



**PROJECT TITLE: Strengthening and development of instruments for the management, prevention and control of beaver (*Castor canadensis*), an invasive alien species in the Chilean Patagonia**

**PROJECT SYMBOL: GCP/CHI/0XX/GFF**

**Country: Chile**

**Financing partner: Global Environment Facility (GEF)**

**FAO Project ID: 625332**

**GEF Project ID: 5506**

**Executing partner: Ministry of Environment (MMA), National Forest Corporation (CONAF), Wildlife Conservation Society-Chile (WCS), Agriculture and Livestock Service (SAG)**

**Estimated starting date: 1 January 2016**

**Estimated end date: 31 December 2018**

**Contribution to  
FAO's strategic  
framework**

**a. Strategic objective /Organizational outcome:**

Strategic objective 2 (SO 2). Increase sustainable supply of goods and services for agriculture, livestock, forestry and fishing.

**b. Regional outcome /Priority area:** OE2, Outcome 201, output 20102 – RI 3 Climate change, disaster risk management and sustainable use of natural resources

**c. Country Programme Framework Outcome:** Pillar 2: Governance of Natural Resources, forestry, farming, livestock and fishing systems under climate change scenarios. Outcome 3: Protection of biodiversity, conservation of natural and genetic resources for food security.

**GEF focal area: Biodiversity**

**GEF strategic objective: BD2, Outcome 2.3 Improved management frameworks to prevent, control and manage invasive alien species**

**Environmental impact assessment category : LOW**

**Financing Plan: GEF allocation:**

Co-financing:

MMA

CONAF

SAG

WCS<sup>1</sup>

Private funds

FAO

Subtotal co-financing:

USD 2,153,882

USD1,549,800

USD1,790,200

USD1,166,370

USD 960,447

USD 18,125

USD 220,000

USD5,704,942

<sup>1</sup>Exchange rate UN, April 2015, CLP627

**Total budget:**

**USD7,858,824**

## **EXECUTIVE SUMMARY**

The North American beaver (*Castor canadensis*) was intentionally introduced to Isla Grande de Tierra del Fuego in 1946. The beaver activity outside its natural area of distribution does not only affect the ecosystem by cutting trees, but also by the disruption of the watercourses and the hydrological and chemical cycle in watersheds affected. It has been estimated that about half of riparian forests of Tierra del Fuego have already been affected, as well as important areas of peatlands and their combined value as biodiversity and capacity for climate change mitigation. It has been estimated that the number of beavers in the Tierra del Fuego archipelago could range from 70,000 to 110,000 individuals (2006). The evolution from 2006 to the present date is unknown. At subcontinental level, the animal represents a threat, with a potential to spread to the province of Neuquén (Argentina) and the region of Maule (Chile).

The impact of beavers includes the destruction of trees by girdling and flooding forests of *Nothofagus* changing the nutrient dynamics of the forest. The beaver has generated a decrease in the biomass and volume of forests, especially forests classified as protection forests to be associated with watercourses, an impact hard to recover naturally. The beaver also causes a serious impact on the ecosystem services of peatlands which play a significant role in regulating basins, supporting biodiversity and its global contribution to carbon sequestration.

Since 2003, the Government of Chile has invested in activities to control and eradicate the beaver. In 2005, the governments of Chile and Argentina began a binational process to address the threat of beaver and implement complementary actions. In September 2008, the countries signed a *Binational Agreement for the Restoration of the Southern Ecosystems Affected by the Beaver*. This agreement provides a framework for cooperation between Chile and Argentina. Researchers of both countries put forward a binational *Strategic Plan for the Eradication of the Beaver Project in Southern Patagonia* (EECP).

The government of Chile has long recognized the threat of invasive alien species (IAS) to national development but, at present, is focused on the protective sanitary regulation of export-oriented economic sectors such as agriculture, forestry, livestock and aquaculture. This system does not cover all IAS that could threaten biodiversity or ecosystems in the country and neither incorporates systematic control programmes already implemented in the country, like the beaver, nor provide good management and control examples. Likewise, the Strategic Plan for the Eradication of the Beaver Project in Southern Patagonia (EECP), requires support to establish mechanisms and roles that, without undermining the competences of national institutions, allow them to coordinate at national and binational level. Such mechanisms and roles must contribute consistently to capacity building at sub-national and local levels.

To face this situation, the MMA, together with CONAF and SAG, requested FAO to support access to the GEF to develop a project with the **global environmental objective** of improving sub-national institutional frameworks to effectively control, prevent and manage IAS in highly valuable ecosystems for biodiversity in the Region of Magallanes. Likewise, the **objective** of the project is to incorporate biodiversity conservation into the management of productive landscapes, through the development of skills that allow for adequate risk management of biological invasions.

To achieve its objectives, the project has two technical components: 1. Management and governance framework, information, monitoring, early warning, participation and communication in the Region of Magallanes, and 2. Demonstration activities of control, management and restoration in pilot areas. The expected outcomes are:

**Outcome 1.1.** Management and governance frameworks to ensure effective management and control of the invasion in the Magallanes Archipelago and the Brunswick Peninsula.

**Target:** a) 6/13 points on the GEF tracking tool (section VI on IAS, questions 1,2,3); b) Beaver control and eradication mechanism for the Region of Magallanes, designed and validated with the participation of all stakeholders<sup>2</sup>; c) 13,229,700 ha (Region of Magallanes excluding the Chilean Antarctica) vulnerable to beaver invasion, under effective management and control of beaver invasion.

**Outcome 1.2.** Decision makers have updated, systematized and available information about beaver management in Magallanes, including data on operational zoning, spread, monitoring, early detection, recovery-restoration and research.

**Target:** a) 13/16 points on the GEF tracking tool (section VI on IAS, questions 4,5,6); b) Coordinated Information, Monitoring and Early Warning System (CMWS), already designed and under implementation.

**Outcome 1.3.** Regional institutions and civil society recognize the importance of beaver eradication practices and restoration in the Region of Magallanes, including the recovery of riparian forests with endemic species.

**Target:** a) 75% of MMA, SAG and CONAF staff recognize the importance of the eradication of invasive species to biodiversity and productive areas of the Region; b) Staff of MMA, SAG and CONAF assigned to control, management and eradication of beaver, implement best practices; c) 3,000 members of civil society improved their knowledge and attitude on the impact of beaver as an invasive species in agricultural systems and vulnerable ecosystems.

**Outcome 2.1.** Beaver invasion is under effective control in selected areas of native forest and peatlands ecosystem in the Region of Magallanes and in the recovery process of riparian forests with endemic species.<sup>3</sup>

**Target:** a) At least 68,543 ha/574km free of channels free of beaver and under basic restoration (i. watercourses freed from beavers recovered to similar conditions as those watercourses not affected by beavers; ii. organic matter in sediments diminishes in the basins freed from beavers); b) 1,499,100 ha/13,660 km under proven early detection of beaver invasion.

**Outcome 2.2.** Beaver invasion is under effective control in multifunctional private property in the Region of Magallanes.

**Target:** a) 45,243 ha/450 km of channels in multifunctional private property free of beaver and under restoration; b) 1,000 ha of forests in process of recovery (recovery of lenga trees *Nothofagus pumilio* and Antarctic beeches *Nothofagus Antarctica* in progress in areas affected).

**Outcome 3.1.** Project implementation based on a results-based management approach and application of project findings and lessons learned in future operations facilitated. **Target:** Project outcomes achieved and demonstrating sustainability

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<sup>2</sup> The plan includes budget and funding sources, regulatory aspects, governance mechanisms and procedural protocols. Led by the Ministry of the Environment, CONAF, SAG, Regional Government with the participation of the WCS and civil society. The plan is designed under the Strategic Plan of Beaver Eradication Project in Southern Patagonia (EECP).

<sup>3</sup> Indicators of biodiversity recovery in terrestrial environments are applied to periods longer than those of the project (10-20 years).

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## GLOSSARY OF NOMENCLATURES AND ACRONYMS<sup>4</sup>

AHTEG	Ad Hoc Technical Expert Group on Risk Assessment and Risk Management
AIHTS	Agreement on International Humane Trapping Standards
AWP/B	Annual Work Plan/Budget
CDB	Convention on Biological Diversity - Convención sobre Diversidad Biológica de Naciones Unidas
CLP	Chilean peso (Acronym used in currency markets)
COCEI	Operating Committee for the Control of Invasive Species - <i>Comité Operativo para el Control de Especies Invasoras</i> -
CONAF	National Forestry Corporation - <i>Corporación Nacional Forestal</i>
CMWS	Coordinated Information, Monitoring and Early Warning System
DIPROREN	Renewable Natural Resources Protection Division - <i>División de Protección de los Recursos Naturales Renovables del SAG</i>
EWS	Early Warning System
EECP	Strategic Plan for the Eradication of the Beaver Project in Southern Patagonia - <i>Plan estratégico del proyecto de erradicación del castor en el sur de Patagonia</i>
FNDR	National Fund for Regional Development - <i>Fondo Nacional para Desarrollo Regional</i>
FONDEMA	Magallanes Development Fund - <i>Fondo de Desarrollo de Magallanes</i>
I3N	Invasive Information Network part of IABIN (Inter-American Biodiversity Information Network) of the Organization of American States (OAS)
IALG-IAS	Inter-Agency Liaison Group on Invasive Alien Species
IAS	Invasive Alien Species
ISSG	Invasive Species Specialist Group of the Species Survival Commission (SSC) of the World Conservation Union (IUCN)
MMA	Ministry of Environment of Chile
msnm	metres above sea level
NBSAP	National Biodiversity Strategy and Action Plan
PACB	Binational Action and Contingency Plan for the invasion of the North American beaver in the continental sector of Southern Patagonia - <i>Plan de acción y contingencia binacional para la erradicación del castor americano en el sector continental de la Patagonia Austral</i>

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<sup>4</sup> Some acronyms reflect the Spanish initials, to allow better track for project stakeholders and readers.

PEEI	<i>Integrated National Programme for the Control of Invasive Species - Programa Nacional Integrado para el Control de Especies Invasoras</i>
PIR	Project Implementation Review
PIF	Project Identification Form
PPR	Project Progress Report
PTF	Project Task Force
SAG	Chile's Livestock and Agricultural Service - <i>Servicio Agrícola y Ganadero</i>
SBAP	Service of Biodiversity and Protected Areas
SEREMI	Regional Ministerial Secretariat - <i>Secretaría Regional Ministerial</i>
SNASP	National System of Wild Protected Areas - <i>Sistema Nacional de Áreas Silvestres Protegidas</i>
SNASPE	National System of State Wild Protected Areas - <i>Sistema Nacional de Áreas Silvestres Protegidas del Estado</i>
PMU	Project Management Unit
WCS	Wildlife Conservation Society

## SECTION 1 – RELEVANCE (strategic adjustment and outcomes-oriented)

### 1.1. GENERAL CONTEXT

#### *a. Context of IAS in Chile*

Chile has a surface of 756,000 km<sup>2</sup> within wide latitudinal and altitudinal ranges between natural barriers that isolate it from the rest of the landmass of South America. This results in a great biological diversity and high levels of endemism. The most influential classifications in the world of conservation (Myers et. al. 2000, WWF 2002, Mittermeier et. al. 2005), identify 26 ecological regions in Chile (11 terrestrial, 8 aquatic and 7 marine regions), representing a wide range of climatic conditions: desert, tropical zones, Mediterranean climate areas; oceanic, continental and polar influence areas. These regions provide habitat for 109 animal species and 5,125 known endemic plant species.

This rich biodiversity is threatened by the elimination, fragmentation and degradation of habitat and environmental services provided by ecosystems. Some of the threats are related to unsustainable production practices stemming from the agricultural, forestry and mining sector. Additionally, there is increasing<sup>5</sup> evidence of invasive alien species (IAS) as one of the major factors of change and threat to Chilean biodiversity and ecosystems.

IAS have been introduced intentionally and unintentionally. For example, Monterey pine (*Pinus radiata*) and the eucalyptus (*Eucalyptus globulus* and others) were introduced intentionally as forest plantations; while others, like maqui (*Aristotelia chilensis*), blackberry (*Rubus ulmifolius*) or murta (*Ugni molinae*), wild species from the continent that were introduced to Juan Fernandez Islands as fruit varieties. Mammals as goat (*Capra hircus*) or rabbit (*Oryctolagus cuniculus*), were introduced as pets or for agricultural purposes. Unintentionally introduced species, mainly for transport and tourism, include rats (*Rattus rattus*, *R. norvegicus*) and mice (*Mus musculus*).

Special attention deserves the North American beaver (*Castor canadensis*). The beaver is a semiaquatic animal that lives in family colonies in burrows located in dams or coastal refuges of rivers and lakes, from sea level to 650 meters above sea level (m.a.s.l.). This boreal rodent was introduced in the Argentine area of Isla Grande de Tierra del Fuego<sup>6</sup> (Fagnano Lake) in 1946 (Zalba 2014, pers. comm.). Since then, it has spread throughout the Chilean portion of the Island and Navarino, Dawson, New Lenox, Picton and Hoste islands and many of the smaller islands to the south of the Strait of Magellan. In the early 90s, the beaver crossed the Strait of Magellan to reach the Brunswick Peninsula and there are recent reports from other parts of continental Magallanes<sup>7</sup> (Soto 2015, pers. comm.), mainly in the Ultima Esperanza Province, where the Torres del Paine National Park is located.

Although the effects of IAS can be perceived in many of Chile's ecosystems, they are of special concern on islands. Chile recognizes that IAS are a serious threat, especially for insular ecosystems such as Isla Grande de Tierra del Fuego in Patagonia<sup>8</sup>. The Isla Grande de Tierra del Fuego and the rest of the archipelago off the southernmost tip of the South American mainland show the serious impact of beaver invasion. In the absence of its original natural predators (wolves, bears, lynx), it has been extended to

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<sup>5</sup> National Biodiversity Strategy and National Action Plan 2004-2015

<sup>6</sup> **Tierra del Fuego** (Spanish for "Land of Fire") is an archipelago off the southernmost tip of the South American mainland, across the Strait of Magellan. The archipelago consists of the main island, Isla Grande de Tierra del Fuego, with an area of 48,100 km<sup>2</sup> (18,572 sq mi), and a group of many islands, including Cape Horn. Tierra del Fuego is divided between Chile and Argentina, with the latter controlling the eastern half of the main island and the former, the western half plus the islands south of Beagle Channel. The southernmost extent of the archipelago is at about latitude 55 S.

<sup>7</sup> In Chile, the Isla Grande de Tierra del Fuego belongs to the Magellan Region (political administration), which has four provinces: Ultima Esperanza, Magallanes, Tierra del Fuego (the Chilean area of the Tierra del Fuego Archipelago) and the Chilean Antarctic province.

<sup>8</sup> **Patagonia** is a geographical region located in the southernmost part of America, comprising areas of southern Argentina and Chile. Politically, the region is divided into two: the Argentine Patagonia to the east, and the Chilean Patagonia to the west. The Patagonia covers an area of 1,060,631 km<sup>2</sup>.

territories and other islands of Tierra del Fuego archipelago and the Brunswick Peninsula, and to the continent.

***b. Current situation and threats to biodiversity and ecosystems of global significance. Main causes.***

The beaver invasion of territories in the Region of Magallanes has caused extensive damage to local ecosystems, glaringly greater than the damage caused by the species to its natural habitat<sup>9</sup>. The damage to the local ecosystem is divided into three macro zones, namely: 1) Tierra del Fuego and Navarino islands; 2) the rest of the archipelago and 3) continental Magallanes (high risk of invasion, although by some accounts from CONAF, there is already presence of the beaver up to Balmaceda Lagoon, 25 km South of Puerto Natales, in the Ultima Esperanza Province).

The scale of the problem is best defined in terms of length of watercourses affected. It is calculated that there are over 27,000 km of watercourses affected, namely rivers and streams from first to fourth order, excluding lakes, the Brunswick Peninsula and small islands. Various estimates have been made about density (0.1 to 8.5 colonies per kilometre of river) and the spread rate (between 2 and 10 kilometres a year). Two years old individuals are the most widely dispersed, females reach farther away and most animals prefer to go downstream. Studies covering binational population (Chile and Argentina) estimate about 110,000 individuals just in the Isla Grande de Tierra del Fuego.

The impact of the beaver in southern Patagonia includes the destruction of trees by girdling, flooding in lenga beech forests (*Nothofagus pumilio*)<sup>10</sup> and changing the nutrient dynamics of the forest<sup>11</sup>. The lenga beech is the most affected tree species in Tierra del Fuego. The beaver colonies extend into low slope first and second order waterways lined with lenga beech, although other endemic species of the Magellan subpolar forests ecoregion, such as coigüe of Magallanes (*Nothofagus betuloides*) or the ñirre (*Nothofagus antarctica*), are also threatened by the spread of beaver.

The gap in the evolutionary history of the beaver in the subantarctic ecosystem (and other South American ecosystems) imprints an essential feature to the invasion, which is its great impact on trees that have not developed the ability to regrow after pruning, different from boreal riparian species such as willow, poplar, alder or other. Therefore, the beaver has caused a decrease in the biomass and volume of forests, especially those classified as protection forests to be associated with watercourses.<sup>12</sup> This impact is difficult to recover naturally.

The activity of the beaver does not only affect the ecosystem by cutting trees, but also disrupting the watercourse and hydrologic and chemical cycles in affected basins. Beavers are considered 'ecosystem engineers' because their dam-building activities change the hydrology and sedimentary flow and alters the chemistry of water basins. It is estimated<sup>13</sup> that about half of riparian forests of Tierra del Fuego have already been affected, as well as large areas of peatlands and their combined values of biodiversity and climate change mitigation. It has been written (with some admiration) about the ecosystem engineering ability of the beaver (Wright et. Al. 2002), which is true in its natural environment, but

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<sup>9</sup> Christopher B. Anderson · Amy D. Rosemond, "Ecosystem engineering by invasive exotic beavers reduces in-stream diversity and enhances ecosystem function in Cape Horn, Chile", in *Oecology* (2007) 154:141–153 DOI 10.1007/s00442-007-0757-4

<sup>10</sup>In 2008, a study of the impact of beaver on lenga beech forest showed that of 864 trees studied, 43% were felled and 7% girdled. With regard to the species damaged, 72% were lenga beech, ratifying previous studies that report it as the most affected species due to its relative abundance in Tierra del Fuego. (Impact of beaver (*Castor canadensis*, Rodentia) in lenga beech forests (*Nothofagus pumilio*) in Tierra del Fuego, Chile, Aida Baldini U, Juan Oltremari A, Mauricio Ramirez, 2008).

<sup>11</sup>Alterations of the nutrients cycle include higher quantities of organic carbon, nitrogen and phosphorous in sediments of areas with beavers, compared to areas without beavers, as well as higher concentration of nitrite, nitrate and potassium in water of beaver dams (Lizarralde et al., 1996).

<sup>12</sup>A recent study of the riparian habitat in Navarino Island, Chile, showed that, due to its activity, the beaver reduces significantly the tree coverage up to 30 meters away from streams, eliminating riparian forests. The tree seeds bank was reduced in size and the seedling species composition was modified by eliminating *Nothofagus betuloides* and *Nothofagus pumilio*, but allowing the growth of *Nothofagus antarctica* (Anderson et al., 2006<sup>9</sup>).

<sup>13</sup> Skewes et al. 1999 and others

increases the severity of the invasion in the southernmost area of the American continent, which is not adapted to this species. This animal that, at micro-level, is able to ‘grow’ its own meadows by girdling trees and flooding, poses a threat at subcontinental level, given the absence of predators and lack of defensive adjustments to the ecosystem, with a potential range of spread to the province of Neuquén (Argentina) and the region of Maule (Chile).

**Figure 1. Map of beaver distribution<sup>14</sup>.**



There are important considerations regarding the long term damage of the beaver to the subantarctic ecosystem. According to some studies in Chile<sup>15</sup>, the beaver is causing long-term damage: environmental alteration virtually eliminates forest regeneration as the subantarctic forests are not adapted to regenerate under this kind of disturbances, which is not the case in forests that are part of the

<sup>14</sup> Based on Soto Volkart N. Control programme of destructive species in Magallanes: castor case (Castor canadensis) p 1 to p 25. In Mann, A. 2008. Harmful vertebrates in Chile: challenges and perspectives. Minutes of the seminar-workshop. 8 January 2008. Santiago, Chile. Universidad Santo Tomás. 109 p.

<sup>15</sup> SKEWES, O., F. GONZALEZ, L. RUBILAR, M. QUEZADA, R. OLAVE, V. VARGAS & A. AVILA. Research, use and Control of the North American Beaver (Castor canadensis) in Tierra del Fuego and Navarino islands. Final Report, XII Region Servicio Agrícola y Ganadero (SAG), Magallanes and Chilean Antarctica, 1999

natural beaver distribution. The same authors point out that the forests in the subantarctic ecosystem are threatened by the disturbance of the environment and invasion of introduced plants, which is favoured by the action of beavers; at the same time, no regeneration has been found, following the beaver damage, as it happens in North America.

