Effective Conservation and Good Governance at the Ramsar Site Bahía Lomas, Tierra del Fuego, Chile

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INTRODUCTION

Bahía Lomas, in South America, is the most southerly Ramsar site, located at the eastern end of the Magellan Strait, on the northern coast of the island of Tierra del Fuego, Chile. This marine wetland covers approximately 58,946 ha (Figure 1) and belongs to the State of Chile, while the surrounding area is privately owned. Bahía Lomas is the most critical wintering area of Red Knot (*Calidris canutus rufa*) and is the second most important place for Hudsonian Godwit (*Limosa haemastica*; Morrison and Ross 1989, Morrison et al. 2004, Niles et al. 2008). This wetland also has significant numbers of Magellanic Oystercatcher (*Haematopus leucopodus*), White-rumped Sandpiper (*C. fuscicollis*), Two-banded Plover (*Charadrius falklandicus*), Least Seedsnipe (*Thinocorus rumicivorus*), and Magellanic Plover (*Pluvianellus socialis*; Espoz et al. 2016). Red Knot has undergone a massive population decline over the past two decades (Harrington and Flowers 1996, Morrison and Harrington 1992, Morrison and Ross 1989, Morrison et al. 2004, Niles et al. 2008). The abundance of Red Knot has contracted to the point that virtually the entire population is now confined to Tierra del Fuego where numbers decreased from 53,232 in 1986 (Morrison and Ross 1989) to 14,800 in 2008 (Niles et al. 2008). Regarding flora, grassland ecosystems dominate the wetland, with a predominance of *Poa* and *Festuca* grasses. In some sectors towards the coastal edge of the intertidal plain, tussock, scrub, and vegetative components of annual and biannual grasses dominate (Espoz et al. 2016). Characteristic species are *Sarcocornia magellanica* and *Atriplex vulgatissima* (Figure 2).

After 20 years of research and monitoring, this article aims to present the conservation and governance process that has allowed Bahía Lomas to have effective conservation and represents a management model for the conservation of shorebirds and wetlands in the southern hemisphere.

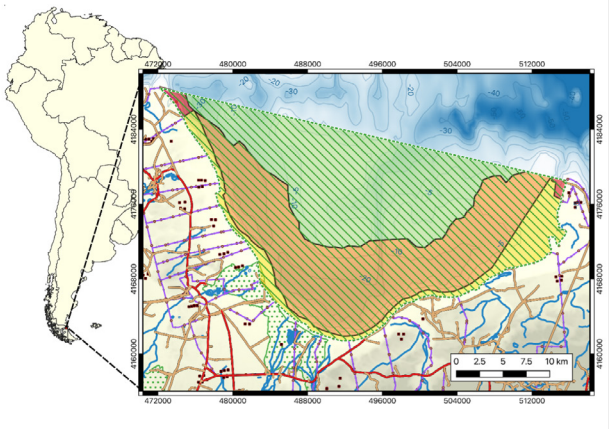

Figure 1. Geographic location of the Bahía Lomas marine wetland in Tierra del Fuego, Chile. Key to colors: green = preservation zone, brown = area of conservation and particular uses, yellow = buffer zone, and red = areas of sustainable management of natural resources.

BAHÍA LOMAS

Bahía Lomas is the southernmost Ramsar site in Chile, located near the eastern end of the Straits of Magellan on the north shore of the main island of Tierra del Fuego. Geographically, the bay is situated between Punta Catalina on the east (52°32'05''S-68°49'4''W) and Punta Anegada on the west (52°27'3''S-69°26'14''W; Figure 1). According to the Ramsar classification, Bahía Lomas is a coastal marine wetland (Frazier 1996) that represents the Chilean coast's most extensive tidal variation range. In South America only the existing plain in Bahía San Sebastián in Tierra del Fuego, Argentina is comparable. In Bahía Lomas, the low tide zone exceeds 7 kilometers daily, measured from the highest tide line in the direction of the sea. Consequently, this bay contains a wide area of continuous and channeled muddy plains (Morrison and Ross 1989),

Figure 2. *Sarcocornia magellanica* and Side River in Bahía Lomas marine wetland, Tierra del Fuego, Chile. (Photo by Antonio Larrea)

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after which large stretches of sand predominate. The linear distance between each margin of the bay is approximately 69 km. In the austral summer season (December to March), Bahía Lomas is characterized by low temperatures (between 6° and 12° C), winds exceeding 80-90 km/h, and low rainfall, with common abrupt climatic changes. In austral winter (June-August), the climatic conditions change towards temperatures below -1 °C and mild winds that do not exceed, most of the time, 60-70 km/h.

CONSERVATION ADVANCES

Over time, research in Bahía Lomas has been a critical factor in producing the scientific and technical knowledge necessary to make decisions that secure the effective management and conservation of the wetland. The first conservation efforts of the Bahía Lomas marine wetland date back to 2001 with the beginning of periodic visits to the area - the first censuses of shorebirds carried out by Chilean researchers (Figure 3) in collaboration with Guy Morrison and Ken Ross (see Morrison and Ross 1989), and campaigns to capture and ring shorebirds led by Lawrence Niles and funded by the New Jersey Division of Endangered and Nongame Species from the United States. Both aerial and terrestrial surveys are currently supported by the National Wildlife Research Center of Canada and "Empresa Nacional del Petróleo" (ENAP). In 2003, an ecological monitoring program led by a team from Universidad Santo Tomás was started. The aims are to evaluate abundance and distribution of macroinvertebrates in the mudflats, the trophic ecology of *Calidris canutus rufa*, and the physical, chemical, and biological characteristics of the sediments and water of Bahía Lomas (Espoz et al. 2008, 2011). This monitoring program is in effect as of today.

