CONSERVING SEABIRDS: ACTIONS OF THE PACIFIC SEABIRD GROUP DURING ITS FIRST 40 YEARS

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ABSTRACT

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The Pacific Seabird Group (PSG), founded in 1972, is "dedicated to the study and conservation of Pacific seabirds and their environment." During its first 40 years, PSG undertook scores of conservation actions, although as an all-volunteer organization, PSG lacked the capacity to implement many programs or projects. It achieved its conservation goals through leadership, raising issues, bringing the best science to decision makers, and serving as a catalyst for others to act. PSG has been especially influential in six areas: (1) eradicating invasive alien animals from seabird colonies; (2) conserving Marbled Murrelets *Brachyramphus marmoratus*; (3) protecting seabird colonies in western Mexico; (4) promoting the wise use of oil spill recovery funds; (5) conserving Newell's Shearwaters *Puffinus newelli*; and (6) protecting many terrestrial and marine environments important to seabirds.

Key words: Caspian Tern, conservation leadership, invasive alien predators, Marbled Murrelet, Marine Protected Area, Mexican conservation, Newell's Shearwater, oil spill recovery, seabird conservation, seabird restoration

INTRODUCTION

"It's not what individuals can do
but what we can all do together!"

—Malcolm C. Coulter

The Pacific Seabird Group (PSG) formed in the early 1970s as an international organization based in the USA, partly inspired by multiple environmental disasters that had increased the public's attention to conservation issues. Included were events that involved seabirds. For example, the widely read 1962 book *Silent Spring* by Rachel Carson was largely about dichloro-diphenyl-trichloroethane (DDT) pollution leading to massive reproductive failures of birds due to eggshell thinning, including the iconic California Brown Pelicans *Pelecanus occidentalis californicus*. Also central in increasing the public's interest were the repeated images on television of seabirds soaked in oil from the *Torrey Canyon* spill in England (1967), the blowout of a drilling platform in Santa Barbara Channel, California, USA (1969), and the collision of oil tankers underneath the Golden Gate Bridge in San Franciso, California (1971). These catastrophes, and the public's intensifying interest, led to new US federal legislation that required agencies to consider environmental impacts before approving development. The Arab oil embargo (1973–1974) prompted an interest in increasing domestic oil and gas production, including underwater fossil fuel deposits on the outer continental shelf. Now aware of the oil-pollution issues for seabirds, agencies needed to improve their understanding of seabird biology, assess the impacts of oil development in marine areas, and consider how to conserve seabirds in order to implement new policies. A group of seabird enthusiasts saw that the research community needed to elevate their activities into a common voice and goal, leading to founding of PSG.

For 21 years, I served as PSG's Vice-Chair for Conservation. In that role, it was my honor to function as the tip of the spear for the efforts by scores of PSG members to work toward conserving seabirds and their habitat. Individuals within PSG often initiated the conservation issues that deserved the organization's attention. My role was to lead and organize the effort, bringing voice to it. During that period, I had opportunities to represent PSG and advocate for seabird conservation at meetings with such officials as the US Secretary of the Interior, the Director of the US Fish and Wildlife Service (FWS), the Director of the US National Marine Fisheries Service (NMFS), and the New Zealand ambassador to the US. Here, I summarize PSG's conservation actions during its first 40 years, from its founding in 1972 until I retired from active PSG involvement in 2013. Perhaps others will, from time to time, recap subsequent conservation work. I hope that by drawing attention to PSG's successes and failures, PSG members will be inspired to address conservation challenges of the current era. During its first 40 years, PSG achieved many victories but also had its share of disappointments; my hope is that understanding them might guide PSG's current and future leaders to shape strategies and tactics to achieve the group's conservation goals. Working on seabird conservation issues on behalf of PSG took me away from the mundane aspects of my daily career and allowed me to participate in a broader landscape. It was among the most rewarding of my various careers.

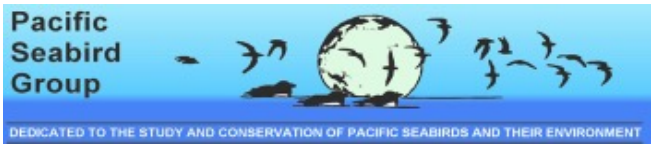
Since its formation in the early 1970s, PSG has functioned as a catalyst for advancements in both seabird science and conservation (Harrison & Divoky, 1997). As an all-volunteer organization, many of whose members were government agency and academic employees, PSG rarely had funds to implement projects. However, it influenced policy by raising important conservation issues and clearly explaining the science behind potential solutions, thus encouraging action by

federal and state wildlife agencies, private conservation organizations, and individuals. Through its efforts, including those of its members, PSG achieved numerous positive outcomes.

PSG'S ORGANIZATIONAL STRUCTURE FOR CONSERVATION

An embryonic PSG formed in 1972 and held its inaugural members' meeting in Seattle, Washington, USA, in December 1974. From its inception, PSG focused simultaneously on conservation and science. Daniel W. Anderson, who served as Chair twice as well as on many PSG committees over the years, often said he hoped that PSG's twin legacies would be an improved understanding of seabird biology and the preservation of healthy seabird populations.

PSG's mission statement on its publications and, until recently, on its letterhead, has always been "Dedicated to the study and conservation of Pacific seabirds and their environment."



The founders of PSG declined to emulate any of the then-existing ornithological societies. Publishing a journal focused on seabirds was initially a low priority, and the founders did not want to become an entity akin to a seabird committee of the American Ornithologists' Union (now the American Ornithological Society, after merging with the Cooper Ornithological Society in 2016). The founding generation wanted to bring state-of-the-art seabird science to decision makers to advance specific conservation objectives. PSG became a pioneer organization in the successful melding of good science and influential conservation efforts. As William T. Everett later explained, good science and conservation advocacy go hand in hand (Everett, 1996). When PSG began, many "environmental" groups worked on conservation issues, but their staffs rarely had much detailed knowledge of seabird biology. In addition, their priorities all too often seemed geared to issues that could raise funds to support their organizations, rather than actually solving the most pressing conservation problems.

The first issues of the *Pacific Seabird Group Bulletin* in 1974 and 1975 promoted specific seabird conservation issues by including policy statements, which PSG members used in meetings to persuade government officials to take positive actions. The *Bulletin*'s regional reports typically included news about conservation issues, although they did not necessarily include calls to action.

PSG's organizational mechanisms to address conservation issues have varied over time. It established a Conservation Committee in 1974 but abolished it the next year because its Chair said PSG was accomplishing those responsibilities elsewhere. PSG lacked a designated Conservation Committee for the next eight years, although it established three committees in 1977 to address specific conservation issues: seabird sanctuaries, seabird–fisheries interactions, and human disturbance. These committees functioned for several years, but each was eventually disbanded and their activities subsumed into another Conservation Committee that was formed in 1983. The new committee was chaired first by Kees Vermeer (1983–1985) then by Jay Nelson (1986). The subsequent Chair, Arthur Sowls (1987–1991), generated 17 letters on nine issues during 1991 alone.

PSG established the Marbled Murrelet Technical Committee (MMTC) in 1986 to serve as a scientific authority on the status, distribution, and life history of Marbled Murrelets *Brachyramphus marmoratus*, a special-status species. The first two chairs were Lora Leschner (1988–1989) and S. Kim Nelson (1990–1994). For decades, Nelson was one of PSG's most energetic advocates for conserving this species. This committee undertook an enormous amount of work and drafted many letters that I signed as Vice-Chair for Conservation. The effort led to FWS officially listing the species under the US federal Endangered Species Act (ESA). Other species-specific committees were formed later (e.g., Xantus's Murrelet Technical Committee for *Synthliboramphus* spp. and Kittlitz's Murrelet Technical Committee for *Brachyramphus brevirostris*) as conservation concerns for those species increased.

The grounding of the *Exxon Valdez* in Prince William Sound, Alaska, USA, in 1989 was one of the worst environmental disasters in US history, stimulating PSG to refine its mission. Douglas Siegel-Causey convened the PSG 2000 Committee that same year to evaluate all aspects of PSG, including whether the Bulletin and annual meetings adequately covered conservation issues. The PSG 2000 Committee surveyed the membership and discussed its findings at PSG's annual meetings in Monterey, California (1991), and in Charleston, Oregon, USA (1992). One outcome of the PSG 2000 Committee was to create the Vice-Chair for Conservation position on the Executive Council (Warheit et al., 1992). When I was elected to that position and took office in January 1992, I had no intention of serving for over two decades.

In 2007, PSG inaugurated the Craig S. Harrison Conservation Fund, which provides an opportunity for citizens of developing countries within or bordering the Pacific Ocean to receive small grants to undertake seabird conservation work (Mendenhall et al., 2012). Grants often have complemented and contributed to PSG's conservation advocacy. The initial chairs were Robert H. Day (2007–2009) and Verena A. Gill (2009–2023).

PSG'S AFFILIATIONS WITH OTHER CONSERVATION ORGANZATIONS

PSG's conservation advocacy was enhanced by its affiliation and networking with larger bird- and wildlife-conservation organizations. Warren B. King, President of the US Section of the International Council for Bird Preservation (ICBP–US), invited PSG to join the coalition in 1982, and PSG accepted in 1983. ICBP is probably one of the oldest international conservation organizations, having been established in 1922 (Harrison et al., 2017). It functioned by creating sections in various regions of the world. After becoming a member of the US Section, PSG actively coordinated with over 40 member organizations, facilitating the dissemination of information about pressing seabird conservation issues and about science-based actions that could remedy those problems (Coulter, 1991). ICBP–US evolved in 1995 to become the American Bird Conservancy (ABC), of which I was a founding director and officer (Harrison et al., 2017). ABC had far greater financial resources than ICBP–US because of its partnership with BirdLife International and thus was able to hire full-time staff. Its Vice-President for Policy, Gerald W. Winegard (1995–2008), energetically addressed a variety of seabird issues that PSG brought to his attention (Harrison et al., 2017).

Seabirds are oblivious to political boundaries, and PSG has always functioned as an international organization (Coulter & Harrison, 2012). The International Union for Conservation of Nature and Natural Resources (IUCN) recognized PSG's status and expertise when it admitted PSG as an international non-governmental organization (Pacific Seabird Group [PSG], 1998a). PSG established the Japanese Seabird Conservation Committee as a PSG standing committee in 1995, with a focus on conserving the Japanese Murrelet *Synthliboramphus wumizusume*. The committee consisted of both Japanese and non-Japanese researchers. Although they were successful in their conservation efforts by drawing the attention of Japanese authorities to seabird conservation issues, members eventually formed the Japan Seabird Group (JSG) in 2003 to work in ways appropriate to Japan. PSG encouraged the creation of the JSG, thereby serving as a catalyst for the founding of a new seabird group (Coulter & Harrison, 2012).

A SUMMARY OF FORTY YEARS OF CONSERVATION ACTIONS

This lengthy section summarizes scores of PSG's conservation actions between 1972 and 2013, typically involving communication with government agencies to persuade them to act. Many of the referenced letters are archived at https://pacificseabirdgroup.org/conservation/psg-policy-conservation-actions/. Herein I have summarized PSG's conservation actions somewhat arbitrarily into eight primary issues, but I recognize that many specific initiatives could be classified in two or more categories. Inevitably this has led to some redundancy. I attempt to explain how an issue was resolved, although many outcomes are inherently ambiguous. Conservation organizations use public policy advocacy to raise funds so that "successes typically have a thousand fathers and failures are orphans." Because PSG often encouraged other organizations to work toward the same conservation outcome, it can be difficult to judge the extent to which PSG's participation influenced positive decisions.

Removing Invasive Animals from Seabird Colonies

Even today, the biggest threat to seabirds is invasive animals, especially mammalian predators, on their colonies. Most colonies are located on islands or near-inaccessible, steep headlands. Therefore, seabirds have evolved few anti-predator behaviors. Invasive mammals affect an estimated 165 seabird species worldwide (Dias et al., 2019). PSG's leadership in promoting and supporting the removal of alien animals from seabird colonies has probably achieved more success than any other aspect of its conservation work. It is now broadly recognized that seabird colonies can flourish, often remarkably so, after predators such as Red Foxes *Vulpes vulpes*, Arctic Foxes *Vulpes lagopus*, rodents (Order: Rodentia), and Domestic Cats *Felis catus* are removed. That was not the situation when PSG began its advocacy. Public acceptance of any conservation remedy is integral to its ultimate success, so laying the scientific foundation and providing thoughtful leadership were essential for achieving that objective. Justifying the extermination of one species at a location to conserve another requires explanation, especially to non-biologists, and some removal techniques do cause some unavoidable collateral damage or death to non-target species. PSG's initial foray into this issue was a 1981 resolution asking FWS to remove introduced predators from seabird colonies under its jurisdiction, especially in Alaska and Hawai'i, USA, where foxes and Indian Mongooses *Herpestes javanicus*, respectively, are serious problems (PSG, 1982a). PSG reiterated this request in letters to FWS in Alaska and to the US Environmental Protection Agency (EPA) in 1991 because until then, little had been accomplished (PSG, 1991d). A major obstacle was EPA's ban on using Compound 1080 (an organofluorine toxicant) and M-44 (cyanide) on public lands; this ban was the result of some federal agencies previously misusing them in efforts to protect livestock from predators. Consequently, many national environmental organizations opposed employing either toxicant anywhere. PSG's membership in ICBP–US provided a platform to educate influential national organizations on the benefits of lifting the ban to remove foxes and rodents from seabird colonies. One of my first acts as Vice-Chair for Conservation was to announce that PSG would develop an action plan to remove introduced predators from current and former colonies (see Harrison, 1992a). I requested and received from PSG members suggestions for colonies where predators should be removed and then submitted PSG's list to appropriate land managers. I promoted this proactive conservation program, when and where possible, for over 20 years because of its enormous long-term payback per conservation dollar spent. PSG issued and circulated widely a policy paper in 1993 that summarized the science behind predator control on seabird colonies (Harrison, 1993h). Many agencies and organizations began to implement predator-control programs on seabird colonies after PSG provided a sound scientific rationale for doing so and actively lobbied other conservation organizations to support such work. Public agencies—and eventually even foundations—funded eradication projects. PSG often received no acknowledgment for inspiring and facilitating this work. For example, a new organization, Island Conservation, was founded soon after PSG's 1995 predator-control workshop in Ensenada, Mexico, and PSG identified for the new organization's founders suitable locations in western Mexico for the removal of predators (Rauzon, 2007). Many other private organizations that undertook this work have roots in PSG's early eradication advocacy, including Point Reyes Bird Observatory, the Endangered Species Recovery Council (ESRC), Oikonos, and Pacific Rim Conservation Science.