If the current situation persists, there is a possibility that the surface affected by floods increases, resulting in further loss of volumes. This occurs because of successive alteration of the original watercourse over time, diverting the flow towards unaffected forests and therefore, increasing losses. The study indicates that the activities of beaver result in the death of that part of the forest reached by the flood when these rodents build a dam and a major change in the dynamics and structure of the surrounding forests. These changes create a gap in the dimetric distributions between unaffected and affected forests. Because of beavers' preference for smaller diameters, there is a sharp reduction of biomass of smaller dimetric classes in riparian forests. This preference for smaller diameters also hinders regeneration; in fact, during the design phase of the project it was possible to verify the lack of regeneration in areas with dead trees due to flooding and which are no longer flooded, finding instead, a rich herbaceous layer. In these areas, the forest does not longer exist and this has altered the micro watersheds, creating meadows for the fodder of *Lama guanicoe*.

The Chilean forest area at risk (over 16 million hectares of Chilean subantarctic and temperate forests beyond the parallel 30° S) and waterways at risk (over 150,000 linear kilometres of courses) consists of the southernmost world's ecosystems and areas of high global biodiversity value, such as Torres del Paine National Park (IUCN category II) and the Chilean biodiversity *hotspot* of Valdivian temperate rain forests (the only temperate rain forest in South America) (Myers et. al. 2000, Mittermeier et. al. 2005).

With regard to the economic losses associated with damage caused by beaver, recent evaluations on the Chilean side of Tierra del Fuego island indicate that the basal area removed by beavers corresponds to 4.02 m<sup>2</sup>/ha, with a removed wood biomass of 14,852 tons/ha, which determines a lost gross volume of lenga beech of 286.79 m<sup>3</sup>/ha and a usable volume of lost lenga beech of 252.13 m<sup>3</sup>/ha<sup>16</sup>. As regards the impact of the species on economic activities, global estimates report about USD1.85 million for loss of forests and primary resources, while the projected costs for 80 years of presence of the beaver in the region amount to USD2,223,017<sup>17</sup>. Beaver activities affect producers because streaming diversions harm the livelihoods of the communities are under constant threat.<sup>18</sup>

Clearly, these figures correspond only to a fraction of the total losses: in fact, they represent the value of using only one of the alternative uses of the forest resources, its value as timber. It does not consider any other type of direct or indirect use (e.g. as a tourism resource, as CO<sub>2</sub> sequestration system) nor any of the non-use alternatives, according to the criteria of Total Economic Value calculation of natural resources<sup>19</sup>.

### ***c. National legal and institutional framework***

Law 18755, dated 1989, authorizes the Chile's Livestock and Agricultural Service (SAG) to take responsibility at the points of entry of all agricultural and forestry goods. Article 2 of the Animal Protection Law (APL) stipulates that *'the objective of the Service shall be to contribute to the agricultural development of the country through the protection, maintenance and enhancement of animal and plant health; the protection and conservation of renewable resources having impact on the*

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<sup>16</sup> Ramírez, 2006

<sup>17</sup> Skewes et. al. 1999

<sup>18</sup> During a feasibility study of eradication of Beaver (*Castor canadensis*) in Patagonia (2008), it was reported a case of impacts of Beaver in a commercial trout hatchery. Beavers' activity led to the loss of 30,000 fingerlings, since water reached too high temperatures, once a beaver prevented its flow.

<sup>19</sup> The methodology of the Total Economic Value allows estimation of systemic damage including direct and indirect use as well as Non-use values.

*agricultural production in the country*’, i.e. enables the SAG to act (at least, it has been interpreted that way) as long as IAS pose a threat to agricultural, forestry and livestock production.

The SAG has the authority to establish border controls: Article 3 states that SAG shall ‘*a) implement and monitor compliance with laws and regulations on prevention, control and eradication of plant pests and communicable diseases to animals. It shall also know and sanction any infringement of laws and regulations which control is responsibility of the service. b) Maintain a system to monitor and diagnose forestry, farming and cattle diseases in the country or that are likely to arise, which, according to the Service, are relevant to domestic production and formulate appropriate action programmes. c) Take measures to prevent the introduction of pests and diseases into the country that may affect animal and plant health. d) Determine actions to be taken by stakeholders to prevent, control, combat and eradicate pests or diseases subject to mandatory control*’. Article 8 of the APL stipulates that SAG checkpoints shall be installed in places where the movement of animal or plant species poses a risk to animal and plant health in the country, even when this location is not an entry point authorized by the National Customs Service.

Another important element is the Hunting Law 19473 and its regulations (see next paragraph), responsibility of SAG as well. The Hunting Law replaces the term ‘pests’ of Law 18755 by the term ‘harmful species’ (Article 2, letter g) as the one that ‘*due to its characteristics or habits, natural or acquired, is causing serious damage to any human activity performed in accordance with the law, or is causing serious imbalances to the ecosystem*’. This article also states that ‘*no animal included in the lists of endangered, vulnerable, rare or hardly known species, may be qualified as harmful*’; while Article 5 expressly excludes the prohibition of lifting nests, destroy burrows or collect eggs and hatchlings of harmful species. Furthermore, Article 25 of the Hunting Law stipulates that the ‘*introduction of live specimens of wildlife species, semen, embryos, fertilized eggs and larvae into the national territory as well as in regions or areas of the national territory where they have no presence and may disturb the ecological balance and conservation of the environmental heritage*’, require prior authorization of SAG. The Regulations of the Hunting Law establishes lists of endangered and vulnerable species, as well as harmful species.

On January 31, 2015, as part of Chile's efforts in managing the threat within the framework of this project, the Decree 65 was published, which ‘*Approves amendment to the Regulations of the Hunting Law, approved by Decree 5, dated 1998*’. The relevant change introduced by the new text reads as follows:

*‘Article 26. The Service may lift the prohibitions specified in the preceding article [‘ Art. 25. ... c) The use of all types of traps to capture animals, such as: elastic bands, nets, cages, plate traps and snares, among others’], to natural or legal persons that so request under articles ..., 19 ... [‘who require to capture or hunt protected wild fauna to control the action of animals causing serious damage to the ecosystem’.] In any case, the authorized methods shall avoid unnecessary suffering of the specimens and ensure people’s safety.*

*Similarly, it is excluded from the prohibitions referred to in subparagraph c of the preceding article, the use of ‘guachis’ or ‘huachis’<sup>20</sup> (snares) to capture rabbits, hares and beavers, and the use of specific traps to control animals declared harmful under Article 6 of this regulation [the new list like the previous one, include the beaver]. The Service shall determine the type of traps authorized to control animals declared harmful’.*

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<sup>20</sup> Wire tie that chokes the animal that gets caught, or cuts of one of its limbs.

This legal amendment will allow government bodies and other stakeholders to participate in control and eradication efforts based on legal actions, which represents a significant progress.

Law 20417 that creates the Ministry of Environment (MMA) and Law 19300 on General Bases for the Environment (Articles 69 and 70) vest the MMA with the authority to protect the biodiversity and protected areas. Article 8 of Law 20417 calls for the creation of a Service of Biodiversity and Protected Areas (SBAP), thus enabling the MMA to accomplish its mandate, including IAS management. At present (February 2016), protected areas (the National System of Wild Protected Areas, SNASP) are still managed by the National Forestry Corporation (CONAF), since Parliament approval of the creation of the SBAP is still pending. In the bill in process at the Senate, Articles 6 and 78 assign broad responsibilities to this future institution in terms of prevention, control and eradication of IAS together with SAG or the Undersecretary of Fisheries and Aquaculture, as appropriate.

Conceptually, the SNASP includes protected areas managed by the state (the National System of Wild Protected Areas) and private protected areas. Of these, the second largest is Karukinka, an area of about 270,000 ha managed by Wildlife Conservation Society (WCS) Chile, that is located in the south-central part of Chile of Isla Grande de Tierra del Fuego. WCS Chile has promoted and/or participated in all the efforts made so far regarding beaver management in Patagonia and has major installed capacities (scientific/technical, logistical and binational).

In keeping with the above, this project considers the active participation of stakeholders mentioned in this section: MMA, SAG, CONAF and WCS.

### **1.1.1. Rationale**

- a. Baseline initiatives, programmes/projects and investments for the next 3-5 years addressing the IAS causes and threats to biodiversity and ecosystems of global significance.*

#### Strategy for control and eradication of IAS

The Chilean government is developing a Comprehensive Programme to control IAS (which is also supported by the GEF, project # 4330, see section 4), which defines the scope and strategic lines of IAS control. The aim of this national programme is to reduce the spread of the existing IAS, strengthen biosafety mechanisms and generalize the IAS management efforts in the country as part of a national framework. The activities of the programme include: establish legal and regulatory mechanisms for territories qualified as priority areas for IAS management; increase management capabilities of relevant public institutions and other stakeholders, to prevent entry, control/eradication of invasive alien species; strengthen productive sectors capabilities for proper IAS management; promote international coordination among institutions with competency on invasive alien species to enhance control and/or eradication plans; foster intra and inter-institutional coordination among national institutions responsible for biodiversity, address management priorities and enhance control and/or eradication plans; generate institutional coordination to have an emergency protocol for early eradication of alien species identified as risky for biodiversity and ecosystem services; promote awareness among citizens about the environmental consequences of releasing and bringing in potentially invasive species, involvement in local activities about alien species, and develop education and awareness programmes to raise public awareness to support IAS management.

#### Inspection system and quarantine

The government of Chile has long recognized the threat of IAS to national welfare and has made considerable investments to tackle it, including permanent costs of a robust inspection and quarantine system for agricultural, forestry, livestock and aquatic health that is extremely useful in preventing IAS. Thanks to SAG, Chile maintains a robust border inspection system aimed at detecting species detrimental to zoo and phytosanitary heritage and human health as well as the protection of important economic activities (mainly agrifood industry). Such control is based on internationally certified quality standards (ISO 9001), aim for preventing the entry of pests, diseases and invasive species. For this purpose, the government has legal regulations, protocols and standards for products brought in and taken out of the country, ensuring that they do not cause negative impact on natural ecosystems.

Government investment through SAG to strengthen the inspection and quarantine system in the region of Magallanes is USD270,780 for the next three years.

#### Studies and information about beaver as IAS

Since 1998, the Chilean government has invested in various studies about the impact of beaver on native ecosystems, namely:

- i) ‘Distribution, abundance and exploitation of beaver’, funded by the National Fund for Regional Development (FNDR)<sup>21</sup> with a contribution of USD40,000. This study refers to the 45 years of invasion of the species, migration patterns and advance rate between 2.6 and 6.7 km/year. The absence of predators, high availability of habitat, plasticity of the species and the reproduction rate are factors favouring the invasion process in the area. This study established a line of communication between the public, political, administrative, scientific and technical sectors, reaching agreements between the forestry and agricultural sectors. A Chile-Argentina network was formed. Training, jobs and new business were created. It raised public awareness about the problem.
- ii) ‘Exploration and beaver control in the Province of Magallanes’ with sectorial funds from SAG in 2011. The outcome is a comparative analysis using interviews with local villagers to identify dates of invasions in areas where the study was carried out. Generally speaking, there is no certainty on the part of the local people when their lands were invaded or when the negative impact on ecosystems began, mainly on large plots. On the other hand, smallholders do have a better understanding of the impact, the times of invasion and spread of beavers.
- iii) ‘Feasibility study to eradicate the North American beaver (*Castor canadensis*) in Patagonia’, executed in 2008, funded by SAG, WCS Chile and the Government of Argentina, representing an investment of USD200,000. The main conclusion of the study is that eradication is possible. This study compares efforts to eradicate this species that were implemented in the United States of America and Europe, compared with similar situations in Tierra del Fuego. The elimination with traps, capturing or shooting had been successfully used at local level and it was proposed to be used in Tierra del Fuego at the watershed level to ensure the elimination of the colony, and monitoring possible ways of re-invasion. Limitations identified are related to land access of different ownership, investment in training and political and institutional support.

Government investment through the MMA to compile and update information on the impact of the beaver as species introduced in the region of Magallanes is USD665,210, for the next three years.

#### Efforts to control beaver invasion

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<sup>21</sup> Central government body focused on strengthening the management capacity of Regional Governments regarding regional public investment, management, control and monitoring of regional investment budget and develop and systematize relevant information for decision making purposes.

Since 2003, the Government of Chile invests in activities to control and eradicate the beaver. In Brunswick Peninsula and Dawson Island, the Programme of control and exploitation of beaver in Tierra del Fuego and Navarino islands 2003-2007, funded by the Magallanes Development Fund (FONDEMA), with USD300,000 and executed by the SAG, promoted the commercial exploitation of beaver's meat and skin, capturing 11,700 individuals during 2005 and 2006. The Programme showed the inverse correlation between density of traps and beavers in a given space, as well as the inability to plan, spatially or temporally, the density of hunters under that logic, that is, the inability to control the problem through a commercial logic.

On the other hand, in 2005 a binational process between the governments of Argentina and Chile was put forward to comprehensively address the threat of the beaver and complement actions. Two binational workshops were carried out, with the participation of international experts from WCS, Island Conservation, Landcare Research and the Animal and Plant Health Inspection Service (APHIS) US, followed by other activities to standardize the information and training. In September 2008, during the 'International Workshop for Beaver Control in Patagonia', a *Binational Agreement for the Restoration of the Southern Ecosystems Affected by Beaver* was signed, which installs a framework for cooperation between Chile and Argentina on this matter. Researchers from both countries have developed a joint binational strategic proposal aimed at the eradication of beaver and the *Strategic Plan for the Eradication of the Beaver Project in Southern Patagonia* (EECP), with the ultimate aim of eradicating beaver in 7 million hectares (ha) and in 27,000 km of waterways. The total estimated cost of the EECP is about USD33 million within a ten-year period and includes four phases:

- a) Phase 1 – implementation – includes the completion of the 'Feasibility study to eradicate the North American beaver (*Castor canadensis*) in Patagonia' (previously described).
- b) Phase 2 – generation of scientific, human and technological capacities – demonstration and pilot activities for capacity building and demonstration of strategies, techniques and methodologies for the eradication and monitoring, control and prevention of re-invasion are performed. A *Binational Action and Contingency Plan for the invasion of the North American beaver in the continental sector of Southern Patagonia* (PACB) is developed in detail. A National Action Plan is being developed to address this problem and transform it into a long-term public policy. The objective of this plan is to strengthen existing regulations for the control and eradication of invasive alien species, improve public-private management, establish biosecurity barriers and establish early warning systems, especially between the islands and the mainland. It also aims to strengthen research, prepare control plans and foremost, raise awareness and public engagement through sensitivity campaigns. The MMA, SAG and CONAF have permanently developed control and monitoring programmes, training of personnel and awareness-raising in different regions after the identification of 128 invasive species. In Magallanes, specifically, these three organizations implement permanent awareness campaigns, staff training on legal and technical aspects of beaver hunting and individuals' disposal. These actions are performed in a coordinated manner under their relevant jurisdiction, namely, MMA in regulatory aspects, SAG with farmers in private property and CONAF, in protected areas.
- c) Phase 3 considers the implementation of a comprehensive operation to control and eradicate beaver in the Patagonian mainland, after achieving technical and scientific support, strategic alliances and adequate funding and installation of appropriate governance structures, decision making and responsibility.
- d) Phase 4 of control, monitoring and prevention of re-invasion, early warning, also included in the PACB.

Government investment through the MMA to support the EECP is USD884,590 for a three-year period. CONAF investment for the EECP in terms of eradication and monitoring activities within public protected areas is USD1,790,200.

Since the 60s, the SAG is in charge of the Programme 'Control, Prevention and Eradication of Invasive Fauna in the Region of Magallanes', whose aim is to control the invasion of beavers in the Region of Magallanes. Authorized hunters to control rodent populations in the region can capture 10 thousand individuals a year. According to SAG, from 2004 to 2006, 11700 individuals were captured and 270 trappers were trained in the region. Investment of SAG to support the eradication of beavers within the framework of this programme is USD895,000 for a period of three years.

In addition to government efforts to eradicate the beaver in the region of Magallanes, the civil society has taken some initiatives. WCS World Conservation Society is a US NGO, that deals with conservation projects, wildlife management and research in various parts of the world, on issues related to climate change, natural resource management, relationship between human and wildlife health and sustainable development of communities. WCS has two offices in Chile: one in Santiago and another in Punta Arenas. WCS and the Government of Chile signed an agreement to work in wetlands, seas and land. Specifically, in Punta Arenas, WCS deals with the administration of the Ramsar site Bahía Lomas and the Karukinka protected area, where a number of biodiversity studies have been carried out. They have investigated, using advanced satellite technology, the behaviour of albatrosses, elephant seals, guanacos (the largest population of protected guanacos in the country is found in this area, a very important species for the development of the Andean cultures from southern Peru to Tierra del Fuego), in order to determine their feeding and breeding habits. The largest carbon masses in the latitude are also located in the park. Wetlands in this region, are important water reserves for the future.

One major problem in Karukinka is the invasion of beavers that entered the area in 1970. WCS works together with SAG and the MMA in the development of techniques to control the species, primarily the use of traps and have also studied their distribution patterns and behaviour. Control practices developed so far are random: when they find individuals or invaded areas, they eliminate them.

As part of the efforts to eradicate the beaver, WCS will invest USD766,000<sup>22</sup> over the next three years to improve the eradication techniques, considering the logistic factor and the most viable and efficient methods and early warning protocol agreements between the organizations involved. It will also lead a training process for 150 people in the use and application of protocols implementation methods. Karukinka will be one of the pilot areas for beaver eradication, including decision making protocols, direct control of the species and monitoring. A basin impact assessment will be made in the area of distribution of the beaver to evaluate and restore water flows and channels. The work will be constantly monitored to develop a guide for the eradication of beaver in this type of ecosystem. The experience in pilot areas will allow WCS to develop land reclamation indicators.

On the other hand, there are several eradication initiatives undertaken by private landowners, breeders and farmers who are affected by the presence of beaver in their fields. These groups hunt on their own productive lands affected by floods and change of river courses and watersheds caused by dams built by beavers. Methodologies will be developed for sustained control and restoration of private property for multiple-use on the basin of Marazzi River and Tierra del Fuego with steppe ecosystem. This experience will give rise to local eradication methods, spread to and re-invasion of other ecosystem, public-private cooperation, basic restoration and monitoring. Organized groups will invest USD18,125 over the next three years in staff to support hunting activities, as well as logistics, transportation and communication of such staff.

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<sup>22</sup>Exchange rate USD1=CLP681

***b. Remaining barriers to be addressed by the project***

The Chilean government has long recognized the IAS threats to national development, but is currently focused on the protective sanitary regulation of export-oriented economic sectors such as agriculture, forestry, livestock and aquaculture. The system does not cover all IAS that could jeopardize the biodiversity and ecosystems of the country, nor includes systematic control programmes for IAS already established in the country like the beaver, providing good examples of management and control.

Likewise, the Strategic Plan for the Eradication of the Beaver Project in Southern Patagonia (EECP) requires support to establish mechanisms and roles that, without undermining the competences of national institutions, allow these to coordinate at domestic and binational level. Such mechanisms and roles must contribute to capacity building at sub-national and local levels.

The main barriers to be tackled by the project are:

**1. Deficiencies in the institutional mechanisms and absence of protocols to manage beaver control and eradication practices, and inadequate coordination among sectors.** So far, efforts to control and eradicate the beaver, lack of a comprehensive approach to prevent the impact on environmental goods of global significance. The current institutional approach does not address uncertainties, set goals and objectives or propose effective measures in terms of time, funds and human resources.

**2. Little and outdated information of the economic value of beaver impact on ecosystems.** There are rough estimates of the economic damage caused by beavers in the productive forestry sector of Isla Grande de Tierra del Fuego. It is necessary to have detailed information about the scale and nature of the problem, to develop an action plan and municipal and regional regulations, for local productive sectors, that addresses the problem.

**3. The local regulatory framework does not include measures to address beaver threats.** Chile has inadequate legal framework to manage IAS at regional and municipal levels. There are 34 rules (laws and others) to control alien species, which stipulate inspection procedures and practices governing various economic sectors considered as main entry points. Although there are restrictions to some IAS brought into continental Chile, the focus is primarily put on prevention and control of pests that could affect the national economy (especially the agrifood sector), while existing invasions, as beaver, which have direct economic impact on the productive sectors, remain neglected, like those affecting the biodiversity of native species and ecosystems. There is no comprehensive cross-sectoral approach and different regulations overlap and cancel each other out, reducing its effectiveness.

**4. There is no systematic process of monitoring and early warning to ensure timely detection of the beaver invasion.** Although baseline investment includes control actions, there is no early warning system being implemented for new invaded areas and prevention of re-invasion of invasion-free areas. This results in greater difficulties to control the invasion and set priorities at the strategic level, which means that so far, the invasion is not even contained. An early warning system has been designed, but has not been implemented yet. Sporadic monitoring is performed without an operational framework. There is no operational zoning for beaver management. There is no reference framework to measure the recovery of ecosystems when actions are performed. Binational information sharing is not systematically performed. Based on the information gathered during the design phase, it was clear the need to identify the spread of the beaver in the intervention areas.

**5. Lack of communication and awareness of the problem generated by beavers.** Uncoordinated

efforts of communication and public awareness resulting in low or no collaboration from the general public at local but mainly at national level to the eradication efforts. The main barrier is related to the beaver's potential charming (charismatic) appearance, which leads to the ungrounded assumptions of a harmless animal, whose existence would entail no negative environmental risks, or need for control actions. At the same time, personnel in charge of planning and management of the beaver as IAS lacks the necessary knowledge (sub-national policy makers, professionals, technicians and operators).

