Argentina

Nomination of Los Alerces National Park as a World Heritage Site

Lake environment with temperate alerce forest

Contents

Executive Summary 4

1. Identification of the Property
- 1.a Country 30
- 1.b State, Province or Region 30
- 1.c Name of Property 30
- 1.d Geographical Coordinates to the Nearest Second 30
- 1.e Maps 30
- 1.f Area of Nominated Property 30

2. Description of the Property
- 2.a Description of Property 34
- 2.b History and Evolution 44

3. Justification for Inscription
- 3.1.a Brief Synthesis 54
- 3.1.b Criteria Under which Inscription is Proposed 56
  - Criterion (vii)
  - Criterion (x)
- 3.1.c Statement of Integrity 63
- 3.1.e Protection and Management Requirements 65
- 3.2 Comparative Analysis 66
- 3.3 Proposed Statement of Outstanding Universal Value 72

4. State of Conservation and Factors Affecting the property
- 4.a Present State of Conservation 78
- 4.b Factors Affecting the Property 84
  - (i) Development pressures 84
  - (ii) Environmental pressures 90
  - (iii) Natural disasters and risk preparedness 92
  - (iv) Pressures caused by abundance of visitors or tourists 97
  - (v) Number of inhabitants within the property and the buffer zone 102

5. Protection and Management
- 5.a Ownership 106
- 5.b Protective Designation 108
- 5.c Means of Implementing Protective Measures 114
- 5.d Existing plans related to municipality and region 118
- 5.e Property Management Plan or Other Management System 126
- 5.f Sources and Levels of Finance 130
- 5.g Sources of Expertise and Training in Conservation and Management Techniques 132
- 5.h Visitor Facilities and Infrastructure 133
- 5.i Policies and Programmes Related to the Presentation 146
- 5.j Staffing Levels and Expertise 149

6. Monitoring
- 6.a Key Indicators for Measuring State of Conservation 152
- 6.b Administrative Arrangements for Monitoring Property 157
- 6.c Results of Previous Reporting Exercises 157

7. Documentation
- 7.a Photographs and Audiovisual Inventory 160
- 7.b Texts Relating to Protective Designation 166
- 7.c Form and Date of Most Recent Records or Inventory of Property 166
- 7.d Address Where Inventory, Records and Archives Are Held 166
- 7.e Bibliography 166

8. Contact Information of Responsible Authorities
- 8.a Preparer 176
- 8.b Official Local Institution 176
- 8.c Other Local Institutions 176
- 8.d Official Web Sites 177

9. Signature on Behalf of the State Party 181

Appendix
- Appendix 1: Maps and Plans 184
  - Map 1: Conservation Categories for the Nominated Property. Los Alerces National Park, Argentina 185
  - Map 2: Andean-North Patagonian Biosphere Reserve: Context for the Nominated Property. Los Alerces National Park, Argentina 186
  - Map 3: Vegetation of the Valdivian Ecoregion 187
  - Map 4: Vegetation Communities in Los Alerces National Park 188
  - Map 5: Strict Nature and Wildlife Reserve 189
  - Map 6: Usage Zoning, Los Alerces National Park 190
  - Map 7: Human Settlements and Infrastructure 191
- Appendix 2: Species Lists 192
  - Appendix 2.1 List of Plant Species Recorded at PNLA 193
  - Appendix 2.2: List of Animal Species: Mammals 212
  - Appendix 2.3: List of Animal Species: Birds 214
  - Appendix 2.4: List of Animal Species: Reptiles 219
  - Appendix 2.5: List of Animal Species: Amphibians 220
  - Appendix 2.6: List of Animal Species: Fish 221
  - Appendix 2.7: List of Animal Species and Threat Status 222
- Appendix 3: Law No. 19,292 228
- Appendix 4: PNLA Management Plan Approval and Contents 242
- Appendix 5: Participative Process for Writing the Nomination Form 252
  - Synthesis 252
  - Management Plan Update Workshop 253
  - Annex A: Interview Guide 256
  - Annex B: Meetings and Interviews Held 257
  - Annex C: Self-Administered Survey 261
  - Annex D: External Workshop Participants 262
  - Annex E: Promotional Leaflet 264
  - Annex F: Interview Results Summary 267
  - Annex G: Survey Results Summary 272
  - Annex H: Esquel Declaration of Interest 274
  - Annex I: Trevelin Declaration of Interest 276
  - Annex J: Chubut Tourism Secretariat Declaration of Interest 278
  - Annex K: Instances of Participation Report 279
- Appendix 6: List of Attractions at PNLA 294

Executive Summary

Country

Argentina

State, Province or Region

Province of Chubut

Name of Property

Los Alerces National Park

Geographical coordinates to the Nearest Second

Latitude: 42o 34′ 43.65″ - 43o 09′ 52.78″ S
Longitude: 72o 09′ 29.55″ - 71o 34′ 40.28″ W
Central coordinate: 42o 51′ 10.08″ S, 71o 52′ 22.08″ W

Textual description of the boundary(ies) of the nominated property

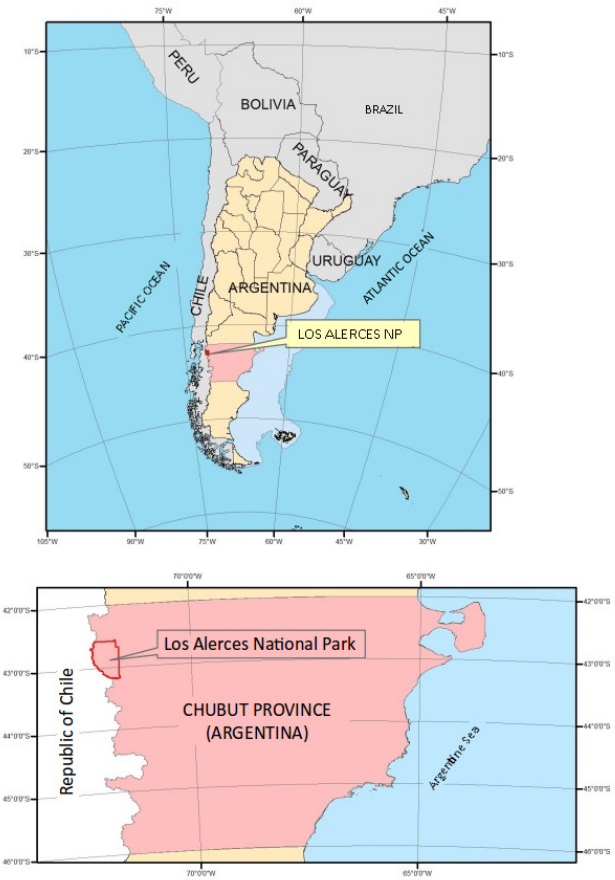
The nominated property comprises the totality of Los Alerces National Park (PNLA, Parque Nacional Los Alerces). Located in the Futaleufú Department, in the mountain- ous region of northwestern Chubut Province, the Park has an extension of 259,822 ha. It was created as a National Reserve by Decree No. 105,433 in 1937; its boundaries and conservation categories were definitively established by Law No. 19,292 in 1971.

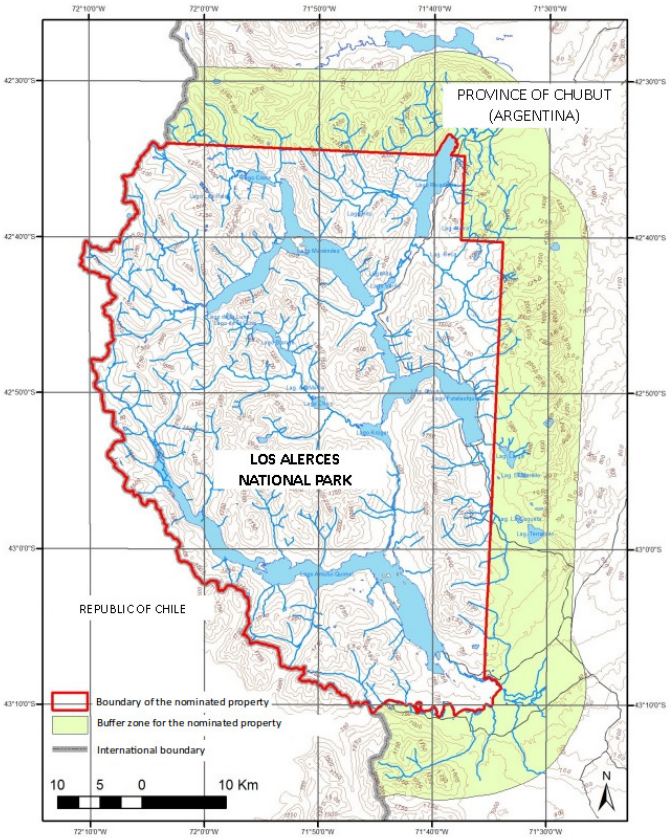
Within PNLA, the National Park per se occupies an area of 188,379 ha, (Cagetory II, IUCN). This area, which includes land and lakes, is completely free of human habita- tion and of fragmentation caused by roads. It includes 71,443 ha of National Reserve (Category VI) inhabited by rural settlers and management and control personnel, as well as the main visitor services and facilities for the protected area. It possesses im- portant conservation values in its own right, and serves as an inner buffer zone for the protected area, providing further protection for the integrity of the stricter conservation areas.

To the west, the boundary of the nominated property runs along the international border with the Republic of Chile, from the border's intersection with the Futaleufú or Grande River (PNLA's southern boundary) northward until reaching Cerro Bonete. From this point, the boundary runs west-east along cadastral lines until reaching the shore of Lake Rivadavia; then runs along the lake's northern shore; then along cadastral lines until reaching approximately longitude 71o 37′ W. The eastern boundary follows cadastral lines running north-south between 71o 37′ W and 71o 34′ W, until reaching the confluence of the Futaleufú and Corintos rivers.

For the purposes of this nomination, the buffer zones in the nominated property's surroundings are defined as the adjacent areas located in the Andean-North Patagonian Biosphere Reserve (ANPBR) — established by UNESCO in 2007 — with other comple- mentary areas that cover a 10-km wide strip around PNLA in Argentine territory. The surface of the external buffer zone is approximately 135,870 ha. Within ANPBR, in adja- cent sectors of the buffer zone to the north and south of PNLA, there are lands reserved for conservation by the Province of Chubut. Acting as a corridor, these lands also help to protect and strengthen the conservation of the nominated property.

LOCATION MAP: BOUNDARIES OF THE NOMINATED PROPERTY AND BUFFER ZONE





Brief Synthesis

The nominated property comprises the totality of Los Alerces National Park and Na- tional Reserve (PNLA, Parque Nacional Los Alerces)[1]. Created in 1937, PNLA pro- tects the millennial forests of alerce — Fitzroya cupressoides — an endangered species of outstanding universal value, being the second longest-living species on Earth, with a lifespan of more than 3,600 years. The Park protects 36% of Argentina's alerce forests, including the forest masses with the greatest genetic variability on the eastern slopes of the Andes. These forests contain exclusive genetic variants and the oldest individuals in the country. They are Argentina's largest alerce forests granted the fullest protection of national law, and the second-largest alerce forests in Chile and Argentina. These forests are part of the Park's 10,298 ha of Valdivian forest. Their most characteristic species include the tepa or huahuán (Laureliopsis phillippiana), tineo (Weinmannia tri- chosperma), Guaitecas cypress (Pilgerodendron uviferum), and species such as Eucryphia cordifolia, Aextoxicon punctatum, Drimys winteri and Guevina avellana (Orellana, 2013).

PNLA, located in the Andes of Chubut Province (42o 51' 10.08" S, 71o 52' 22.08" W) is in the ecoregion called the Valdivian Temperate Forests, one of the world's 200 con- servation hotspots (Olson and Dinerstein, 1997). The Park's biological importance re- sides in the presence of forest masses with an important degree of ecological integrity, ample variety of habitats, and unique fauna assemblages with species typical of the ecoregion. Especially relevant at the ecoregional level is the presence of numerous fam- ily and genus endemisms (34% of woody plant genera are endemic; of these, 80% are monotypic), some of them relictual. PNLA contains the most southerly populations of alerce and other species of flora, such as the Cordilleran cypress (Austrocedrus chilen- sis), coihue (Nothofagus dombeyi), colihue bamboo (Chusquea culeou) and Chilean myrtle (Luma apiculata).

The history of the Park's management for more than 75 years, combined with the natural disposition of its mountain ranges and numerous bodies of water, have made it possible to maintain large sectors of the main forest communities strongly isolated from spontaneous usage and the threats resulting from anthropic activities such as cattle rais- ing and fires. This situation favours a high environmental integrity in the conservation unit, as well as the preservation of landscapes of exceptional scenic quality.

The nominated property's territorial extension allows it to sustain viable populations of its main species assemblages, and to maintain adequate functional connectivity and continuity of the relevant processes at landscape scale. The protected area includes a complete environmental gradient, from the glaciers and quarries in the high mountain — which give birth to water courses — to the communities of northern Patagonian tem- perate forest formations. This is a contributing factor to the resilience of these environ- ments against the effects promoted by climate change. Likewise, the general integrity of the nominated property's surrounding areas — made possible in part due to ongoing improvements in joint management — helps to fortify the aforementioned conditions, and hence the viability of long-term conservation.

[1] *Hereinafter, unless otherwise stated, the expressions "Los Alerces National Park" or PNLA include the National Park as well as the contiguous National Reserve.*

Proposed Statement of Outstanding Universal Value

Protected Valdivian temperate forest environments of high integrity and biological singularity

The basis for the nominated property's outstanding universal value is the fact that PNLA is essential for the conservation of the forest ecosystems in the most southern and eastern portions of the Valdivian Temperate Forests, an outstanding and priority ecoregion for conservation worldwide (Olson and Dinerstein, 1997). The Park is thus a unique asset that is still not included amongst the World Heritage sites.

Important speciation processes have taken place in this ecoregion, which has de- veloped in strong biogeographic insularity as evidenced by the presence of numerous endemisms, relictual taxons and taxonomic singularities. The ecoregion's biological importance resides mainly in the presence of continuous forest masses with a high degree of ecological integrity and a great variety of habitats. These contain the most southerly populations of several species of flora — among which the alerce tree is spe- cially remarkable — and, southward, other species such as Cordilleran cypress, coihue, Chilean myrtle and colihue bamboo.

At landscape scale, the nominated property includes an ample block of intact for- est comprising 190,121 ha (72.3% of its area) free of roads or human occupation, thus sustaining the high environmental integrity of the conservation unit. Historically, the region has had a very low incidence of disturbances derived from anthropic activities (cattle raising and fires), which in turn makes it less vulnerable to the invasion of wild herbivores introduced in the area.

Conservation of wide-ranging millennial alerce forests, the second longest-living species on Earth

The alerce (Fitzroya cupressoides), of monotypic genus, is the largest species in the Valdivian temperate forest. It can grow up to five metres in diameter and 50 metres tall (Veblen et al., 1976; Lara, 1991; Lara and Villalba, 1993). The alerce is the foundational element of the nominated property's outstanding universal value, by virtue of being the second longest-living species on Earth (after the bristlecone pine, Pinus longaeva). Some alerce specimens have been dated at more than 3,600 years old (Premoli et al., 2000).

Los Alerces National Park has the largest continuous and uninterrupted regions of this species in Argentina (7,407 ha, 36% of the species' total surface), in an excellent state of conservation. Specimens in these regions include some of the largest (in diameter and height) and oldest (more than 2,600 years old) east of the Andes.

The disposition of the area's mountain ranges and bodies of water has made it pos- sible for these relevant alerce populations — as well as a great proportion of the forest communities of the National Park's western sector — to remain non-fragmented, and isolated from anthropic effects. Likewise, the nominated property, the numerous pro- tected provincial areas in ANPBR in Argentina, and the natural protected areas at the same latitude in Chile provide connectivity and integrity for the alerce forests, as well as for species that require large areas as habitats.

Protection of significant cores of old-growth forests in northern Patagonia, which possess high genetic singularity

The alerce forests in the nominated property comprise a significant portion of old-growth forests conserved by the protected areas in northern Patagonia, which are mostly mature slope forests. Being glacial refugia, these populations exhibit the highest genetic singularity in their longitudinal and latitudinal distribution, and are thus a key reservoir for the conservation of the species (Premoli et al., 2000 a and b).

Old-growth forests themselves are recognized worldwide as a high conservation value, and of late have have been gathering increasing attention (Lindenmayer, Lau- rance at., 2012; Lindenmayer, Laurance et al., 2014; Mackey, Della Sala el al., 2015). These formations, and the nominated property in particular, are of outstanding value since they constitute ecosystems that have developed in extraordinarily stable and per- sistent conditions for a very long time. They are true witnesses of pristine continuity through millennia, and have allowed for the development of specially intricate and outstanding ecological processes and interactions.

These features make Los Alerces National Park a key component for the long-term viability of the natural features that conform the biodiversity structure, functioning and self-regeneration of the forest ecosystems in the Valdivian ecoregion. It is also an appropriate area for the movement of different species in response to the potential effects of global climate change, providing continuity of natural processes across evolutive times.

PNLA plays an important role for the conservation of a wide variety of fauna, including species of special value and endemic to the ecoregion

Fauna at the nominated property consists of 23 species of mammals, including the huemul, the only endangered species of South American native deer (IUCN, 2007). The huemul's population inside PNLA is key for the conservation of the species. The Park has records of huemul deer in alerce forests, an extremely rare situation. Other relevant mammals are the pudú, the smallest deer in South America; the guigna cat; and a nocturnal marsupial, the monito del monte — a monotypic species endemic to Patagonia and considered a living fossil since it belongs to one of the oldest lineages of marsupials.

In the Park live five species of native fish; three species of reptiles, including the Val- vidian snake; and 15 species of amphibians. Amphibian species include three species exclusive to Patagonia: the gracile frog, the short-brow frog and the Emerald forest frog. Specially remarkable is Batrachyla fitzroya, a frog strictly endemic to the island of Isla Grande in Menéndez lake, whose full life cycle takes place on the island. The area also has records of 133 native bird species, including four endemic to the Valdivian rainforest and threatened species such as the Andean condor, the Chilean flamingo and the bronze-winged duck.

PNLA plays an essential role in protecting high water basins, glaciers, and a vast sweet-water reservoir

The nominated property contains an important sweet-water reservoir. The reser- voir's protection status and management helps to protect the quantity and quality of water, as well as the sustainment of natural hydric processes in an ample portion of the headwaters of the great binational Futaleufú-Yelcho basin, the main collector on the Pa- cific slope. This basin, molded by the action of successive glaciations — which created varied geomorphological features such as moraines, glaciofluvial and glaciolacustrine deposits, glacial cirques, sheepback rocks, U-shaped valleys and glacial striations — en- compasses a complex system of rivers and chained lakes, which regulates the drainage from the abundant snow and rain precipitation.

Likewise, the property contains an important portion of Patagonia's least-impacted wetlands, by virtue of their isolation from anthropic activities (cattle raising, farming, etc.). It also contains some of the few water environments free from the seeding and invasion of salmonidae in Patagonia. The Park belongs to the National System of Pro- tected Areas, managed by the National Parks Administration; its protected status sup- ports the continuity of actions taken for the long-term preservation of biological compo- sition and ecological functions, ensuring the viability of the area's species, populations and ecosystems.

PNLA includes and protects remote areas of extraordinary beauty and natural value

The nominated property is a unique site, combining special elements and condi- tions of the Valdivian temperate forests in northern Patagonia that create a setting of extraordinary beauty: majestic forests, an extensive system of interconnected lakes and mountain corridors with glaciers and perpetual snow — an exceptional natural value amidst a landscape of outstanding beauty, remarkable in all the world.

Scientifically, these environments are also highly relevant: they contain habitats crit- ical for biodiversity, large environmental gradients including forests that range from subhumid to superhumid and the high Andes, ample genetic diversity in plant species, protected high basins, glacial and periglacial environments, and extremely valuable dendrochronological (tree-ring) series, with implicit information about the history of climate and disturbances — all in landscapes of exceptional beauty.

Los Alerces National Park, whose innermost reaches are accessible only by sailing huge lakes or walking narrow footpaths in a remote part of the Andes, is an invaluable asset that deserves to be included amongst the sites distinguished as World Heritage.

Criteria Under which Inscription is Proposed

Criterion (vii): Contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance.

PNLA conserves a variety of landscapes and scenery that enable visitors to live unique experiences. This setting has the power to connect human beings with their own origins and transcendence, bringing us nearer to the pulse of Nature.

The Park contains an extensive system of interconnected, clear-water lakes and rivers. These waters display the most extraordinary shifting hues of green, blue and turquoise; they are surrounded by lush temperate Valdivian forests in an environment of mountain ranges, glaciers and eternal snow. Alerce forests complete a unique, majestic land- scape, and confer upon it an outstanding natural aesthetic among the Andean-Patagonian forests. In particular, the northern arm of Lake Menéndez contains the Millennial Alerce Forest — the heart and emblem of the Park, located amidst a rainforest environ- ment of ferns, moss, lichens, vines and bamboo. One outstanding alerce in this forest is nearly 60 metres tall and approximately 2,600 years old — even today an imposing and silent witness of Earth's natural history and the passage of more than 100 human generations.

Since ancient times, the huiliche mapuche — the original inhabitants of the alerce's distribution area — called these trees lagual or lahuán, which translates as "life after life," meaning "long-living." For them, the alerce was a giant among the rest of the vegetation. This very slow-growing tree hails from another dimension of time and natural processes. It is living proof of the importance of upholding conservation across generations, to perpetuate diversity and the cycles of life.

Amidst these magnificent natural landscapes, the Park offers its visitors an extraordi- nary range of memorable experiences, allowing them to traverse rocky paths in a quiet walk in the forest, or to contemplate the surrounding immensity on the lake shores. Throughout the year, from any point within the Park it is possible to see the snow- capped peaks of the Andes Cordillera. Across the seasons, their aspect is modified by the changing colours of the lenga beech forests. These, in turn, contrast with the hues of the dense forest of many other species, highlighting a landscape where crystal-clear rivers, lakes and streams complete the composition.

The Arrayanes River and Verde Lake are two of the region's most picturesque fluvio- lacustrine landscapes. The green hues of the Arrayanes, recognized as an emblematic site worldwide, run over a riverbed six kilometres long and 50 metres wide. On its shores grows a copious vegetation of coihues and cypresses, among which stand out the cinnamon-coloured trunks of the Chilean myrtles. The symmetric Lake Verde reflects spectacular colours, shifting between emerald and turquoise according to the intensity of sunlight and the time of the year. The water running in the stream and the singing of the birds, surrounded by imposing mountains capped by eternal snow and ice, are capable of moving the senses, and are the manifestation of a majestic Nature.

These sensations become even more profound when one begins the ascent to Tor- recillas glacier and recognizes the U-shaped valley, a mark on the landscape left over the course of millions of years by the passage of this glacier — a giant of olden times now in pronounced retreat.

Criterion (x): Contain the most important and significant natural habitats for in- situ conservation of biological diversity, including those containing threatened species of Outstanding Universal Value from the point of view of science or con- servation.

PNLA is an area of great value for the conservation of biological diversity in the Valdivian Temperate Forest, an outstanding and priority ecoregion for conservation worldwide (Olson, Dinerstein et al., 1995; Armesto, León-Lobos et al., 1997; Olson and Dinerstein, 1997), by reason of being considered one of the 200 hotspots for world con- servation (WWF, 1997).

Unlike other ecoregions which are characterized by greater species diversity, the Val- divian ecoregion has developed in marked biogeographic insularity, which has allowed for important speciation processes to take place (Armesto, León-Lobos et al., 1997). This is evidenced by the presence of relictual genera and even orders, as well as numerous endemisms (Olson, Dinerstein et al., 1997), and threatened species (IUCN, 1995).

The ecoregion's biological relevance resides mainly in the presence of great contin- uous forest masses with an important degree of ecological integrity, great variety of habitats and unique species assemblages. Specially relevant is the presence of numer- ous family and genus endemisms (34% of woody plant genera are endemic; of these, 80% are monotypic), some of them relictual (Olson, Dinerstein et al., 1995; León-Lobos et al., 1997).

PNLA has at least 544 recorded species of vascular plants (Ezcurra and Puntieri, 2013) and numerous species of fungi (APN, 1997; Monjeau, 2006). Remarkable among them we find: Escallonia rosea and Deschampsia laxa, two species which in Argentina have only been found in the area surrounding Lake Menéndez; Griselinia ruscifolia, very rare in Argentina's northern Patagonian Andes region; Silene patagonica, a strict endemism of Chubut Province's mountain region, which has been recorded in the Park; Senecio yegua, discovered in the Lake Chico area — one of only two records in the country — and the Guaitecas cypress, (Pilgerodendron uviferum), the only species of the Pilgeroden- dron genus and the most Southern conifer in the world, of which new populations are still being discovered in little-explored sectors of the protected area (Rovere, 2002). It is important to point out that PNLA's populations of Pilgerodendron are relictual, since they have not been affected by the glacial peak and exhibit the highest genetic variabil- ity in Argentina (Premoli, Souto et al., 2002).

PNLA contains approximately 7,407 ha of millennial virgin alerce forests, as well as the most southerly populations for this species (Kitzberger, Pérez et al., 2000) and of others such as the Cordilleran cypress (Austrocedrus chilensis), coihue (Nothofagus dombeyi), colihue bamboo (Chusquea culeou) and Chilean myrtle (Luma apiculata) (Burkart, Bárbaro et al., 1997).

For generations, the alerce has been considered one of the species of greatest cul- tural value — emblematic of South America's temperate forests — due to its great size, longevity, the physiognomy of its forests and its usage by humans, which dates back to thousands of years (Donoso, 1995; Lara, 1998 in Premoli et al., 2004).

This threatened species is an outstanding universal value, being the second longest- living species in the world (> 3,600 years). Furthermore, these specific populations are of great value due to their extremely high genetic singularity in the whole extension of their distribution, which makes them a key reservoir for the

species' conservation (Premoli et al., 2000 a and b).
Of the species' total distribution, a great portion of its genetic variation in Argentina and Chile is found in the northern areas of PNLA and its adjoining buffer zone. Thus, these populations are important for the conservation of the whole of the species; they are also potential refugia for genetic diversity (Premoli, Souto et al., 2004). In its riparian environments, PNLA contains numerous habitats that are apt for the establishment of new individuals. In contrast to the slope forests, where many stands contain mainly mature individuals, the riparian groves exhibit a high percentage of small-diameter stands.
This type of habitat is normally subject to a high frequency of fluvial disturbances, which favour the establishment of alerce seedlings (Veblen, Armesto et al., currently in press). It is possible to observe the development of young alerce groves, the result of localized regeneration that began with surviving trees in wildfire refugia near the shores of rivers and lakes, where fires' lesser intensity allowed for the survival of a few isolated individuals (Kitzberger, Pérez et al., 2000).
Unlike other alerce forests, which show signs of alteration due to exploitation, live- stock farming or fire, the alerce forest in PNLA is in an excellent state of conservation, which ensures the undisturbed occurrence of natural phenomena and hence guarantees the conditions for the long-term viability of the species' natural populations.
From the point of view of the richness and composition of fauna, the Park includes the groups typical of the Valdivian District, with some representatives of its ecotone with the Patagonian steppe (Burkart et al., 1997). The Park's fauna assemblage com- prises 23 mammal species, 133 bird species, 11 amphibian species, six species of native fish, three reptile species, and numerous invertebrates including important endemisms.

Remarkable among the mammals is the huemul (Hippocamelus bisulcus), the only species of native South American deer in danger of extinction at the international level (IUCN, 2015) and at national level for Argentina and Chile. The nominated property has several populations that are key for the conservation of the species. Because of its importance, the species has been designated as an Argentine Natural National Mon- ument, as well as a Natural Provincial Monument for the provinces of Santa Cruz, Chubut and Río Negro. It is listed in CITES Appendix I as a High-Value Vertebrate Species (HVVS) at PNLA and other protected areas where it is found. In Chile, the species is protected by Law No. 19,473. It is also listed in the Convention on the Con- servation of Migratory Species of Wild Animals (Bonn Convention, Appendix I). Other notable mammal species include the pudú (Pudu puda), one of South America's smallest deer; and the kodkod or guigna cat (Leopardus guigna), the smallest, most distribution- restricted feline in America (Acosta and Lucherini, 2008). Also remarkable is the monito del monte (Dromiciops gliroides) endemic to Patagonia and considered a "living fossil" since it is the sole extant species of the ancient Microbiotheria order of marsupials (Mon- jeau, 2006; Díaz M. and Teta, 2008; Fasola, Cassini et al., 2008).

Notable among the endemic birds that are considered "rare" in Argentina are the torrent duck (Merganetta armata), the Magellanic woodpecker (Campephilus magellani- cus) and the Chilean pigeon (Columba araucana); all are well represented in the Park. The Park also contains threatened species such as the Andean condor (Vultur gryphus), the Chilean flamingo (Phoenicopterus chilensis), and the bronze-winged duck (Speculanas specularis).

Among the amphibians, the protected area has the strictly endemic species Batrachyla fitzroya, which is present only in Isla Grande in Menéndez lake; and three species ex- clusive to Patagonia: the gracile frog (B. antartandica), the short-brow frog (B. taeniata), and the Emerald forest frog (Hylorina sylvatica).

The Park is an important sweet-water reservoir. Its protected status helps to ensure the water quantity and quality for a significant portion of the streams born at its head- waters. This in turn allows the area to sustain sub-basins and minor water bodies, the only ones in northern Patagonia that are free from salmonidae.

In summary, the nominated property is a protected area relevant for the long-term viability of the natural features that conform the biodiversity structure, functioning and self-regeneration of important forest ecosystems — in particular, the communities of millennial alerces, in the most southern and eastern portion of the Valdivian ecoregion (see Map 3: Vegetation of the Valdivian Ecoregion).

Statement of Integrity

The nominated property contains 36% of the alerce forests in Argentina, including the forest masses with the greatest genetic variability on the eastern slopes of the An- des, and the oldest in the country. These forests are Argentina's largest alerce forests granted the fullest protection of national law, and the second largest alerce forests in Chile and Argentina. These alerce communities are immersed in vast areas of forests, which include most of the relevant communities in the northern Andean-Patagonian forest (Cordilleran cypress, lenga beech, coihue, Antarctic beech, mayten, Chilean myr- tle, male mañíu (Podocarpus nubigenus). The forests contain even Guaitecas cypress, tepa, huahuán (Laureliopsis phillippiana), and pitra (Myrceugenia exsucca) in excellent state of conservation, and constitute key habitats for numerous species of native fauna.

PNLA includes 125,463 ha of "intangible area" (off-limits) as well as a Strict Nature Reserve, which together place 47,7% of the nominated property in IUCN category Ia. A further 6% is in category Ib, and corresponds to a sector of the Wilderness Area (see Map 5: Strict Nature Reserve and Wilderness Area Los Alerces National Park), whose conservation state is very good. Baseline biodiversity analyses at regional scale, espe- cially analyses for the area conducted in the last three years, highlight a high level of environmental integrity, using specific indicators for communities and species (Orel- lana, 2013).

Independent analyses conducted using score cards in 1999 indicated 65% effective- ness for conservation success (Rusch, 2002). Since then, the conditions for protection and management of the property have been strengthened.

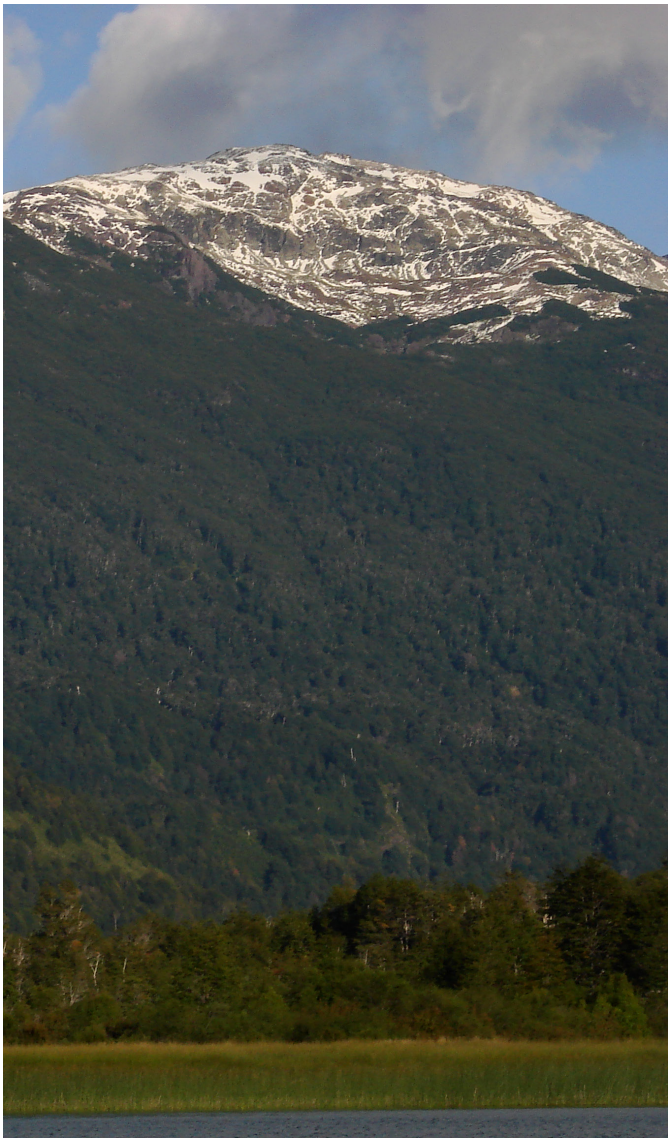
Between 2011 and 2014, the National Parks Administration implemented Manage- ment Efficiency Measurement (MEM), using a quali-quantitative tool of its own design that is applied

to all areas of the system. Results from the first three years of measure- ments for the protected area indicate a satisfactory level of management, placing the Park's score at approximately 64% efficiency, which is the average value for protected areas worldwide.

PNLA is a significant, representative and well-preserved sample of the Valdivian Temperate Forests Ecoregion. For more than 75 years, its legal status as a highly pro- tected area — part of the National System of Protected Areas administered by APN — and its management according to this status were essential to maintaining and strength- ening the conditions conducive to the preservation of the biological make-up, the eco- logical functions and the continuity of relevant processes at landscape scale. Maintain- ing these conditions ensures the viability of the species, populations and ecosystems that develop in the area in the long term.

At landscape scale, the nominated property — which includes an ample expanse of 190,121 ha, 72.3% of its area, free of roads or human occupation — is supported by numerous provincial protected areas in the Andean-North Patagonian Biosphere Re- serve (ANPBR), which provide connectivity and integrity for the alerce forests and for species with ample habitat requirements. Further support is provided by Chile's pro- tected area in Pumalin Park, which limits the nominated property on the western slope of the Andes; and by other neighbouring protected areas such as Chile's Hornopiren National Park and Futaleufú Nature Reserve, both part of Chile's Austral Rainy Tem- perate Forest Biosphere Reserve.

Likewise, the intact block included in the nominated property contains one of the most important populations of huemul, a species declared in danger of extinction, in northern Argentine Patagonia.



Protection and Management Requirements

Los Alerces National Park is part of the National System of Protected Areas in Ar- gentina (SNAP, Sistema Nacional de Áreas Protegidas de la Argentina) which is under the jurisdiction of the National Parks Administration, a self-governed body created by Law No. 12,103 in 1934, regulated by National Law No. 22,351 of 1980.

The latter law defined APN's self-government and functions, and created a collegiate body to lead and administer it. This law also created the National Park Rangers Body, in charge of vigilance and control to guarantee law enforcement in the system's protected areas.

For the nominated property, legal protection is provided by Decree No. 105,433 of 1937, endorsed by National Law No. 13,895/37 and National Law No. 19,292/71 (see Appendix 3: Law No. 19,292). The total protected surface is 259,822 ha, of which 188,379 are sensu stricto a National Park, one of the three categories of maximum pro- tection in Argentina. Thus the nominated property is an area of land in the public domain with the highest degree of legal protection.

The most important identified threats for the region are the potential fragmentation of natural landscape matrices, and the potential displacement of forest boundaries due to climate change. Several key factors are of assistance against these issues, and help- ful in protecting the area. The first is retaining the protected status categories for the nominated property (National Park, Strict Nature Reserve, Strict Wilderness Area and National Reserve). The second is enforcing the Argentine Native Forests Protection Act (Law No. 26,331, Ley de Protección de los Bosques Nativos de Argentina), which included new areas of adjacent forests in the highest conservation categories. A third factor is the Andean-North Patagonian Biosphere Reserve, designated by UNESCO in 2007. ANPBR encompasses an assemblage of protected areas of relevant geographical continuity, and contributes to the sustainable management of the Valdivian ecoregional corridor (APN, 2007) (see Map 2: Andean-North Patagonian Biosphere Reserve: Con- text for the Nominated Property. Los Alerces National Park, Argentina and Map 3: Vegetation of the Valdivian Ecoregion).

The Park's daily management is regulated by the Management Plan approved by Board Resolution No. 171/1997, which provides considerations for zoning consistent with the area's protection categories. The Management Plan is currently being revised and updated, as detailed in 5.c Means of Implementing Protective Measures and 5.e Property Management Plan or Other Management System.

State Party	Argentina
State, Province or Region	Province of Chubut
Name of Property	Los Alerces National Park (PNLA)
Geographical coordinates to the nearest second	Latitude: 42o 34' 43.65" - 43o 09' 52.78" S Longitude: 72o 09' 29.55" - 71o 34' 40.28" W Central coordinate: 42o 51' 10.08" S, 71o 52' 22.08" W
Textual description of the boundary(ies) of the nominated property	The nominated property comprises the whole extension of Los Alerces National Park (PNLA), located in the mountain region in northwestern Chubut Province (Futaleufú Department), and covering a surface area of 259,822 ha. It was created as a National Reserve by Decree No. 105,433 in 1937; its boundaries and conservation categories were definitively established by Law No. 19,292 in 1971. Within Los Alerces National Park, the National Park per se occupies an area of 188,379 ha, equivalent to Cagetory II, IUCN. This area, which includes land and lakes, is completely free of human habitation and of fragmentation caused by roads. It includes 71,443 ha. of National Reserve (Category VI), inhabited by rural settlers as well as management and control personnel. This area also contains the main visitor services and facilities for the protected area. It possesses important conservation values in its own right, and serves as an inner buffer zone for the protected area, providing further protection for the integrity of the stricter conservation areas. To the west, the boundary of the nominated property runs along the international border with the Republic of Chile, from the border's intersection with the Futaleufú or Grande River (PNLA's southern boundary) northward until reaching Cerro Bonete. From this point, the boundary runs west-east along cadastral lines until reaching the shore of Lake Rivadavia; then runs along the lake's northern shore; then along cadastral lines until reaching approximately 71o 37' W longitude. The eastern boundary follows cadastral lines running north-south between 71o 37' W and 71o 34' W, until reaching the confluence of the Futaleufú and Corintos rivers. For the purposes of this nomination, the buffer zones in the nominated property's surroundings are defined as the adjacent areas located in the Andean-North Patagonian Biosphere Reserve (ANPBR) — established by UNESCO in 2007 — with other complementary areas that cover a 10-km wide strip around PNLA in Argentine territory. This implies an external buffer zone surface of approximately 135,870 ha. Within ANPBR, in adjacent sectors of the buffer zone to the north and south of PNLA, there are lands reserved for conservation by the Province of Chubut. Acting as a corridor, these also help to protect and strengthen the conservation of the nominated property.

Map

Attached is an A4 Map of the nominated property, which includes the adjacent areas that act as buffer zones.

Criteria under which property is nominated

• Criterion (vii): Contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance.

• Criterion (x): Contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of Outstanding Universal Value from the point of view of science or conservation.

Draft Statement of Outstanding Universal Value

Brief Synthesis

The nominated property comprises the totality of Los Alerces National Park and National Reserve (PNLA), which protects the millennial forests of alerce — Fitzroya cupressoides — an endangered species of outstanding universal value, being the second longest-living species on Earth (>3,600 years). The Park includes part of the forest masses with the greatest genetic variability on the eastern slopes of the Andes, with exclusive genetic variants and the oldest individuals in the country.