Alaska

On behalf of PSG, I wrote to the Secretary of the Interior Manuel Lujan and FWS Alaska Regional Director Walter Stieglitz in March 1992. I stated that the seabird losses from invasive alien predators in the Alaska Maritime National Wildlife Refuge depressed their populations to a degree equivalent to an *Exxon Valdez*–magnitude oil spill each year (Harrison, 1993a). At that time, at least 59 islands in the refuge had predators, including at least 22 with rats *Rattus* spp. and others with foxes. These observations seemed to not only resonate with these agencies but also spur them to action. The Alaska Regional Director replied: "I am sincerely committed to this effort and recognize it as one of our highest wildlife priorities." The Assistant Secretary of the Interior responded that Interior shared PSG's concerns about the damage done to refuge resources by introduced species. PSG also wrote to the Refuge Manager of the Alaska Maritime National Wildlife Refuge and offered to assist in registering the toxicants M-44 and Compound 1080 with EPA for use there. PSG acknowledged the difficulties in eradicating alien predators on large islands without toxicants and that the refuge was limited to trapping and shooting on smaller islands. Key FWS staff also were PSG members, allowing close coordination on strategy.

PSG solicited widely to garner funding for predator eradication. This effort included a 1992 letter to FWS asking that it seek

funding for fox eradication from the US$50 million *Exxon Valdez* Oil Spill (EVOS) Restitution Fund, as well as a 1993 letter to the Secretary of the Interior asking the department to promote an aggressive program to eliminate the exotic predators causing the local extinction of seabird colonies in Alaska. PSG made multiple requests to the EVOS Trustees in the early 1990s for funding for this work. After submitting at least 10 letters about restoration plans and annual work plans, PSG had its first success in 1994, when the EVOS Trustees approved funds to remove Arctic Foxes from Chernabura and Simeonof islands in the Alaska Maritime National Wildlife Refuge. That removal enhanced populations of seabirds and other species (Byrd et al., 1997; Day et al., 2022), proving the efficacy of such efforts. In a significant breakthrough, the Director of Operations for the trustees embraced PSG's position and stated that the trustees "recognized that exotic predator removal can be one of the most effective means of helping to restore healthy populations of injured seabirds." In 1996, the trustees additionally funded the removal of foxes from Seguam Island (207 km^2) in the Aleutian Islands. Biologists subsequently observed a flock of over 30,000 Whiskered Auklets *Aethia pygmaea* near Seguam in 2003, a number larger than the population estimate for the entire Aleutian Island chain in 1980 (Williams et al. 2003). This indicated that the project was a triumphant success.

In 2003, PSG wrote to both the FWS Alaska Director and the FWS Assistant Director for Migratory Birds to request funding to eradicate Norway Rats *R. norvegicus* from Kiska Island (283 km^2), one island in a group known as the Rat Islands in the Aleutian Islands. This project was led by G. Vernon Byrd and Arthur L. Sowls of the Alaska Maritime National Wildlife Refuge. FWS had removed foxes in 1986, but an unanticipated outcome was a population explosion of Norway Rats. The rats reduced the breeding success of 3–6 million Least Auklets *Aethia pusilla* and Crested Auklets *Aethia cristatella* at Sirius Point on the northern tip of Kiska Island, which had been the world's largest Least Auklet colony. PSG offered to help persuade EPA to issue an aerial permit to distribute toxicants; if successful, this would have been the largest island ever cleared of rats at that time. The permit was approved but the project unfortunately did not kill all the rats, which remain an ongoing problem that may be tackled again soon.

PSG had also expressed concerns since 1993 about the need for an Alaska-wide rat-protection plan, especially to protect the Pribilof Islands in the eastern Bering Sea, where many fishing boats harboring rats dock throughout the year. PSG supported the Alaska Department of Fish and Game's 2007 strategic plan aimed at preventing rats from being introduced to areas that would harm wildlife (Fritts, 2007). The plan focused on biosecurity, prevention of rodent introductions from ships, rapid-response eradication, and restoration of rat-damaged habitats, especially in seabird-rich areas such as the Aleutian Islands. Once the regulations were in effect, shippers were required to check containers for rats and to control or eradicate them if found (Harrison, 2008a). This effort has been effective, and only eight Norway Rats have been caught over the years in the Pribilof Islands during harbor-based rat trapping (H. Renner, FWS, personal communication, October 27, 2025).

PSG supported a 2008 FWS proposal to eliminate Norway Rats from Hawadax Island (formerly Rat Island; 28 km^2) in the Aleutian Islands, which then had few seabirds. New Zealand conservationists had eliminated invasive rodents from islands in many cases by using helicopters to scatter bait containing the anticoagulant brodifacoum, which can kill a rat after a single feeding. Following their recommendations, PSG emphasized that aerial bait distribution minimizes habitat disturbance. The project was a success, albeit controversial. PSG also endorsed FWS's 2010 plan to eradicate invasive species, including European Rabbits *Oryctolagus cuniculus* and Hoary Marmots *Marmota caligata*, on Tangik and Poa islands (eastern Aleutians) and on Sud Island (Barren Islands in the Gulf of Alaska).

California

After the EVOS Trustees used oil spill trust funds to remove predators from several seabird colonies in Alaska, predator removal became a standard option that other trustee councils would consider. Helping in the endeavor was that PSG always supported such projects in public comments. A settlement for damages from the *American Trader* oil spill off Huntington Beach, California, in 1990 provided US$1.6 million to eradicate about 3,000 Black Rats *Rattus rattus* from East, Middle, and West Anacapa islands (3 km^2) in Channel Islands National Park. During the initial phase of the project in 2001, the US National Park Service used helicopters to drop brodifacoum on East Anacapa Island to improve breeding conditions for Xantus's Murrelets *Synthliboramphus hypoleucus* and Ashy Storm Petrels *Hydrobates homochroa*. Native Deer Mice *Peromyscus maniculatus* and Peregrine Falcons *Falco peregrinus* were kept in captivity for protection. The project was delayed when the New York–based animal rights group Fund for Animals filed a lawsuit in opposition. PSG submitted comments with the court that helped persuade the judge to allow the project to go forward. The removal of rats immediately increased murrelet breeding success on East Anacapa Island. PSG supported the second phase of removal in 2002 for Middle and West Anacapa islands, leading to success at both. The Xantus's Murrelet hatching rate after eradication greatly improved, and Ashy Storm Petrels and Cassin's Auklets *Ptychoramphus aleuticus* resumed breeding. After a decade, Anacapa Island remained rat-free, and the project become a model for island restoration (Whitworth et al., 2005).

PSG also supported predator-control projects by using funds from settlements to restore seabirds that were damaged when Montrose Chemical Corporation dumped industrial quantities of DDT and polychlorinated biphenyls (PCBs) into the California Bight from the 1950s to the 1970s. This contributed to the Brown Pelican's problems (see above). Projects funded during 2005 included eradicating Black Rats from San Miguel Island in Channel Islands National Park and cats from San Nicolas and Guadalupe islands in Mexico (Harrison, 2005a). PSG also supported hunting, trapping, and using adaptive management to eradicate cats on San Nicolas Island in 2008. PSG opposed an alternative proposal by animal rights groups to trap, neuter, and release altered cats on the colonies, as altered cats would continue killing native species. PSG's opposition to such half-measures became a model in other predator-control projects to remove feral cats.

Western Mexico

At PSG's urging, ICBP–US asked US Congress in 1993 for funds to remove predators from North Coronado Island to protect the Xantus's Murrelet and Ashy Storm Petrel colonies, as well as from Clarion Island to protect Townsend's Shearwaters *Puffinus auricularis* (Harrison, 1993b). PSG applied for and received in 1994 the first grant (US$24,000) ever awarded under the North American

Free Trade Agreement to conduct a workshop to train 28 Mexican biologists in predator-control techniques for rats and cats. New Zealand predator-control experts Alan Saunders, Dick Veitch, and Brian Bell conducted the workshop at the Autonomous University of Baja California, Ensenada, in tandem with PSG's January 1995 annual meeting in San Diego, California. PSG Chair Mark J. Rauzon and in-coming Chair William T. Everett worked tirelessly to ensure the project was a success. PSG raised funds to match the grant, including a generous donation from Don Henley of the rock group The Eagles. As discussed below, this international transfer of technology has paid off handsomely for seabird conservation in Mexico, including islands in the Gulf of Mexico. Mexico has become a case study for eradication work elsewhere (Spatz et al., 2022).

Hawai'i and the US Tropical Pacific

In 2004, PSG supported the proposed eradication of rabbits and rats on Lehua Island (1 km^2), which is a state seabird sanctuary in the main Hawaiian Islands. PSG suggested that several species would benefit: Blue Noddies *Anous ceruleus*, Band-rumped Storm Petrels *Hydrobates castro*, Tristram's Storm Petrels *Hydrobates tristrami*, and Bulwer's Petrels *Bulweria bulwerii*. PSG objected to the proposed aerial broadcast of bait with diphacinone, which is a weaker rodenticide than brodifacoum, as well as to unreasonable restrictions on the use of a rodenticide near the shoreline. PSG's concerns were prescient in that the rat eradication in 2009 failed. However, a subsequent effort in 2017 using diphacinone did succeed when the agencies employed trail cameras to monitor the occurrence of rats. Because they had the funds and the island was reasonably accessible, they were able to use the monitoring data to return regularly and bait small areas, thus eliminating the last few individuals. Seabirds are now flourishing on Lehua Island, and even Band-rumped Storm Petrels may breed there now (Fish and Wildlife Service [FWS], 2021).

PSG also supported FWS's US$2.7 million plan in 2011 to eradicate Black Rats at Palmyra Atoll, which is located 1,600 km south of Honolulu. FWS and The Nature Conservancy planned the project for years. Ten seabird species totaling 325,000 individuals bred there, and there was hope that another eight species extirpated by rats might return to breed after the rats were exterminated. PSG urged complete eradication by broadcasting brodifacoum aerially. This technique had greatly improved since a failed attempt to eradicate rats on Palmyra the previous decade. Two helicopters distributed bait while groundcrews hand-cast bait to ensure complete coverage. This killed tens of thousands of rats while minimizing ecosystem effects. Palmyra is now rat-free, which has resulted in dramatic increases in Sooty Terns *Onychoprion fuscatus*, White Terns *Gygis alba*, Black Noddies *Anous minutus*, Brown Noddies *Anous stolidus*, and White-tailed Tropicbirds *Phaethon lepturus*. In addition, the project enabled the return of formerly extirpated Blue Noddies, Wedge-tailed Shearwaters *Ardenna pacifica*, and Spectacled Terns (formerly Gray-backed Terns) *Onychoprion lunatus* (The Nature Conservancy, 2023). A ship specializing in island eradications supported the project and later removed rats from Phoenix Island near Kiribati and Henderson Island in the Pitcairn group, thus restoring seabird colonies at both locations (Smith, 2012a).

Fiji and New Zealand

PSG awarded its first Craig S. Harrison Conservation Fund grant in 2007 for a project to eradicate Polynesian Rats *R. exulans* from the island of Mabualau, Fiji. The effort was designed to protect Black Noddies, Red-footed Boobies *Sula sula*, and Lesser Frigatebirds *Fregata ariel*. The project complemented similar efforts on other Fijian islands funded by the Packard Foundation and BirdLife International. It apparently has been a success.

The *Command* tanker spill in Monterey Bay, California, in 1998 oiled 1,500 migratory Sooty Shearwaters *Ardenna grisea*, which breed in New Zealand as well as in Patagonia. The trustees proposed eradicating invasive rats from four nesting islands in the Big South Cape Group, New Zealand, in 2003. PSG strongly supported the project because restoring a shearwater colony in New Zealand was an efficacious means of assisting shearwater recovery (PSG, 2003a). The project succeeded (McClelland et al., 2011).

Restoration of Seabirds After Oil Spills and Pesticide Contamination

As mentioned above, environmental disasters resulting from the extraction of offshore petroleum and the transportation of oil were a major impetus for founding PSG (Harrison & Divoky, 1997). The discovery in 1969 of vast oil reserves at Prudhoe Bay, Alaska, elicited further concerns about the threat to seabirds when development would lead to oil being transported to refineries. In 1970, Congress enacted the National Environmental Policy Act, and President Richard Nixon established EPA and the National Oceanic and Atmospheric Administration (NOAA) by executive order. Three years later, Congress enacted the ESA. These statutes, among others, require that companies responsible for environmental damage pay to restore the damaged natural resources. Within this system, trustee councils direct the use of the trust funds for specific restoration projects, and PSG embraced the opportunity to help guide seabird restoration. In 1975, Congress enacted the Outer Continental Shelf Lands Act, which included the Outer Continental Shelf Environmental Assessment Program, within which many PSG members launched their careers.

Alaska

The grounding of the *Exxon Valdez* in Prince William Sound in March 1989 spilled 11 million gallons of crude oil and contaminated Prince William Sound, Cook Inlet, the Kenai Peninsula, the Kodiak Archipelago, and the Alaska Peninsula. Government agencies eventually estimated that the oil or its effects seriously damaged natural resources, including killing an estimated 400,000 seabirds (Harrison, 1992a). PSG Chair Malcolm Coulter wrote to EPA and the Oil Spill Restoration Planning Office in 1990 to recommend that trust funds be spent on:

- purchasing old-growth habitat to protect Marbled Murrelets;
- purchasing 33 privately owned seabird colonies;
- removing invasive predators from seabird colonies; and
- buying back oil leases in Bristol Bay to protect an important fishing area.