**6. Fragmented approach to the management of beaver as IAS and few evidentiary tools about the effectiveness and management cost (prevention, control, containment and eradication).**

Effective management of IAS requires the application of different approaches simultaneously or sequentially. There have been isolated attempts to control IAS on islands in Chile, but they did not respond to a comprehensive approach and the scale of beaver invasion well exceeds partial approaches to stop the threat to biodiversity in Tierra del Fuego and the Chilean Patagonia. No demonstration activities aimed to strengthen existing capacities and clear up uncertainties have been carried out. These uncertainties are: (i) at technical level, the effectiveness and certainty of eradication; (ii) at institutional level, the regulatory and governance mechanisms necessary for the eradication and (iii) at financial level, budget and funding sources necessary for the eradication, especially in difficult access areas. There are no effective and permanent methods for an adaptive mapping of the presence, density, detection and early action or prevention of re-invasion, all measures that are part of the state of art approach concerning invasive species management. This lack of a comprehensive approach prevents taking actions against the impact on environmental goods of global importance.

**7. Local producers' limited capacities to control the invasion.** Private landowners do not have the technology and knowledge to deal with the beaver invasion on their property.

*c. Incremental reasoning: value added of GEF funding*

Considering the aforementioned barriers, without GEF investment, under the 'business as usual' scenario biodiversity and wild and productive ecosystems in Patagonia and others in Chile (and Argentina), including globally important biodiversity as the world's southernmost ecosystem, the Torres del Paine National Park and the Chilean biodiversity *hotspot* of the winter precipitation Valdivian Forest, will remain threatened by the growing population of beavers. Ongoing investments will keep focusing on eliminating individuals, with little effect on the total population. The lack of a coherent, coordinated and well-funded national and binational approach based on the systematization of experiences, best practices and lessons learned would hinder efforts towards eradication.

Furthermore, deficiencies in the sub-national regulatory framework and institutional mechanisms to manage productive practices and inadequate intersectoral coordination would result in a growing threat of the beaver with the aforementioned consequences. Furthermore, in the absence of a project, efforts will be made in terms of investments and bilateral cooperation to manage the invasion, whose effectiveness can be estimated to be as insufficient as previous actions.

The co-financing and incremental GEF funding will address the shortcomings of the regulatory framework and governance for effective management of beaver as an invasive species and protection of Patagonian biodiversity. An early warning system will be developed for new invaded areas and prevention of re-invasion of beaver-free areas, in support of the implementation of PACB. The system will provide more information about the socioeconomic impact of beaver, produce eradication methodologies and protocols to be put into practice and develop local-institutional and population capacities to effectively manage beaver invasion.

To achieve this incremental impact, the project includes two technical components according to the following rationale:

**Component 1: Management and governance framework, information, monitoring, early warning, participation and communication in the Region of Magallanes.** Based on the binational strategic plan and existing feasibility studies, the incremental contribution will be the creation of space for dialogue and negotiation between different stakeholders, to agree on coordination mechanisms for the design and implementation of management and governance frameworks to control the beaver as an invasive species, prevention and early warning of new invasions and eradication in identified areas. These instruments of governance will include (i) protocols of action to generate and share information among and with stakeholders, (ii) proven and validated management and funding plans, (iii) protocols of national coordination between national and binational agencies in Argentina (in synergy with project # 4768), including best practices, and (iv) generation and dissemination of data and communication to different audiences. Governance frameworks will also consider economic estimates of the damage caused by the invasive species in different production systems in the Region.

Additionally, the design of a monitoring and early warning system, which is one of the main objectives of the project and one of the key pillars of the PACB implementation will be financed. The early warning system will be implemented and adjusted to assess their effectiveness, based on the different ways of land management in the region. The warning system would help containing the degree of spread of the beaver and monitor the areas where it is already present, which, in turn, will influence in recovery area and ecosystem restoration. This warning system will include budget assessment to ensure sustainability.

Investment will be made to raise awareness and influence in the perceptions of people and sectors (forestry, agriculture, tourism fishing, academics, civil servants, armed forces), about beaver as an invasive species and the need to eradicate it from fragile ecosystems. A communication, sensitivity and education strategy will be developed, in addition to defining the appropriate dissemination mechanisms including media.

Finally, investment will be made in training the staff of the participating institutions on issues related to the biology and ecology of beavers, safety use of the eradication equipment and technical aspects, including data collection, processing, monitoring, security, soil restoration techniques, customer service and health of personnel in remote areas.

**Component 2: Demonstration activities of control, management and restoration in pilot areas.** As an incremental contribution to the binational process for the control and eradication of beaver under the PACB, investment will be made in technical assistance (training workshops, participation and planning) and equipment to plan the eradication of beaver in pilot areas, representing different ecosystems and types of land tenure. The aim is, on the one hand, to identify cost-efficient methodologies for the eradication and monitoring and prevention of re-invasion and, on the other, methodologies to support the restoration of ecosystems and riparian *Nothofagus* forests. Activities will be carried out to develop capacities and implement techniques and methodologies for control, monitoring, eradication, re-invasion prevention, as well as restoration, including private land. These pilot activities will be carried out in basins of Karukinka protected area, Laguna Parrillar National Reserve and in private lands which were identified during the design phase. The existing experience will be systematized with special emphasis on eradication and restoration techniques and the necessary public-private partnership, with a view to be replicated by the Government in other areas once the project is over. To this end, SAG will request funds to the National Fund for Rural Development (FNDR) to carry out complementary activities of the Project in Brunswick Peninsula, Dawson Island and Isla Grande de Tierra del Fuego.

The process aims at demonstrating that it is feasible to eradicate the beaver from the Chilean Patagonian region through an appropriate control mechanism, establishing an early warning system and permanent monitoring of the area. Thus, necessary financial resources will be managed, capacities that are currently lacking will be generated and effective technologies will be tested to be applied at different scales. This comprehensive approach is a challenge that would not be properly addressed with current government investment.

The alternative scenario represents a major contribution to the protection of globally significant biodiversity, reducing the vulnerability of native fauna and flora and contributing to the protection and restoration of riparian forests in Patagonia. Through GEF financing and co-financing, the project will test a systemic approach for the management of biological invasions and will contribute to Chile's efforts to have a coherent institutional framework to manage beaver as IAS, thus proving feasible the eradication of beaver. Mechanisms for coordination and exchange of information and improved sub-national capabilities will foster existing capacities and provide a demonstration guide for the implementation of management plans for other cases of IAS.

### **1.1.2. FAO's Comparative advantages**

FAO has supported several countries in developing national strategies for prevention and control of alien species, including Chile and soon in Argentina. The sustainable forest management toolbox <http://www.fao.org/sustainable-forest-management/toolbox/es/> includes a section of pests, diseases and invasive species control in forest ecosystems. In this sector, FAO facilitated the implementation of the Southern Cone Network on Invasive Alien Species and Forest Ecosystems that operates in this sub-region.

The toolbox for stock farming and environment proposes concrete actions to prevent invasive alien species in fishing, forestry and agricultural activities (<http://www.fao.org/ag/againfo/programmes/es/lead/toolbox/Grazing/InvWeedE.htm>). FAO has also worked in areas related to legal and institutional aspects for better control of IAS in the Andean Region, Argentina, Chile and Mesopotamian region among others. FAO also developed the document *FAO Biosecurity Toolkit*, with definitions, assessment of responsiveness of the different sectors and risk analysis.

FAO is also the Implementing Agency of the project '*Strengthening governance for the protection of biodiversity through the formulation and implementation of the National Strategy on Invasive Alien Species (ENEI)*' (# 4768). In this capacity, FAO can facilitate the coordination between the two countries and processes and provide coordinated technical support to the implementation of the Plan in both countries.

FAO has considerable experience in biodiversity conservation and management of ecosystems, including IAS and health protection of plants, trees, forests, landscapes, agriculture, aquatic species, wildlife and livestock. The Global Plan of Action for Animal Genetic Resources for Food and Agriculture of FAO has the objective of ensuring sustainable management of native, alien and alien invasive species on ecosystems including agricultural ecosystems. The FAO Forestry Department has worked for several years in the management and control of plant pests, insects in many cases, which have a potential to increase its spread in times of global change. Additionally, a new FAO publication '*Wildlife in a Changing Climate*' stresses the importance of IAS and its management including case studies, such as the invasion and eradication of coypu (*Myocastor coypus*), a semiaquatic rodent native to South America. This rodent causes tremendous damage to riversides, vegetation and crops in many countries of Asia, Europe and North America, very similar to the problem of beaver invasion in

Patagonia. The FAO Forestry Department strongly supports regional networks focused on IAS as the Asia-Pacific Forest Invasive Species Network and the Forest Invasive Species Network for Africa.

FAO is currently developing tools to maximize the benefits of climate change adaptation in programmes for agriculture, livestock and forestry development including adaptation to new IAS dynamics, based on its experience in projects of this sort through FAO Regional Office for Latin America and the Caribbean. With regard to IAS, FAO has supported the establishment of a network for forest dynamics and pest management in the Latin America sub-region which includes Argentina, Brazil, Chile, Paraguay, Uruguay and Bolivia. The aim is to provide adequate information for sound decision-making.

Finally, FAO has been involved in discussions and work related to IAS under the Convention on Biological Diversity (CBD) and has permanently provided inputs such as its participation in the Inter Agency Liaison Group on IAS, the Ad hoc Technical Expert Group and delivering statements at meetings of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) of the CBD. In this multilateral context, FAO has established partnerships with renowned experts such as the IUCN/SSC Invasive Species Specialist Group (ISSG) and can resort to these contacts to implement the project.

### 1.1.3. Participants and stakeholders

The following stakeholders have a role in the project and participated in project planning:

Stakeholder	Interest in the project according to area of activity	Role in the project
Ministry of Environment (MMA)	Coordination and implementation of environmental policies, plans and programmes	Manager, coordinator and main executing party of the project. The MMA leads the process of establishing a management and governance framework. It coordinates actions and working agreements with the Government of Argentina. It facilitates opportunities for coordination with other GEF projects, specifically project # 4330 in the country. The MMA Regional Ministerial Secretariat - SEREMI facilitates the implementation and coordination of the early warning system. It contributes to the development of the monitoring system protocol and ensures its distribution among stakeholders
National Forestry Corporation (CONAF)	Management of protected areas in the Region of Magallanes and control of beavers in Laguna Parrillar National Reserve	Manages Protected Areas in the region. CONAF participates in activities of Component 1, particularly in the development of a management plan and governance of beaver. CONAF leads the control, monitoring and early warning processes in pilot areas located in protected areas of its jurisdiction, in the Region of Magallanes. It leads the pilot area in Laguna El Parrillar

Stakeholder	Interest in the project according to area of activity	Role in the project
Wildlife Conservation Society Chile (WCS)	Management of Karukinka, the largest private protected area in Magallanes	Manages important experiences regarding beaver, eradication, monitoring and restoration. It participates in the activities of Component 1 to establish the management framework and governance and the management plan. WCS leads the implementation of the pilot area in Karukinka, develops sustained beaver control methodologies and habitat restoration processes.
Livestock and Agricultural Service (SAG)	It is a public institution in charge of the Hunting Law and inspection activities and quarantine	Manages the EECP on the Chilean side and has the legal authority to implement the project. SAG has the greatest experience in the Region of Magallanes, to implement practices proposed in this project. Based on the experience gained during more than 20 years, basic criteria will be established for early warning, control and eradication. It participates in the activities of Component 1 to establish the management framework and governance and the management plan.
Landowners and local producers	Mainly farmers livestock producers (sheep and cattle).	They will be the target population of awareness raising activities and will be trained to participate in pilot activities carried out in multiple-use private properties under Component 2, ensuring access to land, participation of staff in eradication activities, logistics support and supplies for the field work. During project preparation several landowners have expressed interest in control and eradication activities and some have confirmed commitment to participate in project implementation through co-financing letters.

During the design stage of the project the presidents of the Commissions for the Environment, Science and Technology of the Regional Council and the Regional Development Division of the Regional Government of Magallanes, the SEREMIs of Environment and Agriculture and the Regional Intendency of Magallanes participated during the design stage were involved.

The following beneficiaries were identified during the design stage:

- The Chilean Navy and Army Work Corp (CMT) of the Ministry of Defence, specifically in the Dawson Island, where CMT have been involved in monitoring beavers since 1984. This group is one of the main beneficiaries of control and monitoring training.
- The Chilean Public Roads, Hydraulic Works and Water Administration of the Ministry of Public Works, have been affected in their activities due to beaver dams located on roads, which must be destroyed to ensure free traffic in the area. Their participation in this project is mainly related to the elimination of beaver dams in the area.
- The National Tourism Service (SERNATUR) will participate in public sensitivity processes, tourist information in protected areas and informal education in the region.

- The Municipalities of Timaukel, Primavera, Porvenir, Rio Verde, San Gregorio, Laguna Blanca, Punta Arenas and Puerto Williams will be beneficiaries of this project in aspects related to training, monitoring and beaver control.
- The University of Magallanes and the private agents ASOGAMA, Asociación Hereford, Asociación Corriedale, Asociación de Ganaderos de Tierra del Fuego, Forestal Russfin, OMORA and COMAPA will participate in training processes according to management protocols developed in the project.

At the national level, the Operating Committee for the Control of Invasive Species (COCEI), where the MMA acts as Executive Secretariat will ensure a higher level of coordination . At the Magellan region level, a Project Management Committee (see details in section 4) will be established, to ensure that all capacities and needs are taken into account.

Finally, at a binational level, the Treaty on the Environment signed by the Republic of Argentina and the Republic of Chile (1991) on the Restoration of the Southern ecosystems affected by the North American beaver (*Castor canadensis*), has a political monitoring mechanism, the Southern Integration Committee, which is a formal technical-political body for the exchange of information and coordination on border affairs. The relationship with the Argentine government will be entrusted to the MMA.

#### **1.1.4. Lessons learned and related actions including assessments**

At an international level there is a wealth of information on various experiences with regard to control and eradication of IAS. Various international organizations such as the GISP (Global Invasive Species Database) programme have developed manuals that provide guidance to handle this problem<sup>23</sup>. This material contains information on prevention, early warning and control systems and risk analysis. The material is general in nature and should be adapted to local conditions where there is incidence of invasive species. It facilitates practices in land, freshwater and marine environments. International experience suggests that the effective *participation of the society* in the eradication projects, is essential to address the scepticism that exists with respect to the success of these conservation strategies<sup>24</sup>. Numerous control projects worldwide have been restricted or have simply failed due to pressures from groups that oppose to any activities related to IAS capture. To face the public opinion, this project has a strong communication and training component, not only in Chile, but also complemented by communication activities in Argentina.

International experience also shows that eradication efforts can greatly benefit native species and ecosystems. An evaluation of data from Red List (IUCN) has shown that 11 species of birds, 5 species of mammal and 1 species of amphibian improved their conservation status as a result of the eradication of invasive species.<sup>25</sup> Of the more than 1000 eradication efforts implemented to date<sup>26</sup>, 86% were successful, including the eradication of longstanding invasions. It has been demonstrated that eradication may be cheaper than permanent control management.

With regard to invasion of vertebrates, the eradication is becoming a widely accepted practice for ecosystem restoration and its application is increasing in frequency, geographical distribution, size and complexity of managed areas.<sup>27</sup> Invasive vertebrate species that have been eradicated from large islands are goats, pigs and arctic foxes.<sup>28</sup> The eradication of goats from Isabela Island in Galapagos in Ecuador,

<sup>23</sup> Wittenberg R & MJW Cock. 2001. Invasive Alien Species: A Toolkit for Best Prevention and Management Practices. CAB International, Wallingford, Oxon, UK, 228 pp.

<sup>24</sup> Cromarty et al. 2002, Towns and Broome 2003, Menvielle et al. 2011

<sup>25</sup> McGeoch et al. 2010

<sup>26</sup> Simberloff et. al. (2013)

<sup>27</sup> Keitt et al. 2011

<sup>28</sup> idem

implied managing 412,000 hectares. Chile has successfully eradicated vertebrates from islands in the Gulf of Baja California. In Europe there are several examples of highly effective management that provide ‘key’ lessons for beaver and red squirrel, as the eradication of the aquatic rodent coypu (*Myocastor coipus*) in Great Britain, or the rufo duck (*Oxyura jamaicensis*).

Lessons learned from beaver control experience in Argentina collected by CADIC, the Provincial Government of Tierra del Fuego and joint action with the Government of Chile, indicate that it is necessary to maximize the effectiveness of different intervention instruments and techniques outlined in the Feasibility Study. Clear and explicit criteria are required to know where, when and how intensely apply the tools and techniques according to different objectives and contexts. It is necessary to identify the best sequence of tools, which is determined by the use of the environment by the beaver.<sup>29</sup> The strategic approach to the eradication of beavers in Tierra del Fuego requires repeated interventions<sup>30</sup>, usually using different control techniques so the population density of the invasive species decline.<sup>31</sup>

The strategy EMPRES (Emergency Prevention System) established by FAO in 1994, has made clear that to address problems related to management of pests, diseases and invasive species, it is necessary to develop border coordination activities, share databases, and similar monitoring and early warning systems. The main concepts of EMPRES are early warning, early detection, activate research, coordination and communication.

The study performed by FAO *Wildlife in a Changing Climate* (<http://www.fao.org/3/a-i2498s.pdf>) makes clear that climate change may favour the spread of alien species, e.g. tidal changes, water warming that produce currents, aspects to be considered in the implementation of the pilot areas. Specifically, in the case of beaver, tidal changes and currents facilitate the access of the rodent to new islands. The analysis of climate change scenarios (and thus currents and tides) allows for the definition of the most vulnerable sites to invasion.

At a national level, the actions of the Government of Chile and partner organizations (reflected in the baseline) have left the following lessons learned to identify barriers and solutions provided by the project.

- It is necessary a comprehensive approach to the problem beyond the farm approach (territorial) or oriented to reduce the beaver population density (strategic). The potentially affected area should be divided into zones and monitored according to three situations: presence, absence and lack of information; number of remaining individuals and not the number of individuals eliminated.
- Although there is available scientific knowledge to resolve the problem, this information is not enough if capacities, mechanisms, technical approach, management and governance are not developed and applied in the field. Information is kept only as a scientific exercise.
- The non-technical and non-financial aspects of the problem (political will, social participation, perception of the public about the beaver and institutional coordination) are key to achieve an appropriate solution.
- Another advisable measure should be to build interregional barriers, such as those that will be applied in Juan Fernandez Archipelago as a result of GEF project # 4330, where all vessels (air and sea) would be reviewed by an inspection team before leaving for other islands, upon reaching

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<sup>29</sup> Keitt et al. 2011

<sup>30</sup> Parkes et al. 2008

<sup>31</sup> Experience in Pipo River basin. Escobar et al. 2011

to the destination point and before leaving for the next island. There is trained staff at ports and airports to perform this task.

- At a national level, the involvement of the civil society is essential. In Juan Fernandez Archipelago there is strong awareness about the importance of observing the rules to control the invasive species, since inhabitants have been directly affected by them (e.g. yellow jacket wasps)

### **1.1.5. Links to development objectives, strategies, plans, policies and national legislation and GEF and FAO's Strategic Objectives**

#### **a) Alignment with national development objectives and policies**

The project is properly aligned with national priorities and policies for sustainable development and protection of biodiversity in the country. Since 2005 the Chilean government established the Operating Committee for the Control of Invasive Species (COCEI) led by the Ministry of Environment, with the aim of designing a comprehensive national strategy for the prevention, control and eradication of invasive alien species. The COCEI allows the coordination among public institutions and enables the consolidation and expansion of efforts, contributing to sustainability and enabling that efficient IAS control actions are carried out in vulnerable ecosystems of global importance. As of the date of this document, there is an advanced draft of the *Comprehensive National Strategy for the Prevention, Control and/or Eradication of Invasive Alien Species*. According to it, the project would contribute to the following objectives:

- 1.2. Establishing legal and regulatory mechanisms for certain territories determined as priority lands for IAS management;
- 2.1. Increase management capabilities of relevant government institutions and other stakeholders, to prevent entry, control/eradication of invasive alien species;
- 2.2. Strengthen the capacities of the productive sectors for appropriate IAS management;
- 3.1. Promote international coordination among institutions responsible for invasive alien species control and/or eradication plans;
- 3.2. Foster intra and inter-institutional national coordination of those institutions responsible for resolving biodiversity management priorities and leverage control and/or eradication plans;
- 5.6. Build institutional coordination to develop an emergency protocol for early eradication of alien species identified as risky for biodiversity and ecosystem services;
- 6.1. Promote citizens' awareness of the environmental consequences of releasing and bringing in potentially invasive species and involvement in local activities about alien species, and
- 6.4. Develop educational and sensitivity programmes to raise public awareness to support IAS management.

#### **b) Alignment with the National Biodiversity Policy and Strategy**

Article 8 h) of the Convention on Biological Diversity states that each Contracting Party shall, to the extent possible and as appropriate, prevent the introduction and control or eradicate alien species threatening ecosystems, habitats or species. In Chile, the current Biodiversity Strategy responds to this

commitment to the strategic line 1 *Preservation and restoration of ecosystems*, subparagraph c, that states:

‘(...) apply a precautionary approach by analysing the risks of introducing potentially invasive alien species, improve existing tools for the control of invasive alien species and establish eradication programmes mainly in fragile ecosystems to prevent its propagation’.

2003, CONAMA, National Biodiversity Strategy, Government of Chile.

The strategy is being updated (with the support of GEF project # 4857) and will include the control of invasive species as a core objective.