PNLA is located in the Valdivian Temperate Forests ecoregion; its biological importance resides in the presence of forest masses with an important degree of ecological integrity — including old-growth forest cores of high genetic singularity — ample variety of habitats, and unique fauna assemblages with species typical of the ecoregion. The history of the National Park's management, combined with the natural disposition of its mountain ranges and numerous bodies of water, have made it possible to maintain large sectors of the main forest communities strongly isolated from spontaneous usage and the threats resulting from anthropic activities. This situation favours a high environmental integrity in the conservation unit, as well as the preservation of landscapes of exceptional scenic quality.

The nominated property contains an important sweet-water reservoir which includes high basins and glaciers, and also preserves a significant portion of the wetlands that have been least impacted by anthropic activities, due to their isolation and to the presence of some of Patagonia's few water environments free from the invasion and seeding of salmonidae. Likewise, the nominated property's territorial extension allows it to sustain viable populations of its main species assemblages, and to maintain adequate functional connectivity and continuity of the relevant processes at landscape scale. The property includes a complete environmental gradient, from the glaciers and quarries in the high mountain to the communities of northern Patagonian temperate forest formations. This is a contributing factor to the resilience of these environments against the effects promoted by

Draft Statement of Outstanding Universal Value (cont.)

climate change. The property's regional surroundings, including its buffer zone, help to fortify the aforementioned conditions, and hence the viability of long-term conservation, given its general integrity and the increasing implementations of joint management alternatives. PNLA, whose innermost reaches are accessible only by sailing huge lakes or walking narrow footpaths in a remote part of the Andes, is an invaluable asset that deserves a to be included amongst the sites distinguished as World Heritage.

- Criteria Under which Inscription is Proposed

- Criterion (vii): Contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance.

PNLA conserves a variety of landscapes and scenery that enables visitors to live unique experiences, and has the power to connect human beings with our own origins and transcendence, bringing us nearer to the pulse of Nature. The Park contains an extensive system of interconnected, clear-water lakes and rivers, that display the most extraordinary shifting hues of green, blue and turquoise. These water bodies are surrounded by lush temperate Valdivian forests in an environment of mountain ranges, glaciers and eternal snow. Alerce forests complete a unique, majestic landscape, and confer upon it an outstanding natural aesthetic among the Andean-Patagonian forests. Thus, the alerce is the heart and emblem of the Park, an imposing and silent witness of Earth's natural history and the passage of more than 100 human generations. In these magnificent natural surroundings, PNLA offers an outstanding array of memorable experiences, from walking rocky paths toward a serene stroll in the forest, to the contemplation of the immense landscape on the lake shores.

- Criterion (x): Contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of Outstanding Universal Value from the point of view of science or conservation.

PNLA is an area of great value for the conservation of biological diversity in the Valdivian Temperate Forest, an outstanding and priority ecoregion for conservation worldwide. This ecoregion has developed in marked biogeographic insularity, in which important speciation processes have taken place, as evidenced by the presence of relictual genera, numerous endemisms, and threatened species.
PNLA's remarkable biological relevance resides mainly in the presence of great continuous forest masses that exhibit an important degree of ecological integrity; as well as great variety of habitats and unique species

Draft Statement of Outstanding Universal Value (cont.)

assemblages, all of which reside in environments in a very good state of conservation. PNLA contains approximately 7,407 ha of millennial virgin forests of alerce, a species that for generation has been considered of the greatest cultural value, emblematic of South America's temperate forests due to its longevity. The alerce — the second longest-living species in the world — is a threatened species. The populations in PNLA are of very high value given their extremely high genetic singularity, which makes them a key reservoir for the species' conservation, together with the populations in the nominated property's northern buffer zone.

From the point of view of the richness and composition of fauna, the Park includes the groups typical of the Valdivian District, with some representatives of its ecotone with the Patagonian steppe. Specially remarkable is the huemul (Hippocamelus bisulcus), the only species of native South American deer in danger of extinction worldwide (IUCN, 2015), endangered at national level in Argentina and Chile. The nominated property has several populations that are key for the conservation of the species.

PNLA — an important sweet-water reservoir, whose protected status helps to ensure the water quantity and quality for a significant portion of a basin's headwaters — sustains sub-basins and minor water bodies, the only ones in northern Patagonia that are free from salmonidae. To summarize, the nominated property is a protected area relevant for the long-term viability of the natural features that conform the biodiversity structure, functioning and self-regeneration of these important forest ecosystems — specially for the communities of millennial alerces — in the most southern and eastern portion of the Valdivian ecoregion.

- Statement of Integrity

The nominated property contains 36% of the alerce forests in Argentina, including the forest masses with the greatest genetic variability on the eastern slopes of the Andes and the oldest in the country. These are the largest alerce forests in Argentina to be granted the fullest protection of national law, and the second largest alerce forests in Chile and Argentina. These alerce communities are immersed in vast areas of forests, which include most of the relevant communities in the forests of northern Andean Patagonia (Cordilleran cypress, lenga beech, coihue, Antarctic beech, mayten, Chilean myrtle, male maniú (Podocarpus nubigenus) and even Guaitecas cypress; tepa (Laureliopsis philippiana, a monotypic genus), and pitra (Myrceugenia exsucca)) are in an excellent state of conservation, and constitute key habitats for numerous species of native fauna.

PNLA is a significant, representative and well-preserved sample of the Valdivian Temperate Forests Ecoregion. For more than 75 years, its legal status as a highly protected

Draft Statement of Outstanding Universal Value (cont.)

area — part of the National System of Protected Areas administered by APN — and its management according to this status have been essential to maintaining and strengthening the conditions conducive to the preservation of the biological make-up, the ecological functions and the continuity of relevant processes at landscape scale. Maintaining these conditions ensures the viability of the species, populations and ecosystems that develop in the area in the long term. PNLA includes 125,463 ha of "intangible area" (off-limits) and Strict Nature Reserve, which together place 47,7% of the nominated property in IUCN category Ia. A further 6% is in category Ib, and corresponds to a sector of the Strict Wilderness Area, whose conservation state is very good.

At landscape scale, the nominated property — which includes an ample expanse of 190,121 ha, 72.3% of its area, free of roads or human occupation — is supported by numerous provincial protected areas in the Andean-North Patagonian Biosphere Reserve (ANPBR) in Argentina and adjacent protected areas in Chile. Together, these areas provide connectivity and integrity for the alerce forests and for species with ample habitat requirements. Likewise, the intact block included in the nominated property contains one of northern Argentine Patagonia's most important populations of huemul deer, a species in danger of extinction.

- *Protection and Management Requirements*

Los Alerces National Park is part of the National System of Protected Areas in Argentina (SNAP, Sistema Nacional de Áreas Protegidas de la Argentina) which is under the jurisdiction of the National Parks Administration, a self-governed body created by Law No. 12,103 in 1934, regulated by National Law No. 22,351 of 1980. Specific legal protection for the nominated property is provided by Decree No. 105,433 of 1937, endorsed by National Law No. 13,895/37 and National Law No. 19,292/71. The total protected surface is 259,822 ha, of which 188,379 are sensu stricto a National Park, one of the three categories of maximum protection in Argentina. Thus the nominated property is an area of land in the public domain with the highest degree of legal protection.

The most important identified threats for the region are the potential fragmentation of natural landscape matrices, and the potential displacement of forest boundaries due to climate change. Retaining the protected status categories for the nominated property (National Park, Strict Nature Reserve, Strict Wilderness Area and National Reserve) and enforcing the Argentine Native Forests Protection Act — Law No. 26,331, which included new areas of adjacent forests in the highest conservation categories — consolidate protection for the area and support the resolution of existing issues. Likewise, the creation of the Andean-North Patagonian Biosphere Reserve, designated by UNESCO in 2007,

Draft Statement of Outstanding Universal Value (cont.)

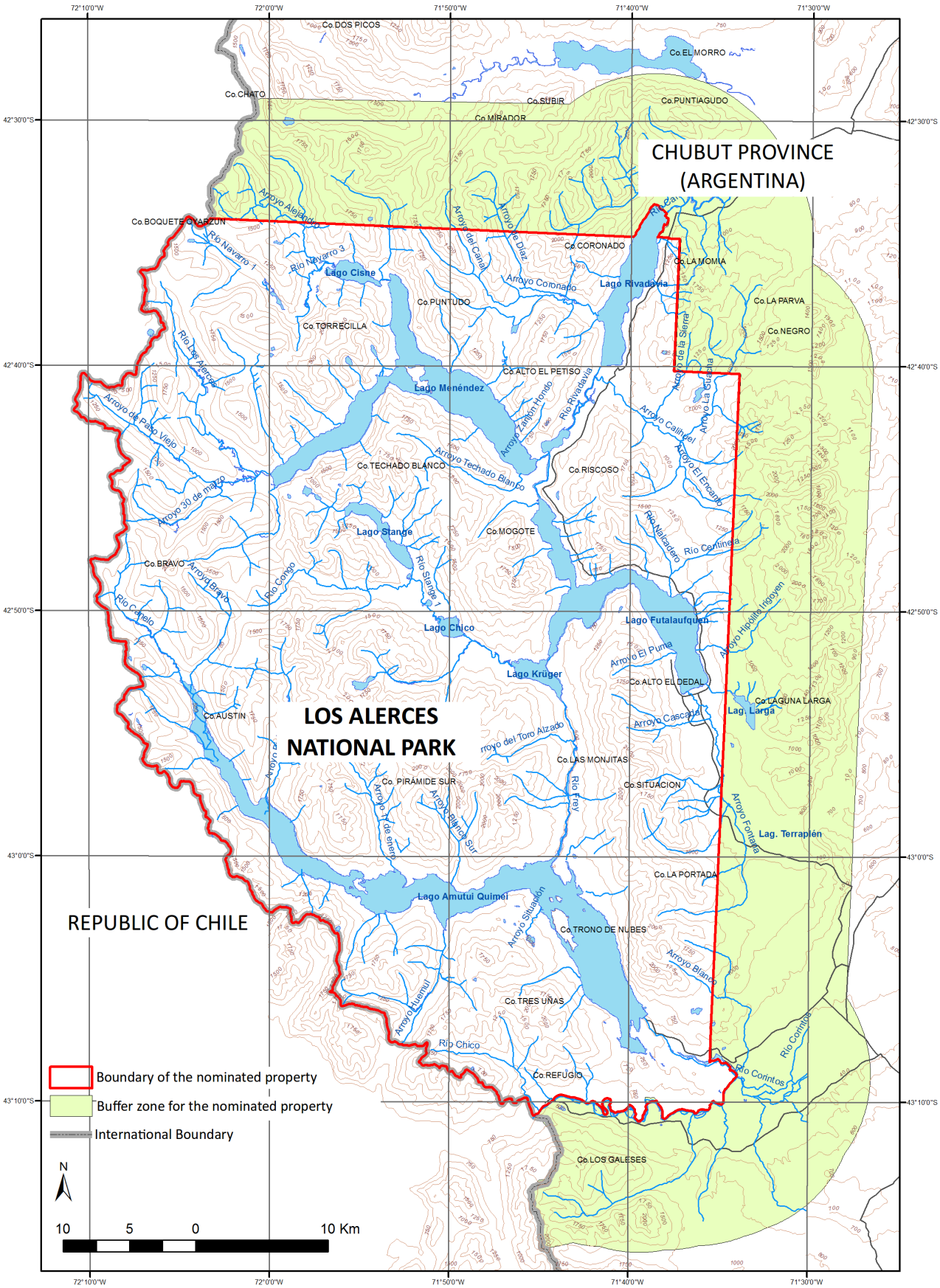
articulates an assemblage of protected areas of relevant geographical continuity, and contributes to the sustainable management of the Valdivian ecoregional corridor.

The Park's daily management is regulated by the Management Plan approved by Board Resolution No. 171/1997, which provides considerations for zoning consistent with the area's protection categories. The Management Plan is currently being revised and updated; however, as was previously pointed out, all directives and actions for the area — inc2lu6ding general management, control and surveillance — are constantly enforced, and monitoring and research are ongoing.

Name and contact information of official local institution/agency

Argentine National Parks Administration (APN) and National Ministry of Tourism (MINTUR). APN:
Santa Fe Ave. 690, C.A.B.A.
MINTUR:
Suipacha 1111, Piso 20, C.A.B.A.
Phone/Fax:
APN: 54 11 4311 0303 / MINTUR: +54 11 4316 1600

LOCATION MAP: BOUNDARIES OF THE NOMINATED PROPERTY AND BUFFER ZONE



1 Identification of the property

1.a Country

Argentina

1.b State, Province or Region

Province of Chubut

1.c Name of Property

Los Alerces National Park

1.d Geographical coordinates to the Nearest Second

Latitude: 42o 34’ 43.65” - 43o 09’ 52.78” S
Longitude: 72o 09’ 29.55” - 71o 34’ 40.28” W
Central coordinate: 42o 51’ 10.08” S, 71o 52’ 22.08” W

1.e Maps

Boundaries of the Nominated Property and Buffer Zone
Map 1: Conservation Categories for the Nominated Property. Los Alerces National Park, Argentina
Map 2: Andean-North Patagonian Biosphere Reserve: Context for the Nominated Property. Los Alerces National Park, Argentina
Map 3: Vegetation of the Valdivian Ecoregion
Map 4: Vegetation Communities in Los Alerces National Park
Map 5: Strict Nature Reserve and Wilderness Area Los Alerces National Park
Map 6: Usage Zoning, Los Alerces National Park
Map 7: Human Settlements and Infrastructure, Los Alerces National Park

1.f Area of Nominated Property

Los Alerces National Park (PNLA)[2] encompasses 259,822 ha, of which 188,379 belong to the National Park per se (Category II, IUCN) and 71,443 ha to the National Reserve (Category VI) (See Map 1: Conservation Categories, Los Alerces National Park).
The buffer zones for PNLA are the areas included in the Andean-North Patagonian Biosphere Reserve (ANPBR[3]), declared by UNESCO in 2007 (Map 2: Andean - North Patagonian Biosphere Reserve) and surrounding areas up to 10 km from PNLA in Argentine territory. The buffer zones comprise an area of approximately 135,870 ha.

[2]Unless stated otherwise, the name “Los Alerces National Park” includes both the National Park and the National Reserve.

[3]Reserva de Biósfera Andino - Norpatagónica.

Del Antiguo Lagoon with Cerro Solo in the background

2 Description of the property

2.a Description of Property

Los Alerces National Park is located on the Southern Patagonian Mountain Range. It is a morphostructural unit with rocky outcrops from the Paleozoic, Mesozoic and Cenozoic eras. The landscape in this region was molded by successive glaciations. These created a variety of geomorphic features such as moraines, glaciofluvial deposits, glaciola- custrine depozsits, glacial cirques, chain-like lagoons, lakes, hanging valleys, sheepback rocks, U-shaped valleys, and glacial striation. These forms of glacial accumulation and erosion are found above the pre-Quaternary deposits, sometimes in good condition and in other cases faded by fluvial erosion (Córdoba, 1999).

The Park is located on the Yelcho river basin. The Yelcho, also called Grande or Futaleufú, is the main collector on the Pacific slope. The basin encompasses a complex system of rivers and chained lakes, which regulates the drainage of the abundant snow and rain precipitation. Water bodies show varied and remarkable colours, shifting between green, turquoise and blue. Remarkable among these are the rivers Arrayanes and Frey; and the lakes Verde, Rivadavia, Cisne, Futalaufquen, Krüger, Stange and Menéndez, whose headwaters are crowned with the Torrecillas glacier. Aside from the natural water courses, the Park contains the hydroelectric dam Futaleufú, and the Amutui Quimey reservoir.

The Park is an important sweet-water reservoir; its protected status helps to ensure the quantity and quality of the basin's water. Specially important among the Park's water environments are the salmonidae-free environments, such as some of the sub- basins and minor water bodies which are the only ones in Northern Patagonia that meet this condition. The identification and management of salmonidae-free environments within Patagonia's National Parks (CUDAP: TRI-PNA: 008120/2011) made it possible to determine the existence of a salmonidae-free basin spanning 12,000 ha, of which approximately 7,000 are in PNLA and 5,000 in Chubut Province. In this basin, the salmonidae-free environments consist of 15 lakes of varying size, which together comprise 700 ha. The basin's rivers and streams add up to a little over 100 km in a straight line. The absence of salmonidae, plus the very high abundance of native fish (presumably similar in number as before the introduction of salmonidae in Patagonia) make this basin one of the most important reservoirs of native fish populations in all of Argentine Patagonia (Baigún and Ferriz, 2003; Aigo, Cussac et al., 2008; Cussac, Fer- nández et al., 2009).

As Kutscher (2013) points out, the areas covered by glaciers in the Patagonian An- des are the largest in South America. PNLA's western sector contains Cerro Torrecillas, a singular asset in the area, whose peak is covered by a small casket of ice of ap- proximately 4.5 km2in surface. Other mountains in the same chain, as well as in the Pirámides chain, possess similar glaciers. Most of the glaciers in mid-latitude mountains are retreating. The retreat is due to the gradual increase in average temperatures that began globally decades ago, and to a decrease in regional precipitation, part of a hemispheric phenomenon (Villalba et al., 2012).

The Torrecillas Glacier lagoon, whose surface is approximately 1.4 km2, is at 750 metres above sea level. It has icebergs of varying sizes for most of the year, and provides chemical components from the areas of hydrothermal alteration over the rocky outcrops that make up the headwaters and walls of the valleys. This phenomenon can exert a great influence on the physical-chemical

Del Antiguo Lagoon, Torrecillas Glacier

Del Antiguo stream, also known as Del Glaciar

makeup of the waters, and on the behaviour and development of the biota (Martínez, personal communication).

The Park is located in the ecoregion named the Andean Patagonian Forests by Burkart et al. (1997), phytogeographically named by Cabrera (1976) as Valdivian District, Subantarctic Domain, Antarctic Region. At the world level, the protected area is included in the ecoregion Valdivian Temperate Forests (Dinerstein, Olsen et al., 1995).

The Valdivian Temperate Forest occupies part of southern Chile and Argentina; its surface is 166,248 km2. The Valdivian Ecoregion includes the forests and other ecosys- tems on both slopes of the Andes (see Map 3: Vegetation of the Valdivian Ecoregion), which range from 35o S to 48o S in South America. It is one of the most diverse temperate biomes on the planet (Armesto et al., 1997).

This forest is one of the five temperate forests in the world, and the only ecoregion of temperate forests in Latin America and the Caribbean. The biome is classified as Vulnerable (Dinerstein, Olsen et al., 1995); the World Wildlife Fund for Nature (WWF) includes this ecoregion in the list of the 200 most-threatened areas in the world (Olson and Dinerstein, 1997). Conservation International (CI) includes it among the 25 world biodiversity hotspots (Myers, Mittermeier et al., 2000; and CI, 2011).

The forests in this ecoregion comprise about 50% of the total surface covered by tem- perate forests in the world. Their importance for preservation has been recognized by the World Resources Institute (WWF, 2001). Pyshiognomically, the predominant vegetation community in the valleys and slopes is the forest of evergreen species, mainly Cordilleran cypress (Austrocedrus chilensis), coihue (Nothofagus dombeyi), radal (Lomatia hirsuta) and mayten (Maytenus boaria), as well as deciduous species such as the lenga beech (Nothofagus pumilio) and Antarctic beech (Nothofagus antarctica).

Remarkable within the forest environments are the cores of Valdivian rainforest, and of species of flora of limited distribution such as Escallonia rosea and Deschampsia laxa — both of which in Argentina have only been found in the area surrounding Lake Menéndez — as well as Griselinia ruscifolia, very rare in Argentina's Northern Patagonian Andes region; Silene patagonica, a strict endemism of Chubut Province's mountain region, which has been recorded in the Park; and the Guaitecas cypress (Pilgerodendron uviferum), the only species of the Pilgerodendron genus and the most Southern conifer in the world (see Map 4: Vegetation Communities in Los Alerces National Park, and Appendix 2.1: List of Plant Species Recorded at PNLA).

Phytogeographically, this ecoregion belongs to the Subantarctic Domain (Cabrera, 1976) and shares species such as the Southern beeches (Nothofagus spp.) with Tasmania, New Caledonia and Southeast Australia, regions to which it is closely linked phy- logenetically. It also contains species of the Neotropical lineage, such as the colihue bamboo (Chusquea culeou) and the Chilean myrtle (Luma apiculata), which are here at their southernmost border (APN, 1997).

The area is of singular ecological and genetic-evolutionary importance at the ecoregional level, since it is found on the southern and eastern limits of the Valdivian forest in Argentina. Within it is preserved the last portion of continuous Patagonian Andean forest, interrupted to the south by the Patagonia steppes. It contains Argentina's most southerly populations of

several species of flora and fauna, such as Cordilleran cypress; coihue; colihue bamboo; Chilean myrtle; a marsupial (Dromiciops gliroides); and the longest-living and the country's best-preserved population of alerce trees (Fitzroya cupressoides), a conifer endemic to South America (Burkart, Bárbaro et al., 1997; Fasola, Cassini et al., 2008).

According to Kitzberger et al. (2000), the alerce is the largest and longest-living conifer of the Andean-Patagonian forest. It can be up to 5 meters in diameter and 50 meters tall, and can live more than 3,600 years (Lara, 1991). This endemic species, which belongs to a monotypic genus, is unevenly distributed between 39o 56' and 42o 35' S in the Andean Cordillera along the coast of Chile, and between 40o 52' and 42o 45' in the Andes of Argentina (CONAF, 1997).

A survey of the distribution of the alerce in Argentina, taking into account the forest masses currently known, indicates that the distribution area includes dense slope forests and riparian masses of the species, reaching a total of 20,625 ha.

Los Alerces National Park contains approximately 7,407 ha of millennial virgin forests of alerce, which comprise 36% of the forests of this species in Argentina (Kitzberger, Pérez et al., 2000). They are distributed in large fluviolacustrine environments, which coexist with other, less frequent environments such as those dominated by herbacea (shrubs, grasslands) and high rocky formations.

Regarding flowers, and as Orellana et al. (2013) pointed out in recent studies, PNLA includes communities and sites of special value for flora. These are detailed in the following paragraphs, and are identified based on specific criteria proposed by this study[4] .

Alerce forest

[4] Communities, environments or sites are considered of special value if they meet at least one of the following criteria:

1. Taxonomic singularity; species or taxa that include one or few genetic forms (e.g. a monotypic genus).
2. Speciesoflowreproductivecapacity,slowgrowthand/orlowdispersioncapacity.
3. SpeciesofvascularplantsstrictlyendemictoPNLA.
4. Speciesidentifiedascriticallyendangered,threatenedorvulnerable,accordingtoIUCN'slistings.
5. Populations that are genetically valuable or at the limits of their geographic distribution; glacial refugia, relictual populations.
6. Populations of species that represent a significant portion of the species' total population in Ar- gentina.
7. VegetationcommunitiesintheTemperateForestsofsouthernSouthAmerica,ofreduceddistribu- tion in Chile and/or Argentina.
8. Environmentsthatcontainfossils.
9. Environmentsthatareeasilyvulnerable.
10. Species reported for the first time in PNLA.

Millennial alerces, Cisne river

a. Valdivian Rainforest - Vegetation Communities with alerce (Fitzroya cupressoides): This community meets criteria (i), (ii), (iv), (v), (vi) and (vii) quoted below. The alerce is considered "rare" at the species level, and "endangered" at population level by UICN. Likewise, it is defined as "vulnerable" in Argentina's national listing, and is listed in CITES Appendix I.

The Valdivian evergreen forest enters from the western slope of the Andes. The Argentine sector comprises three cores of this formation, distinguished by considerable richness in flowers, which are generally present in four or five strata, and present numerous vines and abundant coverage of ferns and moss. The Valdivian core in PNLA contains the high-integrity communities of Fitzroya cupressoides that make up 36% of these forests in the country; their populations are specially relevant for the conservation of the species.

In the Valdivian forests, the populations of F. cupressoides located at approximately 42° S, in the Argentine sector, have been proposed as possible refugia during glaciations (Premoli, Souto et al., 2004).

b. Populations of Guaitecas cypress (Pilgerodendron uviferum): These populations meet criteria (i), (ii), (iv), (v) and (vi). The species is considered "vulnerable" by UICN and is listed in CITES Appendix I.

There are two small-surface populations of P. uviferum near the Gaviota Lagoon, located between the lakes Hito and Menéndez. These populations were detected in 1994 (Jaacks, 1994). One of them is north of the Gaviota lagoon and has adult regenerating specimens up to 15 m tall. These grow next to mixed forests of coihue and Cordilleran cypress, whose underwood is of colihue bamboo and is frehe from Sphagnum moss. The second population is southwest of Hito Lagoon; its development is associated with Sphagnum peat bogs in proximity with Nothofagus forests (Rovere et al., 2002). The density of these populations is estimated at 11,400 specimens/ha. These are healthy woods with abundant regeneration. Generally, the species thrives in places with mild slopes, bad drainage and abundant water at ground level (Rovere et al., 2002).

The populations of Guaitecas cypress in PNLA have high heterocygosis compared to other P. uviferum populations in Chile and Argentina (Premoli and Souto, 2002). Other populations of P. uviferum in the Park are associated to marshlands at several locations: the confluence of the Paso Viejo river and the 30 de Marzo stream, the marshlands near Los Palos lake, the area southwest of Cisne lake, and two marshlands in the valley of Hito lake.

c. Pure or mixed forests of Cordilleran cypress (Austrocedrus chilensis): These communities meet criteria (iv) and (vii). These forests are currently marked in IUCN's Red List (2011) as "vulnerable" since they have been and continue to be severely degradevd.

The species is endemic to the temperate forests of southern South America, and covers a surface of only 45,000 ha in Chile (CONAF, CONAMA et al.,

1997; Donoso, Escobar et al., 2006) and 141,000 ha in Argentina (Bran et al., 2002). However, recent information gathered from more detailed mappings indicates that communities of varying densities cover a total surface of 262,000 ha (Pastorino 2014, personal communication).
The forests of A. chilensis within PNLA are the most southerly populations of the species within the National Parks Administration, since the southern limit of their distribution inside PNLA is near the headwaters of the Amutui Quimey reservoir.

d. Mayten forests: These populations are considered highly valuable sites, since they are continuous communities of mayten forest, which are very rare in the Patagonian temperate forest. The mayten (Maytenus boaria) is typically found on the transition zone between the subantarctic forest and the Patagonian steppe. In northern Patagonia, this species is regularly found on forest slopes with between 800 and 1000 mm annual rainfall. However, in PNLA the mayten is remarkably developed in low and relatively flat areas, where it is the dominant species.There are fair-sized mayten woods in areas of the Grande river valley and specially the Desaguadero river valley, located between the Centre Entrance of PNLA and Villa Futalaufquen, a place known locally as "El Maitenal". [5]

e. River communities: These communities meet criteria (v), (vi) and (vii). They are the communities at the edges of lakes and rivers, where coihue forests or Valdivian rainforests are predominant.
Species of the Myrtaceae family are frequently found in these forests. These are endemic to the temperate forests of southern South America. Examples of these species are Chilean myrtle (Luma apiculata), tepú (Tepualia stipularis) and pitra (Myrceugenia exsucca).

f. High-integrity forest communities of the Stange lake valley and Chico lake: These communities meet criteria (ii), (iv), (v) and (vii).
The Stange river valley, which includes several lakes, is one of the largest in PNLA. The valley's ecosystems are in very good state of conservation, owing to several factors: the absence of wildfires in the area, and the presence of exceptionally large specimens of coihue, Antarctic beech and Guaitecas cypress. The latter is present in groves that amplify the species' distribution area not only in the Park but for the species' total.
Vegetation in these valleys includes the following environments: coihue forests, that include several of the species typical of the Valdivian rainforest; Gauitecas cypress associated with swamplands; and large tracts of grassland. The southeastern and northern margins of Stange lake contain small populations of alerces; in other margins live isolated individuals. The valley of the Congo river and Chico lake contains forests with Antarctic beech trees of great size and in good health (Jaacks and Lema, 1995).

g. Species recorded for the first time in PNLA: The following species, which meet criterion (x), have been recently recorded for the protected area. Their distribution in the property requires further study.

- Senecio yegua, at approximately 200 m on the trail that surrounds Chico lake (Hoermann, 2011 in Orellana, 2013).
- Gaultheria insana, at the mouth of the Alerce river on the southern arm of Menéndez lake (Biganzoli, F. — Inventory No. 844 — SI, Instituto Darwinion; Hoermann I. et al., 2006).

PNLA has 544 species of vascular plants — 81% of the total species in the Park — of which 441 are native. The Park has 21 species of exclusively native plants, meaning that they are not found in other national parks in northern Patagonia; and 17 species endemic to the region (present in the protected area and in up to two provinces). Likewise, there are at least 21 species of high taxonomic singularity — by reason of belonging to monotypic families or genera — or species with highly-restricted distribution, resulting in a high proportion of species of high taxonomic significance (4%) and 29 species of special value.
From the point of view of composition and richness of the fauna, the totality of the Park is locatedv within the Southern Cordillera zoogeographic domain. The park includes the groups typical of the Valdivian District, with some representatives of its ecotone with the Patagonian steppe (Burkart et al., 1997) (see the lists of mammals, birds, reptiles, amphibians and fish in).
PNLA is also home to populations and species of special value for fauna, defined as such on the basis of several national and international criteria (see Appendix 2.7: List of Animal Species and Threat Status).
The native fauna assemblage consists of:

- 23 mammal species, including one species endemic to the region
- 133 bird species, including 3 species endemic to the region
- 11 amphibian species, including one microendemic species
- 3 reptile species
- 9 fish species
- Numerous invertebrate species

[5] *"The place of mayten trees" (TN).*

Common kingfisher

Female huemul with her calf

Focusing on the main groups of fauna — adapting the contents of the Tentative List for Argentina (APN, 2012) and Kutschker (2013) — allows for the following considerations:

a. Mammals: PNLA has populations that are considered viable for several critical mammal species. Important among these are the populations of huemul (Hippocamelus bisulcus), one of the two species of autochthonous cervidae who live exclusively in the Andean-Patagonian forests of Argentina and Chile. In addition, this is the only species of native South American deer in danger of extinction (IUCN, 2015).

The population living in the Park is extremely important for the conservation of the species in the Andean-North Patagonia region. This population includes fawns and juveniles, which suggests that if their living space is not limited, the population is in a condition to expand. It has been confirmed that this population has made contact with other populations living nearby and in Chile. Within the framework of the "APN Huemul Conservation Programme" (APN Res. 164/12), intensive surveys have been taken in different areas of PNLA, identifying the main sites where the species is currently present. The monitoring of these groups is ongoing, as well as the detection and control of the species' conservation problems.

The most important records for the species were obtained in the sectors of Cerro Riscoso, Cordón Situación and Cerro Alto El Petiso. In 2000, a protection area for the huemul — the Cerro Riscoso Critical Area — was created within the National Reserve, with a surface of 21,000 ha (APN Resolution 296/01). Issues specific to the huemul's conservation are managed within the framework of the APN Huemul Conservation Programme, and by the National Plan for the Recovery and Conservation of the Huemul in Argentina (SADyS Resolution 910/05). A binational conservation plan (SAyDS, APN, CONAF) is under development, conceived to contribute guidance for the active management of the protected area.

Other relevant species in the park — given their general conservation status in the country — are the pudú (Pudu puda), one of South America's smallest deer; and the kodkod or guigna cat (Leopardus guigna), the smallest, most distribution-restricted feline in America (Acosta and Lucherini, 2008). Also remarkable is the presence of the monito del monte (Dromiciops gliroides) (Chehébar and Ramilo, 1989; Berardi, 1997; APN, 1997 ; Fasola, Cassini et al., 2008; Chebez, 2008 in Kutschker, 2013). This marsupial is endemic to the Andean-Patagonian forests in Chile and Argentina. It is of the utmost scientific importance, considered a "living fossil" by virtue of being the sole extant species of the ancient Microbiotheria order, an extinct lineage that originated all marsupials, South American and Australian (Monjeau, 2006; Díaz M. and Teta, 2008). The Park protects the most southerly of the known populations of this species.

Other medium-sized and large mammals include the cougar (Puma concolor), the greatest predator in Patagonia; the culpeo or Andean fox (Lycalopex culpaeus); the pampas fox (Lycalopex gymnocercus); Geoffroy's cat (Leopardus geoffroyi); Humboldt's hognosed skunk (Conepatus humboldtii); the lesser grison (Galictis cuja); and the coypu (Myocastor coypus).

Bats have a solid presence in the Park, including the Brazilian free-tailed bat (Tadarida brasiliensis), the southern big-eared brown bat (Histiotus magellanicus), the small bigeared brown bat (H. montanus), the cinammon red bat (Lasiurus varius), and the Chilean myotis (Myotis chiloensis). There is also a numerous presence of rodents: from the aforementioned coypu and the southern viscacha (Lagidium viscacia), both medium-sized, to a wide variety of micro-rodents of the Critediae family.

Exotic mammals include the American mink (Neovison vison), the brown hare (Lepus europaeus), the wild boar (Sus scrofa), the red deer (Cervus elaphus), and rodents such as the common mouse (Mus musculus), the black rat (Rattus rattus) and the brown rat or guarén (R. norvegicus). Domestic animals have been introduced to the park, such as dogs (Canis familiaris), cats (Felis silvestres catus), horses (Equus caballus), cows (Bos taurus) and sheep (Ovis orientalis aries).

b. Birds: The Park is considered an Important Bird and Biodiversity Area (IBA) (Di Giacomo, 2005 in APN, 2012). Andean-Patagonian species are widely represented here, with a total of 133 confirmed species (APN, 2005 in Kutschker, APN 2014).

Endemic birds that are considered nationally "rare" include the torrent duck (Merganetta armata), the Magellanic woodpecker (Campephilus magellanicus) and the Chilean pigeon (Columba araucana). All three species are well represented in the Park.

Birds of prey commonly found in the area include the variable hawk (Buteo polyosoma) , the black-chested buzzard eagle (Geronoaetus melanoleucus) and the bicouloured hawk (Accopiter bicolor). The white-throated hawk (Buteo albogula) and the rufous-tailed hawk (Buteo ventralis) are found in scarcer, but important numbers. Three species of falcons (Falco peregrinus, F. Sparverius and F. femoralis) are also found in the area, as well as the white-throated caracara (Phalcoboenus albogularis). Carrion birds include the Andean condor (Vultur gryphus) and the black vulture (Coragyps atratus), whose presence is usual, along with the carancho or southern crested caracara and the chimango caracara. Of the owls and night-birds of prey, the Magellanic horned owl (Bubo magellanicus) , the austral pygmy owl

Forest-dwelling orange-bellied lizard

Stag beetle

(Glaucidium nanum) and the rufous-legged owl (Strix rufipes) are common in the area. The short-eared owl (Asio flammeus) is also present, though in lesser numbers due to the area's environmental features.
Water species include four species of grebe, of which the most-often sighted is the great grebe (Podicephorus major). There are several species of the Anatidae family — ducks, swans, kelp geese — such as the yellow-billed teal (Anas flavirostris), the yellowbilled pintail (A. georgica), the red shoveller (A. platalaea), the Chiloé wigeon (A. sibilatrix), the bronze-winged duck (A. specularis), the flying steamer duck (Tachyeres patachonicus) and the aforementioned torrent duck. Other water species are the blackcrowned night heron (Nycticorax nycticorax, among other herons), black-faced ibis (Theristicus melanopis), the Chilean flamingo (Phoenicopterus chilensis), the Neotropic cormorant (Phalacrocorax brasilianus), and coots (Fulica spp), which is among the most representative.
Forest birds include the land-dwelling chucao (Scelorchilus rubecula), the black-throated huet-huet (Pteroptochos tarnii) and the Magellanic tapaculo (Scytalopus magellanicus). Birds that use various forest strata include the green-backed firecrown (Sephanoides sephanoides), the Falkland thrush (Turdus falklandicus), the austral parakeet (Enicognathus ferrugineus), the thorn-tailed rayadito (Aphrastura spinicauda), Des Murs's wiretail (Sylviortorhynchus desmursii), the white-crested elaenia (Elaenia albiceps, absent during winter), the buff-winged cinclodes (Cinclodes fuscus and C. patagonicus), the black-chinned siskin (Carduelis barbata), and the Patagonian sierra finch (Phrygilus patagonicus).

c. Amphibians: Remarkable among the Park's amphibians is Batrachyla fitzroya, a species of frog strictly endemic to an island on Lake Menéndez (Basso, 1994), listed as "Vulnerable" (Vaira et al., 2012).
Other amphibians exclusive to the region are the gracile frog (B. antartandica), considered "Vulnerable" (Vaira et al., 2012) and the short-brow frog (B. taeniata). These new records extended southward the previously-known distribution for these species. Also remarkable is the presence in the Park of the Emerald forest frog (Hylorina sylvatica) (APN, 1997), a species with special environmental needs, naturally scarce and also listed as "Vulnerable" (Vaira et al., 2012).

d. Reptiles: As of today, three species of reptiles have been recorded in the Park: the Chilean slender snake (Tachymenis chilensis), the matuasto (Diplolaemus sexcinctus) and the orange-bellied lizard (Liolaemus pictus).

e. Fish: There are six species of fish native to the region: the Otuno (Diplomystes viedmensis), the torrent catfish (Hatcheria macraei), the zebra trout (Aplochiton zebra), the southern pike (Galaxias platei), the perch (Percichthys trucha) and the Patagonian catfish (Odontesthes hatcheri). The zebra trout and the Patagonian catfish boast an important presence in the Park, though they have been strongly impacted by exotic salmonidae (Macchi, 2004 en Kutschker, 2013).

f. Invertebrates: There are very thorough listings of insects and arachnids such as ants, certain families of spiders, dragonflies and Hemiptera. Of particular note is the presence of two species of small flies, Macrurohelea fuscipennis and Notiohelea pilosa, of the family Ceratopogonidae, both of which have been found only in the Park, which is hence their type locality.
Also found in the Park are the Ephemeropterous Siphlonellasp., the Plecopteran Austronemoura chilena, Neofullabiloba and Neone murabarrosi, and the Heteroptera Sigarasantiagensis and Ectemnostega quadrata (Pessac and Miserendino, 2008). Among the arachnids we find Crassanapis chilensis, Acanthoceto cinereus and Ferreria echinata (in Kutschker, 2013).

Historic Cultural Resources

Los Alerces National Park contains diverse archaeological and historical evidence of the different periods of human habitation in its forest areas. This record provides information about the land usage and the networks of travel and exchange established by the peoples who inhabited the region beginning thousands of years ago (Arrigoni 2005, 2007; Novella, 2008).
Early settlement of the area took place in the context of the great demographic growth in Patagonia that began at about 1,000 AD, and which continued into recorded history (possibly until the 19th Century). During this time, it was common for human groups to relocate to other regions; they eventually acquired a territorial identity that gave them cohesion and set them apart from their neighbours. They possessed well-delimited territories with vast inter-ethnic communication networks, as evidenced in the rock art of the "step-fret style" (estilo de grecas) — also called the Complex Abstract Geometric Tendency (Gradin, 1999) — the most recent style in the sequence of rock art developed in Patagonia.
From 1890 onward, population growth was linked to the consolidation of the National State. Population growth was slower here than in other areas of the country due to the region's isolation and great distance from the oceans. These factors marginalized the area from the developing national economic system, at the time clearly oriented toward the sea.

Young bicoloured hawk (Accipiter bicolor)

2.b History and Evolution

This section describes historical and evolutive aspects of the landscape, focusing on the large-scale factors that model and transform the environment such as glaciers, volcanic eruptions, avalanches and wildfires. The particular qualities of the alerce communities, a singular and emblematic asset, are remarked here, as well as exceptional events such as the flowering of the colihue bamboo. A brief history of the processes of human occupation of the region is also given.

Glaciers (Adapted from Kutschker, 2013.)

Periglacial areas are fragile, highly vulnerable environments. As such, they meet criterion (ix) mentioned earlier. This is the case of the area surrounding the Torrecillas glacier, which is currently retreating. The glacier's retreat has given rise to three lagoons: Azul, Verde and Ocre.