The settlement of the *Exxon Valdez* litigation in late 1991 created a US$1 billion trust fund to restore natural resources (Harrison, 1992b). PSG devoted years trying to persuade the EVOS Trustees, who were representatives of state and federal agencies, to devote as much of the trust fund as possible to restoring seabirds. When the

draft restoration framework was released in 1992, PSG generally endorsed the trustees' approach. PSG emphasized that the trust funds must be spent wisely to maximize the restoration of natural resources, including seabirds, and urged the trustees to limit funds spent on overhead and to employ competitive bidding for projects. PSG stressed that seabirds are particularly vulnerable to oil spills and listed 18 species or groups of species that had been injured by the spill. PSG also advocated funding projects that would benefit a community of seabirds, rather than a single-species approach, and encouraged the trustee agencies to use their regulatory authorities to better protect those seabird species that had been injured. For example, it seemed counterproductive to spend trust funds to recover Marbled Murrelets while the agencies concurrently allowed them to be killed as by-catch in gillnet fisheries.

PSG successfully persuaded the trustees to appoint one of PSG's founders, James G. King, to the EVOS Trustee Council Advisory Committee, a public group that advised the EVOS Trustees on which restoration projects merited funding (Harrison, 1992b). This appointment improved PSG's ability to educate and persuade the trustee council to use the best science in deciding how to restore seabird populations. King found that decisions were often political and that the huge sums of money at stake attracted massive lobbying efforts by commercial fishing interests, communities in the areas affected by the spill, Native corporations, and national conservation organizations.

PSG wrote over 20 letters to the trustees and agencies between 1992 and 1996. The letters included comments on the draft Natural Resource Damage Assessment, the draft Restoration Plan, the draft Environmental Impact Statement, Restoration Reports, and annual work plans for each year from 1992 to 1997 (Harrison, 1996a). The trustees initially refused to devote funds to recover seabird colonies outside of the spill area and, over PSG's objections, squandered funds on futile attempts to restore single-species colonies at infeasible sites within the spill-affected area. They further stated, without scientific basis, that it was unknown whether those birds that nest outside of the spill area migrate into the spill-affected area. Consequently, PSG observed that many early work plans provided little benefit to seabirds. PSG finally persuaded the trustees in 1994 to restore seabirds that did not breed in Prince William Sound but were present seasonally . As mentioned earlier, this approach allowed projects to remove Arctic Foxes from islands that lay outside of the oil spill zone (Harrison, 1994a). Such projects typically benefited several injured species.

PSG's advocacy persuaded the trustees in 1995 to add eight species to the original list of injured birds to be restored, including Kittlitz's Murrelets, four species of loons *Gavia* spp., and three species of cormorants *Urile* spp. PSG encouraged monitoring populations of injured seabirds but suggested that trust funds should not necessarily pay for the effort because this seemed to be a regular activity of FWS. PSG further commented in 1996 that the trustees needed to devote more attention to Marbled Murrelets, especially to understand their reproductive success and their use of the marine environment.

At the invitation of the Chair of the US federal Committee on Merchant Marine and Fisheries in the House of Representatives, PSG testified in 1993 on the restoration of Prince William Sound (Harrison, 1993c). PSG advocated purchasing seabird islands, restoring colonies by eliminating introduced predators, and allowing restoration of migratory, seasonally present birds beyond the geographic area of the oil spill. PSG also persuaded the EVOS Trustees in 1993 to purchase from the Old Harbor Native Corporation islets having seabird colonies near Sitkalidak Strait on the southeastern side of Kodiak Island (Harrison, 1995a).

PSG successfully applied to the EVOS Trustees for a US$71,000 grant to hold a workshop on oil spill-related seabird restoration in 1994. Kenneth I. Warheit and I served as volunteer project co-leaders. The grant allowed more than 40 participants from seven countries to convene in Alaska in October 1995 to discuss restoration goals and techniques, recovery modeling, and factors that limit recovery (Warheit, 1995). PSG published the results of the workshop (Warheit et al., 1997), which provided a model for seabird restoration worldwide. PSG's advocacy expanded the horizons and approaches of subsequent trustee councils elsewhere in emphasizing projects that maximize seabird restoration.

Washington and British Columbia

The barge *Nestucca* spilled a large amount of bunker oil near Gray's Harbor, Washington, in 1988 and caused damage to seabirds along the coasts of Washington and British Columbia (BC), Canada. Rhinoceros Auklets *Cerorhinca monocerata* and Tufted Puffins *Fratercula cirrhata* breed on Destruction Island (1.2 ha) in the Quillayute Needles National Wildlife Refuge on Washington's Pacific coast. PSG supported the proposed Restoration Plan for Washington in 1994, including removing European Hares from Destruction Island and assessing seabird by-catch mortality in fisheries. The trustees removed the hare project from the final plan, citing high costs. The Canadian Wildlife Service (CWS) used restoration funds from this spill beginning in 1993 to eliminate Norway Rats and Raccoons *Procyon lotor* from Langara Island and the nearby Queen Charlotte Islands (now known as Haida Gwaii) to restore a colony of Ancient Murrelets *Synthliboramphus antiquus*. The CWS implemented a technique developed in New Zealand that utilized anticoagulants and declared the project to be a success in 1997.

The Japanese fishing vessel *Tenyo Maru* collided with a Chinese freighter in Canada's territorial waters in 1991, spilling oil and fouling beaches from Vancouver Island to northern Oregon. PSG supported restoration of Common Murres *Uria aalge* in Washington's Copalis National Wildlife Refuge in 2000 but objected to the proposal for an oiled-wildlife rehabilitation center because its benefits seemed questionable. Ultimately, the trustees determined that restoring Common Murre colonies was infeasible and redirected the funds to allow surveying for Marbled Murrelets in Washington.

Oregon

The freighter *New Carissa* ran aground near Coos Bay in 1999 and spilled a large amount of fuel oil that killed at least 262 Marbled Murrelets (Harrison, 2007a). Settlement funds contributed about US$4 million for the transfer of over 1,560 ha (15.6 km^2) of old-growth forest from timber companies to a Native American tribe to be managed as Marbled Murrelet habitat. PSG objected to a draft Conservation Easement in 2006 because it lacked sufficient protection of occupied habitat. As a result, the trustees strengthened the easement to require comprehensive monitoring.

California

PSG won a major conservation victory in 2000 concerning the use of trust funds from the *American Trader* oil spill off Huntington Beach. PSG successfully advocated for funding the removal of predators from California Brown Pelican colonies in western Mexico—locations far from the spill site. However, the pelicans disperse into spill-affected waters during the non-breeding season. Although some previous trustee councils had funded projects some distance from the spill zone, this was the first instance of using restoration funds outside of the US. PSG also supported creating and protecting California Brown Pelican communal roost sites and removing Black Rats from Anacapa Island (Harrison, 2000a; see above).

The restoration effort resulting from the *Command* tanker spill near Monterey Bay described above was another significant triumph for science and for PSG, because it was the second instance of using restoration funds outside of the US. In 2003, PSG supported a proposed Restoration Plan that included the eradication of alien rats from four Sooty Shearwater nesting islands in New Zealand. Shearwaters are the most numerous seabirds in the California Current and were the most numerous species harmed by the spill, and Sooty Shearwater populations were declining off California's coast. PSG argued that it was appropriate to restore spill-injured populations at their breeding colonies, however distant, when that was the most efficacious means of restoration. The final Restoration Plan also included protecting nesting Marbled Murrelets from predatory corvids, acquisition of land for nesting Marbled Murrelets, and encouraging Common Murres to return to some nesting ledges in central California (Harrison, 2004a).

The US$140 million settlement from the Montrose Chemical Corporation case described above provided US$38 million for restoration projects. PSG generally supported the proposed Restoration Plan but expressed disappointment that merely US$13 million was allocated to bird restoration. PSG also questioned spending half of those funds on restoring endangered Bald Eagles *Haliaeetus leucocephalus* when 11 species of seabirds were injured (Harrison, 2005a). However, PSG supported all other proposed seabird projects, including:

- eradicating Black Rats on San Miguel Island;
- restoring Cassin's Auklet and Xantus's Murrelets on Santa Barbara Island by social facilitation;
- restoring Western Gulls *Larus occidentalis* and Brandt's Cormorant *Urile penicillatus* populations on San Nicolas Island by eradicating feral cats;
- eradicating cats on Guadalupe Island, Mexico (which has yet to be accomplished); and
- improving seabird nesting habitat on seven western Mexican islands.

In 2008, PSG commended the trustees for funding projects in Mexico (Harrison, 2008b) and reiterated its support for eradicating cats from San Nicolas Island by hunting, trapping, and adaptive management. PSG opposed re-releasing neutered cats because they would complicate achieving eradication and risk squandering the funds if any unaltered cats remained.

PSG supported a proposed Restoration Plan in 2006 that used trust funds from the *Jacob Luckenbach* oil spill near San Francisco. PSG's highest priorities were mouse eradication at the Farallon Islands to increase Ashy Storm Petrel populations, restoration of islands in western Mexico to protect Cassin's Auklets and California Brown Pelicans, and eradication of Norway Rats on the Queen Charlotte Islands to restore Ancient Murrelets (Harrison, 2006a). The final plan added a project to kill rats at shearwater colonies associated with South Island, New Zealand.

Fisheries Conflicts With Seabirds

By-catch in fisheries affects at least 100 species worldwide and is considered the second biggest conservation threat to seabirds (Dias et al., 2019). PSG has long endorsed measures to protect seabirds from being killed in fisheries and initially focused on fisheries in international waters. A 1975 PSG policy statement cited massive by-catch mortality in salmon gillnet fisheries off western Greenland and in the North Pacific, including murres, shearwaters, puffins, and Northern Fulmars *Fulmarus glacialis* (PSG, 1975). PSG urged the governments of the fishing nations, especially Denmark, Japan, and North Korea, to ban fishing within 50 miles (80 km) of seabird colonies. PSG also asked that the nations conduct research on methods of reducing mortality from driftnets and to place observers on fishing vessels to collect by-catch data. PSG twice held symposia on by-catch issues (Melvin & Parrish, 2001; Nettleship et al., 1984).

PSG in 1991 adopted a resolution supporting the United Nations' (UN) proposed ban on high-seas salmon driftnet fishing (PSG, 1991a), which it sent to FWS and the US Secretary of State. The UN banned high-seas large-scale driftnet fishing in 1992. PSG then worked with the ABC in 1999 to successfully urge the UN Food and Agriculture Organization to require fishing nations to develop National Plans of Action to reduce the incidental take of seabirds in longline fisheries (Harrison, 1999a). PSG encouraged protecting all seabirds, not just those deemed to be Endangered or Threatened, so that common species would remain common. When NOAA proposed a National Plan of Action for the US, PSG urged it to adopt a goal of greatly reducing seabird-by-catch mortality in longline fisheries, prescribe specific measures to achieve that goal, require adequate observer coverage to quantify by-catch, and sponsor research to improve by-catch-avoidance techniques (Harrison, 1999b).

NOAA's Marine Fisheries Advisory Committee invited PSG in 1992 to assist in developing an agreement between FWS and NMFS to provide the latter with increased authority to manage seabirds (Harrison, 1993d). PSG summarized the laws that protect seabirds and provided an assessment of incidental by-catch problems. PSG also provided NMFS with an analysis of the relevance of seabirds to ecosystem management (Mendenhall & Harrison, 1997). As a member of IUCN, PSG co-sponsored with the African Seabird Group a resolution for regional fishing bodies to adopt an ecosystem-based approach to protect seabirds from mortality in longline fisheries (Harrison, 2000b). PSG advised a National Science Foundation committee entitled "Charting the course for ocean science in the United States" in 2006. PSG stated that the committee's proposed plan failed to acknowledge the importance of seabirds as indicators of ecosystem health and explained to the committee that seabirds are more sensitive indicators of environmental shifts than are most physical measures (Harrison, 2007b).

PSG's Craig S. Harrison Conservation Fund complemented PSG's conservation advocacy on fisheries issues. The Conservation Fund Committee awarded grants to researchers studying interactions

between seabirds and artisanal fishing on the Chonos Archipelago in Chilean Patagonia (2007); seabird by-catch on the Pacific coast of Guatemala (2008); and the diet of Black-browed Albatrosses *Thalassarche melanophris* in relation to fisheries in Chile (2009). Such studies also helped to build seabird expertise and support conservation efforts in those nations.

Alaska

PSG expressed concern to NMFS in 1987 about the incidental take of seabirds in the draft Environmental Impact Statement on the incidental take of Dall's Porpoise Phocoenoides dalli in salmon driftnet fisheries in the Gulf of Alaska. PSG endorsed a proposal by the Bering Sea Coalition in 1993 to close a zone around the Pribilof Islands to groundfish trawling (Harrison, 1993e). As a result, NOAA established in 1999 a Pribilof Islands Habitat Conservation Zone in which fishing for groundfish is prohibited. PSG coordinated with the National Audubon Society in 2003 to comment extensively on the draft Environmental Impact Statement for managing Alaska groundfish fisheries (Harrison, 2003a). PSG found that seabirds were inadequately covered in the management plan and that there was little focus on maintaining healthy populations of still-common species. The management plan also failed to acknowledge that fisheries may affect food availability for seabirds.

Washington and British Columbia

PSG wrote to FWS, Washington State, Canada, the US treaty tribes, and other fishery officials in 1998 to express concerns about the by-catch of Common Murres and Rhinoceros Auklets in the salmon driftnet fisheries in the shared waters of Washington and BC (Harrison, 1999c). Murre populations had severely declined, attributable at least in part to by-catch, and were not recovering. Canada believed that it had no by-catch problem, and the tribal fleet believed that it had no legal obligation to minimize by-catch. PSG asked that onboard observers monitor the fisheries and that measures be taken to reduce by-catch. No agency seemed interested in taking the lead to resolve these issues, prompting PSG to contact the Secretary of the Interior. Apparently stimulated by PSG, the Department of the Interior responded in 1998 that coordination among the various entities was underway, although persuading the tribes to comply remained an issue. While regulations to reduce by-catch eventually applied to the non-treaty US fleet, no regulations were applied to US treaty tribes or the Canadian gillnet fleet (Melvin et al., 1999).