At the same time, the project is aligned with the Integrated National Programme for the Control of Invasive Species (PEEI) (design with support of GEF project # 4330), which seeks to have regulatory frameworks and modern institutions including the need to keep research initiatives on the status of invasive alien species and their impact on biodiversity and productive activities.

### **c) Alignment with biodiversity and GEF focal area strategy**

The project contributes to Objective 2 of the Biodiversity Focal Area for GEF, which reads ‘incorporate biodiversity conservation and sustainable use of terrestrial/marine productive landscapes and sectors’, specifically Outcome 2.3. Improved management framework to prevent, control and manage invasive alien species, with emphasis on control and sub-national management of IAS already established.

The project contributes to outcome 2.1. *Policies and regulatory frameworks for the productive sectors (the operational management of IAS is operational and meets in % with the IAS monitoring tool of the GEF 5 Tracking tool*, for the Biodiversity Focal Area. The goal of the project is to move from a score of 1/13 to 6/13 in questions 1, 2 and 3 of section VI of said tool, and from 3/16 to 13/16 in questions 4, 5, 6. Beaver control and eradication as an invasive species will make a direct contribution to biodiversity conservation in 1,612,886 hectares in the Region of Magallanes (Chilean subantarctic and temperate forests), including buffer zones and protected areas (including the Torres del Paine National Park, category II IUCN) and indirect contribution over 13,29,700 ha.

The project contributes to goal 9 of Aichi: By 2020, invasive alien species and introduction ways shall be identified and prioritized, priority species shall be controlled or eradicated and measures to prevent their introduction shall be implemented; and to the indicator ‘response trends of policies, legislation and management plans to control and prevent the spread of IAS’ (Strategic Goal B).

### **d) Alignment with FAO’s Strategic Objectives**

The project contributes to Strategic Objective 2 (SO2). Increasing the supply of goods and services from agriculture, livestock, forestry and fishing in a sustainable manner, namely:

- Output 4: Integrated and sustainable practices: adoption of innovative management concepts, practices and a comprehensive environmental approach (including climate change mitigation and adaptation), social aspects (including gender equality) and the economic dimension of sustainable agricultural production.

- Output 5: Knowledge and management: Participatory assessment, development and promotion of mechanisms to integrate, manage and share knowledge about sustainable production and natural resources management.
- Output 6: Identification, development, validation and exchange of inclusive social and technological management approach that contributes to sustainable management of ecosystems; climate change adaptation and mitigation; knowledge generation from previous experiences and understanding of best practices, lessons learned and potential for replication.
- Output 7: Supporting the development of technical and cross-sectoral capacities among institutions and organizations to develop and implement practices that enhance and improve the provision of goods and services on a sustainable manner.
- Output 12: Advising and supporting governance strategies and options to facilitate productivity and sustainability in different productive systems.

Furthermore, the project contributes to Strategic Objective 5, namely:

- Output 5: Technical assistance in adapting and implementing integrated or sector-specific guidelines, best practices and innovative technologies for prevention, impact mitigation, rehabilitation and transition.

This project is one of the priorities identified and agreed upon by FAO Representation in Chile and the Government of Chile in the paper Country Programming Framework, signed on 12 January 2015. These priorities are: governance of natural resources and forestry, farming and cattle systems in the new scenarios posed by climate change.

## SECTION 2 – PROJECT FRAMEWORK AND EXPECTED OUTCOMES

### 2.1. PROJECT STRATEGY

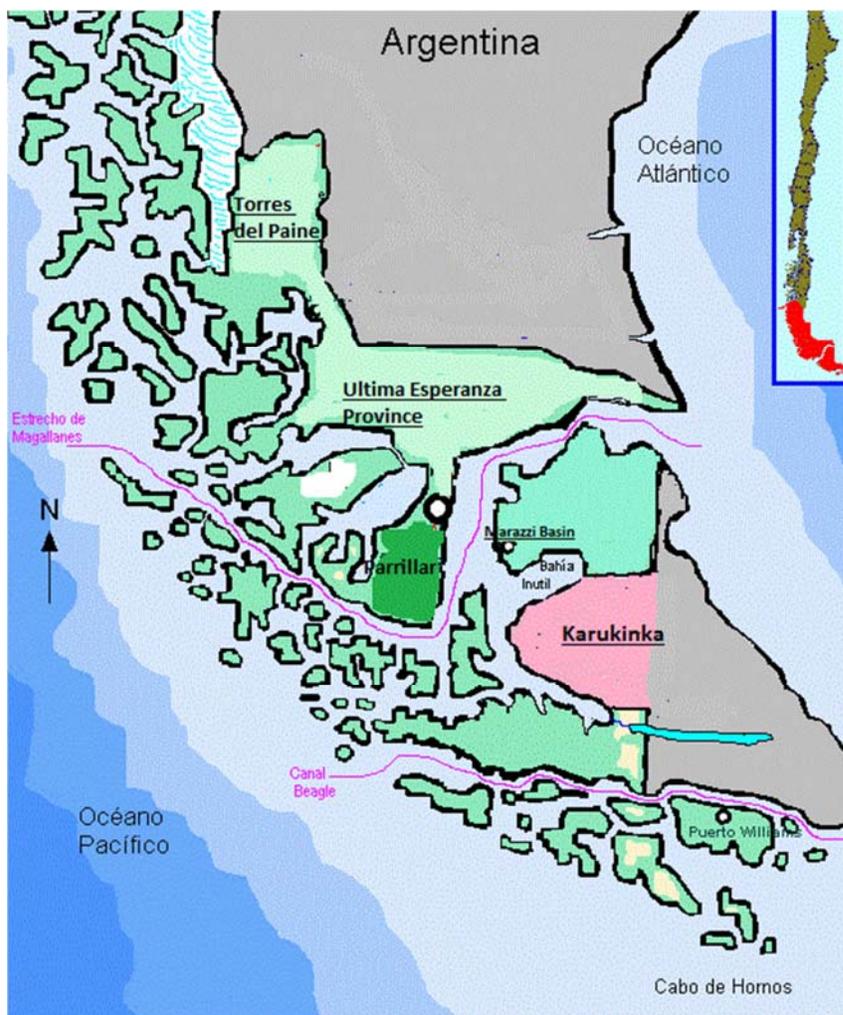
The project contributes to the development of the Binational Strategic Plan for the Eradication of the Beaver Project in Southern Patagonia (EECP), Phase 2, in support of the generation of human and technological capacities to eradicate, control, monitor and prevent re-invasion. The project provides for the strengthening of the institutional framework to ensure the proper management of beaver as invasive species, the development of capacities for beaver monitoring and early warning and the implementation of pilot activities and strategies for the eradication and monitoring, control and preventing re-invasions.

As of the Binational Strategic Plan and the Feasibility Study, a financial and management schedule will be developed, including the binational coordination Chile-Argentina, which will address uncertainties at technical level such as eradication and barrier to mainland invasion. It will establish institutional and governance mechanisms, including national budget and regulatory mechanisms to facilitate the intervention in control and eradication systems. To this end, it will work on local, regional regulations and communication, information and dissemination programmes. As part of the necessary convergence in a coordinated system of governance and knowledge that develops and aligns competencies and skills, the project will establish a Coordinated Information, Monitoring and Early Warning System (CMWS), to serve as the basis for adaptive management and public awareness. Eventually, and as part of said convergence, capacities will be developed to manage political, social, institutional and perception issues. The experience in control and eradication will be disseminated through pilot activities complementary to the ongoing actions within the project funded by the National Fund for Regional Development awarded to SAG in Brunswick Peninsula, Dawson Island and Isla Grande de Tierra del Fuego.

**Table1. Pilot activities intervention sites**

Project site	Area	Ecosystem	Activities
Karukinka Park (Private natural park)- La Paciencia sub-basin	132 km of channels, 18,481 ha	The main ecosystem in this pilot is a matrix of peatlands and mixed and pure lenga beech forests. In sites of high altitude there is the Andean desert with shrubs of ñirre and meadows.	Beaver eradication and basic restoration
Laguna Parrillar National Reserve (state-owned reserve) and downstream private lands	442 km of channels, 50,062 ha	The ecosystem composed mainly of lenga beech, oak of Tierra del Fuego ( <i>Nothofagus pumilio</i> ), cherry tree, white coihue or coigüe from Magallanes ( <i>Nothofagus betuloides</i> ) and ñirre or Antarctic beech ( <i>Nothofagus antarctica</i> ). It is possible to find peatlands dominated by <i>Sphagnum magellanicum</i> (botanical moss species endemic from Argentina, Chile and Peru), <i>Marsippospermum grandiflorum</i> , genus with four species of herbaceous plants belonging to the rush family.	Beaver eradication and basic restoration
Southeast part of Ultima Esperanza Province, including Torres del Paine National Park	13,660 km of channels, 1,499,100 ha (including 227,298	The ecosystem contains four vegetation zones: Patagonian steppe, Pre-Andean shrubland, Magellanic subpolar forests and Andean Desert. The vegetation of the Patagonian steppe is dominated by Fescue species (mainly <i>Festuca gracillima</i> ), which are resistant to harsh	Early warning system

	ha of the National Park)	winds and weather conditions that are typical of the Patagonian region. The Magellanic deciduous forest is home to various species of trees such as the <i>Nothofagus pumilio</i> and <i>Nothofagus antarctica</i> .	
Marazzi river (multifunctional private property)	453 km of channels, 45,243 ha	At the north central area of Tierra del Fuego, small streams associated with the Marazzi River extend into the Patagonian steppe ecosystem, with presence of rangelands, meadows and scrubs, mainly.	Beaver eradication and basic restoration through public-private cooperation strategies



The project includes the inter-institutional coordination at regional and binational level, the participation of the affected population, demonstration activities at appropriate scale to validate or improve the technical and economic aspects, and create or increase existing experience to allow an efficient future eradication throughout Patagonia.

While the project is implemented in the Chilean territory, there will be extensive coordination with parallel efforts undertaken by the Government of Argentina (including GEF funds, see section 4).

## 2.2. PROJECT OBJECTIVES

The **global environmental objective** of the project is to improve sub-national institutional frameworks to effectively control, prevent and manage IAS, in ecosystems valuable for biodiversity in the Region of Magallanes.

The **development objective** of the project is to incorporate biodiversity conservation into the management of productive landscapes, through the development of skills that allow for adequate risk management of biological invasions.

## 2.3. EXPECTED PROJECT OUTCOMES

The expected outcomes at the end of the project are:

**Outcome 1.1.** Management and governance frameworks ensure effective management and control of the invasion in Magallanes archipelago and Brunswick Peninsula.

*Target:* a) 6/13 scores in the GEF tracking tool (Section VI on IAS, questions 1,2,3); b) Beaver control and eradication mechanism for the Region of Magallanes, designed and validated with the participation of all stakeholders<sup>32</sup>; c) 13,229,700 ha (Region of Magallanes excluding the Chilean Antarctica) vulnerable to beaver invasion, under effective management and control of beaver invasion.

**Outcome 1.2.** Decision makers have updated, systematized and available information about beaver management in Magallanes, including data on operational zoning, spread, monitoring, early detection, recovery-restoration and research.

*Target:* a) 13/16 points from the GEF tracking tool (Section VI on IAS, questions 4,5,6); b) Coordinated Information, Monitoring and Early Warning System (CMWS), designed and under implementation.

**Outcome 1.3.** Regional institutions and civil society recognize the importance of beaver eradication practices and restoration of the Region of Magallanes, including the recovery of riparian forests with endemic species. The achievement of the target will be assessed through KAP surveys, that measure changes in Knowledge, Attitude and Practices. The first KAP survey will be conducted in PY 1 and will be repeated in Year 3 to measure change as a result of project interventions.

*Target:* a) 75% of MMA, SAG and CONAF staff recognize the importance of eradicating invasive species to biodiversity and productive areas of the Region; b) Staff of the MMA, SAG and CONAF assigned to beaver control, management and eradication measures implement best practices; c) 3,000 members of the civil society improved their knowledge and attitude on the impact of beaver as an invasive species in agricultural systems and vulnerable ecosystems.

**Outcome 2.1.** Beaver invasion is under effective control in selected areas of native forest and peatlands ecosystem in the Region of Magallanes and in the recovery process of riparian forests with endemic species.<sup>33</sup>

*Target:* a) At least 68,543 ha/574 km of channels free of beaver and under basic restoration (i. watercourses freed from beavers recovered to similar conditions as those watercourses not affected by beavers; ii. organic matter in sediments diminishes in the basins freed from beavers); b) 1,499,100 ha/13,660 km of channels under proper early detection of beaver invasion.

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<sup>32</sup> The plan includes budget and forms of financing, regulatory aspects, governance mechanisms and procedure protocols. Led by the MMA, CONAF and SAG, Regional Government with the participation of WCS, civil society. The plan is designed under the *Strategic Plan of Beaver Eradication Project in Southern Patagonia (EECP)*.

<sup>33</sup> Indicators of recovery of biodiversity in terrestrial environments are applied to periods longer than those of the project (10-20 years).

**Outcome 2.2.** Beaver invasion is under effective control in multifunctional private property in the Region of Magallanes.

**Target:** a) 45,243 ha/450 km of channels in multifunctional private property, free of beaver and under restoration; b) 1,000 ha of forest under recovery (recovery of lenga trees *Nothofagus pumilio* and Antarctic beeches *Nothofagus Antarctica* in progress in affected areas)

**Outcome 3.1.** Project implementation based on a results-based management approach and application of project findings and lessons learned in future operations facilitated.

**Target:** Project outcomes achieved and demonstrating sustainability.

## 2.4. PROJECT COMPONENTS AND OUTPUTS

In order to achieve project objectives and expected outcomes, two technical components with 22 outputs have been structured, as described below:

<b>Component 1: Management and governance framework, information, monitoring, early warning, participation and communication in the Region of Magallanes</b>
1.1.1 Strategic and financial plan for the management of beaver as an invasive species
1.1.2 Coordination and governance plan for the management of beaver as an invasive species
1.1.3 Evaluation of current and potential economic impact of beaver in Chilean Patagonia
1.1.4 Validated regulatory framework for beaver management at municipal and regional level
1.2.1 Coordinated Information, Monitoring and Early Warning System (CMWS)
1.2.2 Spread and adaptive zoning model per management unit
1.2.3 Sub Antarctic ecosystems recovery indicators applied in control and eradication pilot sites.
1.2.4 Information exchange protocols at regional, national and binational level between Chile and Argentina
1.3.1 Communication and awareness raising programmes for different target audiences
1.3.2 Capacity building programme for key stakeholders <sup>34</sup> for the management and eradication of beaver
<b>Component 2: Demonstration activities of control, management and restoration in pilot areas</b>
2.1.1 Beaver eradication and basic restoration method designed and implemented in Karukinka Park
2.1.2 Beaver eradication and basic restoration method designed and implemented in Laguna Parrillar National Reserve and downstream private lands
2.1.3 Early Warning System (EWS) Method to be implemented in the Southeast area of Ultima Esperanza province, including the Torres del Paine National Park
2.1.4 Systematization of best practices for beaver eradication, invasion monitoring and early warning
2.2.1 Sustained control and restoration methodologies for multiple-use private property
2.2.2 Systematization of a 'best practices' model for multifunctional private property
<b>Component 3: Results based management, monitoring, evaluation and dissemination</b>
3.1.1 Project progress assessment and monitoring system
3.1.2 Mid-Term Independent Review (MTR) and Final Independent Evaluation (FIE)
3.1.3 Publication and dissemination of best practices and lessons learned

### **Component 1: Management and governance framework, information, monitoring, early warning, participation and communication in the Region of Magallanes**

Given the complexity and scale of the problem, relevant stakeholders should converge in a coordinated system of knowledge and governance to develop and align competencies and capabilities of public agencies, private stakeholders, scientists, financing partners and others, at strategic level (Output 1.1.1) and at operational level (Output 1.1.2). Both strategies will inform the strategic plan for control and

<sup>34</sup>Key regional actors are officials from the MMA, CONAF, SAG, WCS, including technical staff at the office and field activities.

eradication of beaver in the region of Magallanes, designed and validated with the participation of all relevant stakeholders.<sup>35</sup>

#### Output 1.1.1. Strategic and financial plan for the management of beaver as an invasive species

The current eradication plan will be reviewed during PY 1, to identify specific financial, regulatory and technical information gaps (use of traps, and types of traps for different ecosystems). A preliminary proposal will be made including early warning, control and eradication actions, and each of these actions will have a preliminary budget to determine a long-term funding strategy. A critical aspect to consider is the access to the main area which is essential for the effectiveness of the activity. During PY2, the proposal will be tested in the pilot area to validate efficient control and eradication methodologies. The field experience will feed the proposal, improve actions based on actual implementation and document field costs. These proposals will be negotiated with different stakeholders in order to have a strategic management plan by PY3, with a financial mechanism validated and approved by the stakeholders.

*Target: A strategic plan for beaver prevention, control, management and eradication; it includes a financial mechanism.*

#### Output 1.1.2. Coordination and governance plan for the management of beaver as an invasive species

A proposal of coordination among regional, national and binational stakeholders will be elaborated during PY1 to work on species early warning, control, management and eradication. This management, coordination and governance strategy will be launched during PY2 and improved with the implementation of the pilot area of component 2. In parallel, work will be done with government organizations to include early warning, control, management and eradication activities into work plans and annual budgets of local organizations. By PY3, the procedures protocol for coordination and governance will be approved.

As part of the binational cooperation with Argentina, protocols of intervention, governance, information exchange and operational aspect will be developed, to allow efficient and complementary actions between the countries. This coordinated system is critical to prevent the spread of the species and implement early warning procedures and operational activities in the territory.

*Target: A coordination and governance plan with its protocol of procedures for national and binational coordination; designed and implement governance and information systems.*

#### Output 1.1.3 Evaluation of current and potential economic impact of beaver in Chilean Patagonia

The objective of this output is to obtain detailed information to make the most appropriate political decisions to address the issue of beaver invasion in Magellan territory. Damage to the local ecosystem is divided into at least three macro zones, namely: 1) Tierra del Fuego and Navarino islands; 2) continental Magallanes and 3) the rest of the archipelago. The study should be approached from the perspective of ecosystem damage in these three macro zones. For this purpose, the following activities will be carried out:

- 1) Specify the estimated magnitude of the damage and physical impact caused by *C. canadensis* on local ecosystems.
- 2) Economic - financial valuation of impact and damage.
- 3) Project socioeconomic impact and damage.

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<sup>35</sup>The plan includes budget and funding sources, regulatory aspects, governance mechanisms and procedural protocols. Led by the Ministry of the Environment, CONAF, SAG, Regional Government with the participation of the WCS and civil society. The plan is designed under the *Strategic Plan of Beaver Eradication Project in Southern Patagonia* (EECP).

- 4) Design a clear map of the advantages and disadvantages of implementing different alternatives to manage beaver invasion.
- 5) Identify funding and/or co-funding alternatives.

The study will be conducted during PY1 and presented in national forums with different sectors in charge of decision making on beaver management as invasive species. This report will raise awareness among the different sectors and promote investment for early warning, control, eradication, and management of this species.

*Target: An economic impact study including sectoral analyses (Forestry, farming and cattle; protected areas and tourism; water resources and infrastructure) to be submitted to decision makers.*

#### Output 1.1.4. Validated regulatory framework for beaver management at municipal and regional level

The gap assessment of the regulatory framework carried out during the design phase, will serve to propose municipal and regional regulations to prevent illegal eradication measures and so, implement management plans. This will be done in parallel with the implementation of pilot areas, which will help identify how regulations should be adjusted to implement early warning, control, management and eradication strategies. During PY2, the proposed initiatives will be massively disseminated. By PY3 there will be a regulatory framework validated at municipal and regional level, ready for approval.

*Target: A regulatory framework at municipal ad regional level, designed and ready for approval.*

#### Output 1.2.1. Coordinated Information, Monitoring and Early Warning System (CMWS)

As part of the aforementioned convergence in a coordinated system of governance and knowledge that develops and aligns competencies and skills, the project will establish a Coordinated Information, Monitoring and Early Warning System (CMWS), to serve as the basis for adaptive management and public awareness. A common platform following international standards will be designed and implemented, including at least one geographical support, a monitoring and alert data repository, a recovery/restoration data repository, a studies repository and other references and information and communication protocols. Monitoring requires a systematic data collection platform, in order to make spread projections.

A virtual platform will be developed during PY1. The information gathered during the design phase will indicate what information should be stored, what are the mechanisms that facilitate field data entry, how data will be generated and verified to make appropriate decisions. Technical teams in charge of eradication will determine the type of information required to design the virtual platform. The data collection from pilot areas will begin during PY2, in order to assess the viability of the platform and make the necessary adjustments to ensure its efficiency. The system will be operational during the third year, to process the information necessary to ensure the implementation of CMWS with actual field data.

During PY1, a minimum data collection protocol will be developed, improved and validated with field information from pilot areas and permanently documented. The different stakeholders in charge of the implementation of the project will provide information. This information will be stored in the virtual platform and players may access to it at any time. During PY2 the use of the protocol and its implementation will be improved. As of the third year, the protocol will be adopted by all organizations related to beaver early warning, control, management and eradication. At the end of the project, the protocol will have data from at least four pilot areas.

A preliminary early warning system will be designed during PY1 and implemented in pilot areas. The protocol will be assessed in the field and there an action plan will be designed and validated. The training process for the implementation of the action plan will begin during PY2. It is expected that at least 150 people will be trained on early warning. By PY3, the system will be already established and personnel trained for its implementation.