The Argentine Institute of Nivology, Glaciology and Environmental Sciences (IANIGLA, Instituto Argentino de Nivología, Glaciología y Ciencias Ambientales) has compiled historical photos of the Torrecillas glacier. These include images taken by Francisco Moreno in the late 19th Century which evidence the retreat of the ice, the marked increase in the size of the lake, and the thinning out of the superior portion of the glacier.

Preliminary dendrochronological (tree-ring) analysis indicates that the outermost moraine, associated to the glacier's outermost advancement during the Little Ice Age, was deposited at the beginning of the 18th Century. Complementary data was gathered by estimating the moraines' age, using lichens of the genus Rhizocarpon (Garibotti and Villalba, 2009). This methodology made it possible to estimate the formation dates of moraines created after the peak of the Little Ice Age, approximately in the years 1735 , 1755, 1891, 1900, 1906 and 1934. A more inward moraine, adjacent to the proglacial lake, was dated at about 1937, based on the analysis of period photographs.

Several standing subfossil trunks were found in the valley surrounding the stream that is born in the proglacial lake. These trunks were buried by fluvio-glacial sediment associated to an advance of the ice in historical times. Radiocarbon dating of this material indicates an age of 440±30 (14) C years. This suggests that between the 15th and 17th centuries the glacier was probably advancing and generating great quantities of fluvio-glacial material.

Tronador Glacier, Punta Larsen, Puerto Antiguo, southwestern arm of Menéndez lake

Volcanic Eruptions (From Kutschker, 2013.)

Volcanism in Patagonia (independently of geopolitical limits) is directly related to the predominant tellurian events in the region. However, Argentine Patagonia is relatively quiet in regards to seismic activity. Present-day human populations have experienced few earthquakes, specially in the provinces of Neuquén, Río Negro, Chubut and Santa Cruz.

The Andes cordillera is part of the so-called Pacific Ring of Fire, which contains hundreds of volcanoes, many of them in Patagonia. These volcanic complexes are active, and linked to a geological fault called the Liquiñe-Ofqui Fault Zone (LOFZ). LOFZ is basically a geological fault born in the Liquiñe (Neltume) area, in the pre-Andean zone of the River Region in Chile (R XIV). It extends more than 1,000 km southward, to the Ofqui Isthmus area in the Aysén Region. Chile's most active volcanoes are located along this fault, which is also a source of constant earthquakes that have beset the North Patagonian cordillera for hundreds of thousands of years. The most remarkable volcanoes along this fault are the Puyehue, Llaima, Osorno, Calbuco, Hornopirén, Chaitén and Hudson, among others (Fierro, 2009 in Kutschker, 2013).

After showing no activity for centuries, the Chaitén volcano erupted in 2008 and 2009, emitting an important quantity of ash. This event had a huge impact on the region's human populations and natural environments, particularly in PNLA. The ash emitted by these eruptions covered almost the whole of the protected area, with shortterm consequences in the natural environment. However, there were no profound negative consequences, since the region's communities have co-evolved with this kind of natural event.

Alerce (Adapted from Kitzberger et al., 2000.)

As mentioned earlier, the alerce has a non-continuous distribution between 39° 56 ' and 42° 35' S in the Chilean coast cordillera, and between 40° 52' and 42° 45' S in the Argentine Andes (CONAF, 1997). In large measure, this lack of continuity is due to four centuries of intense exploitation, burning, conversion to grassland and agricultural use of the areas that, in pre-Hispanic times, were covered by large masses of alerce forest (Kitzberger et al., 2000).

These forests were known by the earliest peoples who settled in South America, as proven by the Monte Verde Archaeological Site. This site is in the region of subantarctic evergreen conifer forests in the south of Chile, and has been carbon-dated to 14,800 years ago. On the site were found the remains of dwellings and artifacts made of alerce wood, which evidence early human adaptation to the humid temperate forests of the "Valdivian" type (criteria (iii) and (iv), Cultural Site, admitted in 2004).

Mappings performed on the basis of contemporary chronicles have made it possible to estimate that when European colonization began (in about 1550), the surface of these forests in present-day Chile and Argentina covered 630,000 ha. It is believed that by the year 2000, this area had been reduced by approximately 54% (WWF et al., 1997; Pérez, Bran et al., 2000).

In Chile, towards the end of the 19th Century, the alerce was practically eliminated from easily-accessible areas such as the Central Depression that separates both cordilleras in the country (Veblen, Delmastro et al., 1976; Donoso, 1983). This process of exploitation became more pronounced in the mid-1800s, and declined during the 1970s with the implementation of protective measures for the alerce.

The history of the alerce's exploitation in Argentina has been notably different from that in Chile. In Argentina, the colonization of the lake region began only at the end of the 19th Century, almost four centuries after colonization began in the south

of Chile. In this country, the prolonged dominance of Native American peoples and the long distance of the forests from the national markets delayed the advance of the forest exploitation frontier until the end of the 19th Century.

The period of intense exploitation was short, interrupted by the early creation of Argentina's National Parks system, which today accounts for a great part of the species' distribution.

Toward the end of the 1920s, the creation of the conservation areas caused the commercial exploitation of the species to decline in the area of Lake Nahuel Huapi. At the same time, commercial exploitation began in the area of Lake Menéndez, currently inside the Park. This exploitation continued until 1930, when the region was declared a protected area and tree felling was halted, although cut wood continued to be extracted from the area for about 10 more years (Novella and Filkenstein, 2007).

In 1941, Argentina included the alerce in the Annex to the Convention for the Protection of Nature and Wildlife in the Western Hemisphere (Kitzberger et al., 2000). Exploitation and international trade of the species was banned with its inclusion in CITES Appendix I in 1987 (Lara et al., 1991).

Alerce forest masses are today highly protected, since 85% of them are under jurisdiction of one of the national or provincial protected areas systems. The surface in the national protected areas system is 68.7% of the species' total known distribution. Of the surface in protected areas, 98.4% lives in National Park areas, and only 1.6% in National Reserves. Thus there exists a situation of effective control over alerce forest masses in the Nahuel Huapi, Los Alerces and Lago Puelo National Parks, where only scientific activities and tourism are allowed.

Alerce forest masses that are accessible from populated areas have shown alterations due to herbivory, which could affect the species' regeneration mechanisms in these areas.

There is also evidence of the effect of historical and modern-day wildfires, which have exerted their influence on the dynamics of many alerce forests in Argentina and Chile (Veblen et al., currently in press; Veblen and Ashton, 1982; Lara, 1991; Favrer, González et al., 1999).

These situations are not present in the more isolated populations such as those of PNLA. The Park's historical record, consigned in official documentation, indicates that forests such as those of Lake Menéndez had not been affected by fire, as determined by the 1936 expedition (Novella and Filkenstein, 2007). In the Park, the principal populations of the species are separated from the pressures of the land usage areas by the lakes that divide the National Park from the National Reserve.

In contrast to the slope forests, where many stands contain mainly mature individuals, the riparian groves exhibit a high percentage of small-diameter stands. This type of habitat is normally subject to a high frequency of fluvial disturbances, which favour the establishment of alerce seedlings (Veblen, Armesto et al., currently in press).

For these reasons, it can be said that the Fitzroya populations restricted to the eastern slopes of the Andes, initially considered marginal for the species, show a good state of conservation. Due to the short duration of forest exploitation in Argentina, current populations would largely match the pre-Hispanic distribution of the species, with the exception of alerce populations eliminated or diminished by wildfires. As was previously pointed out, the Park protects the oldest and most extensive of all these populations, which show a high degree of integrity.

Exceptional Events (Adapted from Kutschker, 2013.)

These events could be related to extraordinary environmental conditions that foster particular biological cycles, such as the change in colouring of coihue foliage in 2011 (Davel, Barroetavena et al., 1999), or the atypical flowering of wild strawberries (Potentilla chiloensis) near Puerto Mermoud at Lake Verde (Cerdá, 1991).

Long flowering cycles: The colihue bamboo

The colihue bamboo (Chusquea culeou) is a perennial bush of the Poaceae family belonging to the bamboo subfamily. In Argentina,

Alerce forests and still waters at the end of Menéndez lake

it ranges from the north of Neuquén to the south of Chubut, inhabiting the more humid areas of the southerly temperate forests, where it is often the main component of the underwood. It is also found in open thickets, a situation generally associated to previous wildfires or the presence of livestock (Sanguinetti et al., 2001; Núñez et al., 2011).
Like most of the bamboos, it reproduces vegetatively by means of rhizomes. Production of seeds and flowers (sexual reproduction) occurs once in a lifetime; after this event, the plant dies. Sexual reproduction events are synchronized. They affect a great number of individuals distributed in generally wide and distant areas, and take place only once per several decades (40 to 70 years for colihue bamboo).

The expected consequences of massive flowering events can be grouped and summarized as follows:

- **Great production of seeds.**

Production can reach hundreds of kilogrammes per hectare, and the seeds are very nutritious (similar to barley). This creates a great availability of food that allows for great demographic growth of granivores, mainly birds and wild rodents. Of the latter, especially common are the long-tailed "colilargo" (Oligoryzomys longicaudatus), the olive grass mouse (Abrothrix olivaceus) , and the long-haired grass mouse (Abrothrix longipilis). In areas with human settlements, the rodents' increase in number and their eventual displacement (popularly called a ratada[6]) have diverse sanitary and economic effects. These include the contamination of water sources, contamination and consumption of food destined for humans and livestock, and increase in rodent-transmitted diseases, including Hantavirus Pulmonary Syndrome (HPS).

- **Death of the plants that flowered. This entails:**

1.Renovation of the bamboo populations, since a new generation is born. The new plants grow very slowly and are extremely vulnerable to disturbances for at least a decade.

2.Change in the environmental conditions of the forest, which means a chance for regeneration and growth not only for bamboos but for many other plant species. Exotic species have a chance to become established, and can cause biologic invasions.

3.Increased risk of wildfires, due to the significant increase of combustible material while dead bamboos still stand, a period estimated at 10 years.

4.Important decrease in winter fodder for the livestock of rural populations. This lasts as long as it takes for the new bamboos to reach a size similar to that of the old ones (estimated at 10-15 years). In turn, this increases the pressure of herbivores on other native species, and can cause livestock to access restricted areas, disturbing pristine areas.

There are records in the Andean-Patagonian region of a great flowering of the species that took place between 1938 and 1942. About 60 years later, the 2000-2001 season saw the flowering of the populations south of Lanín National Park, and of a small

portion in the northernmost area of Nahuel Huapi (in Neuquén Province), which affected some 200,000 ha (Sanguinetti et al., 2001; Sage et at., 2007). Since that time, the species has been monitored annually by the Patagonia Regional Directorate (DRP, Dirección Regional Patagónica) and APN. Monitoring made it possible to predict repetitions of the event (Núñez et al., 2010). The flowering of 2010-2011 affected almost 150,000 ha in Nahuel Huapi National Park and 6,500 ha in Lago Puelo National Park. In Los Alerces, the event affected about 86,000 ha in the area of the Amutui Quimey reservoir.

During the 2012-2013 season, bamboo flowering affected the rest of PNLA and surrounding areas such as Trevelin, Aldea Escolar, Los Cipreses, the Tigre river basin and Cholila. In all cases, the events were associated with an increase in the population of rodents; however, rodents' displacement and effect on populated areas was variable. PNLA suffered the "ratada" phenomenon during 2013 and first trimester of 2014 (APN, 2014).

During these events, the necessary health precautions were duly taken, and Park authorities worked in close coordination with the relevant provincial authorities. The alert due to increased risk of wildfire — caused by the dry bamboo inside the forest — still stands; and appropriate resources were allocated to rural dwellers whose livestock suffered the decrease in fodder.

[6]*Literally "rat invasion" or "lots of rats" (TN).*

History of Human Occupation

The earliest archaeological record of human settlement in the area dates from 3040±90 BP until 400±40 years BP. These records are related to hunting and gathering strategies, and to the production of rock art (Arrigoni, 1987, 1988, 1991, 1994, 1997, 1998-1999, 2005; Caracotche et al., 2007; Caracotche et al., 2013). Radiocarbon dating of charcoal samples is shown in the table below.

	Component	Age ^{14}C. AP	Laboratory Code
Alero del Shaman	I	3040±90	LP 475
	I	2250±40	HD 14842
	II	1460±40	HD (code unavailable)
	III	1550±90	LP 435
Alero Sendero de Interpretación	II	1670±80	LP 456
	Ia Aceramic	1450±70	LP 556
		740±70	LP 1118
	Ib Ceramic	400±40	LP 119
		Modern	LP 653

Table 1. Radiocarbon dating based on G. Arrigoni, 1997.

Walking on the rock debris

The modalities and intensity of forest environment usage were related to the availability of raw materials, plants and animals, and to the modes of subsistence that these factors allowed. Regarding diet, ancient settlers took advantage of forest species such as the huemul and small tubers, the remains of which were found in Alero Sendero Interpretación with clear indications of having been used as food (Arrigoni, 2001; Fernández, 2011).

Rock paintings belong to the step-fret style (estilo de grecas), today also known as the Complex Abstract Geometric Tendency, which dates from a late stage in the sequence of rock art developed in Patagonia. Its defining feature is abstract representation (sensu Gradin 1999). The site's representations were exclusively made by painting; the colours employed were red, yellow, green and white, with a predominance of abstract motifs. The inventory of abstract motifs includes: series of aligned dots; straight lines in parallel pairs; "U" and "V" markings; lines with appendices; straight lines (parallel or in zig-zag); horizontal zig-zagged lines; merlon-shaping line(s); series of parallel lines; comb-shaped lines; radiating circles; circles with an appendix; circles with dots; alignment of full circumferences; aligned circles; circles joined by lines; stair-sided, vertically-aligned diamonds; latticed diamonds; stair-sided pyramids; full crosses; frames; step-frets; complex geometric motifs; and others. There are also motifs of human figures and animals. The latter include footprints — possibly of a huemul or camelid, and of Darwin's rhea — and some aligned parallel line pairs which could be guanaco footprints.

Recent analyses have been performed based on cases of superimposition and recycling of motifs, the existence of monochromies and bichromies, differential use of the plastic medium, and some morphological variations in representations. The results have made it possible to determine the existence of at least two main chronological series in the execution of the paintings. This, combined with radiocarbon dating, reaffirms the evidence for sustained use of the forest for at least the last 2000 years (Caracotche et al., 2013).

The first testimonies of European expansion are related to the explorations by Friar Francisco Menéndez of the Franciscan order, who between 1783 and 1786 became "the first European to record in writing the geography of the lake area of present-day Los Alerces National Park" (Novella and Finkelstein, 2008). According to the authors, Menéndez's guides — lumberjacks of the eastern mountain slopes — manufactured canoes from trunks of the alerce tree, which allowed them to cross the lakes they discovered; this became the first form of navigation in these waters.

In 1890, after the "Conquest of the Desert," the Patagonian territory was incorporated into the National State. This marked the beginning of the most recent settlement in the forest areas, at the end of the 19th and beginning of the 20th centuries.

According to Novella and Finkelstein (2008), "the lake area that is today Los Alerces National Park was a part of this process; its settlement began in the last years of the 19 th Century. The farthest areas were settled late, in the 1920s, owing to the topography and dense vegetation which made access difficult."

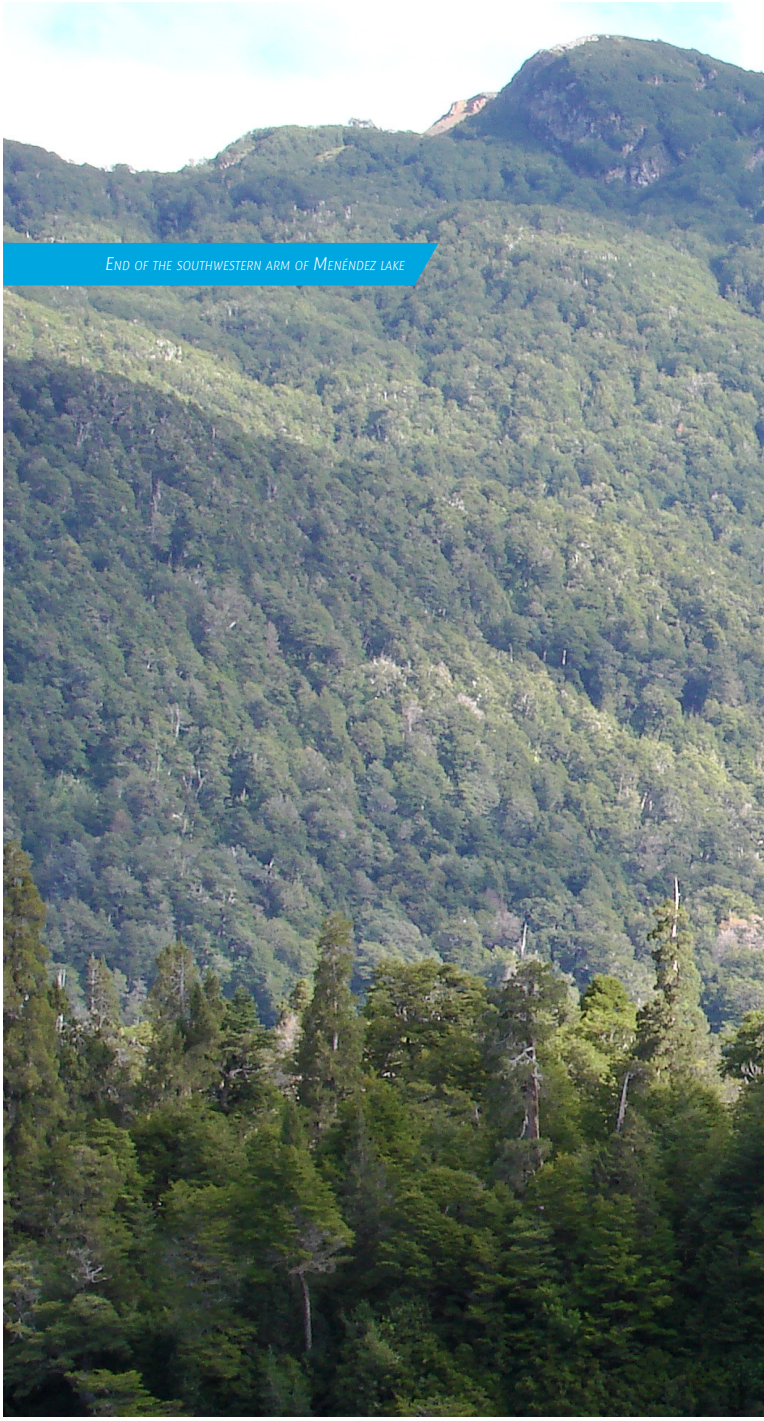
The area included today in the Park was settled by families of diverse origins — Chilean, Creole and European — whose economy was domestic, centred on self-supply for the daily sustenance of the family. They based their production on bovine livestock, to satisfy both local needs and the demand from nearby population centres.

Exploitation of the alerce also took place during the first decades of the 19th Century. It was centred on the alerce forests of Lake Menéndez, where individual trees were selected, cut down with axes, transported on jangada rafts over lakes and rivers to Lake Futalaufquen, and then sent to various sawmills. Over the years, exploitation of the alerce increased, until the National Park was created in 1937, which put an end to the practice (Novella, op. cit.).

After the creation of the National park, rural populations continued their livestock farming practices; their grazing grounds are today in the National Reserve. Today, much of the population has diversified their economic activities to include tourist and trekking services, which are now established visiting modes in the Protected Area.

Rock crystals on the path to Torrecillas Glacier

3 Justification for Inscription



End of the southwestern arm of Menéndez lake

3.1.a Brief Synthesis

The nominated property comprises the totality of Los Alerces National Park and National Reserve (PNLA, Parque Nacional Los Alerces)[7] . Created in 1937, PNLA protects the millennial forests of alerce — Fitzroya cupressoides — an endangered species of outstanding universal value, being the second longest-living species on Earth, with a lifespan of more than 3,600 years. The Park protects 36% of Argentina's alerce forests, including the forest masses with the greatest genetic variability on the eastern slopes of the Andes. These forests contain exclusive genetic variants and the oldest individuals in the country. They are Argentina's largest alerce forests granted the fullest protection of national law, and the second largest alerce forests in Chile and Argentina. These forests are part of the Park's 10,298 ha of Valdivian forest. Their most characteristic species include the tepa or huahuán (Laureliopsis phillippiana), tineo (Weinmannia trichosperma), Guaitecas cypress (Pilgerodendron uviferum), and species such as Eucryphia cordifolia, Aextoxicon punctatum, Drimys winteri and Guevina avellana (Orellana, 2013).

The Park, located in the Andes of Chubut Province (42° 51′ 10.08″ S, 71° 52′ 22.08″ W) is in the ecoregion called the Valdivian Temperate Forests, one of the 200 conservation hotspots worldwide (Olson and Dinerstein, 1997). The Park's biological importance is due to the presence of forest masses with an important degree of ecological integrity, ample variety of habitats, and unique fauna assemblages with species typical of the ecoregion. Specially relevant at the ecoregional level is the presence of numerous family and genus endemisms (34% of woody plant genera are endemic; of these, 80% are monotypic), some of them relictual. PNLA contains the most southerly populations of alerce and other species of flora, such as the Cordilleran cypress (Austrocedrus chilensis), coihue (Nothofagus dombeyi), colihue bamboo (Chusquea culeou) and Chilean myrtle (Luma apiculata).

The Park's legal existence for the last 75 years, combined with the natural disposition of its mountain ranges and numerous bodies of water, have made it possible to maintain large sectors of the main forest communities strongly isolated from spontaneous usage and the threats resulting from anthropic activities such as cattle and fires. This situation favours a high environmental integrity in the conservation unit, as well as the preservation of landscapes of exceptional scenic quality.

The nominated property's territorial extension allows it to sustain viable populations of its main species assemblages, and to maintain adequate functional connectivity and continuity of the relevant processes at landscape scale. In this sense, the protected area includes a complete environmental gradient, from the glaciers and quarries in the high mountain — which give birth to water courses — to the communities of northern Patagonian temperate forest formations. This is a contributing factor to the resilience of these environments against the effects promoted by climate change. Likewise, the general integrity of the nominated property's surrounding areas — made possible in part due to ongoing improvements in joint management — helps to fortify the aforementioned conditions, and hence the viability of long-term conservation.

[7] *Hereinafter, unless otherwise stated, the expression "Los Alerces National Park" includes the National Park as well as the contiguous National Reserve.*

3.1.b Criteria Under which Inscription is Proposed (and Justification for Inscription Under These Criteria)

Criterion (vii): Contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance.

PNLA conserves a variety of landscapes and scenery that enables visitors to live unique experiences. This setting has the power to connect human beings with their own origins and transcendence, bringing them nearer to the pulse of Nature.

The Park contains an extensive system of interconnected, clear-water lakes and rivers. These waters display the most extraordinary shifting hues of green, blue and turquoise; they are surrounded by lush temperate Valdivian forests in an environment of mountain ranges, glaciers and eternal snow. Alerce forests complete a unique, majestic landscape, and confer upon it an outstanding natural aesthetic among the Andean-Patagonian forests. In particular, the north arm of Lake Menéndez contains the Millennial Alerce Forest — the heart and emblem of the Park, located amidst a rainforest environment of ferns, moss, lichens, vines and bamboo. One outstanding alerce in this forest is nearly 60 metres tall and approximately 2,600 years old — even today an imposing and silent witness of Earth's natural history and the passage of more than 100 human generations.

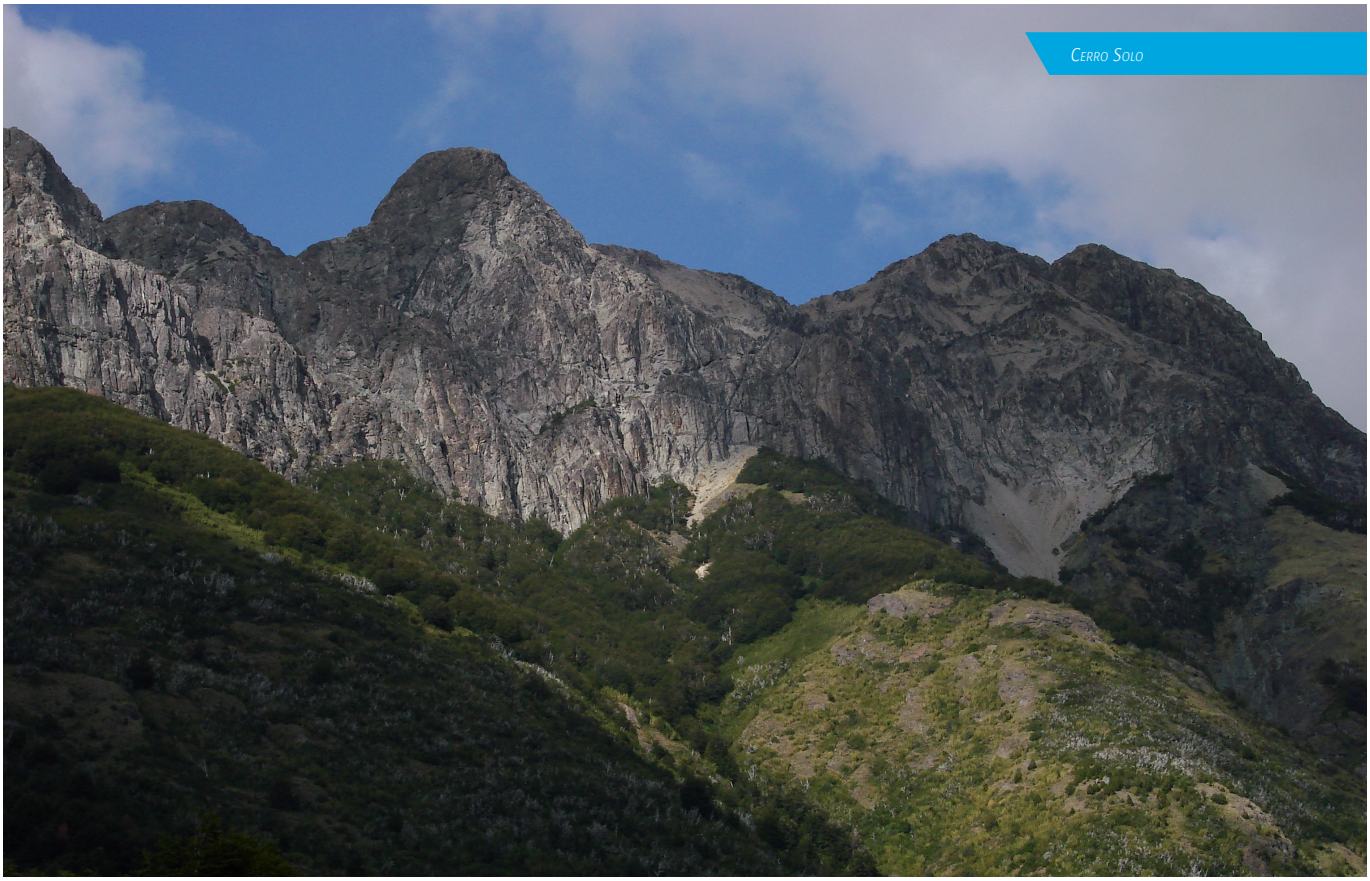
Since ancient times, the huiliche mapuche — the original inhabitants of the alerce's distribution area — called these trees lagual or lahuán, which translates as "life after life," meaning "long-living." For them, the alerce was a giant among the rest of the vegetation. This very slow-growing tree hails from another dimension of time and natural processes. It is living proof of the importance of upholding conservation across generations, to perpetuate diversity and the cycles of life.

Amidst these magnificent natural landscapes, the Park offers its visitors an extraordinary range of memorable experiences, allowing them to traverse rocky paths in a quiet walk in the forest, and to contemplate the surrounding immensity on the lake shores.

Throughout the year, from any point within the Park it is possible to see the snowcapped peaks of the Andes Cordillera. Across the seasons, their aspect is modified by the changing colours of the lenga beech forests. These, in turn, contrast with the hues of the dense forest of many other species, highlighting a landscape where crystal-clear rivers, lake and streams complete the composition.

The Arrayanes river and the Verde lake are two of the region's most picturesque fluvio-lacustrine landscapes. The green hues of the Arrayanes, recognized as an emblematic site worldwide, run over a riverbed six kilometres long and 50 metres wide. On its shores grows a copious vegetation of coihues and cypresses, among which stand out the cinnamon-coloured trunks of the Chilean myrtles. The symmetric Lake Verde reflects spectacular colours, shifting between emerald and turquoise according to the intensity of sunlight and the time of the year. The water running in the stream and the singing of the birds, surrounded by imposing mountains capped by eternal snow and ice, are capable of moving the senses, and are the manifestation of a majestic Nature.

These sensations become even more profound when one begins the ascent to Torrecillas glacier and recognizes the U-shaped valley, a mark on the landscape left over the course of millions of years by the passage of this glacier — a giant of olden times now in pronounced retreat.



Cerro Solo

Chilco

Criterion (x): Contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of Outstanding Universal Value from the point of view of science or conservation.

PNLA is an area of great value for the conservation of biological diversity in the Valdivian Temperate Forest, an outstanding and priority ecoregion for conservation worldwide (Olson, Dinerstein et al., 1995; Armesto, León-Lobos et al., 1997; Olson and Dinerstein, 1997), by reason of being considered one of the 200 hotspots for world conservation (WWF, 1997).

Unlike other ecoregions which are characterized by greater species diversity, the Valdivian ecoregion has developed in marked biogeographic insularity, in which important speciation processes have taken place (Armesto, León-Lobos et al., 1997). This is evidenced by the presence of relictual genera and even orders, as well as numerous endemisms (Olson, Dinerstein et al., 1997), and threatened species (IUCN, 1995).

The ecoregion's biological relevance is mainly due to the presence of great continuous forest masses with an important degree of ecological integrity, great variety of habitats and unique species assemblages. Especially relevant is the presence of numerous family and genus endemisms (34% of woody plant genera are endemic; of these, 80% are monotypic), some of them relictual (Olson, Dinerstein et al., 1995; León-Lobos et al., 1997).

PNLA has at least 544 recorded species of vascular plants (Ezcurra and Puntieri, 2013) and numerous species of fungi (APN, 1997; Monjeau, 2006). Remarkable among them we find: Escallonia rosea and Deschampsia laxa, two species which in Argentina have only been found in the area surrounding Lake Menéndez; Griselinia ruscifolia, very rare in Argentina's northern Patagonian Andes region; Silene patagonica, a strict endemism of Chubut Province's mountain region, which has been recorded in the Park; Senecio yegua, discovered in the Lake Chico area — one of only two records in the country — and the Guaitecas cypress, (Pilgerodendron uviferum), the only species of the Pilgerodendron genus and the most Southern conifer in the world, of which new

populations are still being discovered in little-explored sectors of the protected area (Rovere, 2002). It is important to point out that PNLA's populations of Pilgerodendron are relictual, since they have not been affected by the glacial peak and present the highest genetic variability in Argentina (Premoli, Souto et al., 2002).

PNLA contains approximately 7,407 ha of millennial virgin alerce forests, as well as the most southerly populations for this species (Kitzberger, Pérez et al., 2000) and of others such as the Cordilleran cypress (Austrocedrus chilensis), coihue (Nothofagus dombeyi), colihue bamboo (Chusquea culeou) and Chilean myrtle (Luma apiculata) (Burkart, Bárbaro et al., 1997).

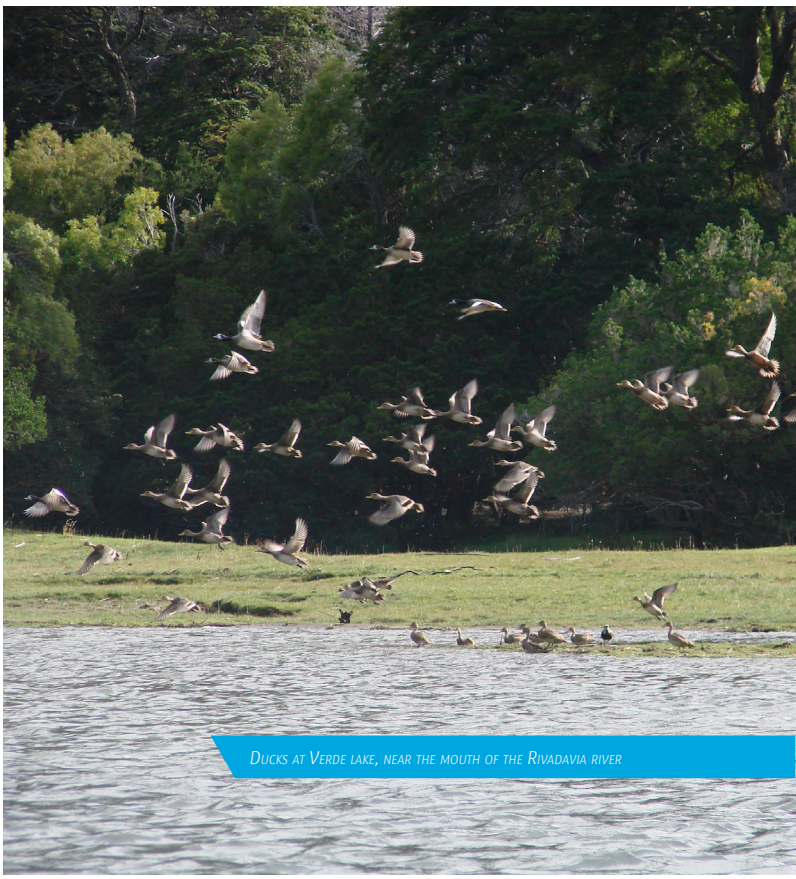
For generations, the alerce has been considered one of the species of greatest cultural value — emblematic of South America's temperate forests — due to its great size, longevity, the physiognomy of its forests and its usage by humans, which dates back to thousands of years (Donoso, 1995; Lara, 1998 in Premoli et al., 2004).

This threatened species is an outstanding universal value, being the second longestliving species in the world (> 3,600 years). Furthermore, these specific populations are of great value due to their extremely high genetic singularity in the whole extension of their distribution, which makes them a key reservoir for the species' conservation (Premoli et al., 2000 a and b).

Of the species' total distribution, a great portion of its genetic variation in Argentina and Chile is found in the northern areas of PNLA and its adjoining buffer zone. Thus, these populations are important for the conservation of the whole of the species; they are also potential refugia for genetic diversity (Premoli, Souto et al., 2004). In its riparian environments, PNLA contains numerous habitats that are apt for the establishment of new individuals. In contrast to the slope forests, where many stands contain mainly mature individuals, the riparian groves exhibit a high percentage of small-diameter stands.

This type of habitat is normally subject to a high frequency of fluvial disturbances, which favour the establishment of alerce seedlings (Veblen, Armesto et al., currently in press). It is possible to observe the development of young alerce groves, the result of localized regeneration that began with surviving trees in wildfire refugia near the shores of rivers and lakes, where fires' lesser intensity allowed for the survival of a few isolated individuals (Kitzberger, Pérez et al., 2000).

Unlike other alerce forests, which show signs of alteration due to exploitation, livestock farming or fire, the alerce forest in PNLA is in an excellent state of conservation, which ensures the undisturbed occurrence of natural phenomena and hence guarantees the conditions for the long-term viability of the species' natural populations.



Ducks at Verde lake, near the mouth of the Rivadavia river

Variety of ferns, Millennial Alerce Forest

From the point of view of the richness and composition of fauna, the Park includes the groups typical of the Valdivian District, with some representatives of its ecotone with the Patagonian steppe (Burkart et al., 1997). The Park's fauna assemblage comprises 23 mammal species, 133 bird species, 11 amphibian species, six species of native fish, three reptile species, and numerous invertebrates, including important endemisms.

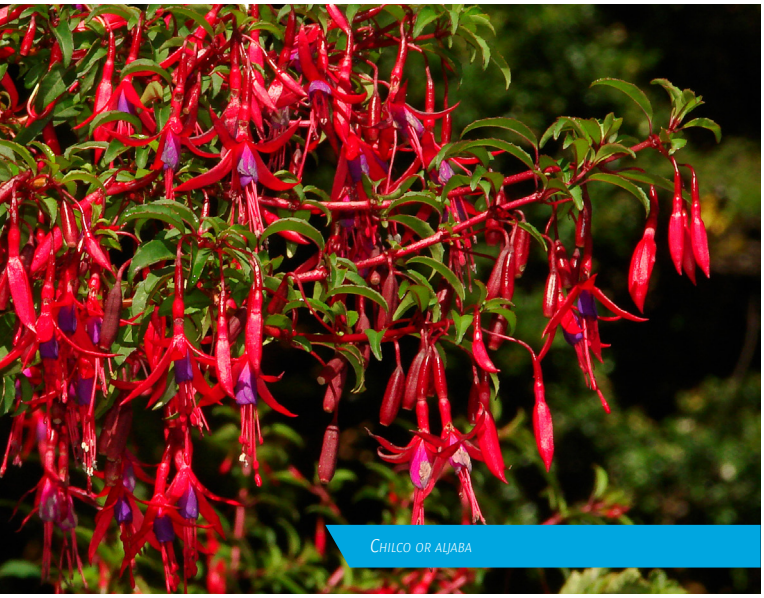
Remarkable among the mammals is the huemul (Hippocamelus bisulcus), the only species of native South American deer in danger of extinction at the international level (IUCN, 2015) and at national level for Argentina and Chile. The nominated property has several populations that are key for the conservation of the species. Because of its importance, the species has been designated as an Argentine Natural National Monument, as well as a Natural Provincial Monument for the provinces of Santa Cruz, Chubut and Río Negro. It is listed in CITES Appendix I as a High-Value Vertebrate Species (HVVS) at PNLA and other protected areas where it is found. In Chile, the species is protected by Law No. 19,473. It is also listed in the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention, Appendix I). Other notable mammal species include the pudú (Pudu puda), one of South America's smallest deer; and the kodkod or guigna cat (Leopardus guigna), the smallest, most distributionrestricted feline in America (Acosta and Lucherini, 2008). Also remarkable is the monito del monte (Dromiciops gliroides) endemic to Patagonia and considered a "living fossil" since it is the sole extant species of the ancient Microbiotheria order of marsupials (Monjeau, 2006; Díaz M. and Teta, 2008).

Notable among the endemic birds that are considered "rare" in Argentina are the torrent duck (Merganetta armata), the Magellanic woodpecker (Campephilus magellanicus) and the Chilean pigeon (Columba araucana); all are well represented in the Park. The Park contains other remarkable species such as the Andean condor (Vultur gryphus) , the Chilean flamingo (Phoenicopterus chilensis), and the bronze-winged duck (Anas specularis).

Among the amphibians, the protected area has the strictly endemic species Batrachyla fitzroya, which is present only in Isla Grande in Menéndez Lake; and three species exclusive to Patagonia: the gracile frog (B. antartandica), the short-brow frog (B. taeniata) , and the Emerald forest frog (Hylorina sylvatica).

The Park is an important sweet-water reservoir. Its protected status helps to ensure the water quantity and quality for a significant portion of the streams born at its headwaters. This in turn allows the area to sustain sub-basins and minor water bodies, the only ones in northern Patagonia that are free from salmonidae.

In summary, the nominated property is a protected area relevant for the long-term viability of the natural features that conform the biodiversity structure, functioning and self-regeneration of important forest ecosystems — in particular, the communities of millennial alerces, in the most southern and eastern portion of the Valdivian ecoregion (see Map 3: Vegetation of the Valdivian Ecoregion).



Chilco or aljaba

Millennial alerce tree

Alerce forests, northern arm of Menéndez lake

3.1.c Statement of Integrity

The nominated property contains 36% of the alerce forests in Argentina, including the forest masses with the greatest genetic variability on the eastern slopes of the Andes, and the oldest in the country. These forests are Argentina's largest alerce forests granted the fullest protection of national law, and the second largest alerce forests in Chile and Argentina. These alerce communities are immersed in vast areas of forests, which include most of the relevant communities in the northern Andean-Patagonian forest (Cordilleran cypress, lenga beech, coihue, Antarctic beech, mayten, Chilean myrtle, male mañíu (Podocarpus nubigenus). The forests contain even Guaitecas cypress, tepa, huahuán (Laureliopsis phillippiana), and pitra (Myrceugenia exsucca) in excellent state of conservation, and constitute key habitats for numerous species of native fauna.