PSG wrote Canada's Minister of Fisheries and Oceans in 2001 urging that Canada develop a National Plan of Action to reduce seabird by-catch to implement the requirements of the UN Food and Agricultural Organization (Harrison, 2001b). Canada had not completed its assessment of seabird by-catch for longline fisheries, which was needed to develop its National Plan of Action. PSG noted that limited programs existed to collect adequate data to fill in the large gaps. The Minister responded that the fleet taking halibut *Hippoglosus* spp. was already required to reduce seabird by-catch and that fisheries for Sablefish *Anoplopoma fimbria* and rockfish *Sebastes* spp. soon would have similar requirements (Harrison, 2002a).

California

Gillnet fisheries in central California killed large numbers of Common Murres in the early 1980s, prompting bans in certain areas (PSG, 1983). PSG sent a letter in 1986 to the California Department of Fish and Game expressing concerns that murre mortalities in the Gulf of the Farallones were so high that a small, coastal colony had disappeared. PSG asked the state to take strong action to halt mortality. California addressed this problem by enacting legislation in 1987 that permanently prohibited gillnetting in sensitive areas (Atkins & Heneman, 1987).

PSG wrote several lengthy letters at the turn of the millennium regarding the fishery for Market Squid *Doryteuthis opalescens* near the Channel Islands. PSG wrote to the manager of the Channel Islands National Marine Sanctuary, the California Department of Fish and Game, and NMFS in 1999 to express concern about the effects of the fishery on nesting Xantus's Murrelets and Ashy Storm Petrels on Santa Barbara, Santa Cruz, and Santa Rosa islands. This nocturnal fishery uses high-intensity lights on boats to attract squid to the surface, whereupon automated jigs and purse seines catch them. The lights disturb nocturnal nesting seabirds and subject them to predation by gulls and owls. PSG focused on the management plan for the fishery in 2002. PSG noted that the long-term viability of seabird populations depends on their ability to forage on Market Squid during fall and winter and emphasized that the plan should drastically reduce allowed landings during El Niño events when other prey is unavailable and squid are uncommon. PSG also recommended closure of the fishery within one mile of colonies during the breeding season. PSG in 2004 wrote again objecting to the California Fish & Game Commission's failure to adopt closures to protect seabirds in the Channel Islands. Ironically, seabirds were protected by seasonal closures near murrelet colonies on Santa Barbara and Anacapa islands while the California Department of Fish and Game considered Xantus's Murrelets for listing under the state ESA, because the department promulgated interim regulations pending a decision on listing. The interim regulations prohibited the use of bright lights within one mile of colonies. Once the murrelet was listed, the interim regulations were rescinded. Today the squid fishery is closed only on weekends.

PSG responded in 2001 to the California Department of Fish and Game's proposed regulations for the fishery on White Seabass *Atractoscion nobilis* by recommending an onboard observer program to monitor by-catch (Harrison, 2001a). While the proposed plan lacked an observer program, it noted that a 1980s study indicated that cormorants, marine mammals, and other non-target species were often caught. Currently this fishery in California has NMFS-trained observers to monitor incidental catches of marine mammals, sea turtles, and seabirds.

Hawai'i

PSG supported a NMFS proposal in 1991 to prohibit longline fisheries within 50 miles of the Northwest Hawaiian Islands because of albatross by-catch. Then, in 1995, PSG celebrated a peculiar conservation victory. NMFS had been collecting information on the by-catch of albatrosses in the longline fisheries that operate out of Hawai'i but refused to provide the data to FWS. This suggested to PSG that NMFS might have been hiding a conservation problem to protect the fisheries. On behalf of PSG, I sent a series of Freedom of Information Act requests to NMFS (Harrison, 1996b). The information that NMFS disclosed suggested potentially serious problems for Laysan Albatross *Phoebastria immutabilis* and Black-footed Albatross *Phoebastria nigripes*. I provided it to FWS, which apparently stimulated

NMFS to release a report estimating that this fishery killed 3,000 albatrosses during each of the two most-recent years.

Thanks to ABC, I met with the director of NMFS in 1999 to urge improvements to the Hawai‘i longline regulations to reduce albatross by-catch (Harrison, 1999d). PSG stated it had supported earlier regulations only with an understanding that NMFS would revise its rules after it had scientifically assessed the efficacy of various by-catch prevention methods. The director promised to conduct such a study. He also said that NMFS was consulting with FWS concerning albatross by-catch and that regulations would be proposed soon. In 2000, a federal judge closed the Hawai‘i-based longline fishery for Swordfish *Xiphias gladius*; it did not reopen until NMFS required the fishers to employ techniques to reduce the deaths of sea turtles and albatrosses (Harrison, 2004b). Perhaps because of PSG's persistence, NMFS appointed a National Seabird Coordinator in 2001 to address seabird conservation issues.

Protecting Threatened and Endangered Seabirds

Congress enacted the ESA in 1973 (Kim et al., 2023) and from its beginning, PSG expressed concerns about declining populations of seabirds that could lead to extinction. The Great Auk *Pinguinus impennis* went extinct around 1844, and island-dwelling species like seabirds account for a large proportion of extinct and at-risk species (Spatz et al., 2022). PSG's efforts generally focused on US federal policy, but PSG also has worked on implementing endangered species statutes at the state level and influencing conservation policy in other nations.

Newell's Shearwaters

FWS listed Newell's Shearwaters *Puffinus newelli* as a Threatened species in 1975 (at the time it was *Puffinus auricularis newelli*). Thanks to the effort of David G. Ainley to convince the American Ornithologists' Union's Check-list Committee, it was subsequently separated from Townsend's Shearwater as a distinct species. While it now nests primarily on Kaua‘i, it once bred on all the main Hawaiian Islands and was eaten regularly by early colonists. It was thought to be extinct until a pig hunter discovered a colony in Kaua‘i's Anahola Mountains in 1967 (Harrison, 2009a). PSG wrote to the Mayor of Kaua‘i County in 1979 to request that new developments on Kaua‘i reduce lighting around residences and resorts (Schreiber, 1978). PSG noted that birds, especially fledglings on their first flight to sea, become confused and blinded by bright lights, causing them to collide with powerlines and buildings.

PSG wrote to FWS and the Hawai‘i Board of Land and Natural Resources in 1996 about the installation of powerlines and cinder mining adjacent to colonies on the island of Hawai‘i. PSG asked that powerlines be reoriented to avoid flyways and suggested that cinder mining be regulated by season and location. PSG's letter went unanswered. PSG wrote to FWS again in 1998 stating that it was preparing to file a petition to designate Critical Habitat and to list certain populations as Endangered. PSG urged FWS to actively manage this species so that such actions might not be needed. PSG also requested surveys to refine our knowledge of nesting locations and population trends and that FWS update and implement the predator-control provisions in its 15-year-old Recovery Plan. FWS responded that cinder mining was not currently being undertaken near Newell's Shearwater colonies on Hawai‘i. It would fund additional surveys within its budget constraints, after which it would decide on Critical Habitat status and listing.

At the request of David G. Ainley, PSG asked FWS in 1999 to conduct surveys to determine the population status of Newell's Shearwaters throughout Hawai‘i, because the Kaua‘i population apparently had declined by 75% since 1992 (Ainley et al., 2001; Harrison, 1999e). PSG also requested that FWS appoint a Recovery Team to implement the 1985 Recovery Plan. FWS initially limited radar surveys to Kaua‘i (Day et al., 2003b), citing budget constraints, and declined to form a Recovery Team (Harrison, 2000c). Eventually, radar studies were funded in the State of Hawai‘i, and Newell's Shearwaters were located on the Big Island (Cooper & Day, 2003) and on Maui (Day et al., 2003a). Perhaps stimulated by PSG, FWS and the Hawai‘i Division of Forestry and Wildlife applied for a grant in 2002 to prepare a Habitat Conservation Plan that included a coordinator to implement it (Harrison, 2002b); this plan dealt specifically with predation on seabird colonies by cats, rats, and Wild Pigs *Sus scrofa*.

PSG wrote to Kaua‘i Electric in 2001 to object to the installation of 100-foot-high (30 m) utility wires at an electricity generating facility (Harrison, 2001c). Because powerlines would likely kill Newell's Shearwaters, PSG asked Kaua‘i Electric to place them underground or redesign them to present a smaller target to shearwaters in flight. PSG noted that the utility had not implemented the recommendations of a 1996 Scientific Advisory Panel regarding the placement of elevated wires. The company agreed to redesign and lower the powerlines and did so.

In 2004, the utility proposed a draft Habitat Conservation Plan for Newell's Shearwaters, Hawaiian Petrels *Pterodroma sandwichensis*, and Hawaiian subpopulation of Band-rumped Storm Petrels (Harrison, 2004c). In response to the draft plan, PSG supported the shielding of streetlights, redesigning existing powerlines to reduce seabird collisions, and placing critical segments underground. PSG also urged an assessment of the effectiveness of salvaging grounded live seabirds and of establishing predator-free colonies.

Environmental groups, led by EarthJustice, sued the owner of a resort in Princeville, Kaua‘i, in 2009, alleging that it violated the ESA each time that shearwaters were attracted to its bright lights (Harrison, 2009a). They also filed a suit against Kaua‘i Electric, alleging that the company violated the ESA when birds died upon hitting powerlines. The US Department of Justice indicted the utility in 2010 for violating the ESA and the Migratory Bird Treaty Act (MBTA). The cases settled with an agreement to prepare a Habitat Conservation Plan that included incidental-take permits. PSG supported the conservation measures in the plan but asked that continued threats be more fully addressed (Harrison & Mendenhall, 2010a). The resort eventually altered its lighting.

Over the past few decades, the Newell's Shearwater population on Kaua‘i has declined dramatically in abundance and distribution since it was deemed to be threatened 50 years ago (Duffy, 2010), although the decline has ended and the population trend has leveled off (Ainley et al., 2023). It remains vulnerable to predation at colonies, fatal collisions with powerlines, and "fallout" of fledglings attracted to artificial lights (FWS, 2024a). These threats, especially predation by feral cats and pigs, continue to prevent the population from recovering by causing low levels of reproductive

success and high levels of adult mortality in unmanaged colonies, almost all of which lack predator fences.

Marbled Murrelets

PSG has been a national leader in addressing the difficult and often controversial problems of Marbled Murrelets. PSG's initial conservation action was to adopt a resolution in 1982 that recommended that agencies in Canada and the US consider this species in management plans for old-growth forests (PSG, 1982b). The resolution recommended that they fund studies to identify the nesting-habitat requirements of Marbled Murrelets.

A workshop on Marbled Murrelet management at PSG's 1986 annual meeting prompted PSG to establish the MMTC, which functions as a scientific authority on the species. The workshop also prompted PSG to adopt a resolution with two recommendations: (1) federal, state, and provincial agencies should establish an interagency working group to address research and management issues for this species; and (2) the murrelet should be designated a sensitive species throughout its range (PSG, 1987). Another workshop at PSG's 1987 meeting summarized the latest science on the species, spurred future research (Carter & Morrison, 1992), and prompted FWS to write a Biological Report on the species (Marshall, 1988). The Portland Audubon Society petitioned FWS in early 1988 to list the Marbled Murrelet as Threatened under the ESA. PSG's early efforts and resolutions were the catalyst, and its workshops provided much of the scientific basis for the petition.

The MMTC sent letters to 19 agencies with management recommendations in March 1988, then sent letters to 23 agencies recommending the formation of an interagency committee (Leschner, 1988). PSG also persuaded ICBP–US to issue a statement supporting listing and commending the agencies that provided funding on short notice to study the murrelet (International Council for Bird Preservation, 1988). PSG sent letters to many agencies in 1989 to support the listing and to urge them to include Marbled Murrelets in their management plans (Leschner, 1989). PSG commended FWS in 1989 for placing this species in Category II, a designation used when listing may be appropriate but where additional information is needed (Leschner, 1990). PSG sent FWS a request to protect the species pending a determination of its status, a list of research priorities, and a list of management options (PSG, 1990).

The MMTC developed in 1988 the first Inland Survey Protocol for murrelets (Paton et al., 1988), which was revised several times before a comprehensive revision in 2003 (Evans Mack et al., 2003). The protocols ensured that agencies and timber companies correctly and consistently surveyed for murrelets in forested areas, especially in areas of proposed timber sales. The 2003 version was used for decades until it was updated with the latest science in 2024 (PSG, 2024a). The MMTC developed interim management guidelines (Nelson, 1991), and PSG adopted a resolution calling for surveys of Marbled Murrelets before logging could be undertaken in old-growth forests (PSG, 1991b).

Canada listed Marbled Murrelets as a Threatened species in 1990 and formed a team that issued a Recovery Plan in 1994 (Naslund, 1994a). The MMTC adopted a resolution in 1991 urging the governments of Canada and BC to ban logging in the Carmanah-Walbran Valley on Vancouver Island (PSG, 1991c). PSG monitored the implementation of protections for murrelets and eventually objected to aspects of a proposed Forest Plan in BC that did not maintain old-growth habitat for nesting Marbled Murrelets (PSG, 2003b). As discussed above, PSG asked the EVOS Trustees for funds to study the species to understand their reproductive success and their use of the marine environment, as well as to purchase old-growth habitat where they nested. Over time, PSG persuaded other oil spill trustee committees to allocate trust funds to projects to conserve Marbled Murrelets, including surveys, improved habitat management, or land purchases in Washington, Oregon, and California.

FWS and California both listed Marbled Murrelets as Threatened under their respective ESAs in 1992, and PSG issued a press release supporting the federal listing (PSG, 1992). Timber companies soon filed lawsuits challenging the federal listing decision. As part of one legal challenge, PSG had to respond to a subpoena from Scott Timber Company to produce 10 years of documents (Harrison, 1996c).

The MMTC held another symposium in 1994 that summarized the growing knowledge about murrelets (Nelson & Sealy, 1995). Such information enabled PSG to use state-of-the art knowledge when it responded to proposed agency policies. PSG objected in 1994 to a FWS proposal for Critical Habitat, noting that much available information had not been used and its failure to include marine habitat, state lands, or federal wilderness areas (Naslund, 1994b). FWS subsequently designated Critical Habitat in 1996. PSG worked with the Recovery Team to develop a Recovery Plan, which was finalized in 1997 (Hamer, 1997).