*Target: (i) Designed and implemented platform (geomatics, workflows, telematic), (ii) Developed and implemented Early Warning System (EWS) and an action protocol, (iii) At least 150 people from 12 institutions/organizations properly trained to implement the EWS, (iv) At least four pilot areas monitored.*

#### Output 1.2.2. Spread and adaptive zoning model per management unit

Inputs from local researchers, the beaver biology, climate and biophysical data, will be used during PY 1 and 2 to compile data about the spread of the species and populate the platform database (1.2.1). Two consecutive years of data will provide a more accurate spread trends of the species, so that by the third year there is a spread model available. This information will help identify areas for early warning and the most vulnerable sites.

*Target: A distribution and potential spread model of the species.*

#### Output 1.2.3. Sub Antarctic ecosystems recovery indicators applied in control and eradication pilot sites

During PY1, short term indicators will be established to identify the restoration of ecosystems in temperate zones, once the beaver has been eradicated. Due to the type of ecosystem, forest recovery is slow, so it is necessary to resume the experiences from baseline activities in areas that have been affected by the beaver and have been effectively treated and hence, identify restoration criteria and indicators. With this and the best available evidence, a matrix of environmental recovery criteria for sites affected by the presence of beaver will be developed during the first year. Mechanisms for field monitoring and collection and storage of data will be defined. A record of information from pilot areas will be implemented after six months from the project inception and will extend throughout the entire project. This will be applied, at least, to pilot areas. So, in the third year, there will be a matrix of recovery criteria adapted to the conditions of Magallanes and a database with entries for this information.

*Target: A matrix of environmental recovery criteria. Indicators to be assessed in the pilot areas.*

#### Output 1.2.4. Information exchange protocols between Chile and Argentina at the regional, national and binational level

In coordination with outcome 4.2 of the GEF Project #4768, *Binational Programme for Beaver Eradication under implementation (at least in Argentine territory of Tierra del Fuego)*, with a target of a Bi-national beaver eradication programme in implementation within two to five years after completion of pilot programmes in each country), a sharing information protocol agreed between the two countries will be designed, for the transfer of information and data at binational level, using the virtual mechanisms included in CMWS. During PY2, the countries will perform tests and validation of the protocol to improve it. By the third year, the exchange system will be operational, with implementation agreements between the two countries ready to formalize it via administrative decision and by relevant institutions.

*Target: Protocol and procedures to be formalized via administrative decision.*

#### Output 1.3.1. Communication and awareness raising programmes for different target audiences

The project will contribute to the alignment and strengthening of communication and awareness programmes aimed at different target audiences. To do this, a communication strategy will be implemented for two target populations: (i) stakeholders involved in eradication and local people affected by the impact of the beaver in its territory, and (ii) sectors not affected by beaver. It is necessary to sensitise people unaffected by beaver, because they do not perceive it as an invasive species and negative reactions to the project could be expected from animal advocacy groups.

With regard to the first target group, the strategy aims at linking government institutions involved in the eradication process and deliver the results of knowledge standardization and use of specific terminology.

With regard to the second target group, the aim is that the general public become multipliers of information and promoters of opinion through the design and dissemination of graphic material, brochures, posters, banners, and advertisements on print media. The strategy will contribute to generate knowledge, awareness of the negative impact of the beaver as an invasive species in fragile ecosystems in southern Chile, including biodiversity of high conservation value, endemic fauna and collective awareness, by means of interviews in newspapers, magazines and specialized programmes, cartoons in children's magazines, design of digital and audio-visual contents and spots.

The communication proposal will be coordinated with project # 4768 of Argentina to complement messages and actions. During PY2 and taking into account the experiences of the pilot areas the strategy may be improved and the messages refined. Coordination mechanisms with Argentina will also be evaluated during PY2 and procedures will be refined. In PY3, mass communication and dissemination programmes will be operating in coordination with Argentina, and would have met the goal of having passed the message to 5000 people. A project Website will be created as part of the strategy.

*Target: (i) Comprehensive communication and sensitivity/education strategy, including the elaboration and distribution of educational material.*

#### Output 1.3.2. Capacity building programme for key stakeholders<sup>36</sup> for the management and eradication of beaver

Based on the information gathered during the design phase and in coordination with project #4768 of Argentina, training course will include the following:

- Introduction to invasive alien species (biology of the species and ecology), its impact and management options.
- The beaver in Tierra del Fuego, history of the invasion and consequences.
- Tools for an effective beaver eradication (techniques, safe use, maintenance, traps design, etc.).
- Eradication organization and operational monitoring (logistics in extreme zones, monitoring techniques, data gathering, restoration techniques).
- Biosecurity.

The training will be given by SAG and WCS staff, who have been in charge of beaver eradication activities, with a view to multiply the institutional knowledge, supported by technical assistance from FAO.

*Target: (i) 150 people trained in management and operational aspects (operational zoning, control and eradication, monitoring, recovery-restoration and research), (ii) 140 people trained in early warning.*

### **Component 2: Demonstration activities of control, management and restoration in pilot areas**

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<sup>36</sup>Key regional actors are officials from the MMA, CONAF, SAG, WCS, including technical staff at the office and field activities.

The AIHTS international standards and the Regulation 3254/91 of the European Union, as well as the best available applied knowledge (Talling & Inglis 2009), will be applied in the demonstration activities of beaver elimination.

#### Output 2.1.1. Beaver eradication and basic restoration method designed and implemented in Karukinka Park

The main ecosystem in this pilot is a matrix of peatlands and mixed and pure lenga beech forests. In sites of high altitude there is the Andean desert with shrubs of ñirre and meadows. The procedures to be implemented in this demonstration unit will allow to use the necessary capture and logistic tools to eradicate the species in a basin and replicate the experience in other areas of similar ecological characteristics. On the basis of sustained trapping, data will be taken on the characteristics of the site, number and position of traps, positioning of rounds with GPS, registered dens and dams, and a photographic record of the activities. The activities of restoration consider the partial or total destruction of dams to restore flows and water level in peatlands. Similarly, criteria for the ecological restoration of coastal systems will be established to compare the trajectory of the recovery of sites affected by beaver.

The activities under this output will be implemented by WCS, that must ensure the participation of two technical teams with experience in different methods of capture, supported by the logistics, which could include the use of 4WD vehicles, carriers and helicopters, as emergency supplies for the staff, among others. An adequate traps stock should be available, based on the previous experience in Tierra del Fuego. Activities will start from Lake Despreciado, moving westward, along the main riverbed of River Sanchez and tributaries of the same. It is expected to work with two teams simultaneously, starting from a central point of the basin and from its eastern end, which should facilitate the logistic support. The next stage involves the inspection of the basin to verify remaining beavers and additional capture, if required. This is done running through of all river streams georeferencing signs of beaver activity after removal. The information will be added to the information system (output 1.2.1 of the project) linked to the management unit or sub-basin.

With regard to the ecological restoration, it is advisable to remove dams to restore the water flow. The information of ecological references historically established in a baseline of other streams, will be analysed and compared to the situation in brooks with beaver capture.

In PY3 there will be concrete field actions, validated protocols and an established monitoring system. In coordination with the activities under output 1.2.3, a monitoring and ecological restoration procedures manual of the pilot area will be produced. Restoration activities will be evaluated depending on the affected area and vegetation surface.

*Target: (i) A demonstration pilot activity of beaver eradication in La Paciencia sub-basin (132 km of channels, 18,481 ha), that includes the absence of new ditches monitored during six months after the end of the pilot; (ii) Sites vulnerable to spread monitored; (iii) A basic restoration monitoring system.*

#### Output 2.1.2. Beaver eradication and basic restoration method, designed and implemented in Laguna Parrillar National Reserve and downstream private lands

The pilot of Laguna Parrillar National Reserve (state-owned, run by CONAF) is an ecosystem composed mainly of lenga beech, oak of Tierra del Fuego (*Nothofagus pumilio*), cherry tree, white coihue or coigüe from Magallanes (*Nothofagus betuloides*) and ñirre or Antarctic beech (*Nothofagus antarctica*). It is possible to find peatlands dominated by *Sphagnum magellanicum* (botanical moss species endemic from Argentina, Chile and Peru), *Marsippospermum grandiflorum*, genus with four species of herbaceous plants belonging to the rush family. It is native to New Zealand and southern South America to the

Falkland Islands), *Rostkovia magellanica* (Magnoliophyta species inhabiting Patagonia), *Polytrichum* sp, among others, corresponding to Ombrotrophic peatlands or peatlands with sedge family among Minerotrophic peatlands.

The first phase to be implemented in this demonstration unit include gathering information and the best estimate of the number of beavers. This activity will be put out to tender in the first quarter and implemented during PY1. This will serve to evaluate and determine the capture plan, in order to distribute the capture and monitoring efforts on the sub-basin and tributaries. A team will work according to a roles system and will be supported with field logistic elements consisting of a 4WD vehicle, an ATV and maybe, horses. A stock of conibear traps shall be available, in a number that will be determined according to the information gathered in the first phase.

Activities will be carried out in three sectors: Chorrillo Hermoso, Turba river and Desaguadero river. A base camp for the staff should be installed during the control activities. In addition, and prior to capture, the native fauna (huillín and nutria) should be recognized, to determine the capture methodology and reduce the risk of capturing native species. This activity would be complemented with cameras in the traps, in order to see the use of the area by native species (huillín and nutria) and beaver, since according to the records of Laguna de Parrillar they share common areas.

The ecological records of control sites, number and location of traps, rounds positioning with GPS, dens and dams and photographic record should be available. The destruction of dams to restore the flow of brooks and the water level in peatlands will be considered once confirmed the absence of individuals in the area. The observation period after capture will be assessed since rangers use it to verify the absence or presence of this species. Likewise, the ecological reference of riparian systems will be defined to compare the recovery of sites affected by beaver.

The post-capture monitoring involves inspection to the basin to look for beavers and supplementary trapping, if needed. At this stage, all the channels should be checked, georeferencing any indications of the presence of beavers after the implementation of control and capture.

At this stage, information from ecological references and control sites is analysed. A monitoring and ecological restoration procedures manual of the pilot area will be produced in coordination with output 1.2.3. Restoration activities will be assessed depending on the affected area and plant surface.

Since part of this output will take place on private-own lands, during the design phase the landowners and the Government officials confirmed their willingness to work together during the project implementation, in order to design collaboration strategies for the eradication of the beaver. During project execution, strategies will be designed and tested as an example of the coordination efforts between individuals and public institutions.

*Target: (i) A demonstration pilot activity for beaver eradication from Laguna Parrillar National Reserve (442 km of channels, 50,062 ha), including the elimination of new ditches monitored during six months after the pilot is finished; (ii) Public-private cooperation strategies.*

Output 2.1.3. Early Warning System (EWS) Method to be implemented in the Southeast area of Ultima Esperanza province, including the Torres del Paine National Park.

An early warning pilot area in mainland with influx of tourism will be implemented in the Southeast area of Ultima Esperanza province, where the Torres del Paine National Park is located. During PY1, field experiences will be systematized. These experiences will serve to design an early warning system including field activities for preventing invasions (identification of ditches, individuals, dams),

categorize and register invasions and enter data into the virtual monitoring platform (output 1.2.1). A group of technicians will be trained (output 1.3.2) to implement the protocol, which will be tested and evaluated during PY1 and implemented during PY2. In parallel, the system will be assessed and improved based on experiences from Parrillar and Karukinka pilot area and in collaboration with other social groups, including the private sector. During the third year, the system will be already implemented and adopted by the agencies participating in this project.

The particularity of this pilot is that the strategy will be adapted during the implementation phase in PY2 of the project. During PY3, the project will focus on disseminating the experience in the region and relating it to the communication and awareness raising programmes for groups not directly affected by the beaver, for example, tourists.

*Target: (i) An EWS in Última Esperanza Province (13,660 km of channels, 1,499,100 ha); (ii) A set of assessed early detection strategies; (iii) A set of assessed public-private cooperation strategies.*

#### Output 2.1.4. Systematization of best practices for beaver eradication, invasion monitoring and early warning

Under this output, field manuals will be developed including best practices of beaver detection, control and eradication in public property and monitoring, control and eradication and restoration in multifunctional private property and . This output will include field work input to be systematized during PY1 and it will be complemented with information gathered during the implementation of pilot areas: field activities, successes and failures to identify best practices and learn from mistakes. In PY2, draft manuals on early warning, control, management, eradication, monitoring and restoration manuals will be prepared for validation. By PY3 four training manuals) will be available for staff training.

*Target: Four beaver management manuals: (i) detection, (ii) control and eradication in public property, (iii) monitoring, (iv) restoration, control and eradication in multifunctional private property.*

#### Output 2.2.1. Sustained control and restoration methodologies for multiple-use private property

The basin formed by Marazzi river and tributaries was selected as pilot area due to the impact of beaver in cattle farms (multifunctional private property), whose landowners have expressed interest in control and eradication activities. This pilot will validate and develop working methodologies for private landowners and provide tools to set priority actions, so decision makers may have essential knowledge at strategic level. The topography is undulating, with low enclosed valleys in the upper part of the area and plains toward the river mouth at Inútil Bay. The vegetation is mainly a semiarid matrix of coiron and rosemary shrub, with meadows in the low plains and murtillar or small peatlands in the highest windy areas.

Two teams of experienced trappers with capacity in capture techniques, supported with vehicle and horses will be available. This means that at least four people will work with logistic support to mobilize as many traps as possible to the capture sites. The waypoints of sustained trapping will be defined with reference of the network of internal roads in each farm. Once there is zero captures in specific sites, data on the characteristics of the site, number and location of traps, logistical support, workdays, rounds with GPS positioning, burrows and dams, and photographic record of the site will be analysed. Partial destruction of dams will be considered to restore the brooks flow. The next stage involves monitoring the basin for the presence of beavers and the action of supplementary trapping. Data should be entered to the information system (project activity 1.2.1) linked to the management unit or sub-basin. The manual of procedures will be used to monitor the ecological restoration (project activity 2.1.4).

Data on the landscape intervened will be collected to establish the criteria for ecological restoration of vegetation and its long term applicability. As previously explained, due to the type of ecosystem in the area, the ecosystem restoration is very slow, which does not show significant changes during project implementation. During the first year of control and eradication practices, changes will be seen in areas that were affected and so, identify simple indicators to monitor for two consecutive years. Hence, in the second year, there will be a monitoring protocol of restoration under validation. The information platform database will be populated with information and personnel will be trained in the use of the protocol. During the third year of implementation there will be a sustained restoration monitoring protocol implemented by stakeholders and the database will be populated permanently. In addition, there will be a public-private agreement for implementation.

*Target: (i) A pilot of species eradication in the main bed of Marazzi river (453 km of beds, 45,243 ha), monitored according to the number of empty ditches six months after the end of the pilot; (ii) A designed and implemented data model on spread and reinvasion; (iii) A set of implemented and assessed public-private cooperation strategies; (iv) An established basic restoration monitoring system.*

#### Output 2.2.2. Systematization of a 'best practices' model for multifunctional private property

The methodological proposal for early warning, control, management, eradication and restoration developed in the Karukinka pilot (output 2.1.1), will be adapted to public-private multifunctional property conditions during the second semester of the first year, including personnel training. The methodology will be assessed during the second year, including data record and population of the database to monitor the area. During the third year, the restoration methodology will be adopted by multifunctional property landowners. The systematization of the experience, will produce a demonstration manual on public-private cooperation strategies for beaver management at the end of the project.

*Target: A public-private cooperation strategies manual for the management of beaver in multifunctional property.*

### **Component 3: Results based management, monitoring, evaluation and dissemination**

#### Output 3.1.1 Project progress assessment and monitoring system

Between PY1 and PY2, the Project Coordinator will prepare the six-monthly Project Progress Report. The PPR includes the results framework of the project with relevant outcomes and output indicators, baseline and biannual targets, monitoring of the risk matrix, with potential risks and mitigation measures to reduce unforeseen risks. At the end of each year, the Project Coordinator will provide inputs to the Lead Technical Officer (LTO) and the LTO-FAO will prepare the Project Implementation Report (PIR). The PIR includes the outcomes framework of the project with relevant outcomes and output indicators, baseline and annual targets, the monitoring of the risk matrix and will identify potential risks and mitigation measures to reduce unforeseen risks

*Target: 6 Six-monthly Project Progress Reports (PPR).*

#### Output 3.1.2 Mid-Term Independent Review (MTR) and Final Independent Evaluation (FIE)

After 13 months of the implementation of the project, a mid-term review will be performed by an independent consultant who will work with the project team including the FAO-GEF Coordination Unit, the LTO and other partners. Three months before the end of the project implementation (month 33), a final evaluation of the same will be done by an independent consultant under the supervision of the

Independent Evaluation Office of FAO, in consultation with the project team, including the FAO-GEF Coordination Unit, the LTO and other partners.

*Target: a) Mid-term evaluation report, b) Final evaluation report*

### Output 3.1.3 Publication and dissemination of best practices and lessons learned

In coordination with activities under output 2.1.4 and 2.2.2, as well as the communication strategy of output 1.3.1, manuals and best practices documentation developed in three stages. Methodological proposals will be developed during the first year based on experiences in early warning, control, monitoring, eradication and restoration. These proposals will be assessed in the pilots according to their relevant emphasis. During the implementation of the pilots, the methodologies and protocols will be improved and adapted according to the field experience, including coordination among stakeholders. Best practices and lessons learned will be published during PY3, including successful cases and failures. The specific themes will be defined during the implementation of the project. Every publication will be uploaded to the Website of the project (part of the communication strategy of output 1.3.1), and printed copies will be distributed (in a limited number) to government representatives and local partners.

*Target: Best practices in early warning, control, management, eradication and restoration systematized and published..*

## **2.5. GLOBAL ENVIRONMENTAL BENEFITS**

The total Chilean forest area at risk (subantarctic and temperate forests beyond parallel 30°S), more than 16 million hectares, and riverbeds at risk (over 150,000 linear kilometres of rivers), is made by the southernmost ecosystems in the world and assets of global significance, such as the Torres del Paine National Park and the Chilean biodiversity *hotspot* of the Valdivian Forests of winter precipitations (Myers et. al. 2000, Mittermeier et. al. 2005). The project will help to prevent the spread of beaver as IAS in the South American continent and contain its population within the region of Magallanes under levels that do not put endemic species and globally important ecosystems at risk.

By establishing systems to manage beaver as IAS in areas of high conservation value as the ones described, including landscapes in areas close to important protected areas, the project contributes directly to maintaining the functioning and resilience of natural ecosystems that harbour globally significant biodiversity. This contributes to the recovery of ecosystem functions and services, such as soil fertility, the availability of water resources of productive and/or ecological value and the conservation of plant and animal habitats.

Specifically, the project will a) validate detection and eradication methodologies in at least 110,000 ha /1,000 km of rivers, including the development of practices for multifunctional private property control; b) establish and validate early detection and response methods in approximately 1,500,000 ha, establishing a containment line for Chile within the region of Magallanes, c) recover ecosystems and terrestrial and freshwater biodiversity, highly or potentially affected by beaver as IAS.

	Basin surface (ha) and channels length (km)	
	Ha	km
<b>Control and eradication pilots</b>		
La Paciencia Basin	18,481	132
Laguna Parrillar Basin	50,062	442

Total Outcome 2.1	68,543	574
Marazzi Basin	45,243	453
Total Outcome 2.2	45,243	453
<b>Total control and eradication</b>	<b>113,786</b>	<b>1,027</b>
<b>Detection and early warning pilot</b>		
Early warning pilot (Outcome 2.1)	1,499,100	13,660
<b>Total early warning</b>	<b>1,499,100</b>	<b>13,660</b>
<b>Total action surface</b>	<b>1,612,886</b>	<b>14,687</b>

## 2.6. COST-EFFECTIVENESS (alternative strategies and methodologies)

The feasibility study of the North American beaver (*Castor canadensis*) eradication in Patagonia (SAG-WCS Chile – Government of Argentina, 2008) established an approximate cost of eradication in about USD33 millions. An extrapolation of the minimum potential damage to the total Chilean forest area at risk (subantarctic and temperate forests beyond parallel 30°S) shows figures of USD13,700,000 and 16,500,000, respectively.

With funding from the GEF and co-financing, the project aims to develop local capacities for the eradication in selected areas, which in turn will allow replication in the rest of the Chilean Patagonia. This initial investment will allow the development of methodologies and protocols that will be tested on the field, thus making it possible to identify economic efficiency and reduction of operational costs. Based on these results, the intervention strategy will be adjusted, thus guaranteeing sustainability and replicability of the initial investment.

Cost-efficiency and effectiveness of the project is achieved by involving the various stakeholders related to beaver management as a IAS in a systematic manner, by establishing a binational, national and regional institutional framework. The involvement of SAG will allow to build upon its experience, human resources and risk mitigation and control system, to avoid the introduction of pests in the agricultural and forest sectors and take early steps in case of failing check points.

The training of public and private staff and of important segments of the rural population in the region of Magallanes, ensures the efficient use of human resources, infrastructure and resources already available and higher efficiency in the prevention of introduction, detection and early warning. Training and sensitivity of people living in the zone and affected by the beaver, will expand the group of observers in the prevention and early warning system in a cost-efficient manner.

On the other hand, the pilot areas have been defined depending on the impact of beaver on native biodiversity of global significance, and its aim is to represent various scenarios and situations regarding management of biological invasions, to validate protocols and communication and awareness strategies to manage, contain and/or eradicate them. These interventions should allow to learn about the cost-efficiency of beaver management practices and techniques. Beavers have not yet spread in a way that makes impossible to control, contain and/or eradicate them. Coordination with Argentina and the binational process in stages will ensure cost-efficiency and cost-effectiveness of actions.

