bird ecology studies at our Palomarin Field Station (in Point Reyes National Seashore) and the Farallon Islands (at the Farallon National Wildlife Refuge).

We are deeply grateful to two anonymous donors for launching the Fund with generous gifts totaling $150,000.

To learn more, please visit **pointblue.org/prbofund**.

We are grateful for in-kind donations during this period from Ace Cider, Bryant T. Bainbridge, Louise Berto, Frances C. Bidstrup, Dix and Didi Boring, Cultivar Wine, DAYMEN (formerly Lowepro), Mr. and Mrs. Robert A. Lewis, Point Reyes Farmstead Cheese Company, and Ben Saenz.

FARALLON PATROL Our Farallon Island Program relies upon the skills and generosity of volunteer skippers in the Farallon Patrol. They provide essential transportation year-round between the mainland and our research station on the Farallon National Wildlife Refuge. We acknowledge all Patrol skippers in our Annual Report, and we thank those who made runs during each calendar year in the winter issue of the Point Blue Quarterly.

Point Blue Board and Staff

Above: At a Point Blue study site, avian ecologist Renée Cormier holds a Golden-crowned Sparrow tagged with a tiny geolocator (see page 15). **Photo:** Diana Humple / Point Blue.

BOARD OF DIRECTORS
Ed Sarti, Chair
Ellie M. Cohen, President and CEO
Brett Robertson, Vice Chair
Rebecca Patton, Secretary; Chair, Strategic Planning Committee
Carolyn Johnson, Immediate Past Chair
Megan G. Colwell, Chair, Finance Committee
David Ackerly, PhD, Chair, Science Advisory Committee
Katherine Beacock
Martha Ehmann Conte
Edith Eddy
Rob Faucett
Simon Francis
Ana Galutera
Stuart Jacobson
Jeffrey Kimball
Mary Power, PhD
James F. Quinn, PhD
Ivan Samuels
Robert S. Shwarts

HONORARY BOARD MEMBERS
Ted Eliot
William S. Foss
Jack Ladd, Chair, Audit Committee
Ann Stone
Stephen Thal

SCIENCE ADVISORY COMMITTEE
David Ackerly, PhD, Chair
Larry Crowder, PhD
John Eadie, PhD
Mary Gleason, PhD
Sam Luoma, PhD
Adina Merenlender, PhD
Peter Moyle, PhD
Mary Power, PhD
James F. Quinn, PhD
Terry L. Root, PhD
Hugh Safford, PhD
Rebecca Shaw, PhD

PRESIDENT AND CEO
Ellie M. Cohen

CHIEF FINANCIAL OFFICER
Laurie Talcott

CHIEF SCIENCE OFFICER
Grant Ballard, PhD

CHIEF TECHNOLOGY OFFICER
Michael Fitzgibbon

CALIFORNIA CURRENT
Jaime Jahncke, PhD, Director
Regina Ball
Ryan Berger
Russell Bradley
Meredith Elliott
Julie Howar
Jamie Miller
Dan Robinette
Jim Tietz
Peter Warzybok

CLIMATE CHANGE AND QUANTITATIVE ECOLOGY
Grant Ballard, PhD, Director
Nathan Elliott
Dennis Jongsomjit
Nadav Nur, PhD
Sam Veloz, PhD

EMERGING PROGRAMS AND PARTNERSHIPS
Geoffrey R. Geupel, Director
Ryan DiGaudio
Bonnie Eyestone
Wendell Gilgert
Aaron Holmes, PhD
Benjamin Martin
Chris McCreedy
Melissa Odell
Breanna Owens
Tiffany Russell
Corey Shake
Kelly Weintraub
Alicia Young

INFORMATICS AND INFORMATION TECHNOLOGY
Michael Fitzgibbon, Director
Deanne DiPietro
Noah Eiger
Martin Magaña
Rene Mejorado
Sherie Michaile, PhD
Douglas Moody
Leonardo Salas, PhD
Zhahai Stewart

PACIFIC COAST AND CENTRAL VALLEY
Tom Gardali, Director
Blake Barbaree
Renée Cormier
Mark Dettling
Dave Dixon
Jennifer Erbes
Carleton Eyster
Doug George
Carlene Henneman
Catherine Hickey
Diana Humple
Kristina Neuman
Gary W. Page
Matt Reiter, PhD
Nat Seavy, PhD
Kristin Sesser
W. David Shuford
Lynne E. Stenzel
Khara Strum

SAN FRANCISCO BAY
Grant Ballard, PhD, Acting Director
Megan Elrod
Julian Wood

SIERRA NEVADA
Ryan Burnett, Director
Brent Campos
Ken Etzel
Alissa Fogg
L. Jay Roberts, PhD