Based on genetic studies, murrelet populations in central California and the Aleutian Islands differed from each other and from populations in both BC and mainland Alaska (Friesen & Piatt, 2003; McShane et al., 2004). In addition, some genetic differences were found in birds from the Aleutian Islands, BC, mainland Alaska, and California. Despite these studies, FWS decided in 2004 that there were no significant genetic or morphological differences between populations at the US–Canada borders. The decision that the population segments are not distinct prompted FWS to reconsider whether the species should be listed as Threatened. PSG wrote FWS that, in its professional opinion, the population encompassing Washington, Oregon, and California constitutes a bona fide distinct population segment under FWS policies and emphasized that the declining population continued to need protection (Harrison, 2004d). FWS ultimately concluded that the tri-state population is a valid distinct population segment (Endangered and threatened, 2010). Through all this uncertainty, the species continued to be listed as Threatened under the ESA.

Beginning in 2006, PSG wrote 15 or more letters defending protections afforded to Marbled Murrelets. PSG objected to a FWS proposal to remove about 95% of lands that had been considered Critical Habitat because FWS had concluded at that time that the tri-state population was not a distinct segment (Harrison, 2007c). FWS also asserted that other programs would provide protection for murrelet nesting habitat, so that designating Critical Habitat was redundant. PSG again emphasized that retaining the Critical Habitat designation was needed because the population was declining. PSG also stressed the need to designate Critical Habitat for marine foraging areas. PSG objected in 2007 to the US Bureau of Land Management's proposal to eliminate protection for murrelets in

areas designated as late-succession reserves in western Oregon, noting that logging these areas could accelerate the decline of nesting habitat and lead to the extinction of this species in Oregon (Harrison, 2007d). PSG also objected to FWS's 2008 proposal for a more limited revision to Critical Habitat designation in Oregon and northern California, largely reiterating arguments PSG had made for years (Harrison, 2008c). When FWS finalized the revised Critical Habitat designation in 2011, it removed inland acreage in southern Oregon and northern California where surveys had found no murrelets (Endangered and threatened, 2011). Despite the failure of previous attempts to delist murrelets, PSG again had to provide extensive comments to successfully oppose delisting in 2008 (Harrison, 2008d; Harrison, 2009b). PSG also opposed a timber harvest in northern California where murrelets nested (Harrison, 2009d). The California Department of Forestry, however, approved the harvest, reasoning that, if the parcel were not logged, it would probably become residential property.

The MMTC recently developed detailed terrestrial habitat management recommendations for ensuring the preservation and improvement of murrelet habitat (PSG, 2024b). Marbled Murrelets remain listed as Threatened under federal and several state ESAs.

California Brown Pelican

PSG wrote to FWS in 1986 to suggest that California Brown Pelicans, based on the species' full recovery from the DDT era, be downlisted from Endangered to Threatened (Leschner, 1986). FWS did not respond. The ESRC, founded by William T. Everett, filed petitions in 2005 with FWS and the California Fish and Game Commission to delist the pelican (Harrison, 2006b). The petitions noted that the species had not only recovered but that peer-reviewed science indicated that its population exceeded historical levels. The ESRC stated that delisting was vital to preserve the integrity of the federal and California ESAs, which it argued should focus on species that truly are in danger of extinction. PSG endorsed both petitions because the species had fully recovered and suggested that wildlife agencies and conservation organizations should celebrate the positive news (Harrison, 2007e). Some members of PSG's Executive Council were uncomfortable with delisting and abstained from voting.

After generating procedures for down-listing (it had never been done before), California removed the California Brown Pelican from the California Endangered Species List in February 2009, the first species ever to have recovered under state law (Harrison, 2008e). FWS removed the species from the federal list several months later. William Everett, David G. Ainley, and I devoted three years to persuading wildlife agencies to draw obvious conclusions about the pelican's status. Each agency celebrated its delisting decision with press releases but did not acknowledge the ESRC, the PSG, or the individuals whose science-based petitions persuaded them to act.

Hawaiian (Band-rumped or Harcourt's) Storm Petrel

PSG filed comments with FWS in 1989 to support my petition earlier that year to list the Hawaiian (Band-rumped or Harcourt's) Storm Petrel as Endangered in Hawai‘i. The State of Hawai‘i had already listed the population as Endangered, as it was estimated to be 200 pairs (Harrison et al., 1990). FWS deemed the Hawai‘i population in 2016 to be a distinct population segment and, therefore, an endangered taxon 27 years later. Today, they are confirmed as likely to breed on Kaua‘i, Lehua, Lāna‘i, and Hawai‘i (FWS, 2021). The population size is small but unknown, the level of threats is very high, and protected nesting habitat is limited. FWS (2021) recently assessed the population's overall viability as low.

Scripps's (Xantus's) Murrelet

PSG established the Xantus's Murrelet Technical Committee (first chaired by William T. Everett) in 1994 and alerted the California Fish and Game Commission that PSG intended to petition to list the species as Threatened under the California ESA (Harrison, 1995b). That same year, PSG sent a detailed list of recommended conservation actions to the managers of Channel Islands National Park, who responded that it appreciated PSG's "excellent suggestions." PSG filed petitions simultaneously with the California Fish and Game Commission and with the FWS in 2002 (Harrison, 2002c). Although obtaining supporting data was a challenge, PSG knew that the California and Mexico populations were small and declining, that the distribution and number of breeding locations was limited, and that introduced predators were a threat. California ultimately listed the species as Threatened (Harrison, 2002d; Harrison, 2004e). In 2012, the species was split into the Scripps's Murrelet *Synthliboramphus scrippsi* and the Guadalupe (Xantus's) Murrelet. FWS decided in 2016 that neither species merited protection under the federal ESA (Endangered and threatened, 2016).

Kittlitz's Murrelet

PSG established the Kittlitz's Murrelet Technical Committee (first chaired by Michelle L. Kissling) in 2008. PSG wrote to the Alaska Department of Fish and Game in 2009 that listing this species under the Alaska ESA was warranted because of apparent steep population declines during recent decades (Harrison, 2009e). Alaska rejected listing, citing insufficient evidence that its continued existence is in jeopardy. PSG then urged FWS to undertake a status review and suggested that FWS conduct a wide variety of monitoring, surveys, and other studies (Harrison & Mendenhall, 2010b). This information assisted FWS, which decided in 2013 that listing was not warranted (Endangered and threatened, 2013).

Chinese Crested Tern

The Chinese Crested Tern *Thalasseus bernsteini* has been a focus of PSG since its 2007 meeting in Taiwan. At that time, the species was not considered extinct overall, but it was perilously close and had not been seen on Taiwan's Matsu Islands for a long time before a small population of no more than 50 individuals was discovered in the year 2000 (Harrison, 2007f). After the meeting, Mark Rauzon noted evidence of rat predation on tern eggs in a review of a documentary film on the species. PSG then wrote two letters to officials in the People's Republic of China concerning this rediscovery, as the islands are 5 km from mainland China. PSG noted an urgent need for conservation action and organized an international working group at the request of Taiwanese biologists to outline a conservation plan. PSG also proposed to coordinate an effort to eradicate rodents from the terns' only known nesting island and requested help in persuading fishermen to refrain from taking eggs and disturbing the terns during the breeding season. PSG Chair Verena A. Gill attended the International Symposium of Chinese Crested Tern in 2009. A synchronized survey of known breeding

sites was undertaken in 2009 to count the terns and identify breeding sites (Gill, 2010). PSG awarded a grant through the Craig S. Harrison Conservation Fund in 2014 to help restore the colony. The restoration project was successful, finding at least 20 breeding pairs and many fledglings in August 2014. PSG's East Asia Seabird Conservation Committee continues to work with scientists in China and the Republic of Korea on Chinese Crested Tern research.

Invoking the Migratory Bird Treaty Act to Conserve Seabirds

The MBTA, enacted in 1918, is among the nation's oldest national wildlife-protection laws. Although the Act originally implemented a treaty with Canada to stem huge declines of waterfowl and shorebirds caused by indiscriminate hunting as well as feather hunting of other species, its protections extend to all migratory birds, including seabirds. It restricts the circumstances by which seabirds can be "taken," including being hunted, killed by any means, or sold; and it applies to any part of a bird, nest, or egg (Harrison et al., 1992). From its early days, PSG advocated using the MBTA to conserve seabirds in a wide variety of circumstances. PSG did not always explicitly mention this Act, but it was the legal basis for advocating PSG's conservation and management goals.

Implementing, Interpreting, and Amending the Migratory Bird Treaty Act

Implementing and interpreting the MBTA has been controversial for 50 years. Solutions to clarifying the extent of its application have often included proposals to amend it, but such efforts have not borne fruit. A year after PSG's founding, it adopted a resolution calling for the US, Japan, Mexico, and Canada to manage and conserve seabirds out to 200 nautical miles (nm; 370 km) from their coasts (PSG, 1976a). PSG essentially argued that seabirds should be protected within the then-developing concept of an Exclusive Economic Zone (EEZ, 200 nm), rather than the much narrower territorial sea (12 nm). PSG wrote to FWS and the Department of the Interior in 1980 asking for and receiving information about how the federal government was implementing the 1974 US–Japan Migratory Bird Treaty (PSG, 1980). PSG adopted a resolution in 1991 urging Congress to amend the MBTA to extend its jurisdiction throughout the EEZ (PSG, 1991a). PSG later wrote to FWS asking it to fully implement the migratory bird treaties with Japan and Russia (Harrison, 1993f). At the requests of the Committee on Merchant Marine and Fisheries in 1994, PSG twice provided detailed recommendations about fully implementing the migratory bird treaties with Japan and Russia to enhance the protection of seabirds (Harrison, 1994b). PSG urged requiring FWS to remove predators from National Wildlife Refuge colonies and to develop nongame management plans for seabirds. No such legislation was ever enacted.

PSG wrote to the Secretary of the Interior and the US Attorney General in 1996 to request that the federal government rescind a legal opinion from the 1970s that limited the enforcement of the MBTA to the territorial sea and instead to expand its application to the EEZ (Harrison, 1997). Although PSG's request languished for years, the Department of the Interior eventually issued a legal opinion in late 2000 that the Act applied throughout the EEZ. PSG and ABC had been urging this interpretation for years and worked with the Department of the Interior to achieve this result (Harrison & Mendenhall, 2001). ABC and PSG met with the FWS Director to discuss the issue, and in early 2001, President Bill Clinton issued an executive order directing all federal agencies to comply with the MBTA (Harrison, 2001d).

Whether the accidental take of birds violates the MBTA continues to be debated, and its enforcement typically changes depending on the administration in power. For example, President Trump issued Executive Order 14154 (Unleashing American Energy) in 2025 directing that accidental take is not prohibited under the Act, reversing the position of President Biden.

Planning and General Protections for Seabirds

PSG wrote Congress in 1986 to encourage increased nongame funding (PSG, 1986a). In a pivot from its historic focus on game species, FWS prepared a draft strategy for nongame birds in 1989. PSG congratulated FWS for taking this step and suggested several improvements. Among the shortcomings were a focus on the status quo, rather than envisioning a program beyond current budget constraints (PSG, 1989). The FWS strategy also failed to include coordination among federal, state, and private organizations. In 2004, FWS prepared an extensive plan for Hawai'i and the continental US west coast to guide seabird conservation projects during the coming decades. PSG suggested that the plan needed clearer priorities, including a list of colonies where predators should be removed and a list of colonies that were insufficiently protected (Harrison, 2004f).

PSG wrote to members of Congress in 2009 to request support for acceding to the Agreement on the Conservation of Albatrosses and Petrels (ACAP) and to enact implementing legislation (Harrison, 2009g). The agreement's goal is to maintain healthy albatross and petrel populations, and it has fostered widespread adoption of mitigation measures in tuna pelagic longline fisheries, including time closures, area closures, offal management, night-setting, line-weighting, and deployment of bird-scaring lines (Melvin et al., 2023). Although these measures indicate progress, only 13 nations are parties, none of which are in Asia, which greatly limits the agreement's effectiveness (Miskelly, 2023).

The National Fish and Wildlife Foundation prepared a draft Work Plan for a five-year, US$40 million seabird conservation program in the Pacific in 2011. I discussed conservation issues with its representatives at length, asked many PSG members for their opinions, and provided extensive written comments (Harrison, 2012).

Management of Individual Species

A PSG resolution in 1978 called for studies of large gulls in Alaska, especially regarding the effects of their population increase on other wildlife (PSG, 1978). PSG objected to a draft Environmental Impact Statement in 2002 that would have allowed agencies to shoot large numbers of west coast Double-crested Cormorants *Nannopterum auritum* under a General Depredation Order (Harrison, 2002e). Unlike interior populations of this species, cormorants on the west coast had not been implicated in widespread damage to commercial aquaculture or displacement of other colonial-nesting waterbirds. PSG successfully urged that the western subspecies be managed separately and that any General Depredation Order exclude birds from the west coast population. As a result, the order was applied in 24 states, none of which are on the west coast (Migratory bird permits, 2003).

Protecting the Terrestrial Environment of Seabirds

PSG has always recognized that conserving seabirds requires effective management of the terrestrial sites where they breed and roost. Such areas include wildlife refuges, parks, and other protected areas that typically are managed in the US by the federal or state government. PSG has frequently undertaken actions to advance its conservation goals with appropriate agencies. PSG provided input on the Master Plan for the management of the entire National Wildlife Refuge system in 1993. PSG stated that FWS placed too much emphasis on Master Plans, which often are ignored, and not enough on legally binding regulations. PSG also suggested that FWS over-emphasized building expensive visitor facilities (Harrison, 1994c).

Alaska

During PSG's early years, Congress was actively considering public land management in Alaska. PSG adopted one resolution that urged Alaska to strengthen its coastal management program and to protect critical seabird habitats (PSG, 1976b) and another that supported the designation of coastal seabird refuges (PSG, 1977). PSG sent its resolution to members of Congress to support designating national wildlife refuges. Once the refuges were established, PSG's attention turned to their management. For example, PSG adopted a resolution in 1985 objecting to the removal of Refuge designation from Attu Island and its 100,000 nesting seabirds (PSG, 1985a). Attu today remains part of the refuge system.