## 2.7.- INNOVATION

For the first time in South America, a binational plan is being promoted to address the problem of IAS and specifically of a big vertebrate. With this project, Chile's contribution to this process is leveraged and leads to maturity, representing a powerful example of the vision required to address complex problems of biodiversity conservation at a supranational level. The scale of this project is significantly

higher than previous experiences worldwide, many of them supported by the GEF; but its most significant innovation is the reinforcement of scientific, technical and local political management capacities, necessary to deal with complex problems and that would benefit not only those affected by this problem but others in similar situations in other countries and regions. In the project pilot and demonstration activities will be performed which will enable learning and knowledge to be transferred after being installed in local institutions. The project emphasizes public-private collaboration, necessary for managing natural heritage.

Once operational capabilities and frameworks have been established and thus, Phase 2 of the EECP is completed, implementing partners and their local base can move forward and implement Phase 3 of the EECP. It is expected that the activities of project could lead the capacities for this type of operation from the formulation of the concept to its demonstration in relevant environments, establish the conditions for its implementation at prototype level in operational environment and reduce the costs of eradication in more than 50%. The project will complete Phase 2 of a four-stage binational strategy, ensuring sustainability and replicability, allowing for scale-up of techniques and systems developed at regional level (Chilean and Argentinean Patagonia).

## SECTION 3 – FEASIBILITY (basic dimensions for high quality outputs)

### 3.1. ENVIRONMENTAL IMPACT ASSESSMENT

In accordance with the document *Environmental and Social Management Guidelines of FAO*<sup>37</sup>, the proposed project is classified under the category of LOW risk: a) the project has no or minimal negative environmental or social potential, either upstream or downstream, b) the project will not be controversial in terms of stakeholder interests. The Environmental and Social Revision Form<sup>38</sup> is attached in Appendix 8. The project will not adversely affect ecosystems, moreover, it has a positive impact by eliminating a major cause of its degradation.

Activities under project Component 1 include proposals of policies and action plans, inter-institutional coordination mechanisms, environmental studies and monitoring, training and promotion workshops, awareness raising workshops, development of educational materials and outreach, and promotion and dissemination events that will have no negative environmental impact whatsoever. With regard to Component 2, the activities will have no negative environmental impact, being management and environmental restoration activities, agreements between participating institutions, farmers training workshops and studies. In fact, the objective of all these activities is to contribute to the restoration and sustainable management and ecosystems resilience. As previously described, the implementation of recovery and restoration practices in affected ecosystems, is expected to have positive environmental effects. Restoration activities will be done with native species and the removal of beavers according to AIHTS international standards and Regulation 3254/91 of the European Union, which represent the highest standards for compassionate trapping applied worldwide.

There are social aspects to be considered during the operation in the area, namely, hunting techniques, humanitarian aspects during the intervention, dead specimens' disposal, among others. Their impact would be addressed through communication and dissemination programmes, as it is considered to have a moderately adverse social impact, given the perception of beaver as a potential charismatic species in other parts of the world. The project also reduces this risk by providing support to raising awareness and sensitivity and specific training to target audiences, including officials and decision-makers of the institutions involved in the project. During the development of the project there will be communication activities to sensitize stakeholders on IAS. The use of new practices for beaver eradication involves investment in training and disposal of traps and dead animals to the highest international standards of humanitarian treatment of animals.

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<sup>37</sup> <http://www.fao.org/environmental-social-standards/es/>

<sup>38</sup> The assignment under Category XXX is certified by the LTO, who has completed the Environmental and Social Revision Form, attached in Appendix 8.

### 3.2. RISK MANAGEMENT

#### 3.2.1 Risks and corrective measures

The following risks and corrective measures have been identified and dealt with:

Risk	Level	Mitigation measures
National and subnational authorities do not include IAS management measures, including beaver, in their institutional priorities.	Low	The NBSAP, developed through a participatory process, identifies the impact of IAS and establishes the need for IAS management. The project deals specifically with the barriers that impede the implementation of management measures by regional institutions of Magallanes. Specifically, the project mitigates the risk through awareness-raising and specific training for target audiences, including officials and decision makers of the institutions involved in the eradication of the beaver. The consultation processes carried out during the design stage, allowed the regional authorities of Magallanes to work in planning activities during project implementation, and agree on field activities related to staff training needs (according to their responsibilities, as mentioned above), the identification of pilot sites, recognition of the ecological diversity of the territory, land tenure and social conditions to classify the different realities that exist in Magallanes. Consultation and awareness raising programmes with municipalities will facilitate the implementation of local practices. Awareness, information and outreach programmes for the civil society will also help to position the need for IAS control in the territory. Coordination with the GEF 4330 project in Chile and GEF 4768 project in Argentina will allow a better positioning at the local, national and international policy level.
Potential funding gaps in the next EECF phase	Low	The project will consider the necessary steps to agree on a participatory design of the action plan which includes a financial component in terms of costs as well as funding sources. Furthermore, the economic impact study of the beaver will provide the elements to negotiate additional resources. The participation of the private sector (breeders, forest and tourism) is an additional source of funding. The adoption of practices on private lands, based on the interest of eradicate IAS, will lead to the restoration of the same. Once these groups are trained in best practices implementation, they may apply them to their own territories with the assistance of government agencies.

Risk	Level	Mitigation measures
Climate change could increase the rate of invasion or lead to another beaver-related threat	Moderate	IAS's threat to vulnerable ecosystems increases when they adapt to new conditions posing a risk of introduction or re-invasion, augmented by an increase in the number of extreme events (floods, droughts, etc.) or higher stress on native species which increases vulnerability. The Second National Communication to the UNFCCC (MMA, 2011) provides good detailed prospective models for the whole country, including the region of Magallanes, reporting on the prioritization of activities in the future management system. The project develops capacities for proactive and adaptive management enabling a more robust response to less favourable conditions as the ones projected in future climate scenarios. Climate change variables are monitored over relatively longer periods of time, beyond the PPG implementation, making difficult, during the design phase, to draw conclusions for the implementation phase. However, some conditions were identified that will help to develop strategies, namely, the role of tides and currents in the spread of the beaver, which enables to identify spread models and vulnerable sites, and hence, propose actions for beaver invasion control, management and early warning.
Local communities and/or key stakeholders are not fully committed or do not adopt the practices proposed	Low	The project supports and coordinates efforts to ensure that the plan integrates key stakeholders and understands their motivation and interests (Outcome 1.3). On the other hand, increasing institutional capacities and a thorough review of the institutional framework should reduce the number of practices against the objective of the project. Communication activities during the project aim at raising stakeholders' awareness of the IAS problem. Stakeholders of local communities, private sector, civil society, academia, were invited to participate in the design phase of this project. Workshops, site visits and landowners' visits were made to define training needs to address the problem recognized by these groups. At the local level, no stakeholders opposed to the project implementation were identified. There may be some resistance from animal defenders' groups, mainly based in the Metropolitan Region. During the implementation of the project, all internationally agreed standards in terms of humanitarian measures will be observed, because of conviction of the staff involved and to reduce the negative connotation that such intervention may have on people.

Risk	Level	Mitigation measures
There is no access to private properties.	Low	Consultations during the PPG phase and those foreseen in the project, suggest that the incorporation of farmers, as partners of the institutions participating in the project, would help to mitigate risks. By way of example, two private landowners have committed their participation in pilot activities. Agreements with private landowners were achieved during the PPG (including project endorsement letters), but given the nature of the property, their interest may lessen or the property may change ownership what would end up in new negotiations.
Restoration of ecosystems does not occur spontaneously or cannot be carried out after successful control and eradication operations	Low	There are enough pristine ecosystems in Patagonia that can provide genetic material within proximities, including the same watersheds, for the reproduction of the main plant species. The project includes restoration activities to demonstrate the most appropriate and cost-effective methods. The scientific evidence compiled during the design phase of the project provides the basis to estimate this risk as minimal. The workshop ‘Designing pilots to manage beaver invasion in Patagonia’ was held in Punta Arenas, March 2015, during the PPG phase. Reference states for ecological restoration of ecosystems and management practices were analysed. During the session, input was received from the experience of forest restoration in Torres del Paine after the fire in 2010, the restoration plan of Cofiue forest in Magallanes, the work experience of SEREMIS of the Ministry of Agriculture and the MMA with seeds and the experience of the Centre for Agricultural and Environmental Studies of Magallanes. However, it is worth noting that restoration of temperate forests takes time before showing any changes, which may not be in line with the time framework of this project. Nevertheless, if there is no negative impact caused by flooding, the ecosystem will tend to restore itself. If there is an intervention, the process may be speeded up, but the forest will not be fully recovered within three years, which is the time framework of the project.

### 3.2.2 Fiduciary risks

As per request of the Ministry of Environment<sup>39</sup>, GEF funds shall be executed by FAO according to systems, standards and regulations of the institution.

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<sup>39</sup> Official note 154897 dated 16 November 2015, appendix 11.

## SECTION 4 – IMPLEMENTATION AND MANAGEMENT ARRANGEMENTS

### 4.1. INSTITUTIONAL ARRANGEMENTS

In addition to FAO as GEF agency, the project will be executed under the responsibility of the Ministry of Environment of Chile (MMA), through the Division of Natural Resources and Biodiversity, in collaboration with the following co-executing institutions: Chile's Livestock and Agricultural Service (SAG) of the Ministry of Agriculture, the National Forestry Corporation (CONAF) of the Ministry of Agriculture and the NGO Wildlife Conservation Society (WCS). They will be responsible for ensuring coordination of the three components of the project, and coordination and collaboration with other partners.

**MMA** is the Ministry of the Republic of Chile responsible for the design and implementation of environmental policies, plans and programmes, protection and conservation of biodiversity and renewable natural and water resources, promotion of sustainable development, integrity of the environmental policy and legal regulations. It has jurisdiction over IAS management in terms of species identification and categorization, development of the national IAS control strategy and coordination of the IAS control plan implementation.

**SAG** is the official agency of the Republic of Chile, responsible for supporting the development of agriculture, forestry and livestock, through the protection and improvement of animal and plant health. It has authority over biosecurity and hunting, exercised through the Renewable Natural Resources Protection Division (DIPROREN), beaver control, training and communication in the so-called 'agricultural matrix', i.e. support to farmers and to part of the territory managed for productive purpose.

**CONAF** is a private entity under the Ministry of Agriculture, whose main task is to manage forest policy in Chile, promote the development of the forest sector and manage the National System of Protected Areas. It performs beaver control and communication in protected areas under its administration.

**WCS** is an American NGO with operations in Chile, which aim is to save wildlife and wild areas through science, conservation, action, education and inspiring people to value nature. It owns Karukinka, one of the pilot intervention areas for beaver eradication. Karukinka is a southern and remote private park, of about 300,000 ha, located in Tierra del Fuego peninsula.

Other partners involved in the project are: the Regional Ministerial Secretariat (SEREMIs) of the Ministry of Environment and Agriculture; Regional Intendency of Magallanes; Regional Council of Magallanes; National Tourism Service (SERNATUR); General Water Administration (DGA); Ministry of Public Works (MOP) Road Administration; Ministry of Public Works (MOP) Hydraulic Works; Navy; Army; Carabineros; Police of Investigation (PDI); Presidency of the Regional Council Environmental Commission; Regional Government Development Division; Municipalities of Timaukel, Primavera, Porvenir, Rio Verde, San Gregorio, Laguna Blanca, Punta Arenas and Puerto Williams; ASOGAMA; Asociación Hereford; Asociación Corriedale; Asociación de Ganaderos de Tierra del Fuego; Forestal Russfin; Universidad de Magallanes; OMORA<sup>40</sup>.

**FAO** and implementing partners will work with executing agencies of other programmes and projects in order to identify opportunities and mechanisms to facilitate synergies with other relevant projects supported by the GEF, as well as projects supported by other donors. This collaboration will be made

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<sup>40</sup>The Etnobotanical Park **Omora** is a botanical garden and protected area of 1,000 ha, located in the south of Chile, at the north of Navarino island.

through: (i) informal communications between GEF agencies and executing partners of other programmes and projects; (ii) exchange of information and materials of other projects.

The project will develop collaboration mechanisms with the following GEF initiatives:

1. *Strengthening National Framework for Invasive Alien Species Governance in Archipelago Juan Fernandez (# 4330)*: this project will provide a national framework for the beaver eradication plan in Magallanes, apart from strengthening COCEI strengthen and establish an Integrated National Programme for the Control of Invasive Species (PEEI). The MMA is also the executing agency of the project and will ensure operational coordination between the two projects.
2. *Strengthening governance for the protection of biodiversity through the formulation and implementation of the National Strategy on Invasive Alien Species (ENEI) (# 4768)*: implemented by the Government of Argentina with the support of FAO as executing agency, this project seeks to develop a strategy to fight IAS in Argentine territory. The MMA coordinates with the government of Argentina, actions that can be carried out in a more systematic way, with unified criteria (including humanitarian control practices) regarding control, disposal of dead individuals, monitoring and early warning systems in continental areas. Both projects are crucial to the eradication of beaver in Patagonia, so that threat to biodiversity of global significance can be effectively controlled (they will demonstrate the control and eradication approach in the Argentine side of the Isla Gran de Tierra del Fuego). Working seminars will be held at least annually, for close coordination..
3. *National Planning Project to support the implementation of the Strategic Plan 2011-2020 of the Convention on Biological Diversity (# 4857)*: its aim is to take effective and urgent actions to stop the loss of biological diversity by increasing awareness about the value of biodiversity and the inclusion of biodiversity considerations in productive, public management and sectoral planning.

## **4.2. IMPLEMENTATION ARRANGEMENTS**

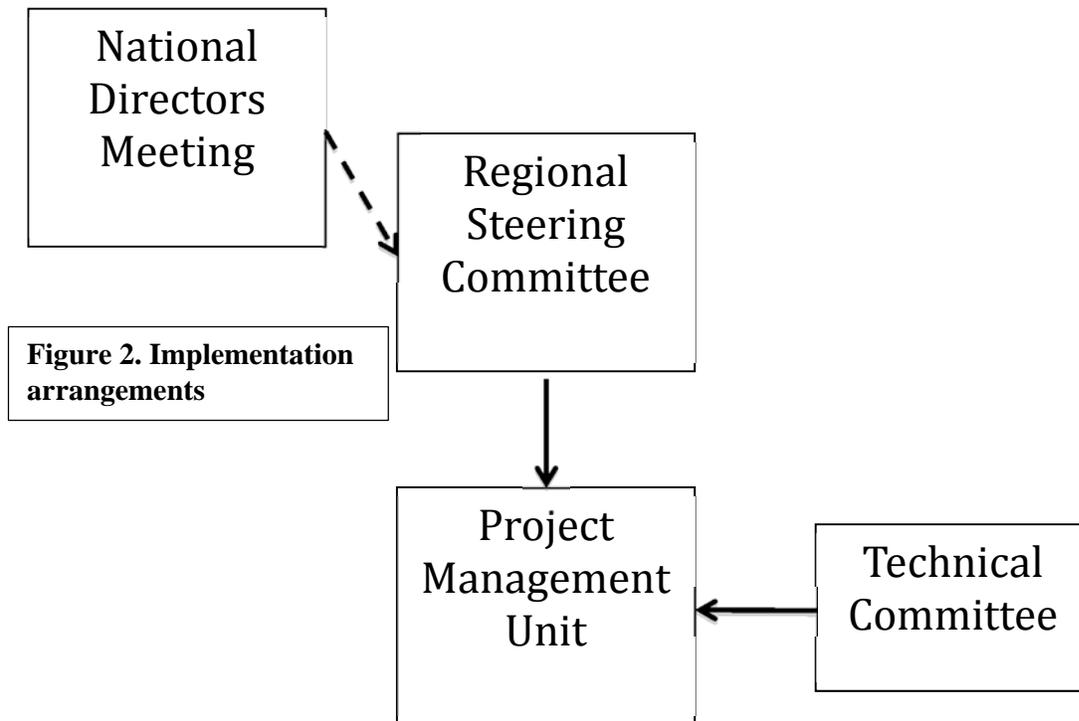
As indicated, the UN Food and Agriculture Organization (FAO) is the GEF agency responsible for monitoring and providing technical backstopping during project implementation. Likewise, at the request of the MMA (see section 3.2.2), FAO will be responsible for the financial and operational implementation of the project, besides its role as Implementing Agency. This implies that FAO will provide procurement and contract services , following FAO rules and procedures, while providing financial services to manage GEF resources.

A National Directors Meeting will be established in order to monitor and support the smooth development of the project from the national level. It will be composed of the MMA (which convenes and chairs the meeting and is represented by the Head of the Natural Resources and Biodiversity Division), CONAF (represented by its Director or delegate), SAG (represented by its Director or delegate), the SEREMI of the Ministry of Environment of the region of Magallanes, the Operational Focal Point for the GEF in the MMA, the National Project Director (see below) (from the Government side) and the FAO Representative in Chile (or delegate), and the FAO Lead Technical Officer. It will meet annually to review the progress report and make recommendations. Detailed procedures and mechanisms will be adopted at the first meeting.

The Regional Steering Committee is responsible for the specific monitoring of the project. Its functions are a) review and approve the Annual Work Plans and Budget (AWP/B) and the Project Progress Reports

(PPR), and b) provide general strategic and technical support to the Project Management Unit (PMU) (see below). The Committee will meet annually and make decisions by consensus; procedures will be defined at the first meeting. The Project Coordinator (see below) will serve as the Secretariat of the Committee; it is composed of: SEREMIs of the Environment (which convenes and chairs) and Agriculture; Regional Directors (or delegates) of SAG and CONAF; the National Project Director and the Regional Project Director (see below); FAO Lead Technical Officer; and the President of the Regional Council Environmental Commission (or delegate). The Committee meets at least once a year with no quorum requirements. The GEF Operational Focal Point at the MMA and the Coordinator of the Project ‘Strengthening governance for the protection of biodiversity through the formulation and implementation of the National Strategy on Invasive Alien Species (ENEEL)’ (GEF ID 4768) of Argentina will be invited as observers.

The Technical Committee is an advisory body that supports and advises the Project Management Unit (PMU) in technical, scientific, operational and inter-institutional coordination matters. It is composed by: Project Coordinator (which convenes and chairs); Head of the Species Section, MMA; Regional Manager of Natural Resources and Biodiversity, MMA; Director of the Renewable Natural Resources Protection Division (DIPROREN), SAG; Regional Natural Resources Manager, SAG; National Protected Areas Manager, CONAF; Regional Manager for Biodiversity Conservation, CONAF; a WCS representative and a representative of the project ‘Strengthening National Framework for Invasive Alien Species Governance in Archipelago Juan Fernandez’ (GEF ID 4330). This Committee will meet at least once a year and procedures and mechanisms will be adopted at the first meeting. The Committee will invite experts on matters to be discussed during the session, who will report to the Committee. The institutional structure of the project management is shown in Figure 2.



#### 4.2.1 Functions and responsibilities of co-executing agencies

Functions and responsibilities of main institutions involved in project implementation:

The *GEF-Chile Operational Focal Point* is responsible for the coordination of resources of the GEF national portfolio and supervise GEF-Chile projects together with GEF agencies and project executing partners.

The *MMA*, through the Natural Resources and Biodiversity Division, shall be responsible for daily supervision of the project. The *MMA* shall appoint a professional from the Natural Resources and Biodiversity Division as **National Project Director**, who will be responsible to the Government and FAO to ensure timely delivery of outputs and outcomes. S/He will supervise the **Project Management Unit (PMU)** (see below) and will monitor the activities. The *MMA* will also appoint, a professional from the SEREMI of Environment as **Regional Project Director**, who supervises administrative and technical activities of the project on a daily basis and reports to the National Project Director, and will represent the National Project Director at a regional level and in the **Project Management Unit**. The National and Regional Directors shall not be paid with GEF funds as they are part of the Government co-financing

CONAF conducts beaver control activities and communication in Protected Areas under its administration. Its role in this project will be to manage control efforts in Protected Areas of the region. CONAF will participate in the activities of Component 1, specifically, development of beaver governance and management plan. It shall lead control, monitoring and early warning processes in pilots located in protected areas under its jurisdiction, in the region of Magallanes. It is leading the pilot in Laguna Parrillar.

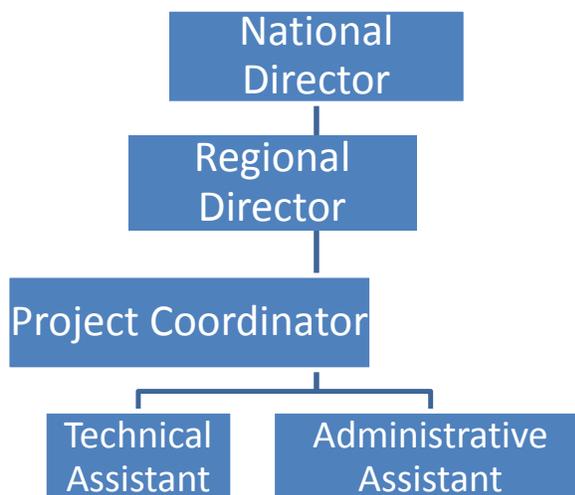
SAG supports beaver control activities, training and communication in the so-called ‘agricultural matrix’, i.e., support to farmers and within the territory actively managed for productive purposes. Specifically, it shall be responsible for managing the strategic plan of the beaver eradication project in southern Patagonia (co-financing) and has the authority to implement the project. SAG has the greatest experience in the region of Magallanes to implement the practices proposed in this project. Based on the experience gained during more than 20 years, it will establish basic criteria for control, eradication and early warning activities. It participates in the activities of Component 1 to establish the management and governance framework.