PNLA includes 125,463 ha of "intangible area" (off-limits) as well as a Strict Nature Reserve, which together place 47,7% of the nominated property in IUCN category Ia.

A further 6% is in category Ib, and corresponds to a sector of the Wilderness Area (see Map 5: Strict Nature Reserve and Wilderness Area Los Alerces National Park), whose conservation state is very good. Baseline biodiversity analyses at regional scale, especially analyses for the area conducted in the last three years, highlight a high level of environmental integrity, using specific indicators for communities and species (Orellana, 2013).

Independent analyses conducted using "score cards" in 1999 indicated 65% effectiveness for conservation success (Rusch, 2002). Since then, the conditions for protection and management of the property have been strengthened.

Between 2011 and 2014, the National Parks Administration implemented Management Efficiency Measurement (MEM), using a quali-quantitative tool of its own design that is applied to all areas of the system. Results from the first three years of measurements for the protected area indicate a satisfactory level of management, placing the Park's score at approximately 64% efficiency, which is the average value for protected areas worldwide.

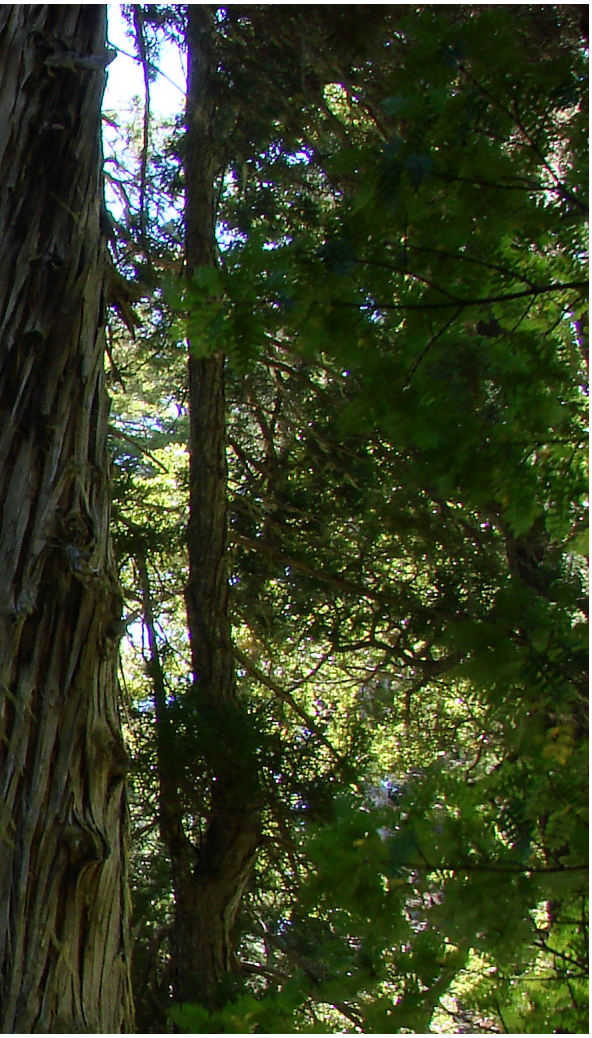
PNLA is a significant, representative and well-preserved sample of the Valdivian Temperate Forests Ecoregion. For more than 75 years, its legal status as a highly protected area — part of the National System of Protected Areas administered by APN — and its management according to this status were essential to maintaining and strengthening the conditions conducive to the preservation of the biological make-up, the ecological functions and the continuity of relevant processes at landscape scale. Maintaining these conditions ensures the viability of the species, populations and ecosystems that develop in the area in the long term.

At landscape scale, the nominated property — which includes an ample expanse of 190,121 ha, 72.3% of its area, free of roads or human occupation — is supported by numerous provincial protected areas in the Andean-North Patagonian Biosphere Reserve (ANPBR), which provide connectivity and integrity for the alerce forests and for species with ample habitat requirements. Further support is provided by Chile's protected area in Pumalin Park, which limits the nominated property on the western slope of the Andes; and by other neighbouring protected areas such as Chile's Hornopiren National Park and Futaleufú Nature Reserve, both part of Chile's Austral Rainy Temperate Forest Biosphere Reserve.

Likewise, the intact block included in the nominated property contains one of the most important populations of huemul, a species declared in danger of extinction, in northern Argentine Patagonia.

Alerce forest

"El Abuelo" (The Grandfather) alerce tree



3.1.e Protection and Management Requirements

Los Alerces National Park is part of the National System of Protected Areas in Argentina (SNAP, Sistema Nacional de Áreas Protegidas de la Argentina) which is under the jurisdiction of the National Park Administration, a self-governed body created by Law No. 12,103 in 1934, regulated by National Law No. 22,351 of 1980. The latter law defined APN's self-government and functions, and created a collegiate body to lead and administer it. This law also created the National Park Rangers Body, in charge of vigilance and control to guarantee law enforcement in the system's protected areas.

For the nominated property, legal protection is provided by Decree No. 105,433 of 1937, endorsed by National Law No. 13,895/37 and National Law No. 19,292/71 (see Appendix 3: Law No. 19,292). The total protected surface is 259,822 ha, of which 188,379 are sensu stricto a National Park, one of the three categories of maximum protection in Argentina. Thus the nominated property is an area of land in the public domain with the highest degree of legal protection.

The most important identified threats for the region are the potential fragmentation of natural landscape matrices, and the potential displacement of forest boundaries due to climate change. Enforcement of the Argentine Native Forests Protection Act (Law No. 26,331, Ley de Protección de los Bosques Nativos de Argentina) guarantees protection for the area, and provides a framework to approach these issues. This Act, which incorporated important areas of adjoining forests to the highest protection categories, guarantees that the nominated property will retain its protection status categories: National Park, Strict Nature Reserve, Strict Wilderness Area and National Reserve. Likewise, the Andean-North Patagonian Biosphere Reserve, designated by UNESCO in 2007, encompasses an assemblage of protected areas of relevant geographical continuity, and contributes to the sustainable management of the Valdivian ecoregional corridor (APN, 2007) (see Map 2: Andean-North Patagonian Biosphere Reserve and Map 3: Vegetation of the Valdivian Ecoregion).

The Park's daily management is regulated by the Management Plan approved by Board Resolution No. 171/1997, which provides considerations for zoning consistent with the area's protection categories. The Management Plan is currently being revised and updated, as detailed in 5.c Means of Implementing Protective Measures and 5.e Property Management Plan or Other Management System.

3.2 Comparative Analysis

Comparison to similar properties

In the last decade, the growing number of nominations and declarations of World Her- itage sites has highlighted the relevance of key sites for conservation at world scale, with areas of genuine, singular natural beauty.
The nomination of Los Alerces National Park (PNLA) as a World Heritage Site re- quires pointing out the main points that justify it, in the context of the relevant nomi- nation criteria ((vii) and (x)).
As a summary of the distinctive features of the nominated property in the context of Wold Heritage sites, we itemize:

• Firstly, PNLA is of relevant singularity for southern Argentina's and southern Chile's temperate forests, whose representation among the World Heritage sites that promote the conservation of the planet's temperate forests needs to grow.
• Secondly, PNLA would become the first property to incorporate a portion of the Argentine-Chilean Valdivian Temperate Forest ecoregion into the World Heritage sites. These forests are considered by the WWF study as one of 200 ecosystems that are critical for conservation worldwide, yet are not represented amongst the World Heritage sites.
• Thirdly, PNLA hosts forests of one of the two longest-living species on Earth. These forests, aside from their intrinsic value, include communities with particu- lar genetic relevance for the conservation of this millennial species.
• Fourthly, PNLA contains important cores of old-growth forests in a highly rele- vant state of conservation. These are immersed in large non-fragmented blocks of forest, which have ensured their preservation to date.
• Fifthly, PNLA offers the opportunity to experience contact with landscape of sin- gular scenic beauty for contemplation and enjoyment.

3.2.1. Strengthening the representation of the temperate forests of southern Argentina and Chile

Currently, the list of UNESCO World Heritage sites includes 104 forest sites (http://whc.unesco.org/en/forests). Nevertheless, a study by IUCN (2006) concluded that, even though forests are well-represented in the list, it is possible that some forest biomes with potential universal value may be underrepresented, including the temper-
ate forests in the south of Chile and Argentina.

Unlike other southern temperate forests, the southern South American Temperate
Forest (SSATF) has a highly endemic biota. At least three families of angiosperm plants (Misodendraceae, Gomortegaceae and Aextoxicaceae) are only found within SSATF (Arroyo et al., 1996; Aizen and Ezcurra, 1998). Likewise, the flora exhibits one of the highest incidences of biotic pollination (especially by ornithofilia) and animal dispersion (espe- cially by endozoochory) recorded for any temperate biome. Temperate flora generally exhibit lower incidence of pollination and biotic dispersion, and a higher importance of abiotic factors (e.g. wind) as agents for the transport of pollen and seeds. The Southern Hemisphere temperate forests such as those included in the nominated property are an exception to this rule, since they were formed in the warmer climate of ancient Gond- wana (Aermesto and Rozzi, 1989; Willson et al., 1989; Willson 1991; Aizen and Ezcurra, 1998).

These temperate forest communities, which include the nominated property, share common roots with plant lineages of other forests in the Southern Cone. For this rea- son, they are similar to the Australian World Heritage sites such as the Tasmanian Wilderness (declared in 1982) and Gondwana (declared in 1986). Combined with these sites, the nominated property would help to strengthen the representation of temperate southern biomes among World Heritage sites.

In this regard, the forests of PNLA, with their specific features that make up their outstanding universal value, are a site that enlarges and strengthens the representation of the temperate forests in southern Argentina and Chile among the World Heritage sites. Currently, this particular biome is represented among World Heritage sites only by Los Glaciares National Park (PNLG, Parque Nacional Los Glaciares). Declared a National Park in 1981, PNLG is home to huge glaciers, lakes and forest communities typical of the southern temperate forests subunit. PNLG protects steppe and forest communities in an excellent state of conservation, including communities and species assemblages with features that differ from the southern Andean Patagonia forests in the nominated property.

Thus we can point out that both PNLG and PNLA share high levels of protection and integrity, and that the incorporation of PNLA into the list of World Heritage sites would contribute to strengthen the representation of a wide range of variability of the temperate forests of Argentina and Chile.

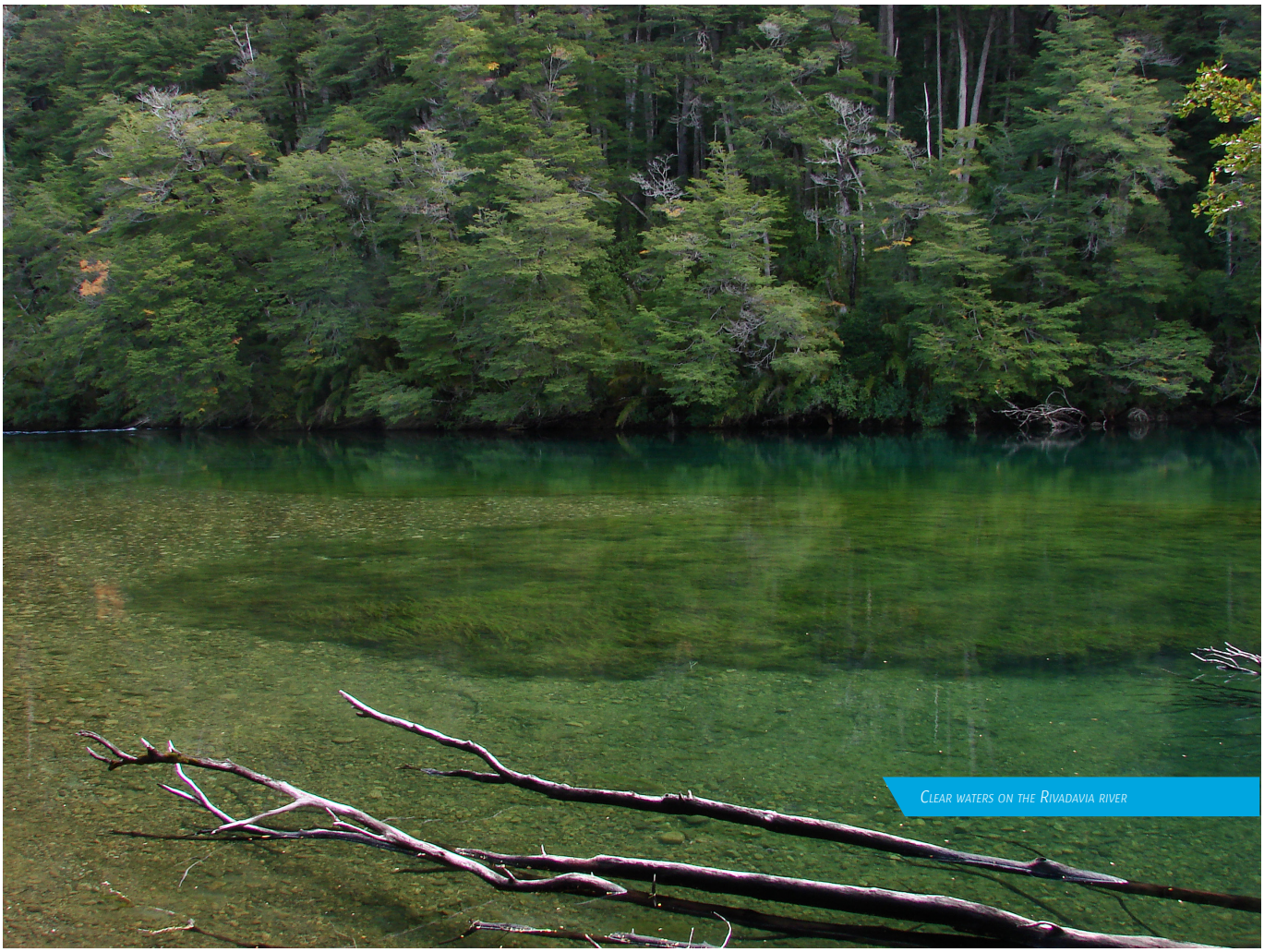
Mixed forest, southern arm of Futalaufquen Lake

3.2.2 First World Heritage Site for the Valdivian Temperate Forest in Argentina and Chile

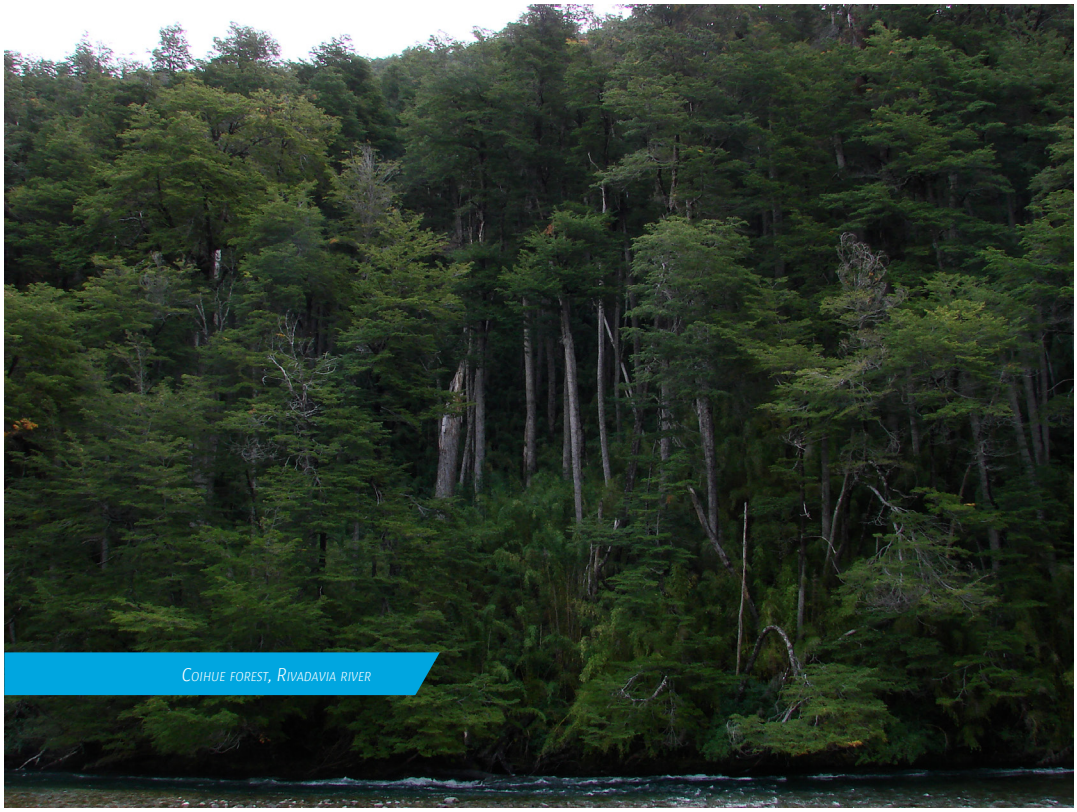
The nominated property would become the first one to represent the Valdivian Ecore- gion among the World Heritage sites. This ecoregion is a temperate biome identified as one of the 200 ecosystems critical for conservation worldwide (Olson and Dinerstein, 1997). With its high biogeographic singularity, the biome includes a significant pro- portion of the total temperate forest formations in the world (WWF, FVSA et al., 1997; WWF et al., 2001).

The declaration of PNLA as a World Heritage Site would mark a first step in the re- doubling of many years' efforts to manage and sustain intact blocks of high integrity in different sectors within the narrow range of mountain environments, temperate forests, grasslands and sub-Andean steppes of Gondwana roots. These highly-intact blocks of continuous forest masses are among the most important of the world's remaining tem- perate forests in a good state of conservation.

In this regard, PNLA includes a large intact block of Valdivian temperate forest, en- compassing 190,121 ha. (72.3% of the nominated property) which, with other sectors in the protected area, would complement the representation of other temperate forests of high integrity and importance, such as the Primeval Beech Forests of the Carpathians and the Ancient Beech Forests of Germany (Slovakia, Ukraine, Germany), declared in 2007.



Clear waters on the Rivadavia river



Coihue forest, Rivadavia river

3.2.3 Forests with long-living species and communities of special genetic relevance for conservation

The nominated property, with its millennial alerce forests — which include individuals more than 2,600 years old, five metres in diameter and 50 metres tall — is a heritage of extremely high value within the biome of northern Patagonia, and is remarkable among other temperate forest biomes that include long-living species. The alerce, Fitzroya cu- pressoides, is the second longest-living species ever recorded. The longest-living is Pinus longaeva, whose oldest living specimen (5,060 years old in 2012) is in the White Moun- tains of California, USA (Brown, 2013). These species are true living witnesses of our planet's natural history, and in the case of the alerce, provide valuable information about climate evolution, specially the last glacial events in South America.

One distinguishing aspect of the alerce communities in the nominated property is their particular relevance for the conservation of the species' genetic variability, as has been shown by studies on populations throughout the species' distribution in Ar- gentina and Chile. These studies demonstrated that the populations of Tigre River and Esperanza Lake in northern PNLA (in the buffer zone) as well as the populations in the protected area, contain the greatest part of genetic variability of the whole distribution of the species (Premoli et al., 2000 a and b). This is further evidence that these for- est masses were some of the main cores of forest that remained as glacial refugia, from which the species' recolonization of the area began. Likewise, the authors point out that conservation efforts for these areas should be redoubled, with the aim of strengthening the long-term conservation of this species which is endemic to South America. Criteria related to the geographic pattern of genetic variability should be taken into considera- tion as a key element to retain the evolutive potential of the natural populations. This would result in greater strength for the species, as well as improved response to even- tual effects due to environmental changes.

Pahueldín, a creeper vine of the Valdivian rainforest

3.2.4 Cores of well-conserved old-growth forests over wide non-fragmented areas

The declaration of PNLA as a World Heritage Site would amplify the core of World Her- itage Sites that comprise important areas of the old-growth forests. Other old-growth forest sites are Yosemite National Park in USA (which includes the forests of sequoia (Sequoiadendron giganteum) and was declared a World Heritage Site in 1984), and the Redwood State and National Parks, also in USA, which protect millennial coastal pop- ulations of redwoods (S. sempervirens), and was declared a World Heritage Site in 1980. Both of these Parks were designed for the conservation of species that were severely fragmented.

The integrity of the forest masses in the nominated property increases the property's value even more. Unlike the old-growth forests mentioned above, communities in the nominated property constitute a large solid block with almost no measurable human influence. For this reason, the current alerce populations in the nominated property, and specially on the eastern slopes of the Andes, are almost equivalent to the species' pre-Hispanic distribution (Kitzberger, Pérez et al., 2000).

Unlike these intact forest blocks, which include the alerce forests, other natural forest areas with alerce masses in Argentina are exposed to tourism and/or production us- age. Even when performed following adequate management regulations, these usages necessarily cause impacts and increase the real and potential vulnerability of the forest areas. Examples of this situation are the alerce forests in other national and provin- cial protected areas, such as the intensive public usage area on Roca Lake in Nahuel Huapi National Park, or the Río Azul-Lago Escondido Protected Nature Area in Río Negro Province, where extensive cattle activities have historically taken place along with tourist usage. Other alerce forests in good state of conservation and under low threat levels — such as those in Nahuel Huapi National Park's Puerto Blest area, or Cerro Cuevas in Lago Puelo National Park — are made up of younger forest masses which conform markedly smaller groves.

In the case of alerce populations in Chile, their present distribution is smaller than the original, as a result of four centuries of intense exploitation, burning, conversion to grassland and agricultural usage in areas that in pre-Hispanic times were covered by alerce forest masses (Veblen, Delmastro et al., 1976; Donoso, 1983). These authors point out that, as a result, by the end of the 19th Century Fitzroya had been practically eliminated from easily-accessible sites such as Chile's Central Depression. This has not been the case in Argentina, partly due to the country's territorial configuration and the difficulty of access to forest masses of this species, and partly because of the early creation of protected areas on the eastern slope of the Andes. Today, the species' best- preserved, most continuous forest masses in Chile's Cordilleran region are in the parks of Alerce Andino, Hornopirén and Pumalín. However, these masses were affected by the long tradition of usage and exploitation prevalent until the creation of the protected areas in the 1980s. It is worth noting that 96% of the total alerce population area in Chile and Argentina is located in Chile; of this percentage, only 9% is in protected areas.

3.2.5 Singular geographic identity conferred by landscape and scenic beauty

Finally, it is important to note that, aside from the relevance of all World Heritage sites mentioned here as outstanding universal values for the conservation of biodiversity, they also share a singular geographic identity conferred by their landscapes and scenic beauty, and offer an exceptional space for human beings to reunite with Nature in con- templation and enjoyment.

The coexistence of slow, meandering rivers — whose shores are covered with trees up to the water's edge, and which include highly attractive species such as the Chilean Myrtle — with rapids and waterfalls visible from paths and lookout points, configure deeply beautiful environments of transcendent diversity. The nominated property com- bines open, immense and navigable lakes with shallow lakes of very small size, with abundant emerging vegetation and presence of aquatic birds. The property holds 13 interconnected lakes and rivers associated with high mountain peaks, glaciers and wa- terfalls. These water bodies comprise one of the great sweet-water reservoirs in Argen- tine Patagonia, and are the same time world-class attractions due to their exceptional natural beauty and their wonderful colourations in a setting of temperate forests.

Because of these features, the nominated property is strongly similar to other tem- perate forest World Heritage sites which lie in landscapes of special immensity and are associated with relevant wetlands, such as Canadian Rocky Mountains Park, declared in 1984, or Plitvice Lakes National Park in Croatia, declared in 1979 and extended in 2000. The nominated property preserves a variety of landscapes and natural environ- ments that have the power to connect us with our origins and transcendence, bringing us closer to a dimension marked by the pulse of Nature amid magnificent natural set- ting, offering an extraordinary array of possibilities to enjoy memorable experiences in the Cordilleran landscape.

Fallen tree trunks become covered with fungi and moss, Millennial Alerce Forest

3.3 Proposed Statement of Outstanding Universal Value

Protected Valdivian temperate forest environments of high integrity and biological singularity

Protected Valdivian temperate forest environments of high integrity and biological singularity

The basis for the nominated property's outstanding universal value is the fact that PNLA is essential for the conservation of the forest ecosystems in the most southern and eastern portions of the Valdivian Temperate Forests, an outstanding and priority ecoregion for conservation worldwide (Olson and Dinerstein, 1997). The Park is thus a unique asset that is still not included amongst the World Heritage sites.

Important speciation processes have taken place in this ecoregion, which has de- veloped in strong biogeographic insularity as evidenced by the presence of numerous endemisms, relictual taxons and taxonomic singularities. The ecoregion's biological importance resides mainly in the presence of continuous forest masses with a high degree of ecological integrity and a great variety of habitats. These contain the most southerly populations of several species of flora — among which the alerce tree is spe- cially remarkable — and, southward, other species such as Cordilleran cypress, coihue, Chilean myrtle and colihue bamboo.

At landscape scale, the nominated property includes an ample block of intact for- est comprising 190,121 ha (72.3% of its area) free of roads or human occupation, thus sustaining the high environmental integrity of the conservation unit. Historically, the region has had a very low incidence of disturbances derived from anthropic activities (cattle raising and fires), which in turn makes it less vulnerable to the invasion of wild herbivores introduced in the area.

Conservation of wide-ranging millennial alerce forests, the second longest-living species on Earth

Conservation of wide-ranging millennial alerce forests, the second longest-living species on Earth

The alerce (Fitzroya cupressoides), of monotypic genus, is the largest species in the Valdivian temperate forest. It can grow up to five metres in diameter and 50 metres tall (Veblen et al., 1976; Lara, 1991; Lara and Villalba, 1993). The alerce is the foundational element of the nominated property's outstanding universal value, by virtue of being the second longest-living species on Earth (after the bristlecone pine, Pinus longaeva). Some alerce specimens have been dated at more than 3,600 years old (Premoli et al., 2000).

Los Alerces National Park has the largest continuous and uninterrupted regions of this species in Argentina (7,407 ha, 36% of the species' total surface), in an excellent state of conservation. Specimens in these regions include some of the largest (in diameter and height) and oldest (more than 2,600 years old) east of the Andes.

The disposition of the area's mountain ranges and bodies of water has made it pos- sible for these relevant alerce populations — as well as a great proportion of the forest communities of the National Park's western sector — to remain non-fragmented, and isolated from anthropic effects. Likewise, the nominated property, the numerous pro- tected provincial areas in ANPBR in Argentina, and the natural protected areas at the same latitude in Chile provide connectivity and integrity for the alerce forests, as well as for species that require large areas as habitats.

Protection of significant cores of old-growth forests in northern Patagonia, which possess high genetic singularity

The alerce forests in the nominated property comprise a significant portion of old-growth forests conserved by the protected areas in northern Patagonia, which are mostly mature slope forests. Being glacial refugia, these populations exhibit the highest genetic singularity in their longitudinal and latitudinal distribution, and are thus a key reservoir for the conservation of the species (Premoli et al., 2000 a and b).

Old-growth forests themselves are recognized worldwide as a high conservation value, and of late have have been gathering increasing attention (Lindenmayer, Lau- rance at., 2012; Lindenmayer, Laurance et al., 2014; Mackey, Della Sala el al., 2015). These formations, and the nominated property in particular, are of outstanding value since they constitute ecosystems that have developed in extraordinarily stable and persistent conditions for a very long time. They are true witnesses of pristine continuity through millennia, and have allowed for the development of specially intricate and outstanding ecological processes and interactions.

These features make Los Alerces National Park a key component for the long-term viability of the natural features that conform the biodiversity structure, functioning and self-regeneration of the forest ecosystems in the Valdivian ecoregion. It is also an appropriate area for the movement of different species in response to the potential effects of global climate change, providing continuity of natural processes across evolutive times.

Taique flower

PNLA plays an important role for the conservation of a wide variety of fauna, including species of special value and endemic to the ecoregion

Fauna at the nominated property consists of 23 species of mammals, including the huemul, the only endangered species of South American native deer (IUCN, 2007). The huemul's population inside PNLA is key for the conservation of the species. The Park has records of huemul deer in alerce forests, an extremely rare situation. Other relevant mammals are the pudú, the smallest deer in South America; the guigna cat; and a nocturnal marsupial, the monito del monte — a monotypic species endemic to Patagonia and considered a living fossil since it belongs to one of the oldest lineages of marsupials.

In the Park live five species of native fish; three species of reptiles, including the Val- vidian snake; and 15 species of amphibians. Amphibian species include three species exclusive to Patagonia: the gracile frog, the short-brow frog and the Emerald forest frog. Specially remarkable is Batrachyla fitzroya, a frog strictly endemic to the island of Isla Grande in Menéndez lake, whose full life cycle takes place on the island. The area also has records of 133 native bird species, including four endemic to the Valdivian rainforest and threatened species such as the Andean condor, the Chilean flamingo and the bronze-winged duck.

PNLA plays an essential role in protecting high water basins, glaciers, and a vast sweet-water reservoir

The nominated property contains an important sweet-water reservoir. The reser- voir's protection status and management helps to protect the quantity and quality of water, as well as the sustainment of natural hydric processes in an ample portion of the headwaters of the great binational Futaleufú-Yelcho basin, the main collector on the Pa- cific slope. This basin, molded by the action of successive glaciations — which created varied geomorphological features such as moraines, glaciofluvial and glaciolacustrine deposits, glacial cirques, sheepback rocks, U-shaped valleys and glacial striations — en- compasses a complex system of rivers and chained lakes, which regulates the drainage from the abundant snow and rain precipitation.

Likewise, the property contains an important portion of Patagonia's least-impacted wetlands, by virtue of their isolation from anthropic activities (cattle raising, farming, etc.). It also contains some of the few water environments free from the seeding and invasion of salmonidae in Patagonia. The Park belongs to the National System of Pro- tected Areas, managed by the National Parks Administration; its protected status sup- ports the continuity of actions taken for the long-term preservation of biological compo- sition and ecological functions, ensuring the viability of the area's species, populations and ecosystems.

PNLA includes and protects remote areas of extraordinary beauty and natural value

The nominated property is a unique site, combining special elements and condi- tions of the Valdivian temperate forests in northern Patagonia that create a setting of extraordinary beauty: majestic forests, an extensive system of interconnected lakes and mountain corridors with glaciers and perpetual snow — an exceptional natural value amidst a landscape of outstanding beauty, remarkable in all the world.

Scientifically, these environments are also highly relevant: they contain habitats crit- ical for biodiversity, large environmental gradients including forests that range from subhumid to superhumid and the high Andes, ample genetic diversity in plant species, protected high basins, glacial and periglacial environments, and extremely valuable dendrochronological (tree-ring) series, with implicit information about the history of climate and disturbances — all in landscapes of exceptional beauty.

Los Alerces National Park, whose innermost reaches are accessible only by sailing huge lakes or walking narrow footpaths in a remote part of the Andes, is an invaluable asset that deserves to be included amongst the sites distinguished as World Heritage.

4 State of Conservation and Factors Affecting the Property

4.a Present State of Conservation

According to the creation form of the Biosphere Reserve (APN et al., 2007), the natural isolation of the Andean-Patagonian forests region — enclosed by steppes to the north and east, and by the Pacific Ocean to the west — led to the development of many plant and animal species and genera, that are endemic to these forests (Mermoz et al., 2000 ; WWF, 2001). Priority sites for the conservation of the Valdivian ecoregion were determined in inter-institutional workshops, with the participation of scientists and specialists in the region[8]. The following features were taken into account when identifying the sites: richness in species, unusual or infrequent interactions, ecological integrity (for example, intact habitats and biotas), and evolutive phenomena and processes (Vita et al., 1999).

In 2005 these sites were later updated and validated with the participation of specialists from a variety of fields. Priority site boundaries were updated, and new sites were defined on the basis of new research, as part of the material for the Plantation Biodiversity Project (INTA and APN, 2005 in APN et al., 2007).

While analysis reaffirmed that the whole area of the National Park is relevant for conservation, the area of Lake Menéndez, Cerro Riscoso, Cordón Situación (139,301 ha total) was identified as a particularly important priority site for conservation (Ramilo, Mermoz, Prémoli and Ubeda in INTA-APN, 2005) due to its natural values and high degree of integrity. This criteria is reaffirmed by baselines recently established for PNLA.

Rock outcroppings at Cerro Químico

This sector was identified by evaluating the following outstanding biodiversity features:

Flora: This high-integrity zone is a core of genetic diversity for the alerce (Fitzroya cupressoides), an endangered species (IUCN, 2004), as well as a glacial refuge for the species (Prémoli and Mermoz in INTA-APN, 2005).
Fauna: Among the threatened mammals in the area we find: important population cores for huemul (Hippocamelus bisulcus), a species endangered nationally and worldwide; and records for the guigna cat (Oncifelis guigna), vulnerable nationally
(Díaz and Ojeda, 2000; IUCN, 2004; Ramilo in INTA-APN, 2005). Also of note is the presence of the pudú (Pudu puda) (Ramilo in INTA-APN, 2005). There are also at least seven confirmed amphibian species in the area of Lake Menéndez, of which three are threatened: Batrachyla antartandica and Hylorina sylvatica, vulnerable in Argentina; and Rhinoderma darwinii, vulnerable worldwide. Also of note is Batrachyla fitzroya, a strict endemism of the Park, exclusive to an island in Lake Menéndez (Lavilla and Scrocchi, 2000; IUCN, 2004; Úbeda in INTA-APN, 2005). Of the three threatened species, the last two are typical of the Valdivian rainforest, while B. antartandica is present in Nothofagus forests. This species depends on the state of conservation of the forest, since it is impacted by the exploitation of the lenga beech (Nothofagus pumilio). The presence of B. antartandica in Nothofagus forests is an indicator for good state of environmental conservation.

Sauco del Diablo flower

[8] *The first workshops took place within the framework of a process initiated by the Argentine Wildlife Fund and WWF (1999-2000). The areas were later reevaluated within the Biodiversity Module of the Critical Factors in Forest Plantations National Project (PIA 08/04). Later, they were again reevaluated for the elaboration of "Baseline information on biodiversity and forest plantations. Northwest Module for Patagonia" (PIA 04/05). To further support and update this information, seven fauna specialists were interviewed by personalized survey, and a workshop was held with 16 attendant specialists in flora (2005).*

In 2002 took place the first evaluation and efficiency comparison for the protected areas in the Argentine area of the Valdivian Ecoregion (Rusch, 2002). The report indicates that when considering only variables for management, the values of Los Alerces National Park are above the 75% optimal (with points beginning at 3). These variables are particularly linked to "implementation."

Likewise, this analysis results in the following efficiency scores for the protected area, discriminated for the areas of the National Park and the National Reserve.

	MANAGEMENT							VULNERABILITY							
National jurisdiction areas	Legal aspects	Administrative aspects	Planning	Policies	Research/Education	Resource usage	Management total	External threats	Internal threats	Total threats	Threats corrected for surface	Total	Corrected total	Total in %	Significance
Los Alerces NP	3.167	3.278	2	3	2.5	4	2.991	1.625	3.2	2.413	2.413	2.846	2.85	71.2	3
Los Alerces NR	3.167	3.278	2	3	2.5	1	2.491	1.125	2.8	1.963	1.963	2.369	2.36	59	2

Table 2. Management Efficiency, Valdivian Ecoregion and Los Alerces NP and NR (Source: Rusch, 2002; WWF and FVS).

As this analysis shows, PNLA is included as an area of high significance, with satisfactory implementation levels and high degree of integrity. This is still the situation today, as shown by APN's Efficiency Measurements for 2012-13 and by the results of the thematic analyses of baselines linked to integrity and conservation state.

In relation to threat indicators, Rusch (2002) points out that internally, the area does not evidence legal problems of relevance for conservation. Likewise, the analysis indicated the low application of planning instruments as a threat. This situation is currently being reverted: all of the management instruments approved nationwide in the last few years have been formalized and are being implemented. These include the Zoning Guidelines of 2002, the Annual Operative Plans (POA, Planes Operativos Anuales) RPD 650/2010, Management Efficiency Measurements HD217/11, and the Management Plan Update that conforms to the 2010 Management Plans Elaboration Guidelines.

As external threats, Rusch (2002) indicated the existence of conflicting projects involving potential mining. However, in 2007 the Andean-North Patagonian Biosphere Reserve was declared as such; its extension completely includes PNLA and its buffer zones, as well as other territories in the ecoregion in different conservation categories. That declaration and a related Provincial Decree made it impossible to initiate openpit mining megaprojects throughout all of the provincial territory within the Biosphere Reserve; hence, today these threat factors are no longer relevant.

Chilean myrtles by the shore at Puerto Nicodemo, Krugger lake

State of Conservation of Cultural Heritage

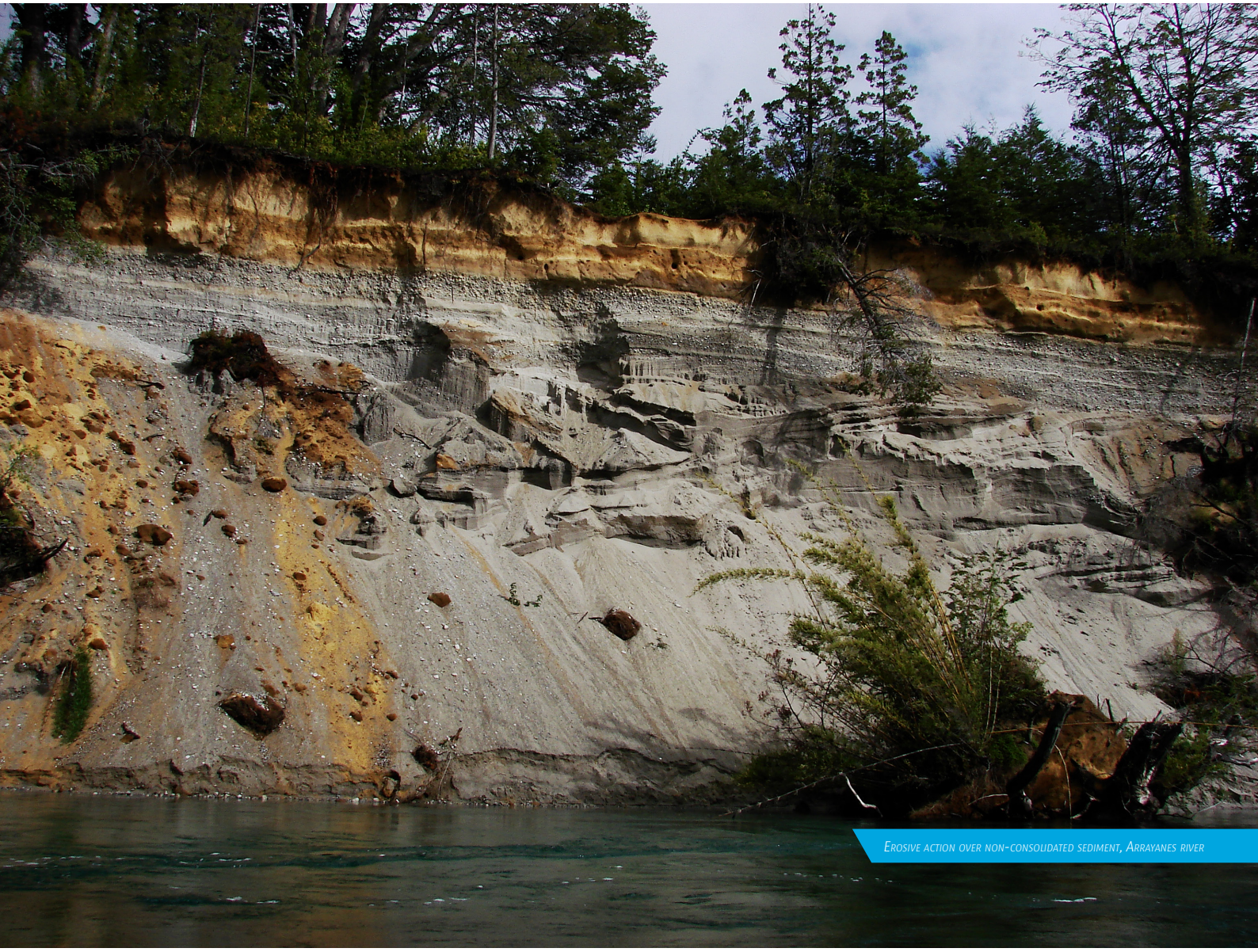
The Park's historical and archaeological sites suffer deterioration caused by the forest environment's weather conditions, which greatly affect their conservation.