During the development of the Management Plan for the Alaska Maritime National Wildlife Refuge in 1987, PSG commented extensively on alternatives. PSG stressed the need to monitor populations, to investigate how fisheries affect seabird populations, and to acquire colonies not already in the refuge (Sowls, 1987). PSG also endorsed Wilderness status for that refuge in 1988 and requested that FWS prepare a list of lands in the refuge having low wildlife values that could be exchanged with Native corporations for seabird colonies. FWS proposed a draft Seabird Management Plan for Alaska in 1992. PSG suggested that the plan include specific goals, policies, and actions to be taken. PSG recommended that FWS adopt a regional marine bird policy for Alaska, akin to the policy that FWS had approved in 1985 for the continental west coast.

Washington

PSG wrote to Congress in 1980 to support designating Protection Island at the mouth of Puget Sound as a National Wildlife Refuge. PSG noted that it harbored 70% of the seabirds in the inland waters of Washington, including half of the Rhinoceros Auklets in the contiguous USA. Protection Island attained Refuge status in 1982.

PSG wrote to the US Senate in 1986 to oppose the transfer of Quillayute Needles and Flattery Rocks, nesting islands for 80% of Washington's coastal seabirds, from the National Wildlife Refuge system to Olympic National Park (Sowls, 1987). PSG was concerned that seabird colonies should be managed by a wildlife agency, not an outdoor recreation agency. The sponsor of the legislation responded that he agreed, and the islands remain under FWS jurisdiction. PSG again addressed conservation issues for the Quillayute Needles, Flattery Rocks, and Copalis national wildlife refuges in 2005, when it commented on a draft Conservation Plan for the Washington Maritime National Wildlife Refuge Complex (Harrison, 2005b). PSG endorsed the plan's goals, especially the protection and long-term monitoring of seabirds and their habitats. PSG also urged the removal of invasive rabbits from Destruction Island.

Oregon

PSG and ABC invested an enormous amount of effort from 1998 to 2006 to protect Caspian Tern *Hydroprogne caspia* colonies on the Columbia River, the largest Caspian Tern colonies in the world. During this period, PSG wrote over 20 letters to state and federal agencies and facilitated a lawsuit that forced the federal government to analyze the consequences of its proposals to decimate colonies.

Just before the 1998 breeding season, NMFS proposed destroying the nesting habitat of 10,000 pairs of Caspian Terns, 5,300 pairs of cormorants, and 7,100 pairs of hybrid gulls on Rice Island in the Columbia River (PSG, 1998b). The terns apparently consumed juveniles of several salmonid species, including about 8% of hatchery-raised smolts released to promote the recovery of endangered populations of Coho Salmon *Oncorhynchus kisutch* and Steelhead *O. mykiss*. Whether hatchery-raised smolts are a legitimate "evolutionarily significant unit" under the federal ESA was never addressed, but the terns were a convenient scapegoat for fishery managers. Only about 1% of smolts from these hatcheries reached adulthood—a much lower level than achieved by hatcheries elsewhere—and the vast majority of smolts die whether terns eat them or not. PSG noted that nesting habitat for Caspian Terns had been decreasing for years in the entire region and that the California population was declining.

PSG initially asked NMFS and FWS to defer taking any drastic actions before assessing whether disturbing the Rice Island colony would increase the survival rates of smolts. PSG's Freedom of Information Act request to NMFS in 1998 asked for the scientific basis for its assumptions about the effects of tern predation on smolts. The US Army Corps of Engineers (Corps) issued an Environmental Assessment to justify relocating most of the Rice Island colony 25 km downriver to East Sand Island, where terns would presumably eat more marine species and fewer smolts (Roby et al., 2002). PSG then asked that the colony be preserved until it could be ascertained whether the terns could be persuaded to move (Harrison, 1999f). The National Audubon Society and ABC, assisted by PSG, filed a lawsuit (Harrison, 2000d). A federal judge in 2001 enjoined the Corps from destroying the Rice Island colony until it prepared an extensive Environmental Impact Statement, which is a multi-year process. The Corps appealed, but the parties entered into a Settlement Agreement in 2002 before an appellate decision was rendered. Its provisions included a commitment that management actions would ensure that Caspian Terns remained a viable and integral part of the ecosystems of the Pacific Northwest, including the Columbia River estuary. FWS also agreed to prepare a Regional Feasibility Assessment of nesting sites that terns had formerly occupied, and the federal agencies agreed to prepare management plans for the Columbia River estuary and the Columbia Plateau.

By 2001, the entire tern breeding colony that formerly nested on Rice Island was relocated to East Sand Island by force or by their own volition (Roby et al., 2002). Pending the completion of the studies in the Settlement Agreement, PSG argued that the status quo should be maintained—i.e., the agencies should not interfere with tern nesting at East Sand Island unless sufficient suitable habitat

elsewhere was available (Harrison, 2001e). FWS's draft Estuary Management Plan in 2002 reviewed the status, conservation, and management issues for Caspian Terns. Simultaneously, the US Department of Agriculture prepared a Management Plan for the Mid-Columbia River Basin (Harrison, 2002f), which was superseded in 2014 by a Columbia Plateau Management Plan (Collis et al., 2024).

PSG strongly criticized a NMFS report in 2002 in which NMFS claimed that Caspian Terns were inhibiting the recovery of listed salmonid species (Harrison, 2002g). NMFS mostly ignored PSG's comments. It failed to provide substantiating data or to discuss the elevated salmon return rates during recent years that undermined its arguments. NMFS further claimed that hatcheries produced 80 million non-endangered smolts annually but provided no estimates of the number that reach the lower Columbia River with and without tern predation. NMFS wrongly assumed there is no compensatory mortality of smolts and ignored the fact that the terns ate fewer smolts downriver at East Sand Island compared to Rice Island because fewer smolts were available there (Lyons, 2010).

FWS evaluated 77 alternative tern nesting sites in Washington, Oregon, and California and concluded that 23 were feasible locations (Harrison, 2003b). Due to political considerations, the most promising were five existing colonies in San Francisco Bay and three inland sites in Oregon. During the planning stage for FWS's draft Environmental Impact Statement, PSG supported both active management of Caspian Terns and addressing their effects on listed salmonids in the Columbia River estuary (Harrison, 2003c). PSG urged the FWS to use only peer-reviewed science and not in-house reports by NMFS that contained unscientific justifications of its policy goals. When the draft Environmental Impact Statement was released, PSG strongly criticized its science (Harrison, 2004g). NMFS assumed, without providing supporting data, that Caspian Terns have a great detrimental effect on wild stocks of adult salmon by eating the smolts. PSG supported slowly dispersing the tern colony at East Sand Island and creating new nesting habitat. PSG also strongly opposed killing terns.

The Corps still had not created any alternative habitat by 2006, and NMFS was considering only two sites in San Francisco Bay (Harrison, 2006c). By this point, the terns on East Sand Island consumed 70% less listed salmon species because the terns were much closer to the Pacific Ocean where other forage species are readily available, which was the goal in the Environmental Impact Statement (Lyons, 2010). Implementation of the Estuary Management Plan began in 2008, with the intention of reducing and redistributing the tern population. The terns used many alternate colony sites, but in low numbers, and the target number for breeding pairs on East Sand Island noted in the final Environmental Impact Report was achieved in 2017 (Collis et al., 2024).

After eight years of active involvement, PSG and ABC scaled back their efforts. Issues regarding Caspian Terns remain unresolved today, especially whether they are affecting the recovery of Steelhead. The management plans for the Columbia River estuary and the Columbia Plateau have greatly reduced smolt losses. However, government actions reduced the population of Caspian Terns by 50% from 2008–2024, and further, dramatic declines are possible (Collis et al., 2024). The terns have abandoned many colonies, and some are returning to the Columbia River estuary because suitable nesting habitat, especially on the coast of Washington, was never created (Roby et al., 2021). Adaptive management is still needed to prevent terns from returning to nest on Rice Island.

PSG asked FWS in 2000 to acquire East Sand Island (25 ha) from the Corps and to manage it as a National Wildlife Refuge. After the birds relocated there from Rice Island, East Sand Island became one of the largest unprotected seabird colonies in North America. It had 8,000 nesting Caspian Terns, the largest Double-crested Cormorant colony in North America, and the largest known roost of California Brown Pelicans (Harrison, 2000e). FWS dithered on analyzing whether the colony met the criteria for a National Wildlife Refuge and ultimately rejected Refuge status. Despite its continued efforts, PSG has so far not persuaded FWS to designate East Sand Island as a National Wildlife Refuge.

California

PSG urged the Los Angeles Department of Water and Power in 1981 to manage diversions of water from the two tributaries of Mono Lake to protect large colonies of California Gulls *Larus californicus* nesting there (PSG, 1981a). Declines in the lake's water levels had caused some colonies to be abandoned, and breeding success had declined precipitously. With pressure from the public and many organizations like PSG, an effective water management plan has been adopted.

PSG commented on the draft Management Plan for the Alameda National Wildlife Refuge in 1999. PSG strongly supported acquiring habitat for the endangered Least Tern *Sternula antillarum* and enhancing habitat for Caspian Terns to help lure them from the Columbia River estuary.

Proposed legislation in 2005 would have allowed public access to the Farallon Islands National Wildlife Refuge, the largest seabird colony in the contiguous US. The bill was written at the behest of amateur radio enthusiasts who wanted to broadcast from there. PSG contacted numerous federal legislators to oppose the bill, citing concerns about wildlife disturbance, habitat damage, and invasive alien species (Harrison, 2005c). As a result, the sponsor rescinded the bill.

A Fourth of July fireworks display in Sonoma County disturbed nesting Brandt's and Pelagic cormorants *Urile pelagicus* at Gualala Point Rocks during 2006 and 2007. The colony is part of the California Coastal National Monument, and cormorant populations had been declining for decades. PSG wrote to the California Coastal Commission to express its concerns (Harrison, 2007g), and the Commission canceled the event in 2008.

Western Mexico

PSG issued a policy statement at its first members' meeting to conserve seabirds in the Gulf of California (PSG, 1974). PSG listed colonies that should be protected during the breeding season. PSG also suggested establishing a conservation patrol, educating Mexican students on seabird biology, and providing financial and technical assistance from the US to achieve these goals. PSG supported a plan in 1985 by Mexico's Institute of Biology, located at the National Autonomous University of Mexico, to conserve 55 islands and nearby resources in the Sea of Cortez (PSG, 1985b).

PSG also supported an initiative by the Fisheries Bureau of Mexico to make Bahía de los Ángeles a preserve to protect juvenile sardines (PSG, 1986b), but no such preserve was established. Today the sardine fishery in this area is catching up to 90% of the juvenile sardines, which panic and release fish oil during the purse-seine process. Seabirds that enter the net to try to eat sardines get oiled and lose the ability to fly, float, or thermoregulate.

PSG wrote to Mexico's Comisión Nacional de Áreas Naturales Protegidas in 2002 to support a proposal to create a Pacific Islands Biosphere Reserve that would include the Pacific islands of Baja California. PSG stated that the threats to those ecosystems would increase with additional tourism, fishing pressures, and unregulated use; the creation of a Biosphere Reserve would help protect those islands in perpetuity. PSG reiterated its support for a Biosphere Reserve in a 2005 letter to Mexico's Minister of the Environment and Natural Resources. PSG adopted a renewed conservation policy statement for the Gulf of California and western Baja California that expanded on its 1974 statement (PSG, 2005). PSG also supported programs, parks, and protected zones to protect the millions of seabirds in western Mexico, singling out the San Benito Islands, which support two million breeding seabirds of 13 species. PSG's advocacy was a success, and the seabird resources of western Mexico are reasonably well protected today, although there will always be new challenges (Holmes et al., 2023).

Hawai'i and the US Tropical Pacific

PSG commented extensively on FWS's 1984 Master Plan for the Hawaiian Islands National Wildlife Refuge. PSG requested establishing a marine sanctuary for the waters that surround the refuge and was concerned about the potential effects of deep-sea mining and at-sea nuclear waste disposal on seabirds (PSG, 1985c). FWS responded that a marine sanctuary would be evaluated once the Master Plan was completed.

PSG sent letters to Congress in 1987 asking that Crater Hill be added to the Kīlauea Point National Wildlife Refuge on Kaua'i because of its seabird colonies. FWS purchased Crater Hill in 1988.

PSG asked Congress to authorize funds to purchase Palmyra Atoll in 1998 to protect its large and important tropical seabird colonies. Although Congress failed to act, The Nature Conservancy raised funds to purchase the atoll. PSG also supported the proposed Conservation Plan for Howland Island, Baker Island, and Jarvis Island national wildlife refuges in 2005 and urged keeping those remote islands closed to the public so they would remain predator-free. PSG, acting in concert with ABC, requested in 2007 that FWS remove lead paint from 95 buildings on the Midway Atoll National Wildlife Refuge to prevent the poisoning of thousands of Laysan Albatross chicks there each year (Harrison, 2007h). Congress eventually funded this program, and the cleanup was completed in 2017.

PSG wrote to the Hawai'i Department of Land and Natural Resources four times between 2008 and 2011 to support erecting a predator-exclusion fence at Ka'ena Point Natural Area Reserve on O'ahu. The fence was designed to prevent Domestic Dogs *Canis familiaris*, House Mice *Mus musculus*, cats, Indian Mongooses, and rats from killing nesting Wedge-tailed Shearwaters and Laysan Albatrosses (Harrison, 2008h). About one hundred seabirds were being killed annually there, which was a major impediment to maintaining healthy colonies. Lindsay C. Young organized this project, which was funded by the Packard Foundation. After the project was completed in 2011, the shearwaters and albatrosses fledged a record number of chicks (Smith, 2012b).

Scotland and the Indian Ocean

Despite its name, PSG never strictly limited its conservation activities to the Pacific Ocean and occasionally has undertaken conservation actions elsewhere. PSG successfully opposed a proposed European Mink *Mustela lutreola* farm in the Shetland Islands (Harrison, 1983a) and received a heartfelt thank you from the Shetland Bird Club.

PSG also successfully opposed the harvest of boobies and frigatebirds at North Keeling (Cocos [Keeling] Islands), Indian Ocean (Vermeer, 1985), and helped fund a 1994 project led by the Danish Ornithological Society to train Filipino biologists and conserve seabirds in the Sulu Sea, Philippines (Harrison, 1994d). This latter project was a progenitor of the Craig S. Harrison Conservation Fund, which began over a decade later.