WCS acts as holder of Karukinka property where one of the eradication pilots is carried out, supports other two pilots, and participates in other activities providing experience and scientific and field operations know-how. In this project, it will manage and participate in the activities of Component 1, setting the management and governance framework. It leads the implementation of the pilot area Karukinka, develops sustained beaver control methodologies and habitat restoration processes.

Daily project management and relations with stakeholders as well as administrative, monitoring and accounting tasks are carried out by the **Project Management Unit (PMU)**. This unit will be installed at the SEREMI of the Environment of Magallanes and will be composed of a National Project Director from the *MMA*, the Regional Project Director, (Government staff); the Project Coordinator, an Administrative Assistant and a Technical Assistant (the last three hired by FAO with GEF funds). The Project Coordinator, hired by FAO with GEF funds, will be responsible for the implementation of the AWP/B and PPR and is supervised by the National Project Director.

The PMU is responsible for managing the project, specifically: (i) technical implementation of the project activities; (ii) daily monitoring of project progress and achievement of outcomes, and (iii) financial planning and procurement of goods, minor works and services be requested to FAO. The PMU will prepare and send to the FAO Representation in Chile (BH and LTO) and to the National Project Administration at the MMA, the biannual Project Progress Reports (PPR), Annual Work Plans and Budget (AWP/B) and all the necessary documentation for the preparation of the APRR (see section 4.5.3). Additionally, the PMU shall be responsible for all of the aspects related to a smooth development of the project.

Organization Chart of the PMU:



The functions of the Project Coordinator are specified in the terms of reference (see Appendix 7). Together with CONAF, SAG and WCS as co-executing institutions, the PMU at the MMA will perform the operations related to the activities of the outputs for which it is responsible, as set out in the following table:

Table 2. Responsible institutions by components, outcomes and output.

Component/Subcomponent/Output	Responsible institution
<b>C 1 Management and governance frameworks, information, monitoring, early warning, participation and communication in the Region of Magallanes</b>	
<b>O 1.1</b> Management and governance frameworks ensure effective management and control of the invasion in Magallanes archipelago and Brunswick Peninsula	
1.1.1 Strategic and financial plan for the management of beaver as an invasive species	MMA, PMU
1.1.2 Coordination and governance plan for the management of beaver as an invasive species	MMA, SAG, CONAF
1.1.3 Evaluation of current and potential economic impact of beaver in Chilean Patagonia	PMU
1.1.4 Validated regulatory framework for beaver management at municipal and regional level	PMU
<b>O 1.2</b> Decision makers have updated, systematized and available information about beaver management in Magallanes, including data on operational zoning, spread, monitoring, early detection, recovery-restoration and research.	

Component/Subcomponent/Output	Responsible institution
1.2.1 Coordinated Information, Monitoring and Early Warning System (CMWS)	MMA, PMU, WCS
1.2.2 Spread and adaptive zoning model per management unit	MMA, PMU
1.2.3 Sub Antarctic ecosystems recovery indicators applied in control and eradication pilot sites	MMA, PMU, WCS
1.2.4 Information exchange protocols at regional, national and binational level between Chile and Argentina	MMA, PMU
<b>O 1.3</b> Regional institutions and civil society recognize the importance of beaver eradication practices and restoration of the Region of Magallanes, including the recovery of riparian forests with endemic species	
1.3.1 Communication and awareness raising programmes for different target audiences	PMU
1.3.2 Capacity building programme for key stakeholders <sup>41</sup> for the management and eradication of beaver	PMU
<b>C 2 Demonstration activities of control, management and restoration in pilot areas</b>	
<b>O 2.1</b> Beaver invasion is under effective control in selected areas of native forest and peatlands ecosystem in the Region of Magallanes and in the recovery process of riparian forests with endemic species	
2.1.1 Beaver eradication and basic restoration method designed and implemented in Karukinka Park	PMU, WCS
2.1.2 Beaver eradication and basic restoration method designed and implemented in Laguna Parrillar National Reserve and downstream private lands	PMU, CONAF, WCS
2.1.3 Early Warning System (EWS) Method to be implemented in the Southeast area of Ultima Esperanza province, including the Torres del Paine National Park	PMU, SAG
2.1.4 Systematization of best practices for the eradication of beaver, invasion monitoring and early warning	PMU
<b>O 2.2</b> Beaver invasion is under effective control in multifunctional private property in the Region of Magallanes.	
2.2.1 Sustained control and restoration methodologies for multiple-use private property	PMU, WCS
2.2.2 Systematization of a 'best practices' model for multifunctional private property	PMU
<b>C 3 Results based management, monitoring, assessment and dissemination</b>	
<b>O 3.1</b> Project implementation based on a results-based management approach and application of project findings and lessons learned in future operations facilitated.	
3.1.1 Project progress assessment and monitoring system	MMA, PMU, FAO
3.1.2 Mid-Term Independent Evaluation (MTE) and Final Independent Evaluation (FIE)	FAO
3.1.3 Publication and dissemination of best practices and lessons learned	MMA, PMU, FAO

#### 4.2.2. FAO's Functions and responsibilities

##### *Role of FAO in the governance structure of the Project*

FAO will be the Implementing as well as financing and operating Agency for the project. As GEF implementing agency, FAO will provide supervision and technical guidance during the project execution. Administration of the GEF grant will be in compliance with the rules and procedures of FAO, and in accordance with the agreement between FAO and the GEF Trustee.

<sup>41</sup>Key regional actors are officials from the MMA, CONAF, SAG, WCS, including technical staff at the office and field activities.

As the GEF agency for the project, FAO will:

- Manage GEF funds in accordance with rules and procedures of FAO;
- Oversee project implementation in accordance with the project document, work plans, budgets, agreements with co-financers and the rules and procedures of FAO;
- Provide technical guidance to ensure that appropriate technical quality is applied to project activities, accordingly;
- Perform at least one annual supervision mission;
- Report to the GEF Secretariat and Evaluation Office, through the Implementation Report, on project progress and provide financial reports to the GEF Trustee.

As per request of the Chilean government (see section 3.2.2), FAO shall be the financial and operational executing agency of GEF resources, including financial management, goods procurement and hiring of services following FAO rules and procedures. As financial executing institution, FAO shall submit a biannual report to the Steering Committee (SC), including a project expenditures statement.

In accordance with this project document and the AWP/B approved by the Steering Committee, FAO shall make budget revisions to keep the budget up to date in FAO financial system and shall provide this information to the Steering Committee to ease planning and implementation of project activities. In collaboration with the PMU and the Steering Committee, FAO will participate and participate in planning, procurement and hiring processes. It will also process payments for goods, services and products requested by the PC on the basis of the AWP/B and procurement plans approved annually by the Steering Committee.

### ***Roles of FAO in the internal organization***

Roles and responsibilities of FAO staff are regulated by FAO Guide to the Project Cycle<sup>42</sup>, and its updates.

The FAO Representative in Chile will be Budget Holder (BH) and responsible for the management of GEF resources. As a first step at the project inception, the FAO Representation in Chile will establish an interdisciplinary Project Task Force (PTF<sup>43</sup>) within FAO to guide the implementation of the project.

The PTF is a consultative and management body that integrates the necessary technical qualifications of relevant FAO units to support the project. The PTF is composed of a Budget Holder, a Lead Technical Officer (LTO), the Funding Liaison Officer (FLO<sup>44</sup>) and one or more Technical Officers based at FAO Headquarters (HQ Officer<sup>45</sup>).

In coordination with the Lead Technical Officer, the FAO Representative in Chile will be responsible for timely operational, administrative and financial management of the GEF resources, including: (1) procurement of goods and hiring services for project activities, in accordance with the rules and procedures of FAO, in accordance with the approved AWP/B; (2) process payments for goods, services and products in consultation with the Project Steering Committee; (3) submit biannual financial reports to the Steering Committee on project expenditures status; (4) at least once a year, or more often if required, prepare budget revisions put to the consideration of the FAO-GEF Coordination Unit, through the Field Programme Management Information System (FPMIS ).

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<sup>42</sup> FAO Guide to the Project Cycle, Quality for Results, 2015, Appendix 4: Roles and Responsibilities of the Project Task Force Members

<sup>43</sup>Project Task Force

<sup>44</sup>Funding Liaison Officer

<sup>45</sup> HQ Officer in FAO Guide to the Project Cycle, Quality for Results, 2015.

The FAO Representative in Chile, in agreement with the PTF, shall give its no-objection to the AWP/B submitted by the PMU and the Project Progress Reports (PPR). The PPR may receive comments from the PTF and shall be approved by the LTO before the BH uploads them into the FPMIS.

The GEF Project Task Manager (PTM), will work under direct supervision of the FAO Representative in Chile and will support the supervision of project management and progress, FAO's participation in procurement and hiring processes and providing technical advice to the project, in close consultation with the Project Task Force. The PTM will be paid with GEF fee resources and will be in charge of the following:

- Review and make comments to the Project Progress Report prepared by the PMU and submit it to the BH and the LTO for approval and then to the FAO-GEF Coordination Unit in the Investment Centre Division (TCI) for clearance and uploading to the FPMIS.
- Participate in annual project progress review and planning workshops, provide comments, and advise the FAO Representative on the AWP/B approval, in consultation with the LTO and the FAO-GEF Coordination Unit.
- Review contracts and procurement documentation for those contracts and procurement to be financed by GEF resources, and advise the FAO Representative on approval, in consultation with the LTO and FAO-GEF Coordination Unit.
- Review co-financing reports submitted annually (June) by the PMU.
- Review biannual financial reports prepared by the FAO Office in Chile, prior sending them to the PMU to prepare the PPR.
- Conduct periodic supervision missions and support the provision of FAO technical and outcome-based management input to the project.
- Support the LTU in preparing the annual Project Implementation Review (PIR).
- Participate in the project Directors Meeting upon request of the FAO Representative.
- Participate in staff interview and selection panels for key positions, to be financed by GEF resources. The panels will be composed of the project Management Committee.
- Prepare draft TOR for mid-term and final evaluations in consultation with the FAO Evaluation Office, the LTO, the FAO-GEF Coordination Unit, the project executing partners, support the organization of the evaluations, contribute to the development of an eventual agreed adjustment plan in project execution approach and supervise its implementation.

The Lead Technical Officer (LTO) for the project will be the Forestry Officer of the FAO Regional Office for Latin America and the Caribbean (RLC FAO). The role of the LTO is essential to ensure the comparative advantage of FAO in terms of projects implementation. The LTO shall oversee and provide technical support during project implementation. The LTO shall support the BH in the implementation and monitoring of the AWP/B, including work plan and budget revisions. The LTO is responsible for providing or obtaining technical approval of inputs and technical services hired by the Organization

In addition, the Lead Technical Officer (LTO) will provide technical backstopping to the project team to ensure the delivery of quality technical outcomes. The LTO will coordinate the provision of appropriate technical support from FAO units that make up the Project Task Force, to respond to requests from the Project Steering Committee. The LTO shall be responsible for:

- Review and giving no-objections to the terms of reference of consultancies and contracts as well as the *curriculum vitae* and technical proposals preselected by the PMU for key positions, minor works and services financed by GEF resources.
- Supported by the FAO Representative in Chile, review and ensure clearance of final technical outputs delivered by consultants and other contract holders financed by GEF resources, before proceeding with the final payment.
- At the request of the Technical Committee, collaborate with the revision and technical observations of project's output and draft reports.
- Review and approve project progress reports submitted by the CNP in coordination with the BH.
- Support the FAO Representative in reviewing and authorizing the AWP/B submitted by the CNP for approval by the Steering Committee.
- Oversee the technical quality of the Project Progress Reports (PPR). The PPR will be prepared by the CNP with inputs from the project team. The BH will submit the PPR to the FAO-GEF Coordination Unit for comments and to the LTO for technical approval. The PPR will be submitted to the PSC for clearance twice a year. The BH will upload cleared PPR to the FPMIS.
- Supervise the technical quality of the PIR annually. The PIR will be drawn up by the CNP with inputs from the EP. The PIR will be submitted to the BH and to the FAO-GEF Coordination Unit for clearance and finalization. The FAO-GEF Coordination Unit will submit the PIR to the GEF Secretariat and the GEF Evaluation Office as part of the annual follow-up report of the FAO-GEF portfolio evaluation. The LTO shall ensure that the PC and PT have provided information on co-financing received throughout the year to be included in the PIR.
- Carry out annual project supervision missions (or as needed).
- Review TOR for the mid-term evaluation; participate in the evaluation mission, including the mid-term workshop with all key project stakeholders; develop an eventual agreed adjustment plan in project execution approach and supervise its implementation.
- Review TOR for the final evaluation; participate in the evaluation mission including the final workshop with all key stakeholders; development and follow-up on recommendations on how to ensure sustainability of project outputs and outcomes after the end of the project.

The HQ Technical Officer is a member of the PTF, as a mandatory requirement of the FAO Guide to the Project Cycle. The HQ Technical Officer has relevant technical knowledge – within FAO technical departments – in line with project thematic. The HQ Technical Officer will advise the LTO to ensure compliance with FAO corporate technical standards during project execution, namely:

- Supports the LTO in monitoring and reporting on the implementation of socio-environmental plans into moderate-risk projects. In this project, the HQ Officer will support the LTO in monitoring and reporting on the risks identified and mitigation measures (Appendix 4), in close coordination with the project partners.
- Provides technical support to project work plan.
- Approves technical reports and supervise the quality of Project Progress Reports (PPR – see subsection 3.5).
- Supports the LTO and PTF in project implementation and monitoring, if required.
- Supports the LTO and BH in the development of the first draft TOR of the team in charge of the final evaluation. Reviews the composition of the evaluation team and supports the evaluation activity.

The FAO-GEF Coordination Unit acts as Funding Liaison Officer. The FAO-GEF Coordination Unit will review the Project Progress Reports and financial reports and clear budget revisions based on the

AWP/B. This unit will review and approve the annual PIR and carry out supervision missions, as necessary. The PIR will be included in the annual follow-up report of the FAO-GEF portfolio evaluation that the Unit will send to the GEF. The Unit may also participate in mid-term and final evaluations and the development of corrective actions in the project implementation strategy to mitigate eventual risks that may affecting the timely and effective implementation of the project. The Unit, in collaboration with the FAO Finance Division, request transfer of project funds from the GEF Trustee, based on semi-annual projections of need for funds.

The FAO Finance Division will provide annual Financial Reports to the GEF Trustee and, in collaboration with the FAO-GEF Coordination Unit, will put biannual funds request to the GEF Trustee.

### **4.3. FINANCIAL PLANNING AND MANAGEMENT**

The total cost of the project is **USD7,858,824** of which **USD2,153,882** (two million one hundred fifty-three thousand eight hundred eighty-two US dollars) will be financed by a GEF grant and **USD5,704,942** will be co-financed by MMA, CONAF, SAG, WCS, FAO, Teraike SA and Estancia Entre Rios. FAO, as GEF agency, will be responsible only for the execution of GEF resources and FAO co-financing.

#### **4.3.1. Financial plan (by component, output and co-financier)**

Table 3 shows the cost by component, output and co-financier. Table 4 shows sources and types of confirmed co-financing. FAO, as GEF implementing agency, shall only be responsible for the execution of the GEF resources and FAO co-financing.

Table 3 Financial plan (by component, output and co-financier)

Component/output	MMA	CONAF	SAG	WCS	OTROS	FAO	Total Co-financing	% Co-financing	GEF	% GEF	Total
<b>Component 1: Management and governance framework, information, monitoring, early warning, participation and communication in the Region of Magallanes</b>	<b>1.100.358</b>	<b>1.271.042</b>	<b>828.123</b>	<b>240.112</b>	-	<b>69.000</b>	<b>3.508.634</b>	<b>77%</b>	<b>1.047.816</b>	<b>23%</b>	<b>4.556.450</b>
1.1.1 Strategic and financial plan for the management of beaver as an invasive species	108.486	125.314	81.646		-	25.000	340.446	65%	183.274	35%	<b>523.720</b>
1.1.2 Coordination and governance plan for the management of beaver as an invasive species	108.486	125.314	81.646		-		315.446	76%	101.624	24%	<b>417.070</b>
1.1.3 Evaluation of current and potential economic impact of beaver in Chilean Patagonia	108.486	125.314	81.646		-		315.446	70%	137.184	30%	<b>452.630</b>
1.1.4 Validated regulatory framework for beaver management at municipal and regional level	108.486	125.314	81.646		-		315.446	80%	79.484	20%	<b>394.930</b>
1.2.1 Coordinated Information, Monitoring and Early Warning System (CMWS)	108.486	125.314	81.646	144.067			459.513	71%	186.145	29%	<b>645.658</b>
1.2.2 Spread and adaptive zoning model per management unit	108.486	125.314	81.646				315.446	88%	42.384	12%	<b>357.830</b>
1.2.3 Sub Antarctic ecosystems recovery indicators applied in control and eradication pilot sites.	108.486	125.314	81.646	96.045		15.000	426.491	93%	31.184	7%	<b>457.675</b>
1.2.4 Information exchange protocols at regional, national and binational level between Chile and Argentina	123.984	143.216	93.310			9.000	369.510	89%	47.769	11%	<b>417.279</b>
1.3.1 Communication and awareness raising programmes for different target audiences	108.486	125.314	81.646			20.000	335.446	72%	129.564	28%	<b>465.010</b>

1.3.2 Capacity building programme for key stakeholders for the management and eradication of beaver	108.486	125.314	81.646				315.446	74%	109.204	26%	<b>424.650</b>
<b>Component 2: Demonstration activities of control, management and restoration in pilot areas</b>	<b>340.956</b>	<b>393.844</b>	<b>256.601</b>	<b>624.291</b>	<b>18.125</b>	<b>120.000</b>	<b>1.753.817</b>	<b>69%</b>	<b>796.588</b>	<b>31%</b>	<b>2.550.405</b>
2.1.1 Beaver eradication and basic restoration method designed and implemented in Karukinka Park			34.991	384.179		20.000	439.170	62%	264.792	38%	<b>703.962</b>
2.1.2 Beaver eradication and basic restoration method designed and implemented in Laguna Parrillar National Reserve and downstream private lands	123.984	125.314	81.646		9.063	20.000	360.006	76%	114.936	24%	<b>474.942</b>
2.1.3 Early Warning System (EWS) Method to be implemented in the Southeast area of Ultima Esperanza province, including the Torres del Paine National Park	77.490	107.412	34.991			20.000	239.893	65%	130.711	35%	<b>370.604</b>
2.1.4 Systematization of best practices for beaver eradication, invasion monitoring and early warning	46.494	53.706	34.991			20.000	155.191	65%	81.943	35%	<b>237.134</b>
2.2.1 Sustained control and restoration methodologies for multiple-use private property	46.494	53.706	34.991	240.112	9.063	20.000	404.365	71%	167.703	29%	<b>572.069</b>
2.2.2 Systematization of a 'best practices' model for multifunctional private property	46.494	53.706	34.991			20.000	155.191	81%	36.502	19%	<b>191.693</b>
<b>Component 3: Results based management, monitoring, evaluation and dissemination</b>	<b>30.996</b>	<b>35.804</b>	<b>23.327</b>	<b>48.022</b>	<b>-</b>	<b>20.000</b>	<b>158.150</b>	<b>43%</b>	<b>207.012</b>	<b>57%</b>	<b>365.162</b>
3.1.1 Project progress assessment and monitoring system	30.996	35.804	23.327	48.022		10.000	148.150	74%	52.931	26%	<b>201.081</b>

3.1.2 Mid-Term Independent Review (MTR) and Final Independent Evaluation (FIE)						10.000	10.000	9%	95.985	91%	<b>105.985</b>
3.1.3 Publication and dissemination of best practices and lessons learned							-	0%	58.096	100%	<b>58.096</b>
<b>Project Management</b>	77.490	89.510	58.319	48.022		11.000	<b>284.341</b>	<b>73%</b>	<b>102.566</b>	<b>27%</b>	<b>386.907</b>
<b>Total Project</b>	<b>1.549.800</b>	<b>1.790.200</b>	<b>1.166.370</b>	<b>960.447</b>	<b>18.125</b>	<b>220.000</b>	<b>5.704.942</b>	<b>73%</b>	<b>2.153.982</b>	<b>27%</b>	<b>7.858.924</b>

Table 4 Confirmed sources of co-financing

Co-financing sources	Name	Type	Amount (USD)
Central government	MMA	Cash	124,760
Central government	MMA	In kind	1,425,040
Central government	CONAF	Cash	114,200
Central government	CONAF	In kind	1,676,000
Central government	SAG	Cash	16,965
Central government	SAG	In kind	1,149,405
NGO	WCS	Cash	96,332
NGO	WCS	In kind	864,115
Private sector	TERAIKE S.A.	In kind	2,411
Private sector	Estancia Entre Ríos	Cash	2,680
Private sector	Estancia Entre Ríos	In kind	13,034
GEF Agency	FAO	Cash	20,000
GEF Agency	FAO	In kind	200,000
<b>Total Co-financing</b>			<b>5,704,942</b>

#### 4.3.2. GEF inputs

GEF contributions are distributed into three components, namely: i) strengthening the institutional framework and capacities of stakeholders in the region of Magallanes to implement a comprehensive and coordinated policy for beaver management; ii) conducting pilot and demonstration activities to increase technical capabilities and scale capacity to manage the problem from a territorial perspective, and (iii) activities related to project supervision and evaluation.