Of particular note, rock art is affected by high humidity and exposure to the sun in two rock faces: Alero del Shaman and Alero Sendero de Interpretación. The area's use as a site for human camps and as an animal shelter during many decades of the 19 th Century also played an important role in deterioration. The main observed effects of deterioration are exfoliations and crystalline accretions over the rock paintings and/or rock faces, or the formation of substances — possibly volcanic ash — over them (Caracotche et al., 2013).

Currently, few rock painting motifs can be seen clearly with the naked eye (between 20 and 35%). More than 50% of rock representations are faded; the rest is indeterminate, since only a small trace or spot of paint remains out of a greater motif affected by various agents (Caracotche et al., 2013).

Results of systematic monitoring between 1997 and 2014 by comparing photographs of the motifs taken since 1989, indicate that no new losses or deterioration have occurred for the past 25 years. This stability is possibly due to two major factors: 1) The decrease in rainfall recorded since 1976 in northern Patagonia between parallels 41° to 47° S (Veblen et al., 2011) could have influenced the maintenance of the supporting structures and panels for the rock art; 2) Management measures such as placing the fence and walkways for the public may have helped in preservation by deterring vandalism or the ingress of livestock.

PNLA has 19 historical heritage sites which include constructions, tools and objects. These provide evidence of the way of life of 19th-Century settlers, traditional wood technologies and the art of lake navigation.



Erosive action over non-consolidated sediment, Arrayanes river

Historical relics made of wood display diverse stages of physical deterioration. Different states of disorganization and loss of structure have been recorded for most of them, owing to the advance of the forest and the passage of animals which can lead to destabilization of constructions. There is only one case of total loss of a relic due to fire.

Decontextualization and reutilization of artifacts for modern usage, and neglect of family cemeteries has been recorded in some sites. This reflects low levels of appreciation and recognition for cultural heritage, and for its value for further in-depth studies of the area's history in the 19th and 20th centuries.

4.b Factors Affecting the Property

This section lists the principal factors that have been detected to affect the nominated property. Included factors are those with the capacity to critically impact or affect the property, its integrity or functionality in the medium or long term. Factors were grouped according to specific issues. These issues were identified on the basis of: a) information gathered directly in the area, and b) analysis of results obtained when updating the Management Plan for the National Park (APN, 2013).

Jara river

(i) Development pressures (e.g. encroachment, adaptation, agriculture, mining)

i.a) Effects on water resources:

- Invasion of Didymo algae. Possible propagation of Didymo in areas where it is not present, such as Stange, Menéndez, Jara, Canelo
- Impact of fishing excursions on Lake Menéndez
- Removal of the benthos and erosion along the coasts of the Arrayanes river, owing to motorboats
- Increase in the impacts caused by greater water usage and diversification of usage. Increase of motor boating. Unauthorized access to restricted areas. Presence of litter and detergents leftover by tourists. Increase in usage pressure due to sports, such as canyoning and water sports (windsurf, kayak, kite surf, stand-up, etc.)
- Usage pressure on the Rivadavia river, increasing litter and safety hazards to persons
- Presence of exotic salmonidae in water bodies, modifying the environment's structure
- Difficulties for control in water bodies
- Increase in the number of visitors and accesses to recreation areas, due to the new pavement in Highway 71

Management actions in basins against problems and/or potential threats:

1. Enforcing access restrictions and controls for waterheads areas, in order to protect high basins, lakes and rivers.

2. Implementation of the Patagonian Continental Sport Fishing Rules (approved by Resolution HD No. 258/2014), a legal instrument updated annually on the basis of environmental surveys. The Rules establish modalities of fishing and water navigation according to the state, fragility and capacity of environments. In the case of the nominated property, the last version incorporated the prohibition of motorboat navigation in the Arrayanes river. Very relevant earlier measures continue in effect, such as the prohibition of entering the southern arm of Lake Menéndez or landing at Isla Grande, both locations in the core of the nominated property.

3. The management plan against Didymo, which contemplates a strategy for containing the invasion based on the concept of defensible zones (Reid et al., 2012) , has been successful in protecting four sub-basins that are free of Didymo. These are the sub-basins for Arroyo Coronado, also called Jara; Menéndez river; Stange river and Canelo river; together they comprise almost half the surface of the nominated property.

4. Implementation of the project "Take your waste back with you," a site for receiving waste material for PET recycling and waste collection in concordance with the National Urban Waste Management Project (GIRSU, Gestión Integral de Residuos Sólidos Urbanos).

5. Inclusion in the bidding terms for sewage waste treatment plants.

6. Detection, characterization and monitoring of water and water quality in salmonidae-free environments.

(ib) Effects on vegetation cover:

• Traditional extensive usage of livestock impacts the environment and biodiversity in general, promoting concentrated and diffuse impacts on forests. Impacts are linked to regeneration, loss of richness of native species and increase of exotic species tolerant of intensive grazing (Veblen et al., 1992; Vázquez, 2002). In the nominated property, livestock farming is restricted to certain sectors of the National Reserve. Its negative effects can diminish to acceptable levels if the area is not overtaxed, and its different sectors are managed according to the seasons.
• Presence of outbreak areas of exotic plant species in public use sectors of the National Reserve, as a result of the escape of plant species used for cultivation or as ornaments.
• The alerce, like the Guaitecas cypress and the Cordilleran cypress, can be affected by P. austrodedrae and C. cupressi. Both pathogens are present in the eastern sector of the protected area.

Management actions in land environments against problems and/ or potential threats:

1. Elaboration and implementation of Livestock Usage Plans with the rural population in the National Reserve, with technical assistance and follow-ups by APN personnel and support by cooperating bodies.

2. Actions to deter unauthorized grazing in the valleys of the Huemul stream and the Coronado river, and to remove rogue livestock from sectors where it was present.

3. Elaboration and implementation of management and control plans for exotic species: Willow (Salix spp.) and pines; and controls for common gorze, Ulex europaeus, near the wildfire called "El Cristo."

4. Preliminary diagnosis of the forest's health status (Technical Report: Main health problems for trees, bush and lichens in Los Alerces National Park; Reports 3, 4 , 5 and 6 and addenda; Technical Report Disturbances in the Nothofagus forest of Los Alerces National Park: Weather variation, plagues and pathogens, by Lic.[9] de Errasti). A meeting was proposed with local experts to encourage priority research of forest health problems (Note No. 15/2015, Dept. of Conservation and Management, PNLA).

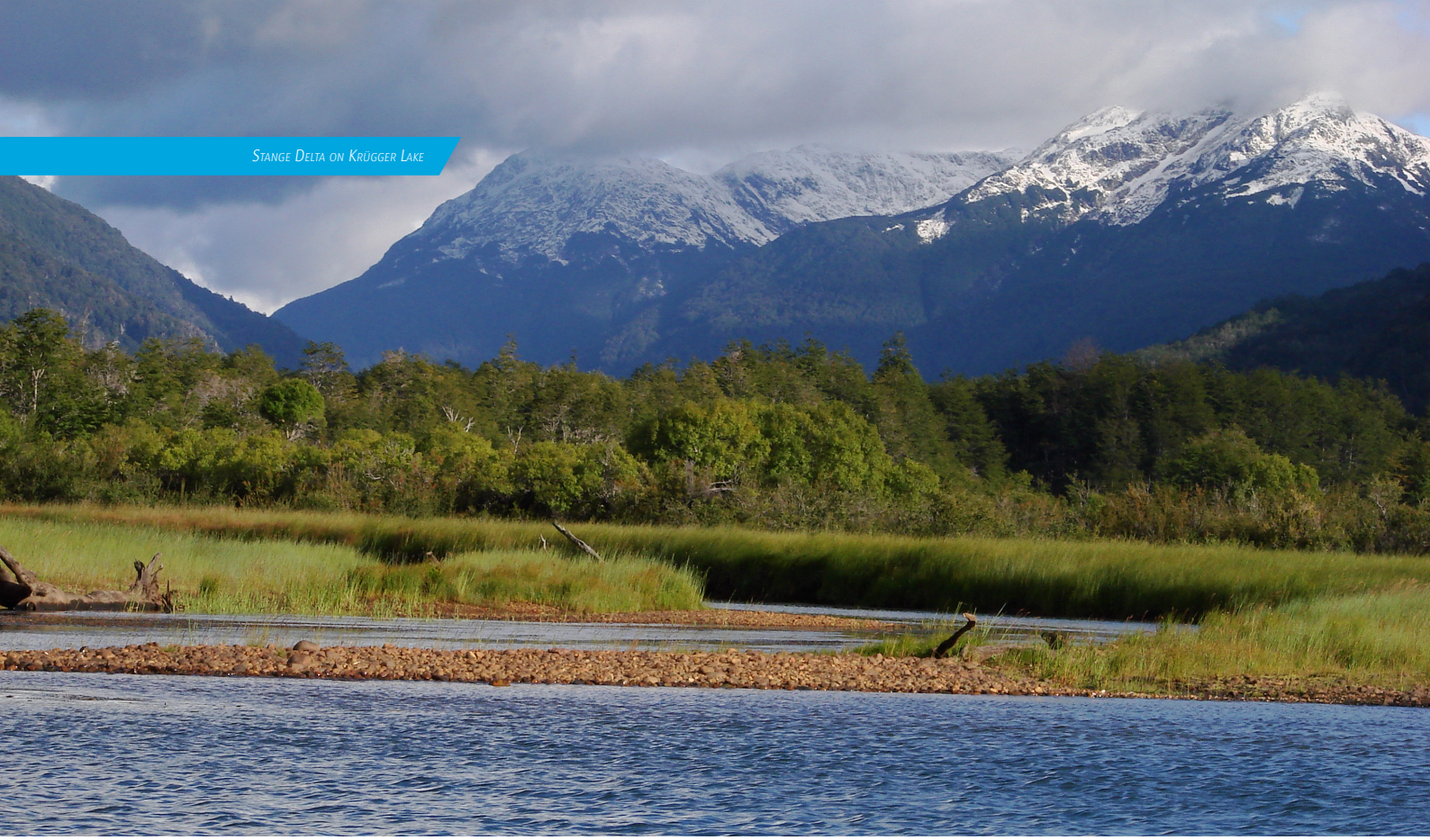
5. Monitoring of forest health status at landscape level, and support of specific research projects. Support of and participation in the research of group mortality of coihue (with CIEFAP and the Forest Pathology Course of Patagonia National University (UNPSJB)). Mapping the presence and preliminary distribution of Cinara cupressi, and first record of the presence of Cinara tujafilina. Proposal for Cinara cupressi monitoring and control (Errasti Report 5, Appendix I).

6. Installation of a sanitary barrier at the Puerto Chucao visitor access to deter the propagation of P. austrodedri towards the National Park area itself.

7. Aerial search for health problems in the alerce forests where affected sites had been identified for monitoring. To date, preliminary results indicate that identified sites are mostly affected by fluctuations in water levels (riparian forests with meandering rivers) and presumably as part of natural dynamics.

[9] *Lic.: Licenciado, an academic undergraduate degree; can belong to many different fields (TN).*

Underwater vegetation in shallow water, Rivadavia lake


Stange Delta on Krügger Lake

(ic) Effects on fauna:

• The huemul is highly vulnerable throughout its distribution area, due to the loss of habitat or connectivity and/or decrease in reproductive success rates as a byproduct of human activities and interaction with exotic species. In the case of the nominated property, these issues are mostly linked to the species' interaction with domestic livestock within the National Reserve (Pastore, 2004; Martínez, 2006 ; Vila and Galende, 2009; Vila and Borrelli, 2009). The presence of livestock and of household animals poses a risk of transmitting infectious disease to the huemul or other native species due to contact or to shared environments (Texera, 1974). On the other hand, certain common pets in human settlements, such as dogs and cats, are predators of many native species, including larger species such as the huemul and pudú. The mere presence of these domestic animals is enough to scare these native species away, causing populations to abandon their habitual areas (CONAF, 2012; Silva-Rodríguez and Sieving, 2012; Hughes and Macdonald, 2013; Schiavini and Narbaiza, 2015).
• Possible impacts of recreational floating trips on the habitat of the torrent duck in the Frey river.
• Alterations in the habitat of native fish and amphibians — including Isla Grande's microendemic frog — due to the effects of watercraft.
• Decrease of native species due to predation (and potential competition) by exotic fish.
• Predation of amphibians, aquatic birds and nests by mink.

Management actions in relation to fauna to combat problems and/or potential threats:

1. Huemul:
• The Cerro Riscoso Critical Area was created in the National Reserve to enhance protection for huemul populations (Resolution HD 296/2001).

"Huemul-friendly" fences were set up, and efforts are being made to decrease livestock numbers and improve the habitat in this sector.

• Since 2006, systematic monitoring of huemul numbers, and non-systematic surveys in different areas of the National Park for which there is no available data on the presence of the species, or only anecdotal and/or outdated information.

• Stool analysis for the evaluation of huemul populations' health status within the National Park, carried out within the framework of the project: "Wildlife and livestock interface in natural environment of the Northern Patagonia Argentina: health indicators for native fauna populations." (Research permit DRP 1339, a Rufford-CONICET/APN project.)

2. Torrent duck: Periodic monitoring of the only stable population known to reproduce in the area, in the rapids of the Frey river.

3. Isla Grande frog (Batrachyla fitzroya): Prohibition of landing on Isla Grande and navigating the canal limited by Isla Grande to the north and by the continent to the south, since waves on the shores could affect the reproductive success of the species (Order 69/2015).

4. Native fish: Elaboration of a "Diagnosis of the fish communities in water environments of Los Alerces National Park, with implications for conservation and management" (Joint Ruling PNLA 40/2015-DRP 14/15), as a basis for later management actions.

5. Aquatic birds and amphibians: Mink was introduced into Patagonia in the 1970 s and is widely distributed; however, actions are being designed for this species as part of the plan to manage Didymo, since it is a potential dispersing agent.

Mt. Gendarme del Perro, northern arm of Futalaufquen Lake

(id) Effects on paleontology resources:

- Lack of knowledge about localization, richness and conservation state of paleontology sites in the National Park.

Management actions to combat problems and/or potential threats to paleontology sites:

1. The Management Plan update includes collecting information on new sites, in order to produce an initial diagnosis about the localization and conservation state of paleontology sites in the National Park.

(ii) Environmental pressures (e.g. pollution, climate change, desertification)

ii.a) Climate change: For northern Patagonia, one of the effects of hemispheric and global climate change was the marked decrease in recorded rainfall between parallels 41º to 47º S since 1976 (Veblen et al., 2011). In this context, it has been shown that for some species of trees, the last decades' hydric deficit and high temperatures are associated with a decrease in radial growth (El Mujtar, 2009; Mundo et al., 2010; Villalba et al,. 2012). These factors are linked to the increased flammability in vegetation areas of medium productivity (shrublands), while areas of low and high productivity (steppes and wet forests) are less flammable (Paritsis, Holz et al., 2013). These changes in climate are combined with the normal disturbances that take place in a forest and — particularly in the National Reserve — with the anthropic factors that may predispose the area to a greater incidence of plagues and pathogens (Paritsis and Veblen, 2011).

Likewise, climate change creates favourable effects for communities native to dry environments such as cypress forests, which are also part of the environmental gradient in the nominated property. Reduced rainfall also slows the speed of deterioration and/or loss of rock art. Monitoring between 1997 and 2014 revealed that for the last 25 years, rock art motifs have suffered no new losses or fadings due to rainfall (Caracotche, Podestá et al., 2013; Caracotche, Cárdenas et al., 2014).

On the other hand, climate change is causing the retreat of the glaciers such as Torrecillas and Tronador, owing to decreased rainfall and increased temperatures (Masiokas et al., 2008).

Management actions related to decisions to combat problems and/or potential threats in relation to large-scale environmental pressures:

1. Support of research:

a) Biodiversity and ecology of communities associated with environments vulnerable to climate change: the Torrecillas and Tronador glaciers (Los Alerces National Park, Patagonia) (Research permit DRP 1368).

b) Influence of climate variations in the decline of Nothofagus pumilio forests in northern and southern Patagonia (Research permit DRP 457).

c) Tendencies of growth and hydric dynamics in the Nothofagus pumilio forests over a range of environmental gradients (Research permit DRP 761).

d) Dating of surfaces exposed by the retreat of glaciers in the Patagonian Andes by using lichenometry and primary inheritance studies (Research permit DRP 830).

e) National Inventory of Glaciers and Periglacial Environments (Research permit DRP 1268).

f) Integration of instrumental, dendrochronological and glaciological records and climate variability in Patagonia during the last 1,000 years (Research permit DRP 484).

2. Monitoring forests' health status at landscape level, and supporting specific research projects.

3. Bi-annual monitoring of the conservation state of sites with rock art in PNLA, approved as part of the Cultural Heritage Programme for the protected area.

Water erosion on mountains south of Playa Blanca

(iii) Natural disasters and risk preparedness (earthquakes, floods, fires, etc.)

iii.a) Landslides: Landslides have occurred in forests of lenga beech (Nothofagus pumilio) and coihue (N. dombeyi) in areas with pronounced slopes. This has taken place in the western sector of the Park, which extends from the mouth of the Canelo river, follows the Pirámide river and ends at the mouth of the Alerces river. These landslides occurred at the high altitude vegetation lines and at the mouths of some watercourses. Some of the more recent landslides exposed naked rock; other, probably older landslide sites were covered by vegetation, specially colihue bamboo (Chasquea culeou).

iii.b) Avalanches: In the winter of 2010 an avalanche at Cerro Cocinero buried a makeshift home (Refugio del Cocinero) in an area of difficult access used for summer hiking, causing the loss of human lives. Dendrochronological studies are currently underway on possible prior avalanches of similar dimensions (Schinelli, personal communication).

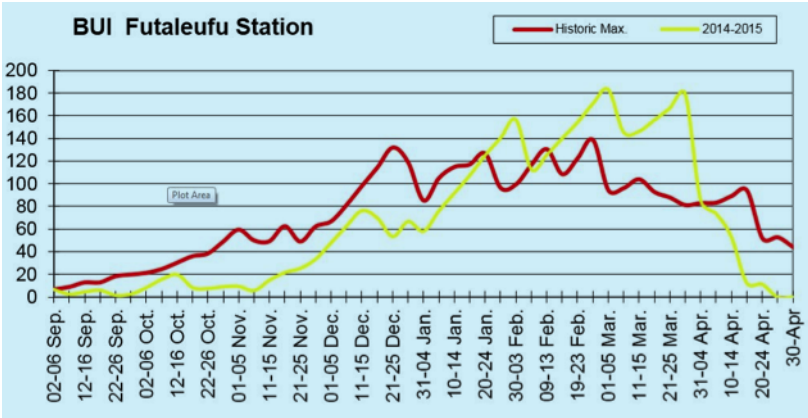
iii.c) Volcanic eruptions: The Andes cordillera is part of the so-called Pacific Ring of Fire, which contains hundreds of volcanoes, many of them in Patagonia. These volcanic complexes are active, and linked to a highly dangerous geological fault called the Liquiñe Ofqui Fault Zone (LOFZ). Volcanism in Patagonia has been a key factor in the formation of soils typical of forest environments, and is directly linked to earthquakes in the area.
However, at least until 2008, Argentine Patagonia has been relatively quiet in regards to seismic activity. Present-day human populations have experienced few earthquakes, specially in the provinces of Neuquén, Río Negro, Chubut and Santa Cruz.
The southern sector of the nominated property was influenced by the fall of

2009 FOREST FIRE

fine ash (Durant et al., 2012) from the eruption of the Chaitén volcano in May 2008, and later in
February 2009. The epicenter was only 40 km from the western border of the National
Park. The Chaitén volcano is in Chile, in the Lake Region, Palena Province, Chaitén Commune (42.85º S 72.52º W). The ash created operational difficulties for the management of the nominated property and for the area's population as a whole. However, monitoring the effects over the environment has not indicated extraordinary effects, since the these eruptions are part of the area's natural dynamics.
Land and air patrols as well as satellite images have made it possible to identify a volcanic debris field, geological faults and possible volcanoes in the western area of the National Park, whose geological threat is unknown.

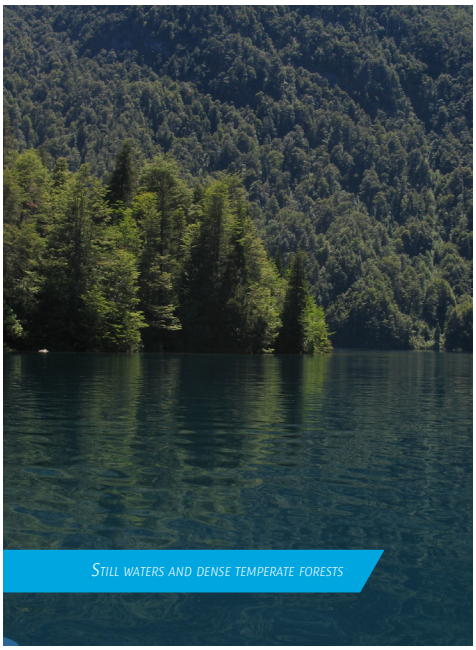
iii.d) Wildfires: Fire is another factor in the dynamics of northern Patagonia's forest communities. Throughout the region, the frequency and intensity of fires has changed not only due to variation in global rainfall levels but by human incidence (Paritsis, Holz et al., 2013). These same factors are linked to increased flammability in extensive medium-productivity vegetation areas where human activity takes place, specially in relation to the distance to human settlements, roads, historical uses and the current social context (Paritsis, Holz et al., 2013).
Anthropic factors are linked to the causes of ignition as well as to the prevention and suppression policies that have been enforced systematically since at least 25 years ago. The first records of wildfires at PNLA date from 1940. From that year to the 2011-12 season 186 fires were recorded, affecting a total of 48,500 ha. Most of this area — 36,000 ha — was burned in 1944 by a fire originated from controlled burning in the southern area of the Park, which is currently recovering and free from livestock farming.
Of the 186 fires, 88% affected less than ten ha; of these, 74% affected less than one ha. Of the total, 95% was caused by human action, and 75% of the area was burned in controlled fires. About 6.5% was caused by lightning, which burned 5.4% of the total surface (Salina, Cárdenas et al., 2009).

The area most affected by fire is the eastern sector in the National Reserve, where human settlements, roads and main service areas for the protected area are located. These fires occurred mostly since the 1940s (Salina, Cárdenas et al., 2009). Today secondary forests are growing in these areas. These forests have an additional component, in most cases minor, of exotic invasive species gone wild (such as musk rose or retama), which were introduced beginning in the 1950s. Besides exotic invasive species, some of the present-day secondary forests suffer the effects of livestock farming and tourism; these factors make the area the most susceptible to ecological damage. Five intentional fires were recorded this year, of which one propagated rapidly and covered an important area near Villa Futalaufquen. Influencing factors were the greatest drought in the last 30 years and the high flammability of the colihue bamboo underwood, which is dead but still standing from the natural flowering of 2012.
The Buildup Index (BUI) is an indicator of humidity in medium and thick flammable materials. During the season of 2014-15, from January 20th to April 4th the BUI remained almost constantly at its greatest historical values in 17 years (Schinelli, personal communication). The figure below shows the maximum historical values and the values for the 2014-15 season.



Comparison of highest historic values vs. values for season 2014-15, Buildup Index (BUI).

Glacial striation on rocks on the shores of Futalaufquen lake, northern arm



Still waters and dense temperate forests

Management actions to combat problems and/or potential threats in relation to environmental disasters:

1. Landslides and avalanches are part of the natural disturbance dynamics that the northern Patagonian forests have co-evolved with (Veblen and Ashton, 1978). For this reason, implemented actions only relate to researching the frequency of these events, and their link to the dynamics of the forests. Likewise, there is no specific prevention plan, since these events occur in remote areas, mostly accessible only during the summer, and — barring chance — do not involve sectors with probabilities of affecting property or persons.

2. During the visit of Dr. Andrés Folguera, of the University of Buenos Aires's Don Pablo Groeber Institute, he was consulted about the geologic risk posed by volcanic debris fields, geological faults and possibly volcanoes in the western area of the National Park. Dr. Folguera showed particular interest in the debris fields, which he called monogenetic volcanoes. He also mentioned the existence of geological risk in some of the glacial lagoons such as the Torrecillas glacier lagoon.
The dams surrounding these lagoons could collapse, leading to violent flooding. A trip with Dr. Folguera is planned for the summer of 2015-16 to the volcanic debris field and the glacial lagoons, to eventually monitor their stability.

3. In 2009, as part of the Agreement with the National Institute of Industrial Technology (INTI, Instituto Nacional de Tecnología Industrial), APN inspected, took samples and elaborated geological profiles in the Park, in order to determine the areas of highest geological risk (Resolution 333/2006). The relevant areas were: Colehual stream and obstruction of the Rivadavia river; Cerro La Torta catchment; Blanco Norte stream and obstruction of the Sange river; high-altitude glacial lake at the Pirámides range; stream from the glaciers Tronador and Amigos del Parque (southwest of Cerro Torrecillas); and impact on the southern arm of Lake Menéndez.

4. After the recent volcanic and telluric events, research began to monitor their effect on the environment, as well as to reconstruct past events in order to analyze long-term dynamics (Pessaq and Miserendino, 2012; Villarosa, 2014). Likewise, links with the Chilean Geologic Service (SERNAGEOMIN, Servicio Nacional de Geología y Minería) were strengthened in regards to permanent collaboration in the early warning and risk prevention systems.

5. PNLA elaborated and applies the Plan for Protection Against Forest Fires 20142015, approved by Park Order No. 248/14. This plan defines aspects related to prevention as well as criteria for suppressing fires within the nominated property, giving highest priority to the preservation of human lives and property and defining intervention modalities according to the relevance of the affected conservation assets (APN 2014b).

6. Elaboration of a plan to monitor forest regeneration in the area of the so-called "El Cristo" forest fire, which includes small experimental restoration parcels.

7. In the area of prevention education, during the low season (August to November) an inter-institutional campaign is conducted in all the schools of the mountain areas in Chubut Province, focusing on the prevention of rural and forest fires. The campaign is coordinated with the Fire Management Service of the General Directorate for Forests and Parks, the National Fire Management System and the Coordinator for the Fight Against Forest Fires. The campaign also includes other aspects related to the problems and care for the environment. It includes talks given by firefighters from the Fire Management Service and by members of the Park's Institutional Outreach and Fire, Communications and Emergencies departments.

Peculiar rock formation, Rivadavia lake

Torrecillas glacier

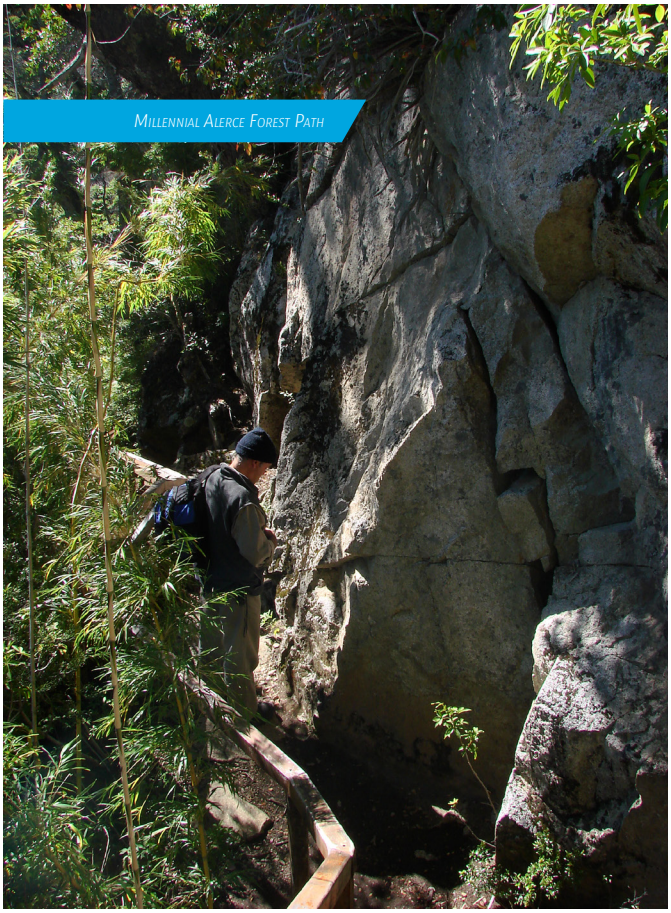
(iv) Responsible visitation at World Heritage Sites

Pressures caused by high numbers of visitors or tourists

Increased demand for tourism requires reinforcing planning processes and increasing service infrastructure, with the aim of keeping tourism's growth in order and reducing the pressure on the environments. Los Alerces National Park, within the framework of the Public Use Programme included in the current Management Plan (APN, 1997) has adapted and incorporated actions modelled on the new usage modes, in order to avoid overtaxing camping sites, hiking trails, shelters, etc. Visitor sites are located mainly in the National Reserve, between Provincial Highway 71 and the chain of rivers and lakes that serve as a natural boundary against expansion of recreational use (see Map 6: Usage Zoning, Los Alerces National Park); these conditions favour the sites' proper management. The sites' location helps to avoid visitor dispersion in areas with the highest protection status, with the exception of a few well-controlled excursions. In fact, tourist sites outside of this area — such as the Millennial Alerce Forest and the Torrecillas glacier — are only accessible by boat, and water navigation is strictly regulated by APN.

As part of updating the Management Plan, planning is underway at PNLA to reinforce order in public usage, to improve the quality of visits and to minimize the negative effects of recreational tourism. Detected negative effects are listed below:

- Increase in the amount of litter
- Impacts due to lake excursions and the intensive use of the Arrayanes river
- Impacts due to increased waves in areas of reproduction of fish and amphibians
- Increase in the usage of motorboats
- Not enough personnel for controlling recreation and tourism activities
- Decrease in the quality of visits
- Change in the Park's tourism profile
- Exceeded capacities for certain environments, or exceeded change limits
- Risk of expansion of "mal del ciprés" ("cypress disease", a lethal disease of Austrocedrus) and Didymo, caused by recreational activities and livestock farming
- Direct dumping of sewage from the ferry that carries passengers on the excursion to the Millennial Alerce Forest



Management actions to combat problems and/or potential threats in relation to high number of visitors: Actions are being carried out to combat the above problems. Below is a partial list:

- Waste Management Programme for Tourist Municipalities: Currently being implemented with Inter-American Development Bank Loan 1868/OC-AR. The Programme establishes Esquel as the location for the PNLA waste treatment plant, since this municipality is adjacent to the Park and able to cover the waste treatment needs of Trevelin as well.
- APN Resolution HD45/2015, in accordance with the Environment Report approved by Order 194/2012, forbids motorboat navigation on the Arrayes river. This change in regulations privileges recreational and tourist activities closer to Nature. Disallowing motorboats on the river not only saves the river and shores from impacts but favours more contemplative activities. These activities allow for closer contact with Nature — amid the stillness and silence of these natural environments — and for closer proximity with fauna, that displays increased presence in the riparian environment due to the absence of disturbance. For visitors who live in large cities, this can be a totally new experience.
- Over the last few years more staff has been hired, and acquisitions have been made of land vehicles and motor launches in order to improve controls. These controls are specially necessary during fishing season and summer. Likewise, the usage and management of the "Las Rocas" camping area was reorganized by newly defining parcels, parking areas, internal pathways, waste disposal areas, etc.
- In relation to the Park's carrying capacity, a study (López and Tabares, 2009) was carried out for PNLA's Alerce Forest, the nominated property's most famous attraction.

Carrying capacity study. The path to the Alerce Forest is located in PNLA to the south of the Cisne river, between the Cisne and Menéndez lakes, approximately at 42° 36′ 40″ S and 71° 53′ 36″ W. It is only accessible by crossing the northern arm of Lake Menéndez. Analysis of PNLA's carrying capacity was performed using the methodology proposed by Cifuentes (1992) and by Cifuentes et al. (1999). This methodology seeks to establish the maximum number of visitors that a protected area can receive, based on physical, biological and management conditions of the area at the moment of study.

The Physical Carrying Capacity (PCC) was calculated first. This calculation considered the length of the path (1,871 metres) and a surface area of one square metre per person. Each person requires two hours to complete the hike. The study considered that the path is open eight hours per day and that visitors walk through it one way only. PCC was estimated at 7,484 visits per day.

Next, the study calculated the Real Carrying Capacity, for which several factors were considered: erosionability, fauna, social factor and wind. The last factor was added to include the influence of autumn days in which it is not possible to visit the path due to the weather. The Real Carrying Capacity was estimated at 947 visitors per day.

Lastly, the study calculated the Effective Carrying Capacity (ECC), using the methodology developed by Lincoqueo (2005), which takes into account aspects related to the localization, numbers, and state of infrastructure and staff. Information on this subject was collected by semi-structured interviews with the Park Superintendent and the chief of Park Rangers in the North Zone. The authors' criteria was taken into account for some of the items, as well as the opinions of tourists gathered by ad-hoc interviews. Thus it was determined that the ECC of the path is 505 visits per day.

ECC was estimated by considering the present-day infrastructure in the area. The number of visitors that can daily visit the path is conditioned by the width and length of the path, which gave as a result approximately 28 groups.

The carrying capacity study concluded with a series of recommendations, some of which are listed below.

New walkways: Build walkways that are elevated from the ground, with ample lookout points at strategic places. Modify slope levels. Developing the new walkways should take into account visual pollution and paths that avoid altering the environment. This is currently being implemented in the construction of the path and walkways to the Millennial Alerce Forest financed by Inter-American Development Bank Loan 2606 /OC-AR.

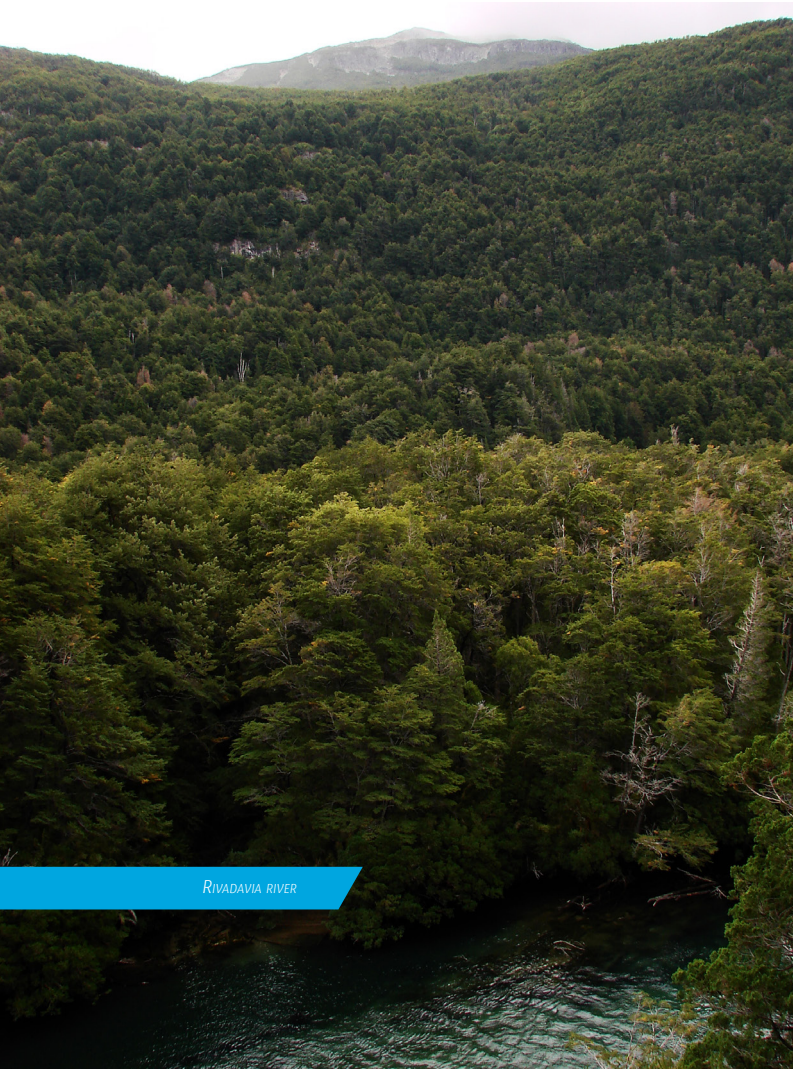
Accessible tourism: Improve the path's infrastructure for accessibility throughout the path. Apply this concept to the water vessels' restrooms, specially taking into account overweight passengers. In this regard, accessibility in the Arrayanes river walkway has already improved, and the new paths and walkways of the Millennial Alerce Forest are accessible by wheelchair.

Environmental interpretation: Incorporate interpretative signs and leaflets in order to provide tangible support for explanations. Communicational tools for environmental education should be bilingual or symbolic. Signs and leaflets are renovated periodically and these suggestions have been implemented.

Expected behaviour signage: This kind of signage (e.g. "DO NOT PASS") is indispensable. Visitors can only access the path with a guide; however, it must be taken into account that it is usual for some persons to become separated from the group, and that some areas are hazardous to visitors. The aforementioned walkway and path designs takes this into account. Part of the walk is self-guided, intended for people who do not have the physical capacity to walk the whole way. In this case, a person may walk opposite the normal direction, walking by "The Grandfather" (El Abuelo) tree, then the Cisne lake until reaching the waterfalls. This part of the path will include interpretative signage for a self-guided walk.

Signage and Promotion: Signs leading to PNLA must be improved. Promotion actions should be centralized in order to increase demand during the low season. This will have the effect of avoiding pronounced seasonal variations and saturation of the area. Signage is incorporated every year throughout PNLA, and leaflets are distributed at Villa Futalaufquen's Visitor Centre; in high season, signage is also distributed at the three entrance gates.

Bamboos in Krugger Area



Rivadavia river

Mouth of the Rivadavia river on Verde lake

This promotion is complemented by the information and supporting material distributed at the information offices of adjoining municipalities.
Currently, provincial and nationwide promotion is carried out with the Municipalities of Esquel and Trevelin. The Ministry of Tourism promotes all national parks, and especially those that participate in the Argentina Paths Programme. Likewise, bid conditions for concessions in the Park now include the requisite of performing interpretative and educational actions in accordance to PNLA guidelines: Installing signs, printing leaflets (including in Braille), promoting a message on the importance and goals of the national park system, and highlighting conservation aspects of natural and cultural heritage.

Revision of bid terms: Update the bid terms for concessions, considering time frames and resources necessary for the general maintenance of the path and for the vessels operating in the area. Include addenda with relevant penalties in case of non-compliance, and update the maximum number of tourists that a guide can be in charge of during the walk. The new bid terms include requirements for treatment of sewage waste in vessels and land facilities (treatment plant and protocol for unloading from vessels to the plant).
As a response to some of the aforementioned issues, bid terms also include the following requisites:

1. Minimum navigation time: 1 hour from Puerto Chucao to Puerto Sagrario.
2. Circuit operations: Up to 4 vessels with a maximum of 60 passengers seated inside.
3. Duration of visit to the Alerce Forest: 45 minutes minimum. Visitors are required to walk the whole length of the path.
4. Maximum simultaneous carrying capacity: 300 persons.
5. Maximum daily carrying capacity: 600 persons.
6. The established excursion is in the daytime, and begins and ends in the same day.

Guide training: Improve the standardization of the visit, so that the Park's objectives are met independently of the guide. Require guides to have the necessary English skills to adequately provide information in this language.
Today, PNLA's annual management programmes include periodic updates in this regard.

Create differential products: Amplify offerings — for companies already operating and for new companies alike — by including new products for smaller tourist groups (boats carrying less than 15 passengers) with thematic and scientific visits, bird watching, environmental interpretation, etc. One operator has been recently included providing service for smaller groups.