Protecting the Marine Environment of Seabirds

Protecting marine areas near seabird colonies, in which seabirds forage, has been a policy goal of PSG since its founding. PSG adopted a resolution in 1975 supporting the establishment of National Marine Sanctuaries to protect nearshore waters (PSG, 1976c). PSG established a Seabird Sanctuaries Committee in 1978, and its Chair (Palmer Sekora) appointed me to be a charter member. Soon thereafter, PSG adopted a policy statement that encouraged the establishment and protection of National Marine Sanctuaries, including breeding islands and their adjacent waters (PSG, 1979).

Alaska

In response to a request by NOAA for comments on its draft National Marine Sanctuary Site Evaluation List in 1983, PSG responded that it was irresponsible that the list included no sites in Alaska. PSG suggested that important areas for feeding seabirds should be evaluated for National Marine Sanctuary status, including Bristol Bay and the waters surrounding the Pribilof Islands, St. Matthew Island, and the Diomede Islands (Harrison, 1983b). PSG wrote NOAA again in 1991 that it should hold public meetings in Alaska to explain why it had not proposed marine sanctuaries there (PSG, 1991d). Today there still are no National Marine Sanctuaries in Alaska.

Washington and Oregon

In commenting on NOAA's 1983 draft National Marine Sanctuary Site Evaluation List, PSG stated that though important areas in Washington were included, many should be expanded to ensure that they included seabird foraging areas. PSG identified the Washington outer coast as a top priority, and eventually the Olympic Coast National Marine Sanctuary was established.

Oregon began planning for a system of coastal marine reserves in 2007. PSG wrote to Oregon's Ocean Policy Advisory Council to encourage the inclusion of seabird foraging areas when considering marine reserves (Harrison, 2008f). PSG noted that over one million seabirds nest on Oregon's offshore rocks and emphasized that they

require healthy stocks of forage fish and invertebrates for nesting success. PSG specifically endorsed marine reserves at Tillamook Head to Cape Falcon, the Three Arch Rocks area, Cascade Head, and Cape Perpetua to Heceta Head. The Chair of the Council thanked PSG for its insights and promised to consider them. PSG wrote to the Oregon Department of Fish and Wildlife in 2010 to again support Oregon's Marine Reserves program (Harrison & Mendenhall, 2010c). PSG urged the state to restrict forage fisheries within the reserves and to establish non-disturbance areas near sensitive seabird colonies. Oregon eventually established five Marine Reserves and Marine Protected Areas, including sites at Cape Falcon, Cascade Head, and Cape Perpetua, the latter of which is the largest and includes a Seabird Protection Area.

California

NOAA was slow to establish a National Marine Sanctuary in Monterey Bay, which seemed an obvious candidate. The California legislature proposed a bill in 1986 to create State Marine Preservation Zones that would provide similar protections to areas selected by the California Secretary of Resources. PSG supported this legislation but pointed out that it lacked a funding mechanism. The California Marine Life Protection Act was approved in 1999 and established the current Marine Protected Area network. There is now a Monterey Bay National Marine Sanctuary, as well as sanctuaries for the Gulf of the Farallones and Cordell Bank.

Hawai'i and the US Tropical Pacific

PSG wrote NOAA several times in 1982 and 1983 that it supported establishing National Marine Sanctuaries to protect the waters around the Hawaiian Islands National Wildlife Refuge, the Marianas Islands, Guam, and Rose Atoll in American Samoa (Harrison, 1983a). In a 1983 letter to NOAA's Chief of its Sanctuary Program, PSG strongly objected to the failure to include any sites in Hawai'i. PSG emphasized that Hawai'i is the only island state and that 10 million seabirds of 18 species breed in the Northwestern Hawaiian Islands. PSG learned that NOAA's consultant for the western Pacific had been instructed to ignore sites in Hawai'i. PSG urged that the evaluation process focus on scientific criteria and expressed a concern that political considerations were excluding highly appropriate sanctuaries. PSG transmitted a report "A marine sanctuary in the Northwestern Hawaiian Islands: An idea whose time has come" to NOAA in 1985 (Harrison, 1985; Harrison, 1990). NOAA ignored PSG's recommendations for decades.

After NOAA announced a feasibility study in 1991 to establish a National Marine Sanctuary in Hawai'i, PSG again recommended the waters surrounding the Northwestern Hawaiian Islands. PSG also suggested protecting the waters offshore of the northern coast of Kaua'i, including the Kīlauea Point National Wildlife Refuge, which had the largest colony of seabirds in the main Hawaiian Islands. PSG objected to the absence of public meetings in Hawai'i, because it enabled opponents to remain anonymous (PSG, 1991d). Soon thereafter, Congress directed NOAA to study the establishment of a sanctuary near Kaho'olawe, and NOAA held public meetings. PSG again asked in 1993 that the Northwestern Hawaiian Islands and northern Kaua'i be designated National Marine Sanctuaries (Harrison, 1993g). PSG wrote to the Secretary of the Interior in 1994 to note that PSG had asked FWS to support Marine Sanctuary status for the waters surrounding the Hawaiian Islands National Wildlife Refuge during the master planning process in 1984. FWS had never recommended this action, and PSG requested that the Department of the Interior do so.

President Clinton announced the creation of a reserve for the coral reef ecosystems of the Northwestern Hawaiian Islands in 2000, which PSG supported (Harrison, 2002h). Before the environmental review process was completed, President George W. Bush designated the entire archipelago from Nīhoa Island to Kure Atoll as the Papahānaumokuākea Marine National Monument (Harrison, 2006d). In late 2008, PSG supported a proposal designating additional areas as monuments adjacent to US territories, including Johnston Atoll, Howland Island, Baker Island, Jarvis Island, Kingman Reef, Palmyra Atoll, Wake Island, and Rose Atoll (Harrison, 2008g). President Bush designated all these locations, which collectively encompass about 1.2 million square miles (3.1 million km^2), as the Pacific Remote Islands Marine National Monument in early 2009. Its islands support many important colonies of seabirds (Rauzon et al., 2011).

Southern Ocean

At the request of David G. Ainley, PSG supported designating a Marine Protected Area in the Ross Sea in a letter to the Commission for the Conservation of Antarctic Marine Living Resources in 2010 (Harrison & Mendenhall, 2010d). PSG also noted that the Ross Sea may be the least-affected expanse of ocean remaining on earth, although that was at risk from proposed scientific whaling for Antarctic Minke Whales *Balaenoptera bonaerensis* and the initiation of fishing for Antarctic Toothfish *Dissosticus mawsoni* (marketed as Chilean Sea Bass). The Ross Sea Region Marine Protected Area was established in 2016 and came into force in 2017; it encompasses about 2.1 million square kilometers and is one of the largest marine sanctuaries on earth, in much of which commercial fishing is prohibited.

Development Projects That Harm Seabirds

PSG has raised conservation concerns regarding specific development projects that could harm seabirds in the US, Canada, Mexico, Japan, and Australia.

United States

PSG adopted a resolution in 1981 opposing oil exploration and development in the Gulf of the Farallones National Marine Sanctuary because it would harm the largest colony of seabirds in the contiguous US (PSG, 1981b). PSG wrote to FWS in 1983 objecting to oil industry proposals to use St. Matthew Island, part of the Bering Sea unit of the Alaska Maritime National Wildlife Refuge as a staging area for offshore oil exploration. PSG also wrote to the US Navy's Chief of Naval Operations in 1983 regarding the disposal of decommissioned, defueled naval submarine reactor plants at sea in the Pacific Ocean. PSG noted that some seabirds consume prey that vertically migrate from very deep waters and, hence, could bring radionuclides to surface waters. None of these proposals came to fruition.

PSG raised concerns in 1984 to the Minerals Management Service and the Hawai'i Department of Planning and Economic Development about leasing outer continental shelf lands for mining cobalt-rich manganese crusts (Hand, 1985). These lands included Gorda Ridge, which is offshore of Oregon and northern California, and waters just

offshore of the main Hawaiian Islands. PSG suggested that seabirds could be affected by diminished or polluted food supplies. No leasing occurred. PSG raised concerns in 2006 to the Minerals Management Service regarding its draft Environmental Impact Statement for the five-year Outer Continental Shelf Oil and Gas Leasing Program. PSG focused on Alaska and stated that the discussion of seabirds was inadequate and erroneous. PSG also identified five Important Bird Areas in the Chukchi and Bering seas that could be affected by the proposal and should be excluded from any industrial development. There is currently no leasing in this region, but offshore oil development remains controversial and unsettled.

PSG wrote to the Washington Department of Natural Resources in 2009 to express concerns about a proposed 32-turbine wind-energy facility to be located at Radar Ridge (Harrison, 2009c). The proposed site was located within the Nemah Marbled Murrelet Management Area, and the surrounding forestland was designated Critical Habitat. Wind turbines would likely kill some murrelets nesting near the facility when they flew between their inland nests and coastal foraging areas. PSG recognized the benefits of developing wind energy but emphasized the unsuitability of this location. PSG reiterated its concerns during the formal environmental review process in 2010. The utilities then terminated this project, claiming that FWS imposed untenable restrictions because of potential harm to murrelets (Harrison, 2011).

Western Canada

PSG wrote to the Minister of Energy and Mines in BC in 2001 to object to the lifting of British Colombia's moratorium on offshore oil and gas development. PSG cited the existence of large numbers of seabirds in the coastal waters that would be at risk, especially in Hecate Strait. The Minister responded that the province would lift the moratorium only if it could be demonstrated that offshore development could be done in an environmentally safe manner.

Western Mexico

PSG wrote to the Mexico's Minister of the Environment and Natural Resources in 2003 to object to a proposal by the Chevron Corporation to build a liquefied natural gas facility 600 meters offshore from the Coronado Islands (Harrison, 2004h). The proposed facility included a 1,000-foot-long concrete island to house 1,200 workers. The Coronado Islands supported 4,600 breeding seabirds of 10 species. Among them were half of the world's population of Xantus's Murrelets, Cassin's Auklets, Ashy Storm Petrels, Leach's Storm Petrels *Hydrobates leucorhous*, and Black Storm Petrels *Hydrobates melania*. Several of these species were endangered or threatened in Mexico. Many are nocturnal, and exposure to lights near the colonies could cause them to abandon nesting. Mexico's National Commission for the Knowledge and Use of Biodiversity designated this area a priority marine region. When the Mexican government approved the project in 2004, PSG asked the Commission for Environmental Cooperation, an arm of the North American Free Trade Agreement (NAFTA), to investigate Mexico's failure to enforce its environmental laws (Harrison, 2005d). The NAFTA Commission began investigating in 2007, and the Chevron Corporation abandoned the project soon thereafter (Harrison, 2007i).

In 2009, PSG asked the Commission for Environmental Cooperation to investigate plans to develop harbor facilities near Manzanillo, Colima (Harrison, 2009f). PSG expressed concerns that the project would degrade Laguna Cuyutlán, a natural coastal lagoon system that is critical for nesting California Brown Pelicans, Laughing Gulls *Leucophaeus atricilla*, Magnificent Frigatebirds *Fregata magnificens*, and Forster's Terns *Sterna forsteri*. Because of its exceptional conservation values, PSG urged that Laguna Cuyutlán and similar lagoon systems be preserved. PSG recommended that, before any development occurred, Mexico undertake an environmental review to minimize habitat degradation and to maintain the lagoon's ecological integrity. Part of Laguna Cuyutlán is now a Ramsar Site (i.e., a wetland of international importance) and is under consideration to be designated as a Natural Protected Area.

Australia, the Caribbean, and Japan

PSG wrote to Australian officials objecting to a proposed phosphate mine on Christmas Island in the Indian Ocean (Sowls, 1987). The location was located near internationally important seabird colonies, including the only breeding site for Abbott's Booby *Papasula abbotti*, and the proposal ultimately was withdrawn.

PSG also wrote to the British National Space Center in 1998 objecting to the construction of a satellite launching station on the uninhabited Sombrero Island, Anguilla (PSG, 1998c). The development would have destroyed important colonies of 10 species of tropical seabirds, included Masked Boobies *Sula dactylatra*, Red-billed Tropicbirds *Phaethon aethereus*, and Roseate Terns *Sterna dougallii*. The project was canceled, and Sombrero Island became a Ramsar Site in 2018.

PSG and the JSG wrote jointly in 2012 to Japanese officials concerning a proposed power plant in the Seto Inland Sea (Smith, 2012c). They stated that elevated water temperatures, pollution, and human disturbance might affect Japanese Murrelets, Ancient Murrelets, and Streaked Shearwaters *Calonectris leucomelas*. These species occur in waters near the proposed plant, and each is an Endangered, Threatened, or Vulnerable species. PSG's East Asia Seabird Conservation Committee continues to monitor the proposed power plant, which has not been built but remains alive in planning documents.

PSG'S MOST SIGNIFICANT CONSERVATION ACCOMPLISHMENTS

Clearly obvious in the above review, PSG has significantly contributed to conserving seabirds, especially in the Pacific Ocean, during its first four decades. Its accomplishments include those actions it took directly and those undertaken by organizations and individuals that PSG inspired. PSG is an all-volunteer society and lacks the human or financial resources to independently undertake major initiatives. PSG exemplifies President Harry Truman's observation that "It is amazing what you can accomplish if you do not care who gets the credit." PSG has contributed, often as a catalyst, to scores of conservation successes. The six initiatives summarized below merit special recognition.

1. Eradicating Invasive Alien Animals From Seabird Colonies

PSG first advocated eradicating invasive alien predators from seabird colonies with a resolution that addressed a problem that many biologists had recognized for decades (PSG, 1982a). For example, the intentional introduction of foxes to Alaskan islands

beginning in the eighteenth century devasted seabirds there (Bailey, 1993). The US military accidentally introduced Black Rats to Midway Atoll in 1943, and the rats soon began extirpating ground-nesting seabirds such as Bulwer's Petrels and Bonin Petrels *Pterodroma hypoleuca* (Fisher & Baldwin, 1946). In the 1970s and 1980s, biologists in New Zealand pioneered and gradually improved poisoning techniques that enabled the eradication of rodents and other alien predators from increasingly larger islands (Clout & Russell, 2006; Robertson & Bell, 1984), but such projects were not common elsewhere at that time.