#### 4.3.3. Government inputs

Main contribution comes from the Government of Chile through the MMA (USD1,549,800), SAG (USD1,166,370) and CONAF (USD1,790,200). These investments are related to the staff assigned to eradication tasks (trapping, disposal of dead individuals), field verification of the eradication and control of re-invasions, technical teams in charge of monitoring activities and movement within protected areas, staff training workshops in CMWS protocols and management, staff assigned to early warning activities, involvement of the authority in the governance frameworks created by the project for decision-making. Other items covered include the cost of project management, some materials and equipment for field testing, media coverage, community relations, meetings and surveys.

#### 4.3.4. FAO inputs

FAO will contribute USD220,000 broken down as follows: an investment of USD20,000 in cash, from the regular programme of the organization, in the development of learning modules on alien species control and management, including the 'Pest and Disease Prevention for Food Security' course. This module will be used in training programmes for CONAF, SAG and MMA staff. It will standardize the knowledge on invasive species types, characteristics and impact. This will contribute directly to capacity building outputs of component 1 of the project and to the communication strategy. On the other hand, an investment of USD200,000 in cash and in kind, in man hours and cost of field trips of technical staff

who provide advice to the project, on issues related to pest management in the agricultural and forestry sectors, risk management and good management practices of alien species and forest and agricultural systems recovery processes.

#### **4.3.5. Other co-financiers' inputs**

The NGO WCS provides in-kind and cash co-financing for the allocation of staff, operational costs, database and other assets for the programme 'Conservation in action: control of alien species and recovery of native ecosystems in Tierra del Fuego', as well as access to assets and infrastructure and to different capacities. WCS contributes with experience in control and restoration monitoring. The experience gained over years of management of Karukinka area and the authorization to manage the area, will allow the eradication pilot of component 2 of the project to be implemented. Its contribution amounts to USD960,447.

Two private properties, Teraike SA and Estancia Entre Ríos, contribute with co-financing control and eradication pilot activities in multifunctional private property for component 2 (man hours of farm workers, logistics and supplies). These contributions amount to USD18,125.

#### **4.3.6. Financial management of and reporting on GEF resources**

Financial management and reporting on GEF resources will be made according to FAO rules and procedures and in accordance with the agreement between FAO and the GEF Trustee. In accordance with the activities detailed in the budget, FAO will make disbursement, procurement and contracts for the total amount of GEF resources.

**Financial records.** FAO shall maintain a separate account in US dollars for the GEF resources for the project, showing income and expenditures. Expenditures incurred in currencies other than US dollars shall be converted to US dollars at the operational United Nations exchange on the date of the transaction. FAO will manage the project in accordance with its rules, regulations and directives.

**Financial reports.** The BH shall prepare every six months project expenditure accounts and final accounts for the project, showing amount budgeted for the year, amount expended since the beginning of the year, and separately, the un-liquidated obligations as follows:

1. 1. Details of project expenditures on outcome-by-outcome basis, reported in line with Project Budget (Appendix 3 of this Project document), as at 30 June and 31 December each year.
2. 2. Final accounts on completion of the Project on a component-by-component and outcome-by-outcome basis, reported in line with the Project Budget (Appendix 3 of this Project document).
3. 3. A final statement of account in line with FAO Oracle Project budget codes, reflecting actual final expenditures under the Project, when all obligations have been liquidated.

**Financial statements:** Within 30 working days as of the end of each semester, that is, on or before July 31 and January 31, the FAO Representative in Chile will issue six-monthly statements of GEF resources expenditures, to be submitted to the Steering and Technical Committees, which will be included in the PPR. The purpose of the biannual financial report is to compare the expenses incurred by the project compared to the budget, thereby monitoring the progress of the project and reconcile the significant progress during the semester. The financial report shall contain information that will serve as the basis for a periodic budget revision.

The BH will send these financial statements for review and monitoring by the LTO and the FAO-GEF Coordination Unit. Financial reports for submission to the donor (GEF) will be prepared in accordance with the provisions of the Financial Procedures Agreement between FAO and the GEF Trustee and submitted by the FAO Finance Division.

### **Responsibility for Cost Overruns.**

The BH shall utilize the GEF project funds in strict compliance with the Project Budget (Appendix3) and the approved AWP/B. The BH shall be authorized to make variations of the project budget provided that the total allocated for the specific budgeted project component is not exceeded as per the project Outcomes Framework (Appendix 1). A budget review by the BH will be submitted to the LTO and the FAO-GEF Coordination Unit for approval, at least once a year and through the FPMIS. Cost overruns shall be the sole responsibility of the Budget Holder.

**Audit.** The project shall be subject to the internal and external auditing procedures provided for in FAO financial regulations, rules and directives and in keeping with the Financial Procedures Agreement between FAO and the GEF Trustee.

The audit regime of FAO consists of an external audit provided by the Auditor-General (or persons exercising an equivalent function) of a member nation appointed by the governing bodies of the Organization and reporting directly to them. An internal audit is headed by the Inspector-General of FAO, who reports directly to the Director-General. This system operates as an integral part of the Organization according to the policies established by the Senior Management, and reports directly to the Governing Body. Both audits are required under the Basic Texts of FAO, which establish a framework of terms of reference of each. Internal audits of the accounts, accounting records, bank reconciliation and asset verification take place at FAO field offices, cyclically.

**Disbursement of Funds:** FAO shall transfer the funds for the AWP/B approved by the Regional Steering Committee each year. Disbursements exceeding USD5,000 shall require approval of the National Project Director. Details shall be provided during the inception workshop.

An estimated GEF grant of USD306,156 will be transferred to WCS through a Letter of Agreement (LOA), for services related to the following outputs (see Appendix 9):

- 1.2.1 Coordinated Information, Monitoring and Early Warning System (CMWS)
- 1.2.3 Sub Antarctic ecosystems recovery indicators applied in control and eradication pilot sites.
- 2.1.1 Beaver eradication and basic restoration method designed and implemented in Karukinka Park.
- 2.1.2. Pilot beaver management practices, in its baseline component within Laguna Parrillar National Reserve.
- 2.2.1 Sustained control and restoration methodologies for multiple-use private property.

For this, WCS shall prepare and submit to the Regional Steering Committee, together with the AWP/B, a detailed budget to facilitate the predictability of the needed funds for the year. For the LOA with WCS, FAO shall transfer the reported amount for a six-month period as stated in the AWP/B, upon delivery of a six-month work plan and budget to facilitate the predictability of the needed funds. The first disbursement shall be a maximum of 20 per cent of the LOA and advanced to WCS within one month as of the signing of the same and the delivery of a six-month work plan based on the AWP/B, in order to carry out the project activities funded by the GEF, as described in the Project Document.

For the following disbursement, WCS shall prepare and submit to the PMU an updated six-month plan including following six-month budget, a progress report of outputs under WCS responsibility (see sections 4.2.1 and 4.5.2) and six-monthly statements of expenditures of GEF resources. Once these reports are approved by FAO and the national Project Manager, FAO shall transfer the funds upon authorization of the national Project Manager. The FAO Representative in Chile supported by the PTM, should certify that reporting requirements under the Letter of Agreement have been met and that project progress reports for the activities completed have been submitted to and accepted by FAO as showing satisfactory management and use of GEF resources. Reports should be submitted to the LTO for review and the GEF Coordination Unit for review and clearance before funds transfers. All approved reports shall be posted on the FPMIS.

#### **4.4. PROCUREMENT**

At the request of the Government of Chile, FAO will procure the equipment and services provided for in the detailed budget (Appendix 3 of this Project Document) and in the AWP/B following FAO rules and regulations.

It is necessary a careful planning of procurement and contracts to ensure that goods, services and contracted works are received at the right time and according to the ‘best value for money’ principle and to the rules and regulations of FAO. An analysis of the needs and constraints is required, including a reasonable projection of the time required to conduct a procurement process. Procurement and output delivery for technical cooperation projects follow the rules and procedures of FAO for the procurement of materials, equipment and services (i.e., sections 502 and 507 of the Manual). Section 502 ‘Procurement of Goods, Works and Services’, establishes the principles and procedures that apply to the acquisition of all goods, works and services by the Organization in all its offices, except for procurements described in Appendix A – Procurements that are not governed by section 502 of the Manual. On the other hand, Section 507 of the Manual sets out the principles and regulations governing the use of Letters of Agreement (LOA) on the part of FAO for an adequate procurement of services from eligible entities in a transparent and impartial manner, considering cost and efficiency to achieve an optimum combination of expected benefits and costs (‘best value for money’).

The BH shall prepare an annual procurement plan for main services and products, which will be the basis of procurement orders during the implementation. The first procurement plan will be updated during the project inception. The plan should include a description of the goods, services and works to be procured, the estimated budget and the source of funds, the schedule of the procurement process and methodology. When accurate information is not available, the procurement plan shall provide at least reasonable projections, which will be adjusted as the information become available.

Before the commencement of procurement, the Project Coordinator shall submit the project Procurement Plan (Appendix 5) to the Steering Committee for approval. The plan will be reviewed during the inception workshop and shall be approved by the FAO Representative in Chile. The procurement plan shall be updated by the Project Coordinator every six months and submitted to and cleared by the FAO Representative in Chile.

Procurements and contracts within the framework of the LOA with WCS are also part of the supervision procedure of this procurement plan, which is described in the following paragraph. The procurement plan shall be updated by the PMU every six months and submit it to and cleared by the FAO Representative in Chile.

The supervision of contracting and procurement processes will be executed as follows:

- All individual consultant contracts will be subject to a selection panel and prior clearance of contracting process and *Curriculum Vitae* (CVs);
- All consultant firms or NGOs contracts will be subject to Regional Steering Committee clearance of contracting process, Terms of Reference and technical proposals;
- All procurement of goods which are not included into the annual procurement plan, will be subject to prior clearance of the Regional Steering Committee, of bidding process of material and offers, technical specifications and/or price quotation comparison;
- All documentation related to non-expendable procurement and non-consultancy services related to training, workshops and WCS events under the LOA, shall be submitted to FAO for review together with the biannual financial statements and expenditure reports.

#### **4.5. MONITORING AND REPORTING**

Monitoring and evaluation of progress in achieving project outcomes and objectives will be done based on the Targets and indicators established in the Project Results Framework (Appendix 1 and described in section 2). The project monitoring and evaluations has been budgeted at USD130,000 (see section 4.5.4). Monitoring and evaluation activities will follow FAO and GEF monitoring and evaluation policies and guidelines. The monitoring and evaluation system will also facilitate learning and replication of project outcomes and lessons in relation to the comprehensive natural resources management.

##### **4.5.1. Oversight and monitoring responsibilities**

The monitoring and evaluation roles and responsibilities specifically described in the project Monitoring Table (see below), will be undertaken through: (i) day-to-day monitoring and project progress supervision missions (PMU); (ii) technical monitoring of indicators to measure a) beaver control and eradication mechanism, b) the number of people trained, c) forest hectares and channels recovered, d) published control, eradication and early warning protocols, e) communication strategy (PMU and MMA and coordination with partners; (iii) mid-term and final evaluations (independent consultants and FAO Evaluation Office); and (iv) monitoring and supervision missions (FAO).

At the beginning of the GEF project implementation, the PMU will establish a project progress monitoring system. Participatory mechanisms and methodologies will be developed to support outcome and output indicators monitoring and evaluation. During the inception workshop (see section below), monitoring and evaluation tasks will include: (i) presentation and clarification (if needed) of the Project Outcomes Framework with all project stakeholders; (ii) review of the monitoring and evaluation indicators and their baseline; (iii) draft clauses that have to be included in consultants' contracts to ensure they comply with monitoring and evaluation reporting functions (if appropriate); and (iv) clarification of the respective monitoring and evaluation tasks among the different project stakeholders. The Project coordinator will prepare a draft of the monitoring and evaluation matrix which shall be discussed and approved by all key stakeholders during the inception workshop. The monitoring matrix shall operate as management instrument for the PCand Project Partners for: i) biannual monitoring of outcome indicators; ii) annual monitoring of outcome indicators; iii) definition of responsibilities and means of verification; iv) selection of the data processing methodology.

The Monitoring Plan will be prepared by the project Coordinator during the first quarter of Year 1 and validated by the PSC. The Monitoring Plan will be based on the Monitoring Table (Table 5) and the Monitoring Matrix and will include: i) the updated outcomes matrix, with clear indicators disaggregated by year; ii) updated baseline, if necessary, and selected tools for information gathering; iii) a description

of the monitoring strategy, including roles and responsibilities for data collection and processing, reporting flow, monitoring matrix and brief analysis of how and when each indicator will be measured. The project activities could coincide with data collection; iv) updated implementation arrangements, when necessary; v) inclusion of indicators of the GEF tracking tools, data collection and monitoring strategy for the mid-term and final evaluation vi) evaluation workshops schedule, including self-assessment techniques.

The continuous monitoring of the project implementation will be the responsibility of the Project Coordinator and will be driven by the preparation and implementation of an AWP/B based on biannual PPRs. The preparation of the AWP/B and biannual PPRs will represent the output of a unified planning process among main project stakeholders. As tools for outcome-based management, the AWP/B will identify the actions put forward for the coming year and provide the necessary details on output and outcome Targets, and the PPRs will report on the monitoring of the implementation of actions and the achievement of output Targets. Specific inputs to the AWP/B and the PPRs will be prepared based on participatory planning and progress review with all stakeholders that will be coordinated and facilitated through project planning and progress review workshops. These contributions will be consolidated by the Coordinator in the draft AWP/B and the PPRs.

There will be an annual project planning and progress review with the participation of the project partners to finish the AWP/B and the PPR. Once finished, the AWP/B and the PPRs will be submitted to the FAO LTO for technical approval and to the Steering Committee for review and clearance. The AWP/B will be developed in a manner consistent with the Project Outcomes Framework to ensure adequate fulfilment and monitoring of project outputs and outcomes.

Following the approval of the Project, the year one AWP/B will be adjusted (either reduced or expanded in time) to synchronize it with the annual reporting calendar. In subsequent years, the AWP/B will follow an annual preparation scheme in line with the reporting cycle as specified in section 4.5.3.

#### **4.5.2. Indicators and information sources**

In order to monitor project outputs and outcomes including inputs to global environmental benefits, specific indicators have been established in the Project Outcome Framework (see Appendix 1). The Outcomes Framework indicators and means of verification will be applied to monitor both project performance and impact. Following FAO monitoring procedures and progress reporting formats, data collected will be sufficiently detailed to be able to track specific outputs and outcomes, and flag project risks early on. Output Target indicators will be monitored every six months, and outcome Target indicators will be monitored on an annual basis, if possible, or at least, in the mid-term and final evaluations.

The project output and outcome indicators have been designed to monitor biophysical and socioeconomic impacts and the effective progress in capacity building for biodiversity management and conservation at political, legal and ecosystem level. Key indicators of the project are presented below.

Outcomes	Key indicators	Means of verification
<p>1.1 Management and governance framework ensure effective management and control of the invasion in the Magallanes Archipelago and the Brunswick Peninsula.</p>	<p>a) 6/13 points on the GEF tracking tool (section VI on IAS, questions 1,2,3)</p> <p>b) Beaver control and eradication mechanism for the Region of Magallanes, designed and validated with the participation of all stakeholders<sup>46</sup></p> <p>c) 13,229,700 ha (Region of Magallanes excluding) vulnerable to beaver invasion, under effective management and control of beaver invasion.</p>	<p>GEF tracking tool completed during mid-term and final evaluation</p> <p>Summary report of beaver management mechanisms and governance arrangements</p> <p>Validation meeting minutes</p> <p>Field monitoring reports.</p> <p>PIR</p> <p>M&amp;E reports</p>
<p>1.2 Decision makers have updated, systematized and available information about beaver management in Magallanes, including data on operational zoning, spread, monitoring, early detection, recovery-restoration and research</p>	<p>a) 13/16 points on the GEF tracking tool (section VI on IAS, questions 4,5,6);</p> <p>b) Coordinated Information, Monitoring and Early Warning System (CMWS), already designed and under implementation.</p>	<p>GEF tracking tool completed during mid-term and final evaluation</p> <p>CMWS Platform</p> <p>PIR</p> <p>M&amp;E reports</p>
<p>1.3 Regional institutions and civil society recognize the importance of beaver eradication practices and restoration in the Region of Magallanes, including the recovery of riparian forests with endemic species.</p>	<p>a) 75% Officials of the MMA, SAG and CONAF, recognize the importance of the eradication of invasive species for biodiversity and productive areas of the Region.</p> <p>b) Personnel of the MMA, SAG and CONAF assigned to control, management and eradication of beaver, implements best practices.</p> <p>c) 3000 members of civil society recognize the impact of beaver as an invasive species in agricultural systems and vulnerable ecosystems.</p>	<p>List of officials.</p> <p>List of officials involved in early warning</p> <p>Lists of people who have participated in campaigns</p> <p>PIR</p> <p>M&amp;E reports</p>

<sup>46</sup>The plan includes budget and funding sources, regulatory aspects, governance mechanisms and procedural protocols. Led by the MMA, CONAF, SAG, Regional Government with the participation of the WCS and civil society. The plan is designed under the *Strategic Plan for the Eradication of the Beaver Project in Southern Patagonia* (EECP).

Outcomes	Key indicators	Means of verification
2.1 Beaver invasion is under effective control in selected areas of native forest and peatlands ecosystem in the Region of Magallanes and in the recovery process of riparian forests with endemic species <sup>47</sup>	a) 68,543 ha/574km of channels under eradication of beaver and basic restoration (i. watercourses freed from beavers recovered to similar conditions as those watercourses not affected by beavers; ii. organic matter in sediments diminishes in the basins freed from beavers)  b) 1,499,100 ha/13,660 km of channels under proven early detection of beaver invasion	Verification reports of areas free of beaver  PIR  M&E reports
2.2 Beaver invasion is under effective control in multifunctional private property in the Region of Magallanes.	a) 45,243 ha/450 km of channels in multifunctional private property free of beaver and under restoration  b) 1,000 ha of forests in process of recovery (recovery of lenga trees <i>Nothofagus pumilio</i> and Antarctic beeches <i>Nothofagus Antarctica</i> in progress in affected areas)	Verification reports of areas free of beavers  PIR  M&E reports

Main information sources to support the monitoring and evaluation programme:

- a) Coordinated Information, Monitoring and Early Warning System.
- b) Agreements with stakeholders in participatory workshops, field visits to pilot areas and others, to collect data on progress status.
- c) Project progress reports prepared by the PMU with inputs from all project stakeholders.
- d) Consultant reports.
- e) Training workshops evaluations and reports.
- f) Mid-term and final evaluations from independent consultants.
- g) Financial reports and budget reviews.
- h) PIR prepared by the FAO LTO, supported by the OG and the PMU.
- i) FAO supervision missions' reports.

#### 4.5.3. Reporting schedule

Specific reports that will be prepared under the monitoring and evaluation program are: (i) Project inception report; (ii) Annual Work Plan and Budget (AWP/B); (iii) Project Progress Reports (PPRs); (iv) Annual Project Implementation Review (PIR); (v) Technical reports; (vi) Co-financing reports; and (vii) Final Report. In addition, in relation to mid-term and final evaluations the GEF<sup>48</sup> Tracking Tool (Appendix 4) will be completed to compare progress against the baseline established during project preparation.

Project Inception Report: after FAO approval of the project, an inception workshop will be held. Immediately after the workshop, the PMU will prepare a project inception report in consultation with the PTM of FAO office in Chile and other project stakeholders. The report will include a description of the institutional roles and responsibilities and coordinating action of project stakeholders, project progress and inception activities and an update of any changes in external conditions that may affect project implementation. It will also include a detailed first year AWP/B, a detailed project monitoring plan based on the monitoring and evaluation plan presented in section 4.5.4 (see below). The draft of

<sup>47</sup>Indicators of biodiversity recovery in terrestrial environments are applied to periods longer than those of the project (10-20 years).

<sup>48</sup>GEF Biodiversity Tracking Tool.

inception report will be circulated to FAO and the Management and Steering Committees for review and comments before its finalization, no later than three months after project inception. The report shall be cleared by the BH, LTO, and the FAO-GEF Coordination Unit that will upload the AWP/B to the FPMIS.

Annual Work Plan and Budget (AWP/B): the PMU shall submit to the Regional Steering Committee a draft AWP/B no later than 20 January each year. The AWP/B shall include detailed activities to be implemented by project outputs and divided into monthly timeframes and goals and milestone dates for output indicators to be achieved during the year. A detailed project budget for the activities to be implemented during the year shall also be included together with all monitoring and supervision activities required during the year. The OG will circulate the draft AWP/B to the FAO interdisciplinary Project Task Force for review and shall consolidate and submit the FAO comments and those of the Technical Committee to the PMU who will incorporate them. The final AWP/B shall be sent to the Regional Steering Committee for approval and to the FAO for final clearance and upload to FPMIS by the OG.

Project Progress Reports (PPR): The PPRs are used to identify constraints, problems or bottlenecks that impede timely implementation and take appropriate remedial action. PPRs will be prepared based on the systematic monitoