

EPILOGUE

THE SECOND DECADE OF LONG-TERM ORNITHOLOGICAL STUDIES AT OMORA PARK: NEW ORNITHOLOGICAL PERSPECTIVES FROM THE SOUTH

JAIME E. JIMÉNEZ AND RICARDO ROZZI

The diversity and peculiarities of the birds of the southern cone of South America have drawn the attention and have fascinated many laymen and scholars of birds. Since the beginning of European explorations to the ecoregion of the Magellanic sub-Antarctic forests, observations on birds were recorded by Sarmiento de Gamboa, James Cook (Beaglehole 1955), Parker King (1830), Charles Darwin (1939), and Ouslelet (1891), among others. Some made collections and descriptions of the first species, most of them around the Strait of Magellan and Cape Horn. These were followed by observations of Crawshay (1907) in Tierra del Fuego. Then, in the second half of the twentieth century, local researchers such as Olrog (1948, 1950), Reynolds (1934, 1935), and Humphrey *et al.* (1970) continued with collections of natural history and descriptions of the bird species, both, in Tierra del Fuego and on other Fuegian islands. These were supplemented in recent decades by observations, censuses, and species lists by Bernath (1965), Sielfeld (1979), Barros (1971, 1976), Venegas (1981, 1991), Schlatter & Riveros (1987) and others. During this period, some works also focused on more detailed and specific aspects of the biology of species such as the Magellanic Plover (*Pluvianellus socialis*) (Jehl 1975), the Ashy-headed Goose (*Chloephaga poliocephala*) (Schlatter *et al.* 2002), the Ruddy-headed Goose (*Chloephaga rubidiceps*) (Blanco *et al.* 2001, Madsen *et al.* 2003) or the Magellanic Woodpecker (*Campephilus magellanicus*, McBride 2000, Vergara & Schlatter 2004, Schlatter & Vergara 2005). At the community level, the ecology of forest birds on the island of Tierra del Fuego (Deferrari *et al.* 2001, Vergara & Schlatter 2006) and of seabirds in the Beagle Channel (Schiavini & Yorio 1995, Schiavini *et al.* 1999, Raya Rey & Schiavini 2000) have been studied. All these works have been limited, however, to short periods, mainly during the breeding season of the austral summer.

In this book we have presented the first synthesis of long-term ornithological studies developed by the interdisciplinary team of the Omora Ethnobotanical Park in the Cape Horn Biosphere Reserve. We have compiled a selection of papers with systematic research, focused primarily on forest birds, and some wetland and coastal environment birds. These papers contribute to the knowledge of the seasonal variations in diversity and abundance, natural history and ecology of the bird species of the Cape Horn Biosphere Reserve, mainly of those from Navarino Island. The topics covered are diverse and include detailed morphometric studies, the autecology of some species, parasitism, descriptions of population dynamics, impacts of predators, distributions and the study of birds also considering the culture and ethno-ornithological knowledge of the ancestral Yahgan native people.

Despite the advances presented in this book and the milestone in the understanding of the birds of the planet's southernmost forests, our understanding of the processes and patterns of bird's ecology and biogeography is still very fragmentary and far from complete. There are still many aspects that are completely unknown for most of the species and that deserve to be studied. The questions are many and diverse. For example, How much do we know about the migratory routes of the species of both terrestrial and aquatic birds, both freshwater and marine? How far do they move and what are their wintering grounds? Our knowledge of most species' population biology is almost nil, as is our knowledge of how the biological processes are governed by internal and external mechanisms, biotic and abiotic factors, and to what extent these can be modified by environmental changes such as global climate change. What are the magnitudes and how are vital rates such as reproduction, survival, mortality, and others are regulated? What is, and what will be the influence that human activities such as fisheries and salmon farming, alteration of forests and landscapes, the potential mass tourism or special interest tourism, including high mountain trekking have on southern birds? It is essential to evaluate the effect of these activities, which have been operating for some decades, but have increased steadily. May human activities have impacts not only on local bird populations, but also on the biota in general. In the context of rapid global and regional environmental change, birds may serve as sentinels of the responses of biodiversity and ecosystems. The pristine condition of much of the archipelagoes could provide a good opportunity to make comparisons with those areas where human impacts have been heavy and lengthy. It is therefore essential to maintain a baseline monitoring that provides information to quantify environmental changes.