PSG focused on the eradication of invasive alien predators for its conservation agenda in 1992 and created a master list of colonies in Alaska, BC, Washington, California, Hawai'i, and western Mexico where predators should be eradicated within a decade (Harrison, 1992a; Rauzon, 2007). For most conservationists, killing one species (typically using poisons, traps, or firearms) to protect another species is not a preferred or intuitive management solution. Some animal rights groups have filed lawsuits to oppose such projects. PSG's reputation as a professional society and its leadership on this issue facilitated bringing the policy of eradicating introduced predators from seabird colonies into the mainstream of conservation.

PSG's advocacy opened doors for governmental agencies to support and allow extermination projects and for agencies and foundations to fund accomplishing these goals. Decades after PSG announced this issue as its highest priority, eradication has become a "foundational conservation action" (Spatz et al., 2022; Veitch et al., 2011). The annual number of eradication events on islands in the US peaked in the mid-2000s, perhaps suggesting that much of the low-hanging fruit had been picked (Spatz et al., 2022). Yet the spatial extent of where alien predators are being eradicated continues to rise each year as increasingly challenging projects on larger islands are being tackled.

As triumphs became legion, the successes begat additional projects that were also victories. Invasive alien animals have now been removed from most colonies that were on PSG's list in the early 1990s. PSG assisted FWS biologists in the Alaska Maritime National Wildlife Refuge to obtain funding and authorization to eradicate foxes from 48 of 50 islands in the refuge, totaling nearly 1.5 million acres (6,070 km^2) with over 2,000 miles of coastline (Thomson & Byrd, 2021). In western Mexico, 60 populations of invasive mammals have been eradicated from at least 39 islands, at least 30 of which are now entirely free of invasive mammals (Aguirre-Muñoz et al., 2011). PSG's 1995 workshop in Ensenada that trained Mexican biologists in predator-control techniques has paid off handsomely in western Mexico.

Seabirds typically are resilient. Once free of predators on their nesting islands, previously extirpated seabird species have returned to breed again in most cases, and many populations have increased dramatically. It can be rare in conservation work to witness immediate positive results, and such successes encourage conservationists to participate in and to support eradication projects. The extermination of cats on the equatorial islands of Howland, Baker, and Jarvis enabled seabird diversity and population levels to return to historically recorded levels (Rauzon, 2016; Rauzon et al., 2011). Formerly extirpated seabirds quickly returned there to breed, including Spectacled Terns, Blue Noddies, Brown Noddies, Christmas Shearwaters *Puffinus nativitatis*, Tropical Shearwaters *Puffinus bailloni dichrous*, and possibly Polynesian Storm Petrels *Nesofregetta fuliginosa*. The recoveries were similar for Kure Atoll, Midway Atoll, and Lehua Island in the Hawaiian Archipelago (Rauzon, 2007) and for Wake Island in the Central Pacific (Rauzon et al., 2008).

The list of success stories after the removal of introduced species from seabird nesting islands is extensive, and seabird colonies throughout the world are being restored after invasive species are removed. Eradicating invasive animals has been attempted at least 1,550 times on 998 islands, with an 88% success rate (Spatz et al., 2022). PSG's leadership has helped foster these successes.

2. Conserving Marbled Murrelets

PSG is the nation's lead organization for conserving Marbled Murrelets and has written some 200 letters to various federal, state, and provincial agencies urging specific actions. Because Marbled Murrelets are an elusive species that nests in old-growth forests, their natural history was so poorly known that the first nest was not found until 1974. PSG first asked forestry agencies in 1982 to conserve murrelets (PSG, 1982b) because their populations were declining, and the logging of old-growth forests was jeopardizing their existence. PSG's MMTC stimulated the formation of an interagency working group to address their management and provided the scientific basis for the Portland Audubon Society's 1988 petition to list Marbled Murrelets under the federal ESA.

PSG labored for years to persuade agencies to support its listing, and PSG's membership in ICBP–US and ABC provided a megaphone to educate the national conservation community about Marbled Murrelets. PSG identified research priorities, suggested management guidelines, and developed survey protocols. After Canada and FWS listed the species as Threatened, PSG pivoted to help designate Critical Habitat and to formulate a viable Recovery Plan. Even after achieving these goals, PSG took the lead in resisting multiple efforts to weaken protections, including efforts to delist the species and attempts to pare back Critical Habitat designations for old-growth forests. PSG vigorously countered each move with scientific arguments and focused FWS and other agencies on recovering declining populations. PSG's prevention of a windfarm project adjacent to an important nesting area on the coast of Washington (Harrison, 2011), discussed above, set a precedent for PSG to successfully oppose other problematic windfarm projects in subsequent years.

The MMTC continues to function after almost four decades. Populations are thought to be stable or increasing in Oregon and northern California but decreasing in Washington. FWS attributes the overall lack of recovery in this region to low productivity (FWS, 2024b). Without PSG's marathon efforts, populations would be much lower, and the murrelet would probably be extinct in parts of its range.

3. Protecting Seabird Colonies in Western Mexico

For over half a century, PSG has been a passionate proponent of protecting the seabirds and colonies in western Mexico, a region that harbors one-third of the world's seabird species (Holmes et al., 2023). PSG's policy statements and a conservation plan championed by David G. Ainley, Daniel W. Anderson, and Enriqueta Velarde identified the most important colonies and species to be protected (PSG, 1974; PSG, 1985b; PSG, 2005). PSG's support for creating a

Pacific Islands Biosphere Reserve that protects 20 species totaling 2.3 million seabirds helped make it a reality in 2016.

As discussed above, PSG's 1995 symposium in Ensenada on enhancing seabird populations through animal and vegetation management, along with its associated workshop on state-of-the-art predator-control techniques, provided practical training for a passel of committed Mexican biologists. PSG's planning for this project laid the groundwork for preparing a Master Plan for the conservation of Baja California's seabirds, including summarizing available information, seabird status, distribution, and abundance, with a focus on introduced predators (Everett, 1994). The biologists at the workshop succeeded in compiling an atlas identifying the Mexican islands with predators, descriptions of affected animals, and recommendations for action (Rauzon, 2007).

Protecting seabirds and their colonies in western Mexico is now a stunning success. About 4,500 islands are protected, and many of them are now World Heritage Sites. For over 20 years, Mexico has been implementing a National Island Protection Program (Holmes et al., 2023). As explained in Aguirre-Muñoz et al. (2011):

> "…social acceptance, organized advocacy, scientific research, private and public funding, and institutional support grew and matured, consolidating into a critical mass for island conservation and restoration comprising federal government agencies, academic institutes and universities, local communities, fishing cooperatives, civil society organizations, and national and international donors."

Of 27 known historically extirpated colonies, 23 have been restored and 12 new colonies have been founded (Bedolla-Guzmán et al., 2019). Remarkably, the Mexican government's stated goal is to eliminate all invasive animals from islands by 2030 (Holmes et al., 2023). Scores of individuals and organizations deserve praise for this stunning achievement, and PSG is prominent among them.

4. Promoting the Wise Use of Oil Spill Recovery Funds

Oil spills may no longer rank as one of the top threats to seabirds (Dias et al., 2019), but they were a paramount conservation problem during PSG's formative years. Fifteen times more oil by volume was spilled in the marine environment during 1970–1979 than in 2000–2009 (Kim et al., 2023). The worldwide ban on single-hull tankers contributed to the reduction in the number of oil spills and the associated seabird catastrophes (Harrison, 2003d).

PSG has been a leader in helping the trustees of oil spill restoration funds spend wisely. PSG's EVOS restoration workshop, which assembled seabird restoration experts from Canada, France, Japan, New Zealand, the United Kingdom, and Saudi Arabia in 1995, was a landmark event. PSG published the workshop's insights and conclusions (Warheit et al., 1997), making this information available to a broad international audience. PSG achieved a fundamental breakthrough when it persuaded EVOS Trustees to broaden the area of consideration for seabird restoration to include projects located far from a spill site. Once this concept was accepted, restoration funds could be used to remove predators from distant colonies where the conservation dollars provided the best mitigation of the loss (Rauzon, 2007). Subsequently, as discussed above, PSG educated trustee councils that funding restoration projects away from a spill site was a standard practice because other trustee councils had already done so. PSG even persuaded two trustee councils in California to fund the eradication of rats from Sooty Shearwater colonies in New Zealand as a mitigation for birds that had been oiled in California. PSG also persuaded three trustee councils to fund projects in western Mexico to restore California Brown Pelicans and other seabirds as mitigation for oil spills and DDT contamination in California waters. PSG's enduring legacy is that it helped to ensure that those projects that are most likely to restore injured seabirds were approved wherever they may be located.

5. Conserving Newell's Shearwaters

PSG first urged an agency to conserve Newell's Shearwaters in 1979 when it asked the Mayor of Kaua‘i County to address the artificial lighting that caused fledgling "fall out." This request was made just four years after FWS had listed the species as Threatened. FWS mostly ignored Newell's Shearwaters for decades. In the late 1990s, it became clear that its population had begun to decline rapidly around 1993 after Hurricane Iniki (Ainley et al., 2001). PSG began pestering FWS to collect more information on population status, to prevent collisions with powerlines, and to protect the remaining colonies from invasive alien predators. PSG eventually raised the species' profile, but by the time FWS and state agencies began work to restore it in earnest, the population had collapsed. Radar studies indicate its population declined by 93% from 1993 to 2020, much of which occurred before 2009 (Ainley et al., 2020; Day et al., 2003b, Raine et al., 2017). Although the downward trend has abated (Ainley et al., 2023), the population remains greatly depressed and shows little evidence of an increase (FWS, 2024a).

Active management has ramped up considerably, especially during the past decade or so. Projects include addressing attraction to artificial light, powerline collisions, and intensive management of small colonies. Kaua‘i has been long the epicenter of its range, constituting 90% or more of the population. Radar surveys confirm that breeding occurs on the islands of Hawai‘i and Maui, and possibly on Moloka‘i and O‘ahu (Ainley et al., 2020). Efforts are being implemented to protect potential colonies, to attract birds to such areas, and to establish colonies via translocation. Eight colonies on Kaua‘i are now managed for predator control, including fences to exclude predators (FWS, 2024a). The only site that is not located in northwestern Kaua‘i is situated within the Kīlauea Point National Wildlife Refuge. Chicks have been translocated from there to a site within a 2.8-ha predator-exclusion fence (VanderWerf et al., 2023). The growing colony is located relatively far from powerlines and lights that might attract fledglings. A colony has also been established on Maui via social attraction (Spencer et al., 2024).

Enhanced management may explain the current steady population trend, but it also suggests that Newell's Shearwaters require active conservation measures. Management efforts, however, have not yet reduced powerline collisions or depredation by alien mammals sufficiently for populations to rebound. The small population size, together with the clustering of most colonies in a small area, renders the species especially vulnerable to catastrophic events. FWS recently recommended changing the listing from Threatened to Endangered because the status of Newell's Shearwaters continues to be worse than previously understood (FWS, 2024a). Hence, the future for Newell's Shearwaters remains uncertain. Although PSG's actions to conserve it initially were unavailing, they probably improved its current situation.

6. Protecting Terrestrial and Marine Environments Essential to Seabirds

PSG has urged protecting seabird colonies and their adjacent waters since 1975, both within the US and abroad. It was irrelevant whether the entity managing a colony was a national or local government or whether the colony was designated as a park, wildlife refuge, sanctuary, or other protected status. PSG's advocacy included all important colonies in western Mexico; much of coastal Alaska; Protection Island, Washington; Crater Hill, Kaua'i; and East Sand Island, Oregon.

PSG's affiliation with ICBP–US provided a vehicle to enlist dozens of conservation organizations to support marine sanctuaries to protect seabirds in the 1980s. PSG calls for protecting waters near colonies have included most North Pacific nations, a few South Pacific nations, and the Ross Sea. Except for East Sand Island in Oregon, each of these efforts eventually bore fruit. It is truly gratifying that most colonies (often including their adjacent waters) in such nations as Mexico, Peru, and Ecuador are now protected (Kim et al., 2023).

PSG remarkably helped designate two Marine National Monuments in the Pacific Ocean. Beginning in 1982 with a request to NOAA to create marine sanctuaries around the Hawaiian Islands National Wildlife Refuge and other US possessions, PSG pestered federal agencies for decades before ultimately succeeding. Today, the waters adjacent to the Hawaiian Archipelago and eight atolls in the US Tropical Pacific are protected. Collectively, they may constitute the largest marine preserve on the planet.

CONCLUSION

PSG has long carried out sustained conservation actions to implement its vision to protect seabirds at land and sea, especially in the Pacific Ocean, through organizing and focusing the activities of its members. Wildlife conservation rarely provides instant gratification. Persistence, patience, and playing the long game pay off. Many of the policies that PSG has advocated have taken decades to bear fruit or remain a work in progress. My contention in 1985 that a marine sanctuary to protect the waters around the Northwestern Hawaiian Islands was "an idea whose time has come" proved to be premature by decades. PSG's efforts to protect seabirds in western Mexico likewise took decades, but the positive outcome there is now almost beyond the imagination of PSG's advocates a half century ago. PSG's request for National Wildlife Refuge status for East Sand Island in the Columbia River estuary, the largest unprotected seabird colony in North America, might still become a reality someday. There are all too many colonies that still harbor alien predators.

In some respects, PSG's first 40 years were a golden age for seabird conservation with much low-hanging fruit. Many new regulatory programs were being implemented (e.g., ESAs, the National Marine Sanctuary Program, oil spill trustee councils), and opportunities to shape them to promote seabird conservation were abundant. Nevertheless, seabirds still face new and age-old conservation challenges that PSG should address, including helping Marbled Murrelets, Newell's Shearwaters, and Caspian Terns recover.

Thirty years ago, a spokesperson for the Old Harbor Native Corporation wrote, "if awards are ever handed out for the 'smallest group—biggest impact' on the *Exxon Valdez* Restoration Project, PSG deserves first place" (Harrison, 1995a). I hope that PSG will continue its rich and storied legacy as a world leader in promoting the conservation of Pacific seabirds and their environment.

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