Figure 3. A mixed flock of Red Knot (*Calidris canutus rufa*) and Hudsonian Godwit (*Limosa haemastica*) registered during the aerial census in January 2021, Bahía Lomas marine wetland, Tierra del Fuego, Chile. (Photo by Heraldo V. Norambuena)

Since sheep farming is the main land use activity in the area, it was necessary to have sheep farmers join conservation efforts as allies. This relationship has had to be constantly reinforced over time, as new owners arrive at the "estancias" near the wetland. In the year 2004, with the support of Ministry of the Environment (formerly CONAMA), this wetland received recognition as Ramsar Site – a wetland of international importance (Vilina et al. 2004). Later in 2009, the wetland was designated as a Site of Hemispheric Importance for Shorebirds (WHSRN site) for the abundance of Red Knot and Hudsonian Godwit. Moreover, in April 2020, the State of Chile declared Bahía Lomas a Nature Sanctuary, the first in the Magallanes and Chilean Antarctic Region. This last categorization required the development of a management plan and the participation of an operating committee for the conservation of Bahía Lomas. While this wetland has had a management plan in place since 2011 (see Espoz et al. 2011), it was updated and expanded in 2021. The conservation targets of the latest management plan are: 1) Red Knot, 2) Hudsonian Godwit, 3) Magellanic Plover, 4) austral shorebirds, 5) tidal flat, 6) coastal edge vegetation, 7) Side River mouth, 8) archaeological sites, and 9) cetaceans.

THREATS TO THE WETLAND

During the last participatory process of updating the management plan of Bahía Lomas, workshops and interviews were held with key actors in the conservation and study of the area. Ten threats to the wetland were identified:

1. Risks of spills due to oil platforms (active and inactive) in Bahía Lomas and its area of influence (Figure 4a and d).
2. The impact generated by the transit of vessels in the Strait of Magellan on Bahía Lomas and its conservation objects (Figure 4c).
3. Risks of spills from oil wells, pipelines, storage facilities, and compressors located in Bahía Lomas and its area of influence.
4. Risk of accidents involving trucks that transport hydrocarbons or dangerous substances at the crossing of the Side River with the international route CH-259.
5. Tourism not oriented towards the conservation of Bahía Lomas.

6. Livestock practices that do not consider the declaration of Bahía Lomas as a Nature Sanctuary (Figure 4b).
7. Discharge of untreated sewage, hydrocarbons, and polluting substances to the Side River.
8. Exploration and expansion of mining activity on land and in the maritime zone of Bahía Lomas.
9. Presence of invasive alien species.
10. Development of investment projects using wind turbines (or wind farms) on the route of migratory shorebirds.

Following the methodology of open standards for conservation, it was proposed that many of these threats be monitored, controlled, and managed to maintain and ideally improve the conservation status of Bahía Lomas in the next ten years.

GOVERNANCE

The administration of the Sanctuary is the responsibility of the Bahía Lomas Conservation and Management Center Corporation ("Centro Bahía Lomas") under the supervision and custody of the Ministry of the Environment. The Centro Bahía Lomas is part of the Faculty of Sciences of the Universidad Santo Tomás, Chile, and its objective is research, education, and social development around the conservation of the Bahía Lomas Ramsar site (Tierra del Fuego, Chile). It is based in the city of Punta Arenas, Magallanes and Chilean Antarctic Region. In addition to the Centro Bahía Lomas, the governance figure of the area includes an operating committee of 11 members that include: Centro Bahía Lomas, Ministry of the Environment, Provincial Government, Municipality of Primavera, Chilean Navy, "Empresa Nacional del Petróleo" (ENAP), WHSRN Executive Office-Manomet, "Centro de Rehabilitación de Aves Leñadura", "Museo de Historia Natural de Río Seco", Council of National Monuments, and representative of owners of territories near the Bahía Lomas Nature Sanctuary. The Bahía Lomas Nature Sanctuary (SNBL) will be under the supervision and custody of the Ministry of the Environment of Chile. The operating committee conducts semiannual meetings where the Centro Bahía Lomas presents progress on the management and monitoring plans.

FUTURE CHALLENGES

In the management plan period 2021-2030, it has been proposed several goals for the conservation of Bahía Lomas, among which the following stand out:

1. By 2025, the operating committee will implement 100% of the actions of the Work Plan with ENAP, including monitoring and safety programs of HC's exploitation, operation, storage, transport activities, and other polluting substances to be followed in the SNBL and its area of influence.

Figure 4. Activities in the region of the Nature Sanctuary of Bahía Lomas: A) oil platforms, B) extensive sheep farming, C) transit of vessels in the Strait of Magellan, and D) oil platforms and shorebirds. (Photos by Antonio Larrea)

2. By 2025, a General Strategic Communication Plan will be developed to strengthen the capacities and avoid accidents of ENAP staff and companies related to the exploitation, operation, storage, and transport of oil or other polluting substances in the Bahía Lomas and its area of influence.

3. By 2024, the Rescue Plan for birds affected by the oil spill in the Bahía Lomas Nature Sanctuary and its area of influence will be implemented.

4. By 2025, prepare an Action Plan to develop sustainable tourism associated with Bahía Lomas.

5. By 2025, implement a Side River Water Quality Monitoring Program in the Sanctuary's area of influence.

6. All these actions must ensure the population stability of the conservation targets of Bahía Lomas, maintaining population abundances like those registered in the last decade. In addition to the progress related to the management plan, we hope to hire a professional to oversee livestock issues. Also, in 2022 we should have a biological station established in Bahía Lomas, which will include facilities for researchers, and an environmental interpretation center.

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