Detailed studies on the population biology of species representative of guilds will help to better understand the unique characteristics of the fauna of these high latitudes. We already know some about the impacts that exotic species have: pervasive impacts of the American mink (*Neovison vison*) on coastal birds have been documented, especially on species that nest on the ground, such as the Flightless Steamer-duck (*Tachyeres pteneres*) and the Kelp Goose (*Chloephaga hybrida*). However, the impacts of this introduced predator could escalate to disastrous levels. It is highly likely that changes are occurring in the populations of many species of birds before there will be time to document them. For example, it appears that the American mink has locally extirpated populations of the southernmost rhinocryptid, the Magellanic Tapaculo (*Scytalopus magellanicus*) in the Omora Park. These ground dwelling birds were commonly heard in the Omora Park until just 10 years ago. Now, you can only find populations of *S. magellanicus* in the more remote islands, which the mink have not yet reached. The effect on the landscape by another invasive species, the American beaver (*Castor canadensis*), has also been documented: it is widespread and has devastated forested landscapes and watersheds. However, beaver impacts on forest ecosystems and wetlands birds—which are likely—are still not studied. Regarding introduced bird species, fortunately we have only recorded House Sparrows (*Passer domesticus*) and Rock Doves (*Columba livia*) as exotic birds in the Cape Horn Biosphere Reserve. Given that these records are restricted to the town of Puerto Williams, we suspect that the impacts of these exotic birds on local ecosystems would be minor.

Our data shows that as annual precipitation increases above 1000 mm, bird abundance decreases. However, we know very little on how birds are distributed at the fine-scale in different environments and during different seasons of the year in the islands of the archipelagos of the western and southern sectors of the biosphere reserve. Most of the work has focused on Navarino Island, mainly on the north coast, where there is good road access, especially in and around the Omora Park, which represents only a small fraction of all habitats available to birds on the island. It is important to consider the greater habitat diversity, since it is very likely that the little we know from specific sites may not be representative of the complex topography and the myriad of islands and vast areas of southern exposure that are subjected to climatic stressors, such as strong westerly winds or ocean currents. The diversity and heterogeneity of environments have also been very little studied. For example, we found no studies describing the bird communities of the important and extensive high Andean ecosystem environments of the islands or in the areas west of the biosphere reserve. These are other fertile fields that need studying to improve our understanding of these ecosystems and their components.

The geographic configuration of Fuegian land masses and channels seems to be an ideal laboratory to decipher spatial and temporal patterns and processes that affect bird distributions, and thus, awaits studies. Additionally, to better understand the roles of birds in the dynamics of energy and fluxes of nutrients, as well as their ecological interactions with plants, insects, and other organisms, it will be necessary to further develop studies on the trophic relationships among birds and their ecosystems components. In this regard, owls and raptors play an important role as top predators. Due to the absence of native carnivorous mammals in the region, this guild would be of particular interest to study. Home range studies for resident birds, such as the Thorn-tailed Rayadito (*Aphrastura spinicauda*) or the Magellanic Woodpecker, also open questions about the seasonal variations of their behaviors and diets. For migratory species such as White-crested Elaenia (*Elaenia albiceps*) we need to know more precisely its habits regarding site fidelity and migration routes. Currently, new technologies that allow us to track small individual birds are being tested. We started to fit White-crested Elaenias in the Omora Park with small devices known as geolocators that record and store the light intensity and time (Figure 1). These devices will help us to unravel the routes, wintering grounds, and other interesting information about these little migrant birds. We only know that one species migrates between the Amazonian and the sub-Antarctic forests, but nothing is known about their migration habits, timing, connectivity, and specific wintering grounds.