Foster the ISO 14001 family of standards: Foster the requirement, in the near future, of the ISO 14001 environmental management standards in the bidding terms for tourist operators. This would guarantee environmental management (even if the rule is not officially certified), and would become an additional highlight for the commercialization of the Park.
The new bid terms obligate providers to obtain, within three years of the start of operations, certification in IRAM[10] -Sectur 42300 (Tourism services in natural protected areas) and IRAM-Sectur 42560 (Water motorcraft navigation in tourism operations). Operators must keep certification up to date throughout the duration of their concession.

(v) Number of inhabitants within the property and the buffer zone

The National Park's human population lives in Villa Futalaufquen, which depends on the Park and is located within the National Reserve. Because of the increase in tourism, this locality also tends to develop as a services area.

Located in the eastern sector of the Park, Villa Futalaufquen is also the Park's administrative centre. It houses the Park's main offices and several types of infrastructure, including: staff housing, workshops, fire-fighting centre, communications and emergencies facilities, a school, a National Gendarmerie post, small supermarkets and shops, a drugstore, a health centre with staff housing and a permanent ambulance service, and three electrical transformer substations capable of cutting off power to specific sectors of the Park (APN 2014b). Even so, the small number of inhabitants and their way of life mark Villa Futalaufquen as a rural locality[11].

Outside Villa Futalaufquen, the greatest concentration of families lives in the area known as El Maitenal. Human population in other Park areas is highly dispersed.

The Population Census of 2012, carried out at PNLA and other protected areas of northern Patagonia, recorded 130 permanent and 79 temporary residents. Permanent residents include 12 children and 27 young adults.

The population lives in a total of 38 localities. The National Parks Administration applies this term to families that hold a Temporary Occupancy and Grazing Permit or other official permit related to cattle-raising activities.

Extensive grazing still takes place in winter and summer seasons on natural grazing grounds created by humans in former forest areas. This is the traditional grazing mode in the region. Plans have begun to be developed together with local inhabitants, to improve cattle productivity and reduce the pressure on grazing areas.

Cattle-raising is concentrated mainly on El Maitenal, although there are more disperse cattle-raising areas along the eastern shore of Lake Futalaufquen and the northern area of the Park. There are also some rural localities in the Grande river valley, near the Park's southern border. The area affected by livestock farming is approximately 22,000 ha, with an estimated 1,000 to 1,200 large animals and 1,700 small animals.

Mayten trees on the floodplain of Desaguadero river

Population				
Scattered inhabitants	Villa Futalaufquen Residents			
Inhabitants	APN employees living in Villa Futalaufquen	Provincial/national employees		
		Organism	No. of houses	No. of people
130 permanent 79 temporary	78 people 56 houses	Ministry of Health Ministry of Education National Gendarmerie Naval Prefecture	2 2 1 1	4 6 3 2

Table 3. Inhabitants and resident employees.

HOUSES: 56	
Area name	No. of houses
Villa Futalaufquen	19
El Maitenal	19
Portada Centro	3
Bahía Rosales	7
Portada Norte	2
Zona Sur	2

Table 4. Number of houses per area.

Area of the nominated property: 130 permanent inhabitants
Buffer zone: 42,852 inhabitants
Total: 42,982 Year: 2012

Note: There is no discriminatory data for the buffer zone, which is a rural area. Available information from the 2010 National Population and Housing Census refers to localities near the National Park. The data is from the municipalities of Trevelin (7,908 inhabitants), Cholila (2,186) and Esquel (32,758), linked directly or indirectly to PNLA (data from December 2014, from http://www.estadistica.chubut.gov.ar, accessed on December 15th, 2014).

[10] IRAM: Argentine Normalization and Certification Institute (Instituto Argentino de Normalización y Certificación) (TN).

[11] The National Population Census defines a rural population as living "scattered throughout the countryside or grouped in localities of less than 2,000 inhabitants" (National Statistics and Census Institute (INDEC, Instituto National de Estadísticas y Censos)).

5 Protection and Management

5.a **Ownership**

Los Alerces National Park is a National Protected Area under National Law No. 22,351 of 1980, which in Article 2 states that public lands within National Parks and Reserves are in the national public domain. This feature of Argentina's legal regulations for protected areas has been present from the system's inception. It was established by Law No. 12,103, which created the first National Parks and the institutions for their administration and management, as well as by Law Decree 18,594/1970 which modified the original law.

The legal nature of the public domain is that of a specific, real ownership right, characterized by the rights holder and by the social purpose that sustains it. This purpose — in this case, the direct and collective use by the community — stems from the goal of the declaration of the national protected areas, which as defined in the Law's Article 1 is the protection and conservation for "… scientific research, education and enjoyment of the present and future generations…" The owner of the lands is the National State, which exercises ownership by means of the National Parks Administration (an independent entity with jurisdiction and capacity to operate in the spheres of public and private rights, as stated in Article

14). The public domain is characterized as inalienable, imprescriptible and immune from seizure, and subject to the applicable rules of public police.

Inalienability tends to enforce the protection of public domain properties, with the goal of ensuring that they fulfill their assigned roles, and that they remain free from all commerce entailing private rights.

Imprescriptibility of property in the public domain is justified by the need to defend the property's integrity against possible misappropriation or seizure by private individuals or entities, which could impose themselves with the passage of time.

The south zone of Los Alerces National Reserve contains some lands in the private domain, i.e. private property. In this case, and to ensure the conservation goals established by the legal regime for this protection category, the Law and APN regulations define a series of administrative restrictions for private property. These restrictions are part of the limitations to private property in favour of the public interest. These limitations are the legal measures conceived to guarantee that the use of private property harmonize with the requirements of the public good.

Administrative restrictions only regulate over the absolute character of the right to property, by establishing the frame or sphere within which private individuals can exercise their right. They are normal conditions of the exercise of the right to property, and applicable to all properties in the same conditions.

Private properties in the National Reserve account for 1,942 ha, only 0.027% of the total surface. The administrative restrictions set by Law No. 22,351 for private properties are defined in Article 10, items a), c) and d). These items specify that the priority in these private properties is the conservation of nature, while allowing for some economic activities in keeping with regulations and

Southwestern arm of Menéndez lake

authorizations issued by the relevant authorities.
Likewise, and in keeping with the attributions and faculties conferred by law, APN itself has issued relevant regulations. These include the Forest Regulations for Natural Monuments, National Parks and National Reserves in the Andean-Patagonian Region (approved by Board Resolution No. 11/1994), the Regulations for the Exploitation of Dry Quarries and Soil Removal Within APN Jurisdiction (Board Resolution 128/1997) , the Regulations for the Evaluation of Environmental Impacts in APN Areas (Board Resolution 16/1994), the Private Property Parcel Subdivision Regulations for Lanín and Nahuel Huapi National Reserves (Board Resolution 14/2006), and the Regulations for Building in National Parks, National Monuments and National Reserves (Board Resolution 241/2007).

Alerce trees, Menéndez lake and Torrecillas glacier

5.b Protective Designation

The nominated property is part of the National System of Protected Areas in Argentina (SNAP), managed by the National Parks Administration according National Law No. 22,351. Since 2007, the Park was incorporated into the highest protection category defined in Law No. 26,331, "Minimum Standards for the Environmental Protection of Native Forests" in the country.

PNLA has an extension of 259,822 ha, and was created in 1937 with the goal of protecting the forests of centuries- and millennia-old alerces (APN, 1997). In 1937, Decree No. 105,433/37 created the "National Reserve of the Alerces," destined to eventually become a National Park. The original boundaries were modified by Decree No. 94,284/41; four years later, Decree No. 9,504/45 declared the National Reserve a National Park. The Park's present-day boundaries are defined in Article 1 of Law No. 19,292 (see Appendix 3: Law No. 19,292).

These legal precedents are mentioned in Item 5, Article 32 of Law No. 22,351, "Legal Regime for National Parks, Natural Monuments and National Reserves."

Los Alerces National Reserve was created by Article 2 of Law No. 19,292, and its boundaries described in Article 4, Item 6. This legal precedent is mentioned in Article 32, Item 25 of Law No. 22,351.

Los Alerces Strict Nature Reserve was created in Article 1, Item 16 of Decree No.2,149/90. Its boundaries are detailed in Decree No. 453/94. Los Alerces Wilderness Area was created in Article 14 of Decree No. 453/94.

Law No. 19,292 establishes the boundaries for the National Park and National Reserve, as detailed below.

Los Alerces National Park

Boundaries: North: From the border with the Republic of Chile, the Park's boundary runs east passing over Cerro Trepado, then runs along the border between lots 8 and 13 of Fraction D of Section J III, until reaching the western shore of Rivadavia lake. Following the shore northward, the boundary reaches the lake's northern waterheads, then continues along the northern shore to the east of the lake until reaching the birth of the Rivadavia river. From that point, the boundary continues along the left shore of the Rivadavia river until the mouth of the river at Verde lake. From there it runs along the eastern shore of the lake until reaching the birth of the Arrayanes river. From this point it continues along a 100 metre wide parallel line left of the Arrayanes river, until the mouth of the river at Futalaufquen lake. From this point the boundary continues along an east-west line until reaching the left shore of the Frey river, then along the river's left shore until the east headwaters at Lake No. 1. The boundary then runs along the south shore of Lake No. 1 , following the right shore of River No. 2 until the mouth of the Huemul stream in that river. The boundary then continues along the right shore of the Huemul stream until reaching the stream's birth, and lastly ends at the international border with the Republic of Chile. Throughout the rest of the southwestern border, the boundary coincides with the international border between Argentina and Chile.

Alerce trees and still waters near the end of Menéndez lake

Alerces river and Cerro Bravo

Los Alerces National Reserve

Boundaries: Eastern boundary: Defined by a line that begins at the confluence of the Bajo Futaleufú and Corintos rivers, then runs north along the eastern boundaries of lots 17, 14, 7 and 4, Fraction A, Section I III; then along the eastern boundary of lots 24 and 17, the northern boundary of the eastern half of Lot 17; the eastern boundary of the western half of Lot 14; and the northern boundary of the same half (these last lots in Fraction D, Section J III), until reaching the eastern shore of Rivadavia lake.

From this point, the boundary continues southward along the same shore until reaching the birth of the Rivadavia river. Then, the boundary continues along the left shore of the river, until reaching the mouth of the river in Verde lake.

The boundary then continues along the eastern shore of the lake until reaching the birth of the Arrayanes river. From here it runs along a 100 metre wide parallel line left of the Arrayanes river, until reaching the mouth of the river at Lake Futalaufquen. From this point, it continues along the eastern shore of the lake until reaching the most western point of its southern waterheads.

Then, the boundary continues toward the southwest, until reaching spot elevation 2,307 of Cerro Situación. From this point the boundary continues along an eastwest line until reaching the left shore of the Frey river, then along the river's left shore until reaching the east headwaters at Lake No. 1. The boundary then runs along the south margin of Lake No. 1, following the right margin of River No. 2 until the mouth of the Huemul stream in that river.

The boundary continues along the right margin of the Huemul stream until the stream's birth, and lastly ends at the international border with the Republic of Chile. From this point, it follows the international border to the east until reaching the right margin of the Futaleufú river. It continues eastward along this margin until reaching the confluence of this river with the Corintos river.

Alerce forests and quiet waters near the end of Menéndez Lake

Today, the part of the boundary described as running along the shores of Lake No. 1 and River No. 2 follow the same path, but along the shores of Amutui Quimey lake — the reservoir in the National Reserve that flooded these bodies of water.

Law No. 22,351 defines the legal framework for nationally protected areas. Its Article 4 states that: "National Parks are areas to be preserved in their natural state, that are representative of a phytozoogeographic region and possess great scenic beauty or scientific interest..." These are the two conditions required by law for an area to be declared a National Park: be representative of a phytozoogeographic region (these are a territory's natural regions as determined by its native vegetation and fauna), and possess value for its beauty or scientific interest.

Within National Parks, all economic exploitation is forbidden except when linked to tourism. Tourism itself is limited by the law's Article 5, Item J, which states that in a National Park it is not allowed to "erect buildings or installations..." This is reinforced by Article 6, which states that "Infrastructure destined for the visitors of National Parks [...] shall be located within National Reserves."

However, the same article establishes the mechanism by which the Executive Power can issue a Decree to authorize construction of said infrastructure within the National Park. To this end, APN must prove that the new installation is in the public interest, and that it will not substantially modify the area's ecosystem.

The only exceptions provided by Article 5, Item J are: 1) installations for law enforcement authorities (such as Park Ranger units, emergency and fire response centres, etc.); 2) installations for national security or surveillance (such as Customs or Migrations, National Gendarmerie units, etc.); and 3) living quarters within private property.

The National Parks Administration is designated as law enforcement agency within the National Parks. The law maintains and highlights the ample independence of APN, in accordance with the attributions and functions assigned to it in articles 18 and 23.

It is worth noting that the law assigns the National Park Rangers the mission of controlling and watching over the areas to guarantee "compliance with the regulations that derive from this Law and from its regulatory decree, and also with the further regulations dictated by the enforcement body [...] with the aim of properly fulfilling the functions and goals of administrative police assigned to it."

Menéndez lake

Strict Nature Reserves, Nature Wildlife Reserves and Educational Nature Reserves

On October 10th, 1990, the nation's Executive Power issued Decree No. 2,148/90 which created a new category of protected area, called Strict Nature Reserve. In this new category, direct human interference is reduced as much as possible, ensuring the undisturbed progress of natural communities and ecological processes.

Article 1 of the Decree designates a Strict Nature Reserve as "the kind of protected area that offers maximum guarantee for the conservation of Argentine biological diversity." Article 2 defines these areas as "such areas within the National domain that are of great biological value and representative of the various ecosystems in the country, or that contain important populations of native animal or plant species." Article 4 states that in these areas it is forbidden to incur in "any and all activities that modify the area's natural features, threaten to diminish its biological diversity or that in any way affect its fauna, flora or non-living natural resources, with the exception of such activities as are necessary for the management of the area."

Strict Nature Reserves enjoy a higher degree of protection than National Parks. The Decree designates the National Parks Administration as the law enforcement institution for the National System of Protected Areas.

A few years later, Decree 453/94 created two new area categories: Nature Wildlife Reserves and Educational Nature Reserves. Nature Wildlife Reserves were defined as those areas "whose environmental wildlife is preserved unaltered or very little changed" and that contain "valid representations of one or more ecosystems, animal or plant populations valuable [for the goal of conservation], to which special protection must be provided..." (Article 1). Educational Nature Reserves were defined as "those areas whose features or location, contiguous or near Strict Nature Reserves or Nature Wildlife Reserves, provide special opportunities for environmental or Nature interpretation education" (Article 6). Los Alerces National Park contains a Strict Nature Reserve and a Wildlife Reserve (see Map 5: Strict Nature Reserve and Wilderness Area Los Alerces National Park). In 2007, these protection levels were nationally reaffirmed by the application of Law No. 26,311 "Minimum Standards for the Environmental Protection of Native Forests." For National Parks and northern Patagonia in general — and for the nominated property in particular — the law defined regulations for forest territories which took into account their relevancy for conservation, the functions of their environments and communities, and the realities of usage in each area. These standards were articulated with the zoning created for the Andean-North Patagonian Biosphere Reserve. Regulations for PNLA's territory determined that of its 167,630 ha of forests, 77 % should be included in category I, destined strictly for conservation; the remaining 23 % was included in category II. Both categories are highly valuable for conservation, and do not allow for changes in their usage (approved by Resolution HD No. 88/2008).

Torrecillas glacier, Del Antiguo lake

Risk of collapse at Del Antiguo lagoon

5.c Means of Implementing Protective Measures

Los Alerces National Park develops and executes all institutional management mechanisms which allow for the articulation of the various levels of strategic and operational planning, as well as management tracking. These are the Protected Area Management Plan (MP), Management Efficiency Measurements (MEM) and Annual Operational Planning (AOP).

Annual Operational Planning guides the management actions implemented in the Park every year by technical and administrative personnel. Currently, the Park has 97 staff members of which 38 are National Park rangers, i.e. conservation agents trained by APN. There are 14 agents at the Department of Works, 10 in Administration, 12 are temporary workers and 32 are firefighters in the Forest Fire Brigade. The total staff includes 10 technicians and professionals of various fields of expertise who contribute to managing the protected area. PNLA is also backed by the technical assistance of 19 professionals of the Patagonia Regional Office in Bariloche, who participate, coordinate and provide support for projects and management measures implemented in the protected area.

PNLA staff authorizes and controls in situ the various activities carried out in the protected area, such as giving licenses to tourist operators, fishermen, settlers, researchers, etc. These are accorded following administrative acts for the protected area and/or other instances of APN which regulate usage. In particular, usage regulations apply to the items listed below.

Menéndez river

a) Control, auditing and emergencies The Park Ranger Department is in charge of preemptive surveillance and control in the natural protected areas, as well as checking the conditions of tourist paths and walkways. Based on the Department's reports, the Superintendency determines which paths and walkways can be used for the season.
PNLA has a preliminary strategic surveillance and control plan elaborated by the Park Ranger Department. Pending official approval, the plan is used as part of fulfilling AOP requisites.

b) Fires, Communication and Emergencies (FCE) Visitor influx due to tourism is increasing, and projected to continue increasing after Provincial Highway No. 71 is fully paved. This factor, and the different tourist activities available today at the park, has caused a diversification of FCE's tasks. FCE has developed and implemented, and continues to update its emergency response protocol.

c) Conservation and sustainable use of the natural and cultural heritage Specific programmes have been created, and various projects are in development for the conservation and sustainable use of the natural and cultural heritage at PNLA, focusing on the main problems that currently affect the area. Plans and projects are detailed below.

Natural resource conservation and sustainable use programmes		
Subprogramme	**Subject**	**Project**
Protection and recovery	Exotic species	Dydimo algae monitoring and control
		Management of exotic woody plant species
	Native forest restoration	Planning for a cypress forest
		School-Garden Centre Provincial School No. 25 "Delia Médici de Chayep" Villa Futalaufquen
Research and monitoring	Monitoring	Huemul monitoring

Cultural heritage conservation and sustainable use programmes	
Subject	**Project**
Tangible cultural heritage	Creation of Cultural Heritage Programme (Order 16/12)
Intangible cultural heritage	History, memory and heritage in protected areas in the Chubut cordillera. Plant knowledge heritage

Human settlements	
Human settlement development	Creation of Development Programmes for rural inhabitants in PNLA (Order 114/12)

Table 5: Source: APN, 2014.

Source: APN, 2014. Based on information provided by UAI.

In relation to public use of the protected area, the Public Use Programme of the current Management Plant privileges daytime visits, and the organized use of approved paths and walkways, camping areas and different types of lodging in the National Reserve (see Map 6: Usage Zoning, Los Alerces National Park). This approach aims to promote sustainable management of tourism as a tool for the protection of the property, and to fortify the economies of neighbouring communities through the installation of services that require greater infrastructure (hotels, restaurants, etc.) in neighbouring cities like Esquel, Trevelin and Cholila. This is clearly favoured by the fact that only a very small percentage of visitors can lodge at PNLA, since the maximum total occupation in the Park is 3,450, 93% in camping areas.

Pirámides range

5.d Existing plans related to municipality and region in which the proposed property is located

(e.g., regional or local plan, conservation plan, tourism development plan)

There are plans of varying territorial scale for conservation and development in relation to the property, its natural resources and their use. These plans contribute to secure conservation, equity and sustainable development in the region, where tourism is of great economic and social importance.
Listed below are the plans and/or legal instruments most relevant for the area:

A- Relative to conservation

A 1. Law No. 26,331 Minimum Standards for the Environmental Protection of Native Forests

This law, passed in 2007, defines the minimum standards for sustainable enrichment, restoration, conservation, use and management of native forests, and of the environmental services that these forests provide to the community. The law's objectives are:

a) To promote conservation by organizing the territories of native forests and regulating the expansion of agricultural boundaries and of any other modification in the use of the soil.
b) To ensure the durability of existing native forests by regulating and controlling the decrease in their surface area.
c) To maintain and improve the ecological and cultural processes in native forests that are of benefit to society.
d) To ensure the prevalence of the principles of precaution and preemption, maintaining native forests whose environmental benefits — or the environmental damage that would be caused by their absence — cannot be demonstrated with the techniques available today.
e) To foster activities that help to sustainably enrich, conserve, restore, improve and manage native forests.
The law highlights that the main environmental services provided by native forests to society are:

- Regulation of water bodies and resources
- Conservation of biodiversity
- Conservation of the soil and the quality of water
- Trapping greenhouse effect gases
- Contribution to the diversification and beauty of the landscape
- Defense of cultural identity

In keeping with the law's objectives, territorial regulations have been approved for PNLA and other protected areas in consistency with the properties' conservation goals and with the zoning of the Biosphere Reserve. These regulations help to strengthen the management of PNLA on the basis of the precautionary principle, providing an additional protection for the conservation of its forests and the environmental services they provide. The property's zoning in the framework of this law promotes the payment for environmental services to the provincial jurisdiction in which the property is located. This helps to generate genuine economic resources, to be used to promote and reinforce active management of the forests in this and other basins, to contribute to their persistence in time, and to improve quality of life of the area's populations.

Cisnes lake, Cerro Chato

A 2. Strategic Plan for the Andean-North Patagonian Biosphere Reserve

On February 12th 2005, the governors of the Argentine provinces of Río Negro and Chubut, and the President of the National Parks Administration signed an agreement for the creation of the "Andean-North Patagonian Ecoregional Corridor." This corridor encompasses the following National Parks: Lanín, Nahuel Huapi, Los Arrayanes, Lago Puelo and Los Alerces. It also includes four provincial protected areas in Río Negro and ten provincial protected areas in Chubut. Their combined surface covers 2,300,000 ha and benefits 195,000 permanent inhabitants in the cities of San Martín de los Andes, Villa La Angostura, San Carlos de Bariloche, El Bolsón, El Maitén, Lago Puelo, El Hoyo, Epuyén, Cholila, Esquel, Trevelin and Corcovado.

With the Ecoregional Corridor project, a search began for a legal figure that would help to determine common guidelines for the sustainable management of neighbouring protected areas, elaborating viable planning for the region and putting it into operation. Thus in September 2007 UNESCO declared the Andean-North Patagonian Biosphere

Reserve and, in a similar territory in Chile, the Temperate Rain Forests of the Austral Andes Biosphere Reserve. In the future, these will conform a single cross-border Biosphere Reserve between the two countries.

In 2010, after an exhaustive process of regional participative planning, regional authorities approved the Preliminary Strategic Plan for the Management of the AndeanNorth Patagonian Biosphere Reserve (PSP-BR). The plan details a series of immediate actions, as well as work outlines and strategies for the short, medium and in some cases long term. These were identified during planning and are proposed in relation to the continuity of the project.

This document is a first planning tool for the joint management of jurisdictions as part of their legal entity, i.e. their being part of a Biosphere Reserve. The goal is to promote development that is socially and environmentally sustainable for the ecoregion as a whole. Planning was elaborated on the basis of six main axis and territorial reference units, looking for close coordination with other policies, actions and regulations currently enforced in the territory whose goals were compatible with the Biosphere Reserve's vision and mission. Multiple mechanisms for joint consultation and planning were designed and developed in order to design the scenarios, action lines, programmes and projects included in the document from a pluralistic perspective.

To summarize, the plan proposes a group of strategic and viable directives for territorial action — in the short, medium and eventually long term — promoting the conservation of the natural and cultural heritage, the preservation of ecosystems' environmental integrity as well as their long-term services, as well as the sustainable development with social inclusion for the territory's populations.

The preliminary plan was approved with the consensus of political authorities and regional key actors in participating jurisdictions. Currently, a network of institutions and actors is working toward the plan's implementation, and toward the greater participation and inclusion of new actors.

Millennial alerces

Stones and pebbles at the mouth of the Colehual river

B) Relative to tourism

One of the greatest challenges faced by tourism is to guarantee sustainability of the protected areas and tourist activities. Conservation of the property requires an adequate articulation and coordination between tourism management and the National System of Protected Areas, as well as between other public and private institutions to guarantee the perpetuation of the resources. The increase in tourist offerings and demand require special attention for spatial planning and territorial regulation, with the aim of avoiding overwhelming tourist areas.

Along these lines, nationwide planning efforts were intensified for defining reasonable thresholds for growth, taking into account criteria for economic, social and environmental sustainability.

APN, a de-centralized organism under the authority of the Ministry of Tourism (MINTUR), is jointly working to improve institutional relations between different organisms and institutions. Advances have been made toward a collective construction to allows participative criteria in planning for public use in protected areas. For its part, MINTUR has developed a tourism policy whose most significant axis is economic development with social inclusion and heritage conservation.

The following are descriptions of the Strategic Federal Plan for Sustainable Tourism, Argentine Paths Programme, Tourist Corridors, Chubut's Strategic Tourism Plan and a valuable precedent for strategic planning in Los Alerces Shire (Comarca Los Alerces).

B 1. Strategic Federal Plan for Sustainable Tourism (PFETS 2020) - National Tourism Plan 2020

The ratification of Law No. 25,997 established the principal obligation of the Strategic Federal Plan for Sustainable Tourism (PFETS, Plan Estratégico de Turismo Sustentable) in order to guarantee the continuation of public policies to consolidate the tourism sector as a pillar of productivity within the national economy, optimizing Argentine international competitiveness in tourism.

Cisnes river

The planning process began in 2004. Its goal is defined as "To become the orienting and articulating process for actions that synergically reaffirm collective will, optimize resources and lead efforts toward a concerted model of tourism development that is sustainable for the Republic of Argentina."

The Plan, directed and coordinated by MINTUR, was backed by the participation of the National Parks Administration, among other institutions such as national, provincial, regional and municipal bodies; intermediate associations such as the Argentine Chamber of Tourism, academic institutions and others.

The Plan specifically states that sustainability is one of the goals to pursue. To this end, it includes items for the consolidation of the National System of Protected Areas in Argentina and for the preservation of properties and heritage valuable for tourism.

The Plan's Update 2012/2020 mentions the Strengthening of the administration of National Parks, within the module for Institutionalization of Argentine Tourism. Since the Plan began in 2005, APN has launched remarkable initiatives for institutional strengthening and general management, based on the strategic pillars of the Plan. Among other issues, the latest update focused on the conservation of patrimony. In this area, the following actions were taken which are worth pointing out:

- The "Guide for the Elaboration of Management Plans in Protected Areas" was approved, edited, and distributed throughout all protected areas in APN jurisdictions as well as regional administrations and delegations, provinces, and all Wildlife Refuges of the Argentine Wildlife Fund.
- Quality standards were implemented and certified throughout APN, which is also gradually adding these requirements to service providers in the National System of Protected Areas.
- Specific standards and regulations were defined for tourism developments within protected areas. These allowed for constant updating of the tourist sector, the adaptation of APN to the increase in tourism, issues relating to the security of the public, environmental preservation of affected areas and other changing realities.
- Service providers within protected areas participated in diverse programmes for improvement and training, made available by MINTUR region-wide.
- Economic studies were articulated with other information available to APN, gradually integrating National Park data of relevance to tourism.
- Visiting plans were implemented in almost all National Parks with relevant tourist activity, whether for all or part of their territories.
- APN presented the retrospective Declarations of Outstanding Universal Value to the UNESCO World Heritage Centre for Los Glaciares, Iguazú and Talampaya National Parks, obtaining approval.

- The project "Rural Corridors and Conservation of Biodiversity" was presented to the Global Environmental Facility (GEF), which approved the project for financing. The project includes areas of Greater Chaco and the Patagonian steppe.
- A contract was signed with the International Bank for Reconstruction and Development by the Environment and Sustainable Development Secretariat and the Ministry of Agriculture (including the National Institute of Agrarian Technology, INTA), which includes actions for developing greater management capacity in 11 protected areas.
- Licensing more service providers produced greater public and private investments within the National System of Protected Areas. Service providers closely follow the increase in the number of visitors, and contribute to creating local employment.

The agenda for future challenges includes: Elaborating final studies and designs, public works, and equipment and technical assistance to allow for adequate use of some National Parks, including Los Alerces.

To summarize, the plan installed long-term strategic participative planning as a process to guide and articulate the actions of the Ministry of Tourism and all relevant actors in the industry, fostering greater social inclusion, competitiveness and sustainability. This participative methodology achieved the consensus of local populations, civil organizations, tourism companies and government institutions.

Mayten, more than a century old, next to the former Jara outpost

Walkway on the Arrayanes river

B 2. Argentina Paths Programme: Andean Trail Project One of the programmes defined in the framework of PFETS is the "Destinations and Products Programme for Inclusive Development," which incorporates relevant projects. In this context, in March 2015 a Ministry Resolution created the Argentina Paths Programme.

Los Alerces National Park is involved in the Paths Programme through the Andean Trail (Huella Andina), which comprises the North-Andean Biosphere Reserve, where the Park is located.

The Andean Trail, the first long trail in Argentina, began in May 2010 as part of the

Paths Programme. Its development was inter-institutional; participants were MINTUR's Tourism Development Subsecretariat, Tourism Offerings Development Directorate, APN and the National Tourism Council. The joint effort involved several different levels, fortifying links in a body of actors of considerable complexity due to their diversity and number.

The Andean Trail provides a path of low- to medium-level difficulty with clear demarcations for approximately 570 km, from Villa Pehuenia in Neuquén Province to the Baggilt lake area in Trevelin, Chubut Province. The path runs near cities such as Junín de los Andes, San Martín de los Andes, Villa La Angostura, San Carlos de Bariloche, El Bolsón, Lago Puelo, Cholila and Esquel.

The path traverses the National Parks of Lanín, Nahuel Huapi, Arrayanes, Lago Puelo and Los Alerces, besides provincial protected areas and public and private lands. The goals of the Andean Trail are:

- Enhance the value of the cultural and natural resources of the western cordillera, fostering sustainable tourism through hiking.
- Create a new, alternative brand to foster hiking in Argentina, under the umbrella of the Patagonia brand.
- Become an option for developing sports and recreation among the population of northern Patagonia, by creating possibilities of enjoying Nature in the AndeanNorth Patagonian environment.
- Foster opportunities for the environmental education of communities and visitors in the region of northern Patagonia.
- Become a new tourism product and a development alternative for inhabitants of national parks and nearby tourist centres, by incorporating them as service providers throughout the path.
- Give impulse to a greater integration of parks, service areas and the increase of night camping in the region.
- Promote the integrity of communities and institutions in northern Patagonia.

Andean Trail has 42 stages in total, of which six are linked to Los Alerces National Park.

Verde lake

B 3. Tourist Corridors Development Programme

Approved by Inter-American Development Bank Loans 1648/OC-AR and 2606/OC-AR accorded with the Ministry of Tourism. The Programme's goal is to increase tourist spending, improving the usages in time and space of the protected areas and their associated destinations by providing support to tourism products, as well as actions for institutional strengthening and environmental management. The Foreign Loan Executing Unit (UEPI, Unidad Ejecutora de Préstamos Internacionales) was created with the goals of managing and implementing programmes financed by international credit bodies whose executing agency is the MINTUR. In this context, the National Parks Administration acts as executing sub-unit for the Programme.

Different components are being developed to ensure the correct execution of the programme, such as support for structuring tourism products or tourism enhancement in each benefited corridor. These project includes the Lakes Corridor, which in turn includes the nominated property.

B 4. Chubut Strategic Plan for Sustainable Tourism 2022

Chubut Province has designed its Strategic Plan for Sustainable Tourism following the general guidelines defined in PFETS. The Plan's general objective is:

To become the orienting and articulating process that will reaffirm collective will, optimize resources and lead efforts toward a

concerted model of tourism development for Chubut Province, guiding the actions toward a balanced, integrated, sustainable, participative and socially fair development of the provincial territory, building the most adequate intervention mechanisms.
The Plan was elaborated by the joint efforts of municipal and provincial officials, academic institutions, and tourism service providers and groups from the various tourism corridors in the province.
This document considers protected areas as one of the key axis of the tourist industry. For this reason, it fosters the creation of new protected areas and the enhancement and consolidation of existing areas, by elaborating and updating management plans.
The Plan also fosters actions for the construction and consolidation of a balanced, sustainable structure of tourist areas that will contribute to provincial and local development.
Of vital importance among the products being planned is the Integral Conservation Plan. This is a technical document that defines management by the Tourism and Protected Areas Secretariat, with the aim of preserving and enhancing the value of the cultural and natural heritage of the province of Chubut.
Among others, the Plan contains programmes for strengthening protected areas, including projects such as creation of new areas and creation of new areas with international approval, as well as operational projects such as enhancing the value of the cultural and natural heritage in protected areas.

B 5. Los Alerces Shire, Strategic and Participatory Planning The main goal of "Los Alerces Shire, Strategic and Participatory Planning" was to become a governing project that would define the path to follow for developing tourism in the areas known as Los Alerces Shire (Comarca de los Alerces) (Córdoba, 1999; in Chubut Provincial Tourism Board, 1998/99).
The plan sought to follow a new development model, which would become predominant by stages: first in specialized/technical fields, then socially, and finally politically. This new development model is "sustainable development," which fosters the use of resources or heritage without compromising future generations.
This participative process involved the municipalities of Trevelin, Esquel, Corcovado, Cholila and Tecka. APN was involved through the Superintendency of Los Alerces National Park.
To summarize Item 5d, it is worth noting that the nominated property's protection is assured by the present Management Plan — which is currently being updated — as well as the

Colehual river

regional protection framework of the Andean-North Patagonian Biosphere Reserve and the nationwide legal protection granted by the Argentine Native Forests Protection Act. Likewise, planning for sustainable tourism at the national and regional levels complements and contributes to reinforce protection of the nominated property, and to favour the regional development of neighbouring communities.
In this sense, public use planned by APN, and usage zoning of the Park (see Map 6: Usage Zoning, Los Alerces National Park) are aimed at promoting responsible tourism management as a tool for: 1) protecting the nominated property, and 2) strengthening local communities' economies by installing tourist services that require infrastructure (hotels, restaurants, etc.) in neighbouring cities. PNLA lies within a tourist corridor of wide regional influence, which is jointly managed by the aforementioned planning frameworks and focuses on sustainable use associated with conservation.
It is estimated that tourism demand in the Park will see an important increase as a consequence of its future designation as a World Heritage Site, hence the necessity of articulating infrastructure and equipment in the communities linked to the property. For this reason, municipal, provincial and national authorities are working jointly with tourism operators and local communities to favour the orderly and sustainable development of the nominated property as well as the neighbouring communities.

5.e Property Management Plan or Other Management System

PNLA has a Management Plan (see Appendix 4: Approval Document and Contents of the Management Plan for Los Alerces National Park) approved by Board Resolution No. 171/1997. The Plan includes usage zoning consistent with the conservation categories for the area. It is currently in force and appropriate for management needs, since no problems, conflicts or superposition of significant uses have been detected that would necessitate core changes in the area's management. The Plan's management is guided by the general conservation goals, which are listed below.

Rivadavia river, drainage of Rivadavia lake

1. To preserve a representative sample of the Andean-North Patagonian ecosystems, ensuring the continuity of natural processes.
2. To protect high basins, ensuring that the natural processes for regional regulation of hydric cycles are sustained.
3. To preserve the diversity of the area's cultural heritage.
4. To preserve the natural scenic beauty of the region, providing an adequate frame for the development of tourism.
5. To provide opportunities and adequate areas for the scientific research of ecosystems, biological diversity and cultural heritage in the region.
6. To facilitate the development of recreational and tourist activities in contact with Nature.
7. To promote public knowledge of the area's natural features, as well as their functions and importance.

Every year, the Park uses the Annual Operative Plans (AOP) and Management Efficiency Measurements (MEM) to simultaneously execute all due strategic, operative and tracking plans for the nominated property.
The Park carried out the Management Efficiency Measurements defined by the National System from 2011 to 2013. The results fall within the category of "moderately satisfactory" management, with percentages of 74%, 54%, 64% respectively for the years 2011, 2012 and 2013.
In consequence, the Park's tri-annual efficiency average is 64%, higher than the totality of the Parks managed by APN, which is about 50 %.
PNLA regulates usage of the protected area by means of administrative orders, which authorize different activities within the property in fulfillment of APN regulations. These regulations cover modular aspects of management (environmental impact and management of fauna, cultural heritage, research permits, constructions, usage of available space, among others).

Part of the woods buried under the rubble

Update Process for the Nominated Property's Current Management Plan

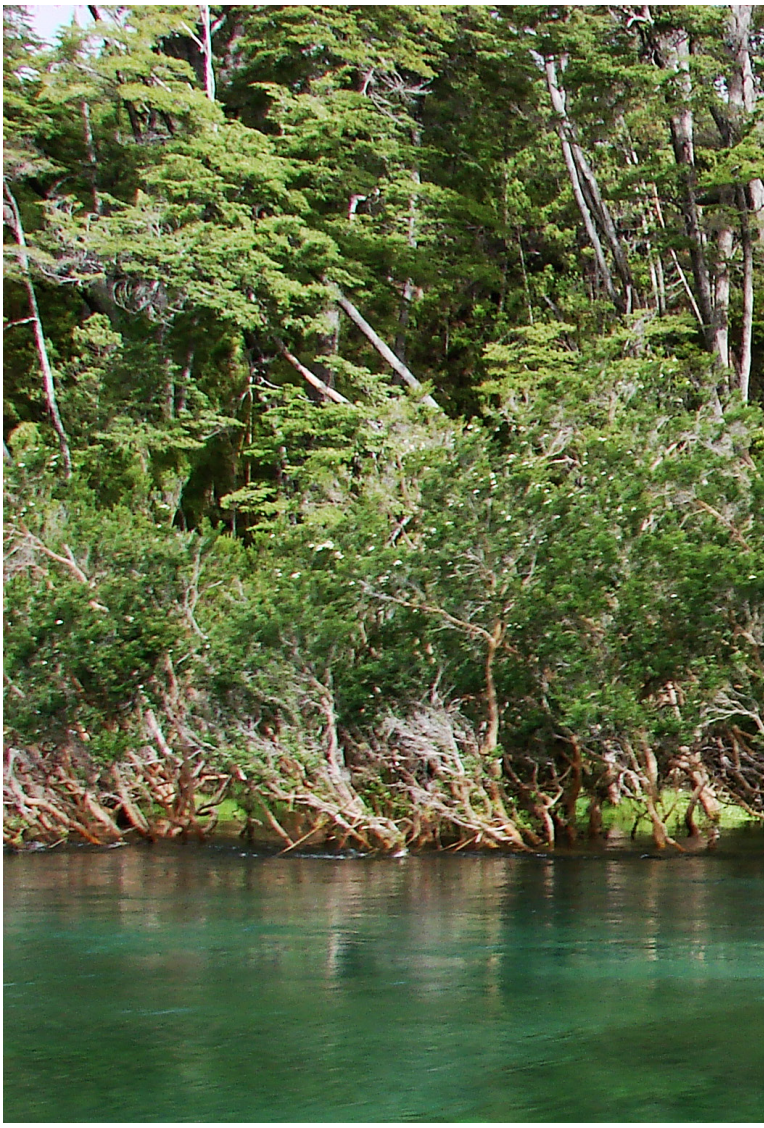
The Park is currently developing a process to update the Management Plan in accordance to the Guide for the Elaboration of Management Plans approved by APN in 2010. So far the Preparatory and Descriptive phases have been completed — based on updated information — and the Diagnostics and Proposition phases are in preparation. As part of the diagnosis, an internal workshop was held on problems and threats affecting the conservation assets, in which the whole staff of the National Park as well as APN's regional areas took part.

Likewise, participatory sessions and other internal instances were held with the goal of identifying natural and cultural conservation assets. In this context, tourism operators were called to become acquainted with the vision and perspectives of public use of the Park, within the framework of updating the Management Plan.

A workshop was held in October 2014 with the participation of all social actors involved with the protected area. The goals were: 1) to inform of the advances in the Management Plan; 2) to identify natural and cultural conservation assets of significance to the local community; 3) to communicate the ongoing process and the steps for declaring PNLA a World Heritage Site (see Appendix 5: Nomination of Los Alerces National Park (PNLA) as World Heritage Site); and 4) to effect a first approach to the environmental or socio-environmental changes perceived by diverse social actors directly linked to the Park.