OUTREACH AND EDUCATION
Melissa Pitkin, Director
Emily Allen
Lishka Arata
Jennifer Benson
Leia Giambastiani
John Parodi
Claire Peaslee
Laurette Rogers
Isaiah Thalmayer
Vanessa Wyant

DEVELOPMENT AND MEMBERSHIP
Nancy Gamble, Director of Individual Giving
Brian Huse, Director of Strategic Program Development
Alison Romano
Eve Williams

FINANCE AND ADMINISTRATION
Laurie Talcott, Chief Financial Officer
David Adams
Lee Callero
Karen Carlson
Marilyn Kihara
Heather Kurland
Laurel Schuyler

SEASONAL BIOLOGISTS
Justin Bosler
Xeronimo Castaneda
Elizabeth Condon
Jennifer Dhundale
Mike Johns
Kristie Nelson
Allie Patrick
Mel Preston
Sam Roberts
Suzie Winquist

RESEARCH ASSOCIATES
David G. Ainley, PhD
Sarah Allen, PhD
Frances Bidstrup
Jules G. Evens
Mark Herzog, PhD
Steve N. G. Howell
David Hyrenbach, PhD
John P. Kelly, PhD
A. Peter Klimley, PhD
Borja Mila, PhD
Helen M. Pratt
Mark Rauzon
Stacy Small, PhD
Nils Warnock, PhD
Jane C. Warriner
Sophie Webb
John Wiens, PhD
David W. Winkler, PhD
Steve Zack, PhD

GRADUATE STUDENTS
Anne Cassell
Sara Chandler
Richard Chasey
Kate Davis
Dori Dick
Sarah Hameed
Jamie Hawk
Caitlin Jensen
Emma Kelsey
Allison Nelson
Bret Robinson
Thad Shelton
Anna Studwell
Michael Valanais

INTERNS (January 1 to March 31, 2014)
Emily Abernathy
Hilary Allen
Danielle Aube
Max Baber
Janelle Chojnacki
Brian Cole
Elizabeth Eichorn
Hodali Almonte Espinosa
David Farris
Sean Gee
Kimberly Geissler
Esther Haile
Anna Lashko
Eliza Lasky
Suzanne Manugian
Marina Milligan
Claire Nasr
Anastasia Rahlin
Annie Schmidt
Anna Stunkel
Lindsay Wagner
Kellen Watson
Lara White
Enoc Zuniga
Colleen Weiler
Jared Zimmerman

STAFF MIGRATION We extend our deep appreciation to John Wiens, PhD, who recently retired as Point Blue's Chief Scientist. Adding to his lifelong accomplishment in ecology and avian studies, John joined our staff in January of 2008. He continued to author high-impact publications, brought in significant funding for our key strategic projects, improved scores of other Point Blue papers and proposals, helped chart our strategic direction, and generally raised the prestige of Point Blue in the international conservation science arena. John will continue to serve as our Research Associate.

ADOPT AN AUKLET Help Point Blue monitor and restore the Farallon Islands for generations to come by "leasing" a Cassin's Auklet nest box for one year. Receive updates from our Farallon biologists about what happens to the auklet family in your nest site! To learn more and to donate, please visit **pointblue.org/adopt** . Thank you!

Point Blue
Conservation science for a healthy planet.

Non-Profit
U.S. Postage
PAID
DMS

Point Blue Conservation Science
3820 Cypress Drive Suite 11
Petaluma, CA 94954
t. 707.781.2555 f. 707.765.1685
e. pointblue@pointblue.org
pointblue.org

Advancing nature-based solutions to climate change, habitat loss and other environmental threats through bird and ecosystem science, partnerships and outreach.

Leave a Lasting Legacy

"We must always remember... that caring counts and that where there is no vision, people perish. That hope... count(s) and that without charity, there can be nothing good."

— John Gilbert Winant,
U.S. Ambassador to Britain, 1941–1946

These inspirational words remind us of what we can accomplish in our lifetimes to secure a future thriving with birds, other wildlife, and all of nature's benefits.

A bequest is one of the simplest ways to support Point Blue and conservation science for a healthy planet.

Make a bequest for nature's future – our future – today. Include Point Blue in your estate plans!

Please contact us at pointblue.plannedgiving.org, legacy@pointblue.org, or 707-781-2554.

Note: Estate gifts will continue to be accepted under PRBO, PRBO Conservation Science, and Point Reyes Bird Observatory.

Photo of the South Farallon Islands by Annie Schmidt / Point Blue.