Under the scenario of global environmental change, de-coupling of the times bird species arrive to the region to reproduce, and the availability of local resources that constitute their food base, will or already is occurring. More specifically, for example, we may ask, What is the role of the Green-backed Firecrown (*Sephanoides sephaniodes*) in the pollination of certain plants species or of Austral Thrushes (*Turdus falcklandii*) in seed dispersal? What would happen to these southern forests if wood boring insect eaters, such as the Magellanic Woodpecker, or the White-crowned Elaenia (as a migrant), disappear? What are the evolutionary processes in which birds interact with the environment and with other species? How different are these from those of other nearby or distant regions?

We know that sub-Antarctic ecosystems are unique and have no replicate. The sub-Antarctic region has a lower land/ocean ratio than its northern latitudinal counterpart that continues to decrease towards the south until Cape Horn. Thus, these land masses, by being surrounded by vast oceans, have milder weather than in the northern hemisphere. Also, because of this, and the different geological histories and evolutionary lineages of the birds, the results and paradigms generated in the northern hemisphere cannot be directly applied to this region. Thus, the importance of generating local knowledge is essential. Then, we would be able to evaluate the similarities and differences in the biological patterns of bird species groups compared to these in the northern hemisphere. By making these inter-hemispheric comparisons, it is likely that we will find some surprises that will make us rethink what we understand about the bird ecology of temperate and sub-polar areas.

The sub-Antarctic forest birds can also help us to understand rapid environmental changes that result from increasing anthropogenic influences on the planet. The condition of extreme distributions of many species of birds that live or breed in the Cape Horn region appear



Figure 1. Left, White-crested Elaenia (*Elaenia albiceps*) bearing a geolocator as part of our studies of bird migration between the sub-Antarctic forests of Cape Horn and the tropical forests of Amazonia. Right, Geolocator being installed on banded Elaenia. Photos Jaime E. Jiménez.

to be an ideal natural laboratory to address such questions. Faced with this emerging knowledge and with the important role that birds directly or indirectly play on ecological processes and in our lives—think about the Magellanic Woodpecker as a charismatic species for the protection of the forest or as an emblematic bird for attracting ecotourism (Figure 2)—it is essential to promote long-term research and monitoring to assess population trends in parallel to short- and medium-term studies to track changes in environmental processes in the different environments of the region. This monitoring could be specific for the most representative environments or for those most likely to be impacted in the near future, as well as to record the abundances of birds at greater spatial scales, including the little studied western and southern islands of the Cape Horn Biosphere Reserve.

Birds as models for learning and of approaching our current global society that has concentrated in cities, with daily lives distant from nature, represent an opportunity we should not miss, both from the point of view of the new knowledge that we can learn from them, as well as of that we can still learn from ancient cultures and educational elements for local people, formally or informally. The latter seems crucial, since we have perceived a great ignorance of the unique and peculiar region, as a result of an alarming biocultural homogenization processes. What is not known is not valued, and what is not valued is not cared for and preserved.

In summary, the unique features of both the birds and ecosystem, and cultural mosaics open a wealth of possibilities for deepening our knowledge of birds and improve our relationships with them before it is too late. We hope that this book will serve for that purpose and that the ideas and questions raised in this last section motivate the questioning and exploring of other facets of bird life in the Cape Horn region during the second decade of the Long-Term Ornithological Studies Program in the Sub-Antarctic Forests of Cape Horn in the Omora Park. Birds offer our current global society that is concentrated within cities a unique opportunity to reconnect with nature and the diversity of life that we should not miss. From the south of the world, we seek to contribute to the knowledge of the birds and the protection of the habitats we share with them, for the welfare of present and future generations of both humans as birds and biodiversity as a whole.

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Figure 2. The charismatic Magellanic Woodpecker (*Campephilus magellanicus*). A male (upper left) feeding on wood-boring larvae and a female (upper right) perching on a younger branch of a High-deciduous beech or Lenga (*Nothofagus pumilio*) in the Cape Horn Biosphere Reserve, observed by groups of visitors at Omora Park. Photos Jaime E. Jiménez.

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