These mechanisms made it possible to identify natural and cultural conservation assets that complement and amplify the objectives set forth in the Management Plan of 1997, in relation to the following elements (APN, 2012; DRP/PNLA Workshop):

1. The alerce forests
2. All forests, particularly those in regeneration
3. Fauna: huemul, pudú, torrent duck, guigna cat, monito del monte, Isla Grande frog, native fish
4.Restricted distribution (endemic) species and species at their distribution boundaries
5. Water
6. Salmonidae-free sub-basins
7. Environments free from Dydimo algae
8. Glaciers
9. Paleontology sites
10. History of the Park's population and archaeological sites (rock paintings, artifacts)



It is worth noting that APN is currently implementing a series of strategies, thematic plans and projects linked to detected conservation assets and the main issues affecting them; these will be incorporated into the Management Plan currently being elaborated. The principal plans, and current and future projects for the protected area are:

- Updating the Managament Plan for Los Alerces National Park — currently in the diagnostics stage (Joint Order PNLA 26/2013-DRP 031/13. Includes Public Use Plan).
- Applying a Forest Fire Protection Plan at PNLA, 2014/2015 (PNLA Order 248/14).
- Actions in the protected area for the Huemul Conservation Programme, and other specific actions defined at PNLA Superintendency.
- Implementing the Didymo Containment Plan, and updating the Plan for its next iteration.
- Implementing the Exotic Woody Plant Species Management Project for the restoration of natural environments. Call for the 2009 Native Forest

Arrayanes river

Protection Programme by the Environment and Sustainable Development Secretariat (Resolution SAyDS 256/2009) against willows (Salix sp.) and pines.

• Elaborating and implementing the Livestock Use Plans with rural inhabitants in the National reserve, with technical assistance and follow-ups by APN staff and support by other agencies.

• Elaborating a Resolution for the management of cattle in unauthorized areas.

• Generating, annually updating and applying new management regulations for water bodies: sports fishing rules 2014-15 (Resolution HD 258/14) and ban on motorboats on the Arrayanes river (Resolution HD 45/2015). Incorporating into bidding terms for tourist concessions the necessity of waste treatment plants and maintenance of visitor infrastructure (paths, walkways, ports).

• Maintaining and eventually amplifying the sanitary barrier at the Puerto Chucao visitor access to deter the propagation of P. austrodedri towards the National Park area.

• Elaborating a trial project for managing the invasion of Cinara cupressi, and elaborating a management plan at a later stage.

• Trials for the control of P. austrocedrae to the west of the "drainage axis" of PNLA.

• Maintaining restricted access to and control of headwaters sectors, in order to protect high basins, lakes and rivers from exotic organisms.

• Implementing rules for the ownership of dogs in the protected areas (Resolution HD 59/2013).

• Implementing the Cerro Riscoso Huemul Population Monitoring Plan.

• Implementing the Los Alerces National Park Cultural Heritage Programme: inventories and updating of historic and archaeological sites. Approved by Order 16/12.

• Implementing the project "Take your waste back with you," a site for receiving waste material for PET recycling and waste collection in concordance with the National Urban Waste Management Project (GIRSU)

• Inter-Jurisdiction Waste Management Programme for Tourist Municipalities: Currently being implemented with Inter-American Development Bank Loan 1868/OCAR.

• Elaborating a contingency plan for the possible entrance of P. austrocedrae to the Millennial Alerce Forest path.

Base studies and research about conservation assets and problems in the National Park

- Elaboration of "Preliminary diagnosis of the health status of the forest," internal report by PNLA.
- Elaboration of the plan "Diagnosis of the fish communities in water environments of Los Alerces National Park, with implications for conservation and management" (Joint Ruling PNLA 40/2015-DRP 14/15), as a basis for later management actions.

Participation and support for the following projects:

- "Wildlife and livestock interface in natural environment of the Northern Patagonia Argentina: health indicators for native fauna populations." (Research permit DRP 1339, a Rufford-CONICET/APN project.)
- Biodiversity and ecology of communities associated with environments vulnerable to climate change: the Torrecillas and Tronador glaciers (Los Alerces National Park, Patagonia) (Research permit DRP 1368).
- Influence of climate variations in the decline of Nothofagus pumilio forests in northern and southern Patagonia (Research permit DRP 457, CRICYT/CONICET).
- Growth dynamics of Austrocedrus chilensis and Nothofagus dombeyi in mixed forests and influence of environmental factors on their saplings for forest management of stands affected by "mal del ciprés" (Research permit DRP 1373, CIEFAP/CONICET).
- Tendencies of growth and hydric dynamic in the Nothofagus pumilio forests over a range of environmental gradients (Research permit DRP 761).

Dating of surfaces exposed by the retreat of glaciers in the Patagonian Andes by using lichenometry and primary inheritance studies (Research permit DRP 830).

- National Inventory of Glaciers and Periglacial Environments (Research permit DRP 1268).
- Integration of instrumental, dendrochronological and glaciological records and climate variability in Patagonia during the last 1,000 years (Research permit DRP 484).

Actions

- Registering vertebrate species of special value (Resolution 181/94).
- Controls for common gorze (Ulex europaeus) near the wildfire called "El Cristo."
- Diagnosis and management of sites invaded by wild cattle (Bos taurus).
- Monitoring of the ingress, and eventual control actions for red deer (Cervus elaphus).
- Actions for the management of mink (Neovison vison) as part of the plan for containing the Didymo invasion.
- Diagnosis of the state of new paleontology sites at the Park.

The list includes the monitoring projects listed in 6. Monitoring.

When the Management Plan update process is complete, the resulting document will be analyzed by the Board and approved by administrative resolution, which will allow to replace the 1997 Management Plan with the new, updated Plan.

5.f Sources and Levels of Finance

The budget is provided by the National State, and is destined toward the following:

- Preserve and manage existing natural and cultural resources. Control and eradicate exotic woody plant species.
- Further develop management of human settlements and sustainable use of the soil, supporting the construction of greenhouses and activities such as handcrafting, fruit farming and tourism.
- Develop, enhance the value of, and operate the Visitor Centre. Audit visitor services and use of public areas. Perform maintenance and adaptation of paths and walkways.
- Foster environmental education through talks and workshops for neighbouring communities. Build, maintain and operate basic urban services (running water, electricity) for Villa Futalaufquen. Social, health and cultural services for local populations. Control the pavement works in Highway No. 71.

Develop scientific research in the area and monitor natural and cultural resources, as well as species of special value (huemul).

- Manage the Andean-North Patagonian Biosphere Reserve. Conform the Futaleufú Basin Committee and the Directory of the Futaleufú Model Forest.

During 2014, PNLA had an annual operations budget of $3,688,000, plus $22,942,480 for staff salaries.

Usage of the annual budget as defined by regulations is detailed below.

Cormorants

Item 2.1: $1,195,690 for food and products related to agriculture, livestock and forest.
Item 3.1: $526,426 for basic services (electricity, running water, gas, phones, mail, etc.)
Item 3.2: $132,526 for rentals and other rights (buildings, machinery, land, rights to intangible assets)
Item 3.3: $894,871 for maintenance, repairs and cleaning (of buildings, vehicles, machinery, communication lanes, computers, and general cleaning)
Item 3.4: $421,449 for technical and professional services (in scientific research, health, legal, tourism, etc.)
Item 3.5: $298,921 for commercial and financial services (delivery fees, banking commissions, highway tolls, publications and printing, Internet)
Item 3.7: $187,117 for tickets and travel expenses
Item 3.8: $11,700 for taxes, charges and lawsuits (rights and charges, fines, overcharges)
Item 4.3: $20,000 for machinery and equipment (computers, furniture, major tools, machinery)

Throughout 2012/13, the Park collected a total of $1,728,221.65 for ticket sales, stamps, fines, etc. These funds are deposited in APN's bank account; part of the total amount goes back to the Park.

An additional source of finance, destined for the construction of the path and walkways to the Millennial Alerce Forest, is Inter-American Development Bank Loan 2606/OCAR, managed by the Foreign Loan Executing Unit.

Cisne lake beach, off-limits area

5.g Sources of Expertise and Training in Conservation and Management Techniques

The alerce tree called "Meli"

New park rangers undergo training at the Embalse Training and Qualification Centre in Córdoba Province. In 2014, 50 park rangers entered the APN.

After graduation, park rangers' duties include monitoring, auditing and surveillance in protected areas. This mission cannot be delegated by APN, and contributes to the continuous implementation of training programmes for park rangers.

In 2004, the then National Tourism Secretariat offered APN facilities in the Embalse Río Tercero Tourism Unit, in Córdoba Province.

In August of 2005, Resolution PD No. 391/05 created the Training and Qualification Centre for Protected Areas (CFyCAP, Centro de Formación y Capacitación en Áreas Protegidas). Its goal is to train human resources in issues related to protected areas, focusing on work that is both internal and external to APN.

The curricula includes a degree in Protected Natural Areas Management issued by the College of Agronomy of Buenos Aires University-APN and the Regional Course for Park Rangers in Latin America (Cooperation Agreement with Japan (JICA) and the National Ministry of Foreign Relations and Religious Affairs (MREC-APN)).

The Regional Course aims at amplifying training opportunities and offerings for professionals in the management of protected areas, whether in public or private land. It provides an opportunity for training of conservation agents who have not specifically trained for conservation in protected areas.

From 2005 until 2012, the course has trained more than 150 park rangers from 19 countries in Latin America and the Caribbean. Graduates are certified as "Technician in Protected Area Management."

5.h Visitor Facilities and Infrastructure

Los Alerces National Park, with its intrinsic value for the conservation of Nature, is a singular natural environment for motivating national and international tourists to travel to the region of the Andean Temperate Forests. The Park's principal distinguishing quality resides in that it is the only area in Argentina where one can live the unique experience of walking in direct contact with a millennial alerce forest. This quality heightens interest in the nominated property and its insertion as a privileged destination for visitors from all over the world.

The Park's main attractions (see Appendix 6: List of Attractions at PNLA) can be appreciated in excursions over land and water. These offer an ample variety of activities according to the type of visit. Land excursions include high-altitude trekking, hiking in short and long paths, horse riding, mountain biking and bird watching. Lake excursions are usual for reaching the most outstanding areas — such as Torrecillas Glacier and the Millennial Alerce Forest — and amplify the Park's offerings, providing opportunities for nautical activities and sports fishing.

Lastly, Highway No. 71, which runs through landscapes of high scenic quality, allows visitors to travel northward or southward through the Park, entering dense forests, taking a rest at scenic spots overlooking several lakes, and accessing the shores of lakes Rivadavia, Verde and Futalaufen. These are the locations of the beaches and daytime use areas, as well as the camping sites and inns that complete the quality of the experience.

PNLA is part of the Andean-North Patagonian Biosphere Reserve, which also contains the national parks and reserves of Lanín (412,000 ha), Nahuel Huapi (750,000 ha), Los Arrayanes (1,753 ha) and Lago Puelo (27,674 ha). Also part of the Biosphere are the provincial protected areas of Río Limay Protected Landscape (17,690 ha) and Río Azul-Lago Escondido Protected Nature Area (80,000 ha) in Río Negro Province; and the Motoco Forest Reserve (7,200 ha), the Lago Epuyén Multiple Use Forest Reserve (20,000 ha), the Río Turbio Provincial Park and Reserve (82,134 ha), the Baggilt Lake Protected Nature Area and the Hielo and Huemul Rivers Reserve (32,400 ha) in Chubut Province.

The nominated property is part of the Lakes Corridor, a tourism initiative promoted by MINTUR in the same territory as the Andean-North Patagonian Biosphere Reserve. The Lakes Corridor contains a number of tourist locations: Villa Pehuenia, Aluminé, Junín de los Andes, San Martín de los Andes, Villa La Angostura and Villa Traful in Neuquén Province; San Carlos de Bariloche and El Bolsón in Río Negro Province; and El Hoyo, Cholila, Esquel and Trevelin in Chubut Province.

Visitor surveys highlight that the corridor's protected areas, with their environmental integrity and the immensity of their landscapes, are the main reason to visit the region. In this corridor, the most populated cities are main bases for accessing the corridor by air and by land. The movement that originates in these cities interconnects all of the territory.

In this regard, PNLA is a focal point in the southern area of the Biosphere Reserve and the Lake Corridor. Tourist access to the Corridor is provided by the city of Esquel — which serves as the southern access portal by land and air — and by the smaller cities of Trevelin and Cholila, which possess distinctly Andean identities. These three population centres concentrate tourist service offerings, and are the focus of principal tourist demand in the Corridor's southern zone, with an 180,000 estimated annual visitors.

5.h.1 Evolution of demand

Annual influx of tourism

Los Alerces National Park receives tourists throughout the year. Many of them lodge within Park limits, in inns and camping sites which can be organized, rural or free[12]. Most visitors to the Park arrive in summer. Visitors to Esquel and Trevelin arrive throughout the year. These cities have the greatest concentration of tourist services, including a variety of lodging options, restaurants and travel agencies that include excursions to the Park.

Aside from tourists from other regions and countries, the protected area receives a high number of local visitors, specially in the lake beaches and camping sites.

Most visitor services are located in Villa Futalaufquen and its surroundings — the area nearest to the Park entrance, known as Portada Centro (Centre Entrance). There are also visitor facilities, albeit more sparse, northward along Provincial Highway 71.

Most of the area's attractions can be visited by land, either by car or by walking one of the many paths in the Park. There are also mixed excursions that combine boating with hiking or trekking. Access to the alerce forest is restricted; it can only be reached by boat in groups led by authorized guides. This enables the sustainable use of the site, and makes for an improved visitor experience.

PNLA's data indicates that the number of visitors has increased in the past few years, surpassing 170,000 tourists in the 2013-14 season. Most of them arrive between January and April (see Table 6 below).

Season	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97
Total	9,088	13,789	16,739	N/A	67,300	69,154	29,911
Season	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04
Total	71,031	81,661	63,641	57,514	74,924	108,794	118,985
Season	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Total	121,166	154,463	161,817	155,921	139,374	156,870	194,068
Season	2011/12	2012/13	2013/14				
Total	161,792	175,374	70,606				

Table 6: Evolution in the number of visitors to PNLA.

Most visitors to PNLA are residents of the region, followed by Argentine nationals and lastly foreign tourists, mostly from neighbouring countries.

Data from ticket sales to the Millennial Alerce Forest indicates that approximately 11% of visitors to the Park takes part in this excursion.

Statistics reports from the Municipal Secretariat for Tourism in Esquel indicate that most tourist who visit the Park take lodgings in this city.

Year	Summer	Rest of the year	Total
2007	42,744	77,318	120,062
2008	43,649	59,652	103,211
2009	31,262	41,854	73,116
2010	51,012	88,552	139,564
2011	54,448	87,124	141,572
2012	42,550	70,212	112,762
2013	46,010	59,999	106,009

* January and February.

Table 7: Evolution in the number of visitors to Esquel.

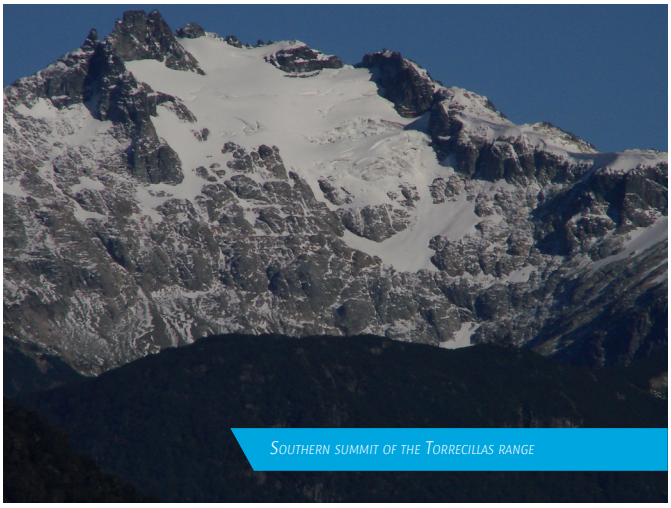
[12] *Camping categories within national parks, each with their own specific set of visitor services (TN).*

5.h.2 Services Offerings

The following table displays tourist services offerings at PNLA.

Service	No. of providers	Motorboats
Fishing excursions	21	17
Land excursions	8	
Lake excursions	4	5
House riding excursions	1	
Tourist guides	73	
Site guides	12	
Trekking guides	9	
Fishing guides	86	
Kayak guides	10	
Photographers	2	
Bird watcher guides	1	
Mountain nike guides	1	
Camping sites	13	
Inns	6	
Food/Grocerles	5	
Dormitories	1	
Lodging	**Units**	**Beds**
Cabins	23	82
Inns	5	127
Dormitories	2	16
Camping	**Parcels**	**Accomodation**
Organized	290	1160
Free	175	700
Rural	337.5	1350
Transportation companies	4	

Table 8: Tourist offerings at PNLA



Southern summit of the Torrecillas range

Cisnes river

Tourist activity at PNLA

Introduction: The history of Argentina's national parks begins with a land donation in 1922, which enabled the creation of the National Park of the South. As stated earlier, Los Alerces National Park was created in 1937, with a surface of 259,822 ha. The Park's creation sought to protect a highly important river basin highlighted by the Millennial Alerce Forest, within a biogeographic zone rich in species and of exceptional environmental quality.
Thirteen interconnected lakes and rivers are part of the Park's singular geography, and offer an ideal environment for fishing, boating or simply contemplating the natural environment.
The alerce — or Lahuán, as it was called by the region's original inhabitants — is a gigantic example of Andean-Patagonian flora, and one of the longest-living organisms in the world. Visitors feel entranced when standing in front of "The Grandfather," an alerce tree more than 52 metres tall, three metres wide and more than 2,600 years old. A tree full of life, imposing tall since before the time of Christ.
To get to the Millennial Forest, visitors take a Lake Safari excursion to Puerto Sagrario on Menéndez lake, navigating through the heart of this natural sanctuary. The Park, very little impacted by human activity, is one of the most interesting of protected areas — its beautiful natural landscapes alternate virgin forests with lakes, cascades and rapids; mountain ranges and imposing high-altitude glaciers such as the Torrecillas or the Pirámides.
The Park is the only place in Argentina that is home to critical species such as the huemul, pudú, Chilean pigeon and guigna cat, some of which are considered "rare" worldwide. Villa Futalaufquen, where the Park's headquarters are located, has a Museum and Visitor Centre, providing interpretative information, samples of flora and fauna, and other resources. Guided visits, video, photos and leaflets with interesting facts help to mold visitors' vision of this National Park.
The list of attractions is included in Appendix 6: List of Attractions at PNLA. Existing paths and excursions in the Park are described below.

Paths Los Alerces National Park contains a great diversity of native flora and fauna, which make this nature reserve an attractive environment for rest and contemplation. The Park's rivers and lakes are marked by their purity and their colours, and with the Millennial Alerce Forest are considered heaven-like environments that retain their timeless essence.
The Park has a variety of paths and trails. It is one of five national parks that conform the main network of the Andean Trail, Argentina's first long-distance trail.
Altogether, the Park's path and trail network is a thematically rich tourist attraction, that allows visitors to walk in the Valdivian forest, acquire knowledge about the area's exuberant flora and fauna, visit rock paintings or walk along the slopes of beautiful mountains.
Paths and walkways are marked by signs and graded by difficulty. The Visitor Centre at Villa Futalaufquen, as well as the northern and southern Park entrances provide information about the current state of paths, as well as the mandatory sign-in for Park visitors.
The main paths in PNLA are described below.

Central area paths

1. ROCK PAINTINGS: 1200 metres from the Visitor Centre at Villa Futalaufquen. Visitors can observe a rock wall with paintings — geometric abstract motifs dated 1500-1600 years BP — and then undertake a 10-minute climb to a lookout point over Lake Futalaufquen. The walk includes a path with interpretative information on regional flora, called "A Forest Heritage."

- Total distance: 1 km (circular)
- Approximate duration: 30 min.
- Difficulty: Easy

2. PUERTO LIMONAO: 650 metres from the Visitor Centre at Villa Futalaufquen. A dock for lake excursions, surrounded by beach and service facilities including issuing fishing licenses. A highlight of the tour is the coihue forest. The itinerary is linked to the Cinco Saltos path.

- Distance: 7 km round trip (8 km circular)
- Approximate duration: 2 hs
- Difficulty: Easy

3. CINCO SALTOS: 1500 metres beyond Puerto Bustillo, allows access to the lookout points over the waterfalls of Los Pumas stream which also provide an excellent view of Lake Futalaufquen. Requires registration at the Visitor Centre.

- Distance: 3 km (1 km more if taking the gravel road)
- Approximate duration: 3 hs
- Difficulty: Moderate

4. ARROYO CASCADA: 200 metres from the Visitor Centre. A path along the east slope of Cordón Situación, including several lookout points. The walk traverses the Cascada stream valley. Requires registration at the Visitor Centre.

- Distance: 8.4 km complete circular walk
- Approximate duration: 4 hs
- Difficulty: Moderate

5. CERRO EL DEDAL: 200 metres from the Visitor Centre. Hikers can see Lake Futalaufquen, Cordón Situación and the Desaguadero river valley. Requires registration at the Visitor Centre.

- Distance: 12 km circular walk
- Approximate duration: 7 hs
- Difficulty: Hard

6. LAGO KRÜGGER: Begins 1,500 metres from Puerto Bustillo and ends at Krügger lake, where camping is allowed (fires are not allowed). This is the Park's most complex path, providing the longest hike. In the first stage of the walk, visitors can observe spectacular views of the Futalaufquen and Menéndez lakes. In the second stage, hikers arrive at Krügger lake and the mouth of the Frey river. Requires registration at the Visitor Centre.

- Distance: 17 km (one-way)
- Approximate duration: 12 hs (one-way only)
- Difficulty: Hard

7. LAGUNA LARGA: 2 km from the Visitors Centre. This lagoon is outside the National Park, and accessible by car.

- Distance: 4 km
- Approximate duration: 4 hs
- Difficulty: Easy-Moderate

8. CASCADA IRIGOYEN: 6 km from the Visitor Centre. A visit to a large waterfall amid abundant and varied vegetation.

- Distance: 340 m round trip
- Approximate duration: 15 min.
- Difficulty: Easy

9. CASCADA TÍO MINDO: 9 km from the Visitor Centre.

- Distance: 300 m
- Approximate duration: 15 min.
- Difficulty: Easy

10. CERRO LA TORTA: 7 km from the Visitor Centre. Allows visitors to climb Cerro La Torta along a path that is in large part outside the boundaries of the National Park.

- Approximate duration: 6 hs (one-way)
- Difficulty: Hard

11. CERRO COCINERO: 150 metres from Rañinto stream. Visitors ascend through a ravine to the mountain. Requires registration at the Visitor Centre.

- Approximate duration: 7 hs
- Difficulty: Hard

Northern area paths:

1. LAGUNA ESCONDIDA: Begins in front of the Río Arrayanes Park Ranger Station. The climb traverses forests with varied types of vegetation, and ends at Escondida lagoon. Requires registration at the Visitor Centre.

- Distance: 3.8 km
- Approximate duration: 4 hs
- Difficulty: Moderate-Hard

2. VIEJO LAHUÁN: Begins at the Arrayanes camping site, and continues along the Arrayanes river downstream, until arriving at an old alerce tree.

- Distance: 3 km
- Approximate duration: 2 hs
- Difficulty: Easy

3. LAHUÁN SOLITARIO: A path along Menéndez river toward Puerto Chucao. Along the way visitors can observe a 300-year-old alerce. A hike of great scenic variety.

- Distance: 3 km
- Approximate duration: 1 h
- Difficulty: Easy

4. CERRO ALTO EL PETISO: Begins at Puerto Mermoud on the shores of Lake Verde, and reaches the summit of El Petiso. A varied route that takes hikers over different mountain environments (ravines, forests, quarries). Requires registration at the Park Ranger Station for the area.

- Distance: 15.2 km
- Approximate duration: 6 hs 35 min.
- Difficulty: Hard

5. TORRECILLAS GLACIER: See the description in Excursions.

6. MILLENNIAL ALERCE FOREST: See the description in Excursions.

7. LAGO HITO: A hike along a little-traversed area of the Park. A path along a valley that joins lakes Rivadavia and Menéndez, with two lagoons, one of them surrounded by Gauitecas cypresses.

- Distance: 20 km
- Approximate duration: It is recommended to reserve two nights
- Difficulty: Moderate-Hard

8. MIRADOR LAGO VERDE: 500 metres from the Lake Verde Park Ranger Station. Provides a scenic view of lakes Verde, Menéndez and Futalaufquen.

- Distance: 600 m round trip. Circular walk about 2 km
- Approximate duration: Round trip: 25 min. Circular walk: 40 min.
- Difficulty: Moderate-Hard.

9. CIRCUITO RIVADAVIA: Begins at the mouth of the Rivadavia river. A path along the shores of the Rivadavia lake, the mouth of the Rivadavia river and the Colehual stream, in a setting of great beauty.

- Distance: 4.7 km circular walk
- Approximate duration: 2 hs
- Difficulty: Easy

10. CASCADA ARROYO HACHA: Along the way, visitors can observe a large waterfall and a lookout point over Lake Rivadavia. The path traverses a setting of coihues, cypresses and radal trees.

- Distance: 800 m circular walk
- Approximate duration: 22 min.
- Difficulty: Easy

11. THREE LAKES, FOUR RIVERS: See the description in Excursions.

On the way to Frilan lake

Cisnes lake

Southern area paths:

1. CASCADA TAMBORES: A walk near the southern entrance to the Park, which takes visitors to a waterfall. A forest setting of cypresses, coihues and radal trees.

- Distance: 100 m round trip
- Approximate duration: 10 min.
- Difficulty: Easy

2. LAGUNA TORO: A hike to the lagoon near the base of Cerro La Monja. Provides scenic views of Embalse Amutui Quimei in the Futaleufú river valley. A setting with abundant vegetation of mayten trees, cypresses and willows.

- Distance: 9 km round trip
- Approximate duration: 4 hs 15 min.
- Difficulty: Moderate

3. TRAVESÍA LA BALSA: A hike along the shores of the Futaleufú river. Visitors can see the remains of the old raft used to cross the river. The path comes near to the Chilean border (Futaleufú Pass).

- Distance: 11 km one-way
- Approximate duration: 5 hs
- Difficulty: Moderate

Andean Trail

This is the first long-distance trail in Argentina. Its main network joins Lake Aluminé in Neuquén Province with Lake Baggilt in Chubut Province. The trail runs northsouth along the Northern Patagonian Andes.

The Andean Trail experience was impulsed by the Ministry of Tourism jointly with the National Parks Administration, within the framework of the Argentina Paths Programme. Its main goal is to enhance the value of the region's natural and cultural resources, fostering sustainable tourism through hiking.

The Andean Trail is an experience in collective construction, since it is the result of the efforts of several public and private institutions from different jurisdictions and backgrounds. Long-distance hiking has a very low environmental impact and brings enormous benefits in health, recreation and the creation of job opportunities for rural inhabitants and for small local populations away from the cities.

A premise of Argentina Paths is that the Andean Trail's core network join preexisting paths and trails, in a design that aims for the least possible environmental impact and contributes to the management and general tourism policies of the protected area. In this context, in Los Alerces National Park the Andean Trail includes the stages listed below. (See also http://huellaandina.desarrolloturistico.gov.ar/etapas/chubut.)

VILLA LAGO RIVADAVIA - NORTH ENTRANCE

- Distance: 11 km
- Duration: 6.5 hs
- Difficulty: Moderate
- Highlights: Lookout points, panoramic views of the Carrileufu valley and Rivadavia lake

Description

Begins at Villa Lago Rivadavia, where the beginning of the trail is indicated by signage. The trail climbs along a local road going through an open forest of Cordilleran cypresses. Signage in the area was crafted by students of the local rural school; the signs are on the trees, painted yellow. The path has steps made out of logs, as well as handrails and seats crafted by the schoolchildren — this is a clear example of the Andean Trail's spirit of collective construction, in this case further supported by the participation of the Cholila Andean Club. Andean Trail markings lead up to the two first lookout points overlooking the Carrileufu river valley and the cordillera. The path continues along a slope, passing a second lookout point facing the Rivadavia Sur lake, in front of Cerro Coronado and behind Cerro La Momia. A sign welcomes visitors to Los Alerces National Park, as the transitional forest gradually becomes a taller coihue forest. The path goes by a local population's animal corrals and begins the descent to the highway, at the North Entrance of the National Park.

NORTH ENTRANCE - BAHÍA SOLÍS CAMPING

- Distance: 9.3 km
- Duration: 4.5 hs
- Difficulty: Moderate
- Highlights: Panoramic views, access to Rivadavia river at the end of the walk.

Description

Begins at the Northern Entrance (free camping area next to the Park Ranger station), four km away from Villa Lago Rivadavia. Signs indicating the entrance to the trail are near the bridge over the Hacha stream. The trail begins in a climb, until reaching a plateau that continues almost to the beginning of the descent to Bahía Solís. Visitors can observe native forests and streams. To the west of the trail is the panoramic view of Lake Rivadavia. The final descent ends at Bahía Solís, a bay on the shores of the lake.

BAHÍA SOLÍS CAMPING - ARRAYANES SECTOR

- Distance: 15.2 km
- Duration: 8 hs
- Difficulty: Moderate
- Highlights: Panoramic views from the Lake Verde lookout point

Description

Begins at the Bahía Solís organized camping site. The trail runs on the tracks of an old station wagon road along the shore of Lake Rivadavia, then along the Rivadavia river until reaching the Colehual stream. From there the old tracks approach the rural locality of Alarcón. From the lookout point, which provides a beautiful panoramic view, the trail continues to the road leading to the Lago Verde Park Ranger Station, which joins the path along the shores of Lake Verde. Hikers continue on this path — overlooking the tranquil, mirror-like lake — until reaching the parking lot. A path of wooden planks leads to the final trail to the Park Ranger station and the Arrayanes rural camping site.

ARRAYANES STATION - PUNTA MATTOS

- Distance: 11.3 km
- Duration: 7 hs
- Difficulty: Hard
- Highlights: Panoramic views

Description

Begins at the Arrayanes Park Ranger Station and connects with the Escondida lagoon path. The trail climbs up to a lookout point overlooking Lake Menéndez, and then continues the climb toward the Escondida lagoon. Near the lagoon, the trail continues through a native forest along the Braese stream, overlooking Lake Futalaufquen, eventually reaching the lake shore and running alongside of it. The path then climbs up to a lookout point overlooking Cerro Riscoso, from which it is possible to glimpse huemul deer. The path continues along flatlands and old forest tracks until Playa del Francés beach, then runs along the lake shore to Punta Mattos.

LAGO KRÜGGER - VILLA FUTALAUFQUEN

- Distance: 18.6 km
- Duration: 12 hs
- Difficulty: Hard
- Highlights: Panoramic views, lakeside beach

Description

The first stage borders the shores of Krügger lake, then climbs

Del Medio stream, northern arm of Futalaufquen lake

up to a plateau from which it descends to Playa Blanca. The trail ascends until reaching a mountain pass with panoramic views. The trail runs along the mountain slope until reaching the ruins of Puesto Rozas cemetery, from which it continues until the entrance to the Cinco Saltos path. The path crosses the Los Pumas stream over a bridge; near Puerto Limonao it joins the coast road that leads to Villa Futalaufquen passing by Puerto Bustillo.

VILLA FUTALAUFQUEN- CENTRE ENTRANCE

- Distance: 11.4 km
- Duration: 4 hs
- Difficulty: Easy
- Highlights:Contact with local population, local products

Description

The first stage begins at Villa Futalaufquen, on a flat path among fields with a view of the mountains that surround the valley. The path crosses the Cascada stream, and continues along a route that includes streams and lookout points over an open plateau. The path then descends near the locality of Pichón Tardón, next to the Rañinto stream, where it levels and leads to the Park's Centre Entrance.

Futalaufquen lake

Excursions

This section details the excursions and recreational activities in PNLA (see also http://www.esquel.gov.ar).

MILLENNIAL ALERCE FOREST

This excursion is ideal for sailing the waters of the National Park, contemplating the majestic mountain ranges surrounding the lakes, and observing the varied vegetation that adorns the landscape, of which the Millennial Alerce Forest is a remarkable part. During the trip, visitors can appreciate some of the oldest trees in the world, aged over 2,600 years and astonishingly large.

To begin the excursion, visitors first arrive at the parking lot next to Highway 71, then cross the walkway over the Arrayanes river — an impressive suspension bridge — and from there begin a brief walk to Puerto Chucao. Visitors then embark on the vessel that takes them through Lake Menéndez to Puerto Sagrario.

At Puerto Sagrario begins the walk through an area possessing great variety of vegetation. Young alerce trees, no more than a few centuries old, can be seen next to the Cisne lake and rapids. At the end of the trail is the imposing millennial forest. One of the oldest trees, "The Grandfather," is 2,600 years old, nearly 60 metres tall and more than two metres wide.

The complete excursion runs for two kilometres and is graded of moderate difficulty.

THREE LAKES, FOUR RIVERS

This excursion begins with a raft trip on lakes and rivers, then continues with a walk through a dense forest, where hikers become acquainted with historic and cultural aspects of the region's first inhabitants. The circuit is ideal for contemplating natural beauty and enjoying the landscape as the trail progresses through the lakes Futalaufquen, Verde and Menéndez, the rivers Arrayanes and Menéndez, and the streams Torcido and Techado Blanco. Remarkable among the historic and cultural aspects are the remains of the first white pioneer settlements from the 19th Century. In this area visitors can observe the old roads made by horse carts and wagons, and the livestock corrals and cultivation fields. This circuit was created by PNLA with the San Juan Bosco National University of Patagonia.

TORRECILLAS GLACIER TREKKING

The trip begins by boat from Puerto Chucao on Lake Menéndez, then continues by land over a trail that includes several lookout points over the woody mountain slopes. Here visitors can see the snow-capped mountain peaks, like white islands rising from a sea of green forest. The path continues over pristine forest environments, then reaches a beautiful, emerald-like lagoon, dotted with small icebergs from the glacier. From this point the trail continues through an environment of Valdivian forest, following a mountain stream until reaching its birth: the Laguna del Antiguo, located at the foot of the Torrecillas glacier. From here visitors can appreciate the basins where snow began to accumulate and to shape the glacier's ice, during the last glaciation 24,000 years ago.

SPORTS FISHING

The Central Patagonian region is rich in a variety of fish species of high value in sports fishing. The area's lakes and rivers, with their cold, crystalline waters born in the Andes cordillera, offer excellent conditions for the reproduction and growth of salmonidae.

Fishing season lasts from November to April. Only fly- and spin-fishing with artificial bait is allowed. The richness in species includes landlocked salmon and the brown, stream, lake and rainbow trout, attracting sports fishermen from all over the world.

Century-old notro tree, path to the Alarcón outpost

KAYAKING

This excursion provides an opportunity for contact with Nature, enjoying the landscape and arriving at places only accessible by water. It's an ideal excursion for resting, and for discovering the crystalline waters of the Park's lakes and rivers. The excursion can last from two hours to several days, depending on the chosen itinerary.
This activity is ideal for summer. No previous experience is necessary; guides are available to select the best itinerary for each group.

FUTALEUFÚ HYDROELECTRIC COMPLEX

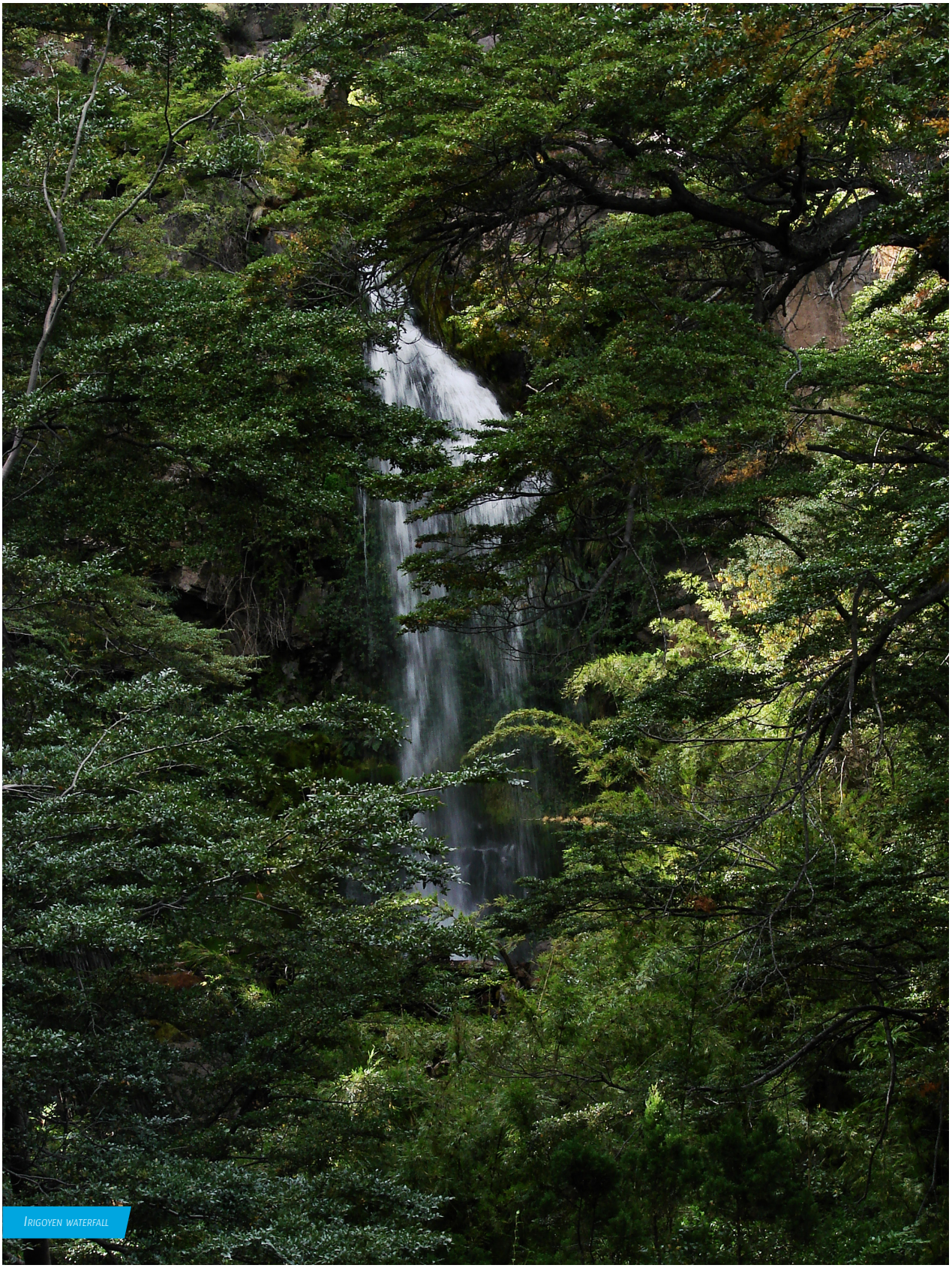
Located 18 km away from Trevelin, in the Park's southern area. The reservoir gave rise to a great number of transparent water holes, fed by water that falls in small cascades between the rocks. The dam was built in the 1970s; visitors can access it to see Amutuy Quimey (which in Mapuche means "lost beauty"), a lake formed by the San Martín Dam. The site is surrounded by crystalline waters, dense woods, recreational areas and high-quality fishing spots. The area includes an interpretative path with historic information about the construction of the dam. The complex was built to provide energy to the aluminum plant near Puerto Madryn.

BIRD WATCHING

Many different species of birds cohabit the different natural environments in the region, allowing visitors the unique experience of observing them in their native habitats.
The most remarkable species in the area is the Andean condor, the greatest flying bird in the word and a symbol of the Andes cordillera. Also found in the area is the grebe, which makes its nests on the water, out of reach of predators, tied to tree branches so that it is not swept away by the current. The beautiful kingfisher, of blue and green feathers surrounding an orange-feathered chest, is also found in the area. Also remarkable are the great grebes, one of the largest diving birds in the country, which never leave the water and avoid flying.

KRÜGGER LAKE

Located to the west of Futalaufquen lake. Krügger lake is populated by glacial sediments which give its waters a singular colouration and beauty.
Frey river basins: The lake is connected to the Frey river, along which runs a path for an easy 1.5-hour hike. At the end of the path are the Frey river basins, which contain a variety of regional fauna and flora including the torrent duck, which is very difficult to find.
Hikers can also visit the site of "the Frey shipwreck." In the 19th Century, Emilio Frey, an engineer working for the National Boundaries Commission, and his party were wrecked in the rapids; several expeditionaries died. River is named in Frey's honour.
Krügger lake is accessible by water or by a 12-hr walk.



Irigoyen waterfall

Quality management systems for tourist operations

Incorporation of tourist operators in PNLA and surrounding areas to the Argentine System of Tourism Quality.

The Argentine System of Tourism Quality (SACT, Sistema Argentino de Calidad Turística), approved in 2008, is a group of operative tools aimed at promoting a culture of quality and constant improvement in all actors that conform the value chain of the national tourism industry. SACT is composed of tools organized by levels:

- Initial System of Organization Management (SIGO, Sistema Inicial de Gestión Organizacional)
- Good Practices at Destinations Programme (BB.PP, Programa Buenas Prácticas en Destinos)
- Management Directives
- Management Excellence Programme
- IRAM SECTUR[13] Regulations
- Excellence Clubs
- National Quality Award

As mentioned earlier, there are ongoing joint efforts in the region to integrate the tourism industry. For this reason, and considering that the tourism industry is built on the totality of products and services in the value chain — not all of which are provided within PNLA — this section details programmes for quality management not only in PNLA but also in Esquel, Trevelin and Cholila.

The Tourism Quality system's initial level is comprised by the Initial System of Organization Management (ISOM) and Good Practices at Destinations (GPDP). The aim of ISOM is to create a methodology to solve operational problems, favour integration and avoid waste and inefficiency for micro, small and medium tourism operations.

The Tourism Quality-Good Practices Commitment Model is a methodology based on good management practices for physical locations and for service providers. Its focus avoids excessive technicalities, since it is intended for small and medium-sized companies and service providers (although it also involves the public sector).

In 2012, the following service providers in the PNLA area revalidated ISOM and Good Practices:

CHOLILA:

- Cerro Pintado Interpretative Centre
- Tourist Information Office
- Cerro La Momia Lodge

ESQUEL:

- Tourist Information Office
- La Hoya Mountain Activity Centre
- La Trochita Old Patagonian Express
- One travel agency
- 11 lodges and inns

TREVELIN:

- Nant and Fall Interpretative Centre
- PNLA Information Office
- Five lodges and inns

VILLA FUTALAUFQUEN:

- PNLA Tourist Information Office

In April of 2014, the Park's Superintendency began the process of adhering PNLA to the Project for Implementing Accessibility Directives in Tourist Services and Lodgings, a part of the SACT Programme head by the Tourism Quality Subsecretariat, part of the National Ministry of Tourism.

[13] *Lic.: Argentine Normalization and Certification Institute (Instituto Argentino de Normalización y Certificación) (TN).*

Rivadavia lake

5.i Policies and Programmes Related to the Presentation and Promotion of the Property

This section describes the work of the Park's Department of Communication and Environmental Education, and the programme "Tourism, Heritage and the School" currently being implemented by the Municipality of Esquel in the Park's area of influence.

Environmental Education (EE) is a response to the emerging environmental crisis. EE motivates the development and practice of communication tools to face the daily individual and social challenges that arise in this field. For these reasons, Park authorities and other bodies use various media to implement actions to guarantee a greater awareness of the importance of conservation and sustenance of the resources at Los Alerces National Park. Thus, Communication is one of the central tasks carried out by the Park.

STRUCTURE

The Park's structure for public relations and awareness is the Institutional Communications Division, which performs the following tasks:

- Formulating and implementing projects and actions related to the interpretation of Nature, and environmental education and extension
- Developing and publishing printed material and signage
- Diffusion of institutional policies, projects and goals
- Providing attention to educational establishments and other institutions
- Library service
- Public information
- Press and mass media relations, follow-ups of current coverage on current issues and protocol. This area is currently understaffed, and made possible by the enthusiasm of park rangers and contractors.

TOOLS:

- Short Radio segments, for communicating news and issuing recommendations
- Press. Contact with the press is currently sporadic and little systematized Internal and external news releases
- Blog
- Public e-mail for direct contact with tourists. This channel serves to answer questions and offer information on services, trails and activities in the Park.

ENVIRONMENTAL EDUCATION TASKS

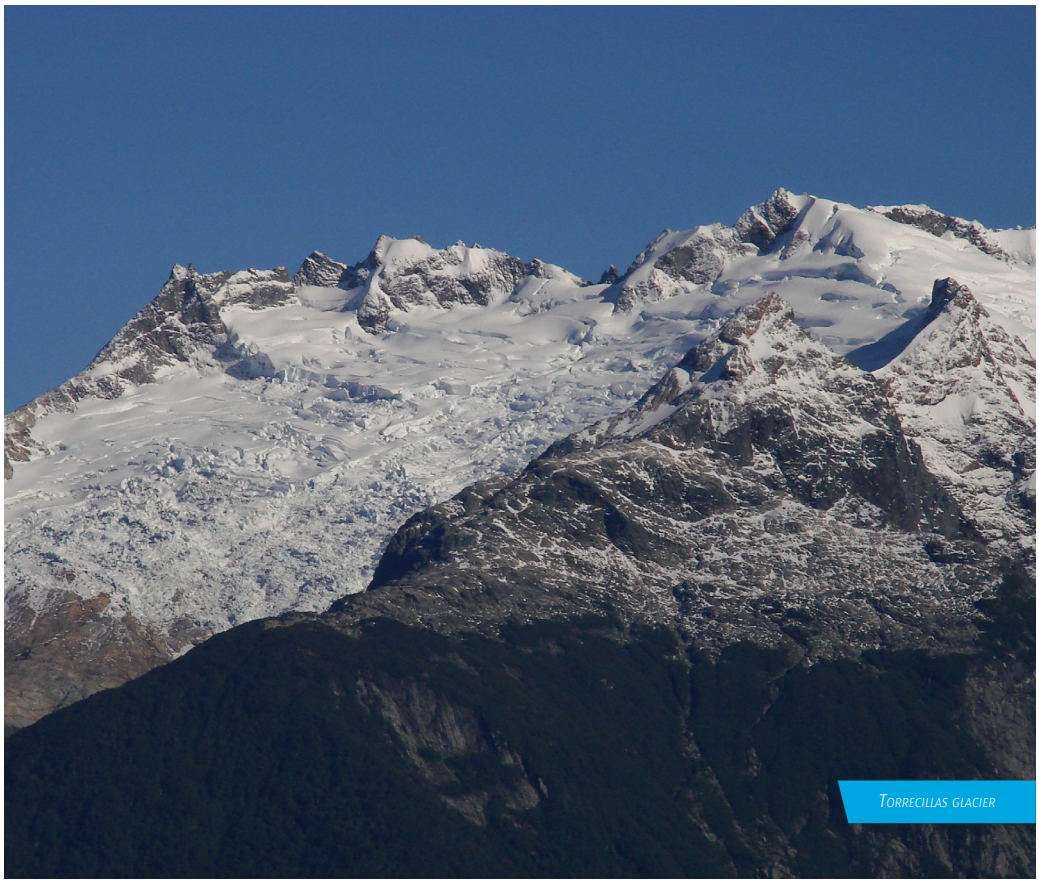
Currently the following tasks are being carried out in this field.

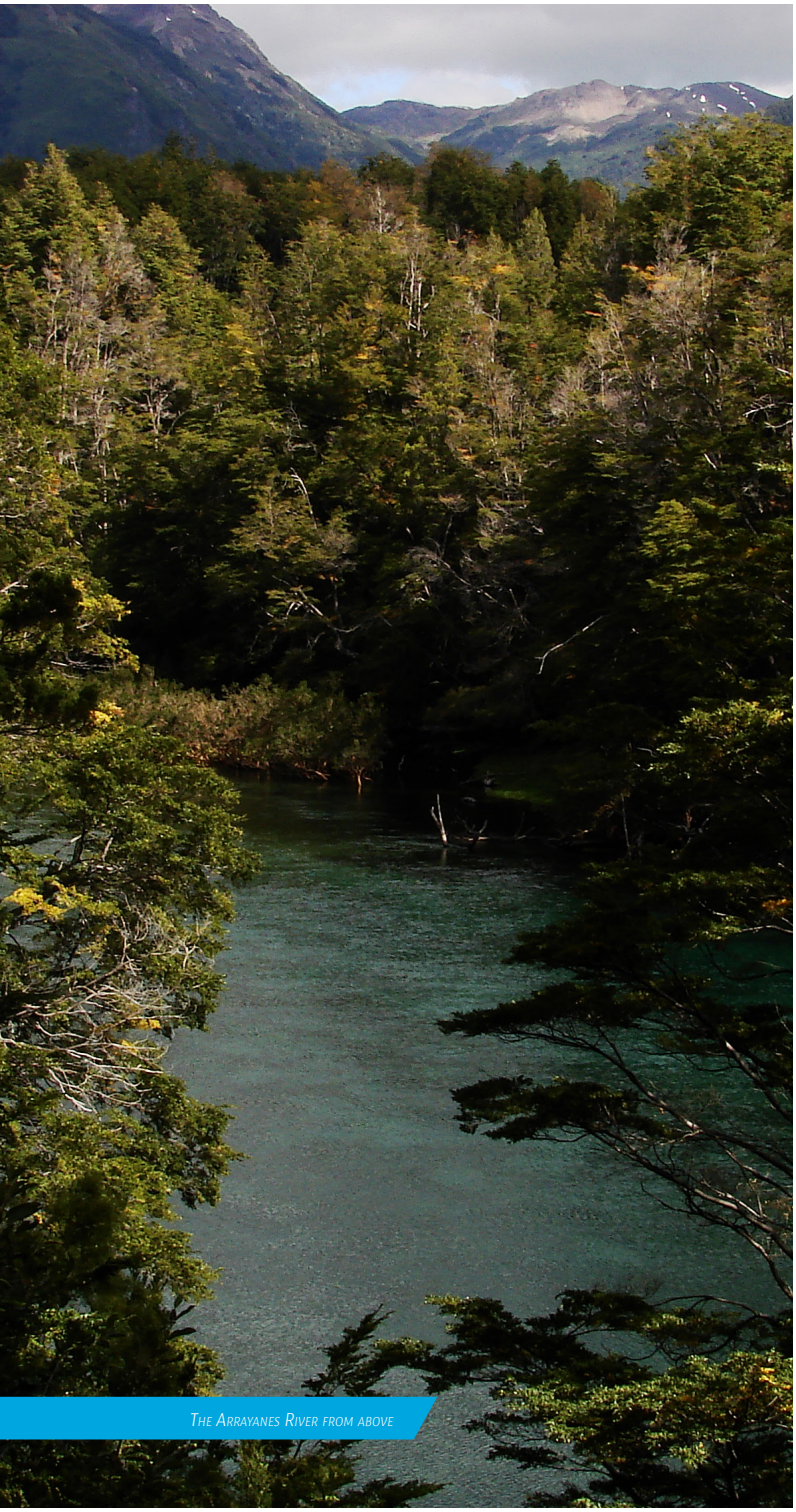
- Talks given in the Park's Information Centre for visiting schools or other institutions
- Distributing audiovisual and other educational material (leaflets, posters, digital material)

• Talks given at schools, on schools' request. Some recent visits to schools include: School No. 25 at Villa Futalaufquen (May 2015), the Cholila School (September 2014), Aldea Escolar School (several visits in September, October and November 2014)
• As part of the Forest Fire Protection Plan, the Park took part in the educational campaign "United by nature, for Nature," a joint effort by APN and the General Directorate of Forests and Parks (DGByP, Dirección General de Bosques y Parques).

The campaign involved the city of Trevelin and its surrounding areas, reaching 286 schoolchildren in the fourth grade, including 16 schools:
• School No. 96, Aldea Escolar: 8 4th-grade schoolchildren (September 2)
• Sierra Colorada: 2 4th graders plus the rest of the schoolchildren (September 3)
• Lago Rosario: 8 4th graders plus all other grades in the school (September 3)
• Experimental School No. 1: 6 4th graders plus the rest of the school (September 4)
• Los Cipreses School: 2 4th graders plus the rest of the schools (September 5)
• School No. 166: 45 schoolchildren in two divisions (September 8)
• School No. 37: 30 schoolchildren in two division (September 9)
• School No. 25 at Villa Futalaufquen: 6 4th graders plus the other grades in the school (September 18)
• School No. 57: 47 schoolchildren in two divisions (September 15)
• Bilingual School: 12 4th graders (September 15)
• Centinela School: 5 4th graders plus the rest of the school (September 16)
• Corcovado School: 34 schoolchildren in two divisions (September 16)
• Carrenleufú School: 16 4th graders (September 16)
• Río Pico School: 27 schoolchildren in two divisions (September 22)
• Atilio Viglione School: 5 4th graders plus the rest of the school (September 22)
• Río Senguer School: 33 schoolchildren in two divisions (September 23)

The campaign closed with the excursion to the Millennial Alerce Forest for the schools that won a contest (72 people between schoolchildren, teachers and coordinators).
The Park takes part in the Heritage and Schools Workshop, given by the Tourism Secretariat of Esquel.


Torrecillas glacier



The Arrayanes River from above

Tourism, Heritage and Schools (THS)

The Tourism, Heritage and Schools programme depends on the National Ministry of Tourism, and is carried out in some municipalities in accordance to a pre-approved protocol. THS is intended for schoolchildren in the last stages of primary school. Its purpose is to promote the value and protection of the natural and cultural heritage as an essential pillar of tourism, and to contribute to the recognition of existing UNESCO World Heritage Sites.
Activities with schoolchildren are held in participative workshops, based on the premise that knowledge is built by acting and reflecting as a group. After the workshops, work continues in the classroom with the teachers, to delve deeper into the subjects at hand: tourism and Argentine World Heritage.
The workshops end with an excursion, as a tourist and educational experience for the schools of outstanding work.
It is worth noting that this project receives help from the team of volunteers and technicians from APN linked to environmental education.
THS includes the Volunteers Project. This is a training project for students, technical teachers and professionals in tourism and/or education. Its focus is on the concepts of Tourism and Heritage, and on sites declared as World Heritage by UNESCO.
The Volunteers Project aims at amplifying and deepening the actions aimed at increasing tourist awareness, with the goal of building a national culture of tourism through the training of volunteers who participate actively, with commitment and solidarity.
THS was introduced in Esquel in June 2013, led by the municipal Secretariat for Tourism; activities began in School No. 210. In the first stage, it was not possible to include all of the city's primary schools, so the programme was directed at a group of selected schools. An estimated more than 200 students from different schools took part in the programme. The programme continued in 2014, and included all primary schools in the city.
It worth noting that, while THS only refers to already existing World Heritage Sites, it also covered Los Alerces National Park since it is already tentatively listed for Argentina.
The opening and closing acts of THS in 2013 and 2014 included the participation of officials from PNLA, the Municipal and Provincial Secretariats for Tourism, and the National Ministry of Tourism.
At the end of October 2014, an inter-institutional meeting was held to analyze the viability of replicating the THS programme in the framework of activities being carried out by APN and the Municipality of Trevelin. The conclusion was to perform a pilot test at School No. 25 in Villa Futalaufquen, during the third week of November. The programme, consisting of two meetings, was adapted for replication.

5.j Staffing Levels and Expertise (Professional, Technical, Maintenance)

The main responsibility of PNLA personnel is to plan, program and define conservation strategies in direct accordance with the policies and guidelines defined by the National Directorate for the Conservation of Protected Areas. This entails aspects relative to research, protection, interpretation, management, sustainable use and recreation.

Key actions include evaluating the state of conservation; identifying requirements and proposing protection measures for the preservation of the flora, fauna, and landscape; enforcing the guidelines of the Management Plan; and managing programmes related to visitor services and information/interpretation of Nature.

To efficiently fulfill their due tasks and actions, PNLA staff is organized as shown below.

Department	Staff
Temporary staff	12
Firefighters Brigade	26
Park Rangers	33 Manager:2
Works	13 Manager:1
Park Rangers	Superintendent:1 Manager:1 Sataff: 6

Table 9: Personnel at PNLA.

De los Monstruos straight, with powerful currents

Current staff numbers are satisfactory in relation to the recent measurements of management efficiency for the area.

However, and considering that the number of visitors to the Park will continue to increase and that the area's conservation strategies need to be reinforced, it will soon be necessary to increase staff by seeking additional personnel of the same technical/professional fields. Currently, there is an open call issued by APN authorities for additional staff.

6 Monitoring

6.a Key Indicators for Measuring State of Conservation

Indicator: Pristine status, integrity and absence of salmonidae in the Cisne river sub-basin

Relation to the Outstanding Universal Value	Almost all of the water systems in Cordilleran Patagonia have been impacted by the artificial introduction of exotic fish for sports fishing. Of these, the most successful have been some species of salmonidae, which have caused profound changes in water ecosystems. Salmonidae are top predators in the aquatic trophic chains, a key species that modifies the structure, composition and functioning of these ecosystems. Being pristine and intact is therefore a feature that adds outstanding universal value to the conservation of the Patagonian basins, where water environments are the central axis.
Justification	The absence of salmonidae can be used as an indicator of pristine status, integrity and health of these ecosystems.
Monitoring area	Cisne river sub-basin: Includes connected lotic and lentic environments, in the "heart" of the future World Heritage Site.
Goal	To detect the presence or absence of salmonidae, a feature of existing ichthyofauna.
Methodology	Monitoring with nets, electrofishing, fishing baskets and bait fishing.
Periodicity	Biannual/triannual
Indicator of compliance	Report.
Persons in charge	PNLA: Lic. Gabriel Bauer DRP: Dr. Leonardo Buria

Indicator: Deterioration of the forest at landscape level

Relation to the Outstanding Universal Value	Forests, specially those in the National Park itself, are largely the basis for the region's outstanding universal value, given their integrity (lack of fragmentation) and the fact that direct anthropic disturbances are almost non-existent (the few existent disturbances are associated with river areas, ideal for forest roads). Hemispheric and global climate change (Veblen et al., 2011; Villalba et al., 2012) are indirect, large-scale effects of human activity that could impact the forests. These directional changes in climate combine with the natural disturbances in the forests, and — specially in the Natural Reserve — with anthropic effects that can result in a greater predisposition to plagues and pathogens (Paritsis and Veblen, 2011) or cause deterioration in the forest.
Justification	Forests, through their dominant species, channel a great part of the energy that enters an ecosystem, passing it to the following trophic levels. Ecosystems themselves provide the principal features of habitats, which in turn are necessary for sustaining the rest of the species, and thus for biodiversity. Recently, isolated instances of deterioration were detected for some forest species; whether these are part of a natural dynamic or a consequence of human activity is yet unknown.
Monitoring area	Monitoring will be effected by taking photographic records from fixed points in the main lakes of the Parks. The location of these points will be georeferenced so they can be located in the field by GPS. As far as possible, main monitoring will be complemented by aerial photography. Photographic monitoring complements on-site surveys and actions relative to support, participation and incentive of scientific research to determine causes for forest deterioration, with a special interest in identifying whether it is caused by exotic primary pathogens.
Goal	To identify the health or deterioration problems of the forest.
Methodology	Photography and visual comparison of the same site in previous years/on-site samples of vegetation
Periodicity	Annual/Biannual
Indicator of compliance	Report
Persons in charge	PNLA: Lic. Martín Izquierdo DRP: Eng. Anahí Pérez

Indicator: Monitoring of Guaitecas cypress groves and marginal alerce forests

Relation to the Outstanding Universal Value	As already mentioned, forests, mainly those in the National Park itself, are largely the basis for the region's outstanding universal value. The alerce communities and — to a slightly lesser degree — the Guaitecas cypress communities account for a large part of that value.
Justification	Current data indicates that there are less than 10 Guaitecas cypress groves, and each of these is less than 1 ha in surface. This is a rare community in the nominated property. Field observations indicate good regeneration of marginal alerce forests, which could be expanding (like the Guaitecas cypress). Monitoring begins with surveying, characterizing and determining the state of conservation of groves, in order to create a baseline for monitoring.
Monitoring area	It is proposed that monitoring should include all Guaitecas cypress groves. Monitoring of marginal alerce forests should cover at least the groves south of the Stange river, those south of Puerto Chucao, those in Sendero Chucao and those on the shore of Rivadavia lake.
Goal	Guaitecas cypress: Identify potential conservation problems and evaluate their expansion. Alerce: Evaluate their expansion.
Methodology	Field samples, taken in fixed parcels, to record the structure, regeneration, signs of historic or actual usage, stumps (old/new), grazing or browsing, and presence of dung, paths and other signs. A methodology similar to Rovere et al. (2002) would be used.
Periodicity	Every 5 years.
Indicator of compliance	Report.
Persons in charge	PNLA: Lic. Martín Izquierdo DRP: A.E. Anahí Pérez

Cerro La Momia

Indicator: Monitoring the health of native Cupressaceae in the Millennial Alerce Forest path

Relation to the Outstanding Universal Value	See Indicator: Monitoring of Guaitecas cypress groves and marginal alerce forests in the previous table.
Justification	Native Cupressaceae are susceptible to the exotic pathogens *P. austrocedrae* and *C. cupressi.* It is strongly suspected that *P. austrocedrae* can be spread by humans who carry it on the soles of their shoes. The spreading mechanisms for *C. cupressi* are unknown, but available information suggests that it has not yet entered areas with great masses of alerce forest. Monitoring complements the foot washing areas in Puerto Chucao for cleaning and disinfecting shoes, at the site of embarkation for the lake excursion to the Millennial Alerce Forest.
Monitoring area	Millennial Alerce Forest path.
Goal	Early identification of the appearance of the disease in the forests along the path.
Methodology	Visual inspection of trees near the path. If symptoms are detected, evaluate the state of the phloem in the neck of the tree, and confirm by ELISA test.
Periodicity	Annual.
Indicator of compliance	Annual report.
Persons in charge	Lic. Martín Izquierdo DRP: A.E. Anahí Pérez

Indicator: Monitoring huemul deer

Relation to the Outstanding Universal Value	This species is a Natural Monument for the Nation and the provinces of Santa Cruz, Chubut and Río Negro. The species is endangered worldwide (UICN), and is a vertebrate species of special value for Los Alerces and other national parks where it is found.It is the greatest of herbivores native to these forests on the continent, a representative and emblematic species of the region.
Justification	This species continues to suffer a marked decrease in numbers and distribution area.
Monitoring area	Cerro Riscoso Critical Area. This subpopulation is monitored systematically since 2006. The population is stable but marginal (eastern boundary of its current distribution in the National Park), hence highly susceptible to multiple sources of stress. Changes in species abundance would likely occur in this area.
Goal	To detect changes in species abundance.
Methodology	Six transects, perpendicular to contour lines where traces of ungulates and carnivores are found.
Periodicity	Annual. At a minimum, in spring; generally in spring and autumn.
Indicator of compliance	Annual report.
Persons in charge	PNLA: Park Ranger Fernando Corvalán DRP: Lic. Hernán Pastore

Indicator: Isla Grande island frog

Relation to the Outstanding Universal Value	Strict endemism of Isla Grande.
Justification	The extinction of the local population would mean the extinction of this species worldwide.
Monitoring area	Isla Grande in Lake Menéndez.
Goal	To detect changes in species abundance, or other conservation problems.
Methodology	To be defined.
Periodicity	Annually, during the reproductive season.
Indicator of compliance	Report.
Persons in charge	PNLA: Lic. Gabriel Bauer DRP: Lic. Hernán Pastore

Indicator: Basin water quality

Relation to the Outstanding Universal Value	Water quality is considered a key parameter of a basin's health status, where basin is the part of a territory in which all water drains to a common area. Changes in water quality parameters are indicators of disturbance in a sector of the basin, and hence a good indicator of the basin's health status.
Justification	Measuring water quality parameters can be highly useful to measure the pristine status of large surfaces. Measurements' integrating quality helps to prioritize time and resources.
Monitoring area	Carrileufu basin (collector of the Futaleufú river high basin, and protected area's external sector). Futaleufú river (below the dam).
Goal	Early detection of possible problems in the conservation of water environments.
Methodology	Measuring biological and physical-chemical parameters at different stations: pH, dissolved oxygen, temperature, transparency, total nitrogen, reactive soluble phosphorus, biochemical demand of oxygen, and electrical conductivity. Chlorophyll a, fecal coliforms, total coliforms, zooplankton, phytoplankton and benthos.
Periodicity	At a minimum, in spring; generally in spring and autumn.
Indicator of compliance	Report.
Persons in charge	PNLA: Gabriel Bauer DRP: Leonardo Buria

Indicator: Basins free from Didymosphenia geminata algae

Relation to the Outstanding Universal Value	Since 2010, the Futaleufú river basin is under pressure of colonization by the exotic invading algae Didymosphenia geminata, commonly known as "rock snot." Its invasive character and capacity to produce changes in the ecosystem are a grave threat to the conservation of the continental water environments. A great part of the Futaleufú river in APN jurisdiction is free from this invasion, and there are several protection alternatives for this area.
Justification	Keeping sub-basins free from Didymo is of great importance to the conservation of water environments, since the possibilities for eradicating the algae or mitigating its effects are currently unknown.
Monitoring area	Sub-basins of the Stange river, Coronado stream, Canelo river, and Menéndez river.
Goal	Monitor the success of the Didymo containment plan.
Methodology	Sampling of epyphitic and epylitic algae. Sampling of phytoplankton. Analysis by microscope. Molecular DNA analysis (desirable).
Periodicity	At a minimum, in spring; generally in spring and autumn.
Indicator of compliance	Report
Persons in charge	PNLA: Gabriel Bauer DRP: Leonardo Buria

6.b Administrative Arrangements for Monitoring Property

Monitoring is performed by PNLA's Conservation Department, in joint efforts with APN's Patagonia Regional Delegation and other institutions linked ad hoc for the nec- essary actions.

6.c Results of Previous Reporting Exercises

In its current structure for area conservation, the Biosphere Reserve Report (MAB/UNESCO) is scheduled for 2017, in accordance with current international regulations. Currently available are the Biosphere Reserve Strategic Plan (2007) and the reports by Ezcurra (2013) and Orellana (2013). These reports are respectively entitled: "Final report on up- dating the management plans of the national parks Lanín, Nahuel Huapi, Lago Puelo
and Los Alerces: Flora;" and "Final Report: Vegetation communities and land ecosys- tems in Los Alerces National Park."

7 Documentation

7.a Photographs and Audiovisual Image Inventory and Authorization Form

Id. No	*Format (slide/ print/ video)*	*Caption*	*Date of Photo (mo/yr)*
171	File (jpg)	Alerce forest	01/2015
173	File (jpg)	Torrecillas Glacier	01/2012
175	File (jpg)	Lake environment with temperate alerce forest	01/2015
007	File (jpg)	Laguna del Antiguo, behind Cerro Solo	03/2011
006	File (jpg)	Laguna del Antiguo, Torrecillas Glacier	03/2011
011	File (jpg)	Antiguo or Glaciar stream	03/2011
176	File (jpg)	Alerce forest	01/2015
129	File (jpg)	Millennial alerces, Cisne River	03/2011
177	File (jpg)	Common kingfisher	01/2015
178	File (jpg)	Female huemul with her calf	05/2008
179	File (jpg)		
013	File (jpg)	Forest-dwelling orange-bellied lizard	03/2011
014	File (jpg)	Stag beetle	03/2011
001	File (jpg)	Young bicoloured hawk (Accipiter bicolor)	03/2011
028	File (jpg)	Tronador Glacier, Cerro Torrecillas. Punta Larsen, Puerto Antiguo, southwestern arm of Menéndez Lake	03/2011
026	File (jpg)	Alerce forests and quiet waters on Menéndez Lake	03/2011
061	File (jpg)	Alerce	03/2011
055	File (jpg)	Fungi and lichens	03/2011
004	File (jpg)	Walkway on Arroyo Viejo, path to Torrecillas Glacier	03/2011
105	File (jpg)	Footpath entering a labyrinth of huge fallen tree trunks	03/2011
039	File (jpg)	Forests on Rivadavia River	03/2011
179	File (jpg)	Chilean myrtles on the beach	03/2011
180	File (jpg)	Cerro Solo	03/2011
181	File (jpg)	Chilco	03/2011
106	File (jpg)	Species of the Valdivian rainforest	03/2011
030	File (jpg)	Ducks on Verde Lake, next to the mouth of the Rivadavia River	03/2011
109	File (jpg)	Variety of ferns and fungi in the Millennial Alerce Forest	03/2011
112	File (jpg)	Fuchsia magellanica	03/2011
115	File (jpg)	Millennial alerce	03/2011
101	File (jpg)	Alerce forests, northern arm of Menéndez Lake	03/2011
123	File (jpg)	Alerce forest	03/2011
130	File (jpg)	Alerce El Abuelo, The Grandfather	03/2011
064	File (jpg)	Mixed forest, southern arm of Futalaufquen Lake	03/2011
104	File (jpg)	Laurel tree	03/2011
057	File (jpg)	Coihue forest, Rivadavia River	03/2011
058	File (jpg)	Clear waters, Rivadavia River	03/2011
003	File (jpg)	Desfontainia flower	03/2011
108	File (jpg)	Fallen tree trunks become filled with lichens and fungi, Millennial Alerce Forest	03/2011
118	File (jpg)	Pahueldín, enredadera de la selva valdiviana.	03/2011
023	File (jpg)	Near the end of the southwestern arm of Menéndez Lake	03/2011
085	File (jpg)	Rocky outcrops at Cerro Químico	03/2011

Photographer / Director of the video	*Copyright owner(if different than photographer / director of video)*	*Contact details of copyright owner (Name, address, tel/fax, and email)**	*Non exclusive cession of*
Ricardo Villalba	Ricardo Villalba	Ricardo Villalba – Email: Ricardo@mandoza-conicet.gov.ar	YES
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Federico Soria	Federico Soria	Federico Soria – Email: fsoria@apn.gov.ar	YES
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Unidentified	Unidentified	Unidentified	YES
Federico Soria	Federico Soria	Federico Soria – Email: fsoria@apn.gov.ar	YES
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Id. No	Format (slide/ print/ video)	Caption	Date of Photo (mo/yr)
073	File (jpg)	Sauco del diablo flower	03/2011
070	File (jpg)	Shoreside Chilean myrtles, Puerto Nicodemo, Krügger Lake	03/2011
041	File (jpg)	Nevada temprana sobre el bosque de lengas	03/2011
036	File (jpg)	Erosive action on non-consolidated sediment, Arrayanes River	03/2011
049	File (jpg)	Jara River	03/2011
037	File (jpg)	Arrayanes River	03/2011
053	File (jpg)	Underwater plants in shallow water, Rivadavia Lake	03/2011
069	File (jpg)	Stange Delta on Krügger Lake	03/2011
063	File (jpg)	Mt. Gendarme del Perro, northern arm of Futalaufquen Lake	03/2011
087	File (jpg)	Water erosion on hills south of Playa Blanca	03/2011
143	File (jpg)	Forest fire of 2009	03/2011
086	File (jpg)	Glacial striation on the rocks, shores of the northern arm of Futalaufquen Lake	03/2011
182	File (jpg)	Still waters and dense temperate forests	12/2007
048	File (jpg)	Curious rock formations, Rivadavia Lake	03/2011
010	File (jpg)	Torrecillas Glacier	03/2011
121	File (jpg)	Millennial Alerce Path	03/2011
072	File (jpg)	Bamboo grove in Krügger Area	03/2011
152	File (jpg)	Rivadavia River	03/2011
154	File (jpg)	Mouth of the Rivadavia River on Verde Lake	03/2011
183	File (jpg)	Chilean myrtles on Cisne Lake	03/2011
150	File (jpg)	Chilean myrtle forests, Rivadavia Chico River	03/2011
139	File (jpg)	Mayten groves on the floodplain of Desaguadero River	03/2011
015	File (jpg)	Southwestern arm of Menéndez Lake	03/2011
005	File (jpg)	Alerce forests on the path to Torrecillas Glacier, with Menéndez Lake in background	03/2011
025	File (jpg)	Alerce forests and quiet waters near the end of Menéndez Lake	03/2011
021	File (jpg)	Alerces River and Cerro Bravo	03/2011
027	File (jpg)	Southwestern arm of Menéndez Lake	03/2011
009	File (jpg)	Front of Torrecillas Glacier, ending on Laguna del Antiguo	03/2011
008	File (jpg)	Laguna del Antiguo with border in risk of collapse	03/2011
091	File (jpg)	Menéndez River	03/2011
082	File (jpg)	Pirámides chain	03/2011
116	File (jpg)	Cisnes Lake, Cerro Chato	03/2011
113	File (jpg)	Twisted branches of millennial alerce trees	03/2011
056	File (jpg)	Quarry on the mouth of the Colehual River	03/2011
124	File (jpg)	Small waterfalls on Cisnes River	03/2011
033	File (jpg)	Sauco del diablo flower	03/2011
052	File (jpg)	Millennial mayten tree next to the former Jara outpost	03/2011
032	File (jpg)	Verde Lake	03/2011
161	File (jpg)	Colehual River	03/2011
054	File (jpg)	Rivadavia River and drain of Rivadavia Lake	03/2011
018	File (jpg)	El cono de escombros dejó sepultado parte del bosque	03/2011
034	File (jpg)	Arrayanes River	03/2011
062	File (jpg)	Cormorants	03/2011
110	File (jpg)	Beach on Cisnes Lake, intangible area	03/2011
131	File (jpg)	Alerce tree known as Meli	03/2011

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Id. No	Format (slide/ print/ video)	Caption	Date of Photo (mo/yr)
094	File (jpg)	Peak on the south of Torrecillas Chain, also called Amigos del Parque ("Friends of the Park")	03/2011
128	File (jpg)	Cisnes River	03/2011
160	File (jpg)	Toward Froilán Lake	03/2011
111	File (jpg)	Cisnes Lake	03/2011
084	File (jpg)	Arroyo del Medio, northern arm of Futalaufquen Lake	03/2011
079	File (jpg)	Playa Blanca, Futalafquen Lake	03/2011
159	File (jpg)	Century-old Chilean firetree, path to Alarcón outpost	03/2011
168	File (jpg)	Hirigoyen Waterfall	04/2011
166	File (jpg)	View from the slopes of Cerro Riscoso toward Rivadavia Lake	04/2011
097	File (jpg)	Tronador Glacier, Torrecillas mountain chain	03/2011
184	File (jpg)	Fuchsia magellanica	01/2015
077	File (jpg)	Estrecho de los monstruos ("Strait of the monsters") with fast-flowing waters	03/2011
068	File (jpg)	Stange River	03/2011
165	File (jpg)	View from the slopes of Cerro Riscoso toward Cerro La Momia	03/2011
185	File (jpg)	Arrayanes River	04/2011

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Federico Soria	Federico Soria	Federico Soria – Email: fsoria@apn.gov.ar	YES

7.b Texts Relating to Protective Designation,

Copies of Property Management Plans or Documented Management Systems and Extracts of Other Plans Relevant to the Property

See Appendix 3: Law No. 19,292, Appendix 4: Approval Document and Contents of the Management Plan for Los Alerces National Park and 5.d Existing Plans Related to Municipality and Region in Which the Proposed Property is Located (e.g., Regional or Local Plan, Conservation Plan, Tourism Development Plan).

7.c Form and Date of Most Recent Records or Inventory of Property

PNLA has records and baselines divided by subject. The most relevant and updated information is available on the following Web pages:

- National Parks Administration Biodiversity Information System: http://www.sib.gov.ar
- National System of Biological Data: http: //www.datosbiologicos.mincyt.gob.ar

The most recent documents on which this information is based are:

- Ezcurra and Puntieri, 2013. "Informe Final: Flora vascular. Líneas de base elaboradas a través del Préstamo BID 1648OC/AR - Actualización de los Planes de Manejo de los Parques Nacionales Lanín, Nahuel Huapi, Lago Puelo y Los Alerces." 141 pages.
- Orellana, 2013. "Informe Final: Comunidades vegetales y ecosistemas terrestres del Parque Nacional Los Alerces. Líneas de base elaboradas a través del Préstamo BID 1648OC/AR - Actualización de los Planes de Manejo de los Parques Nacionales Lago Puelo y Los Alerces." UNPSJB-CIEFAP, Esquel.

7.d Address Where Inventory, Records and Archives Are Held

National Parks Administration: Santa Fe Ave 690 (1059), City of Buenos Aires, Argentina.
National Parks Administration, Patagonia Regional Delegation: Vicealmirante O'Connor 1188 (8400), San Carlos de Bariloche, Río Negro Province.
Superintendency of Los Alerces National Park: (9201) Villa Futalaufquen, Chubut Province.

a) For Main Text

7.e Bibliography

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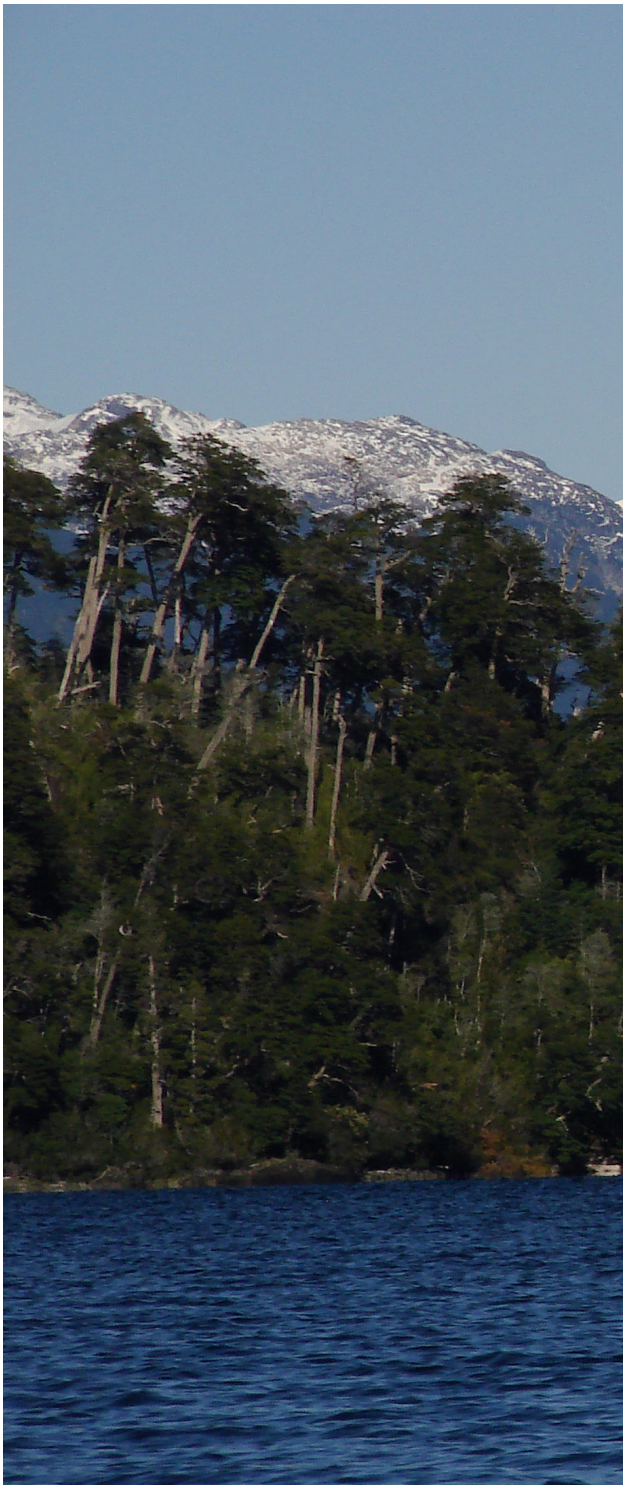

Cerro Bravo, Menéndez lake

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9 Signature on Behalf of the State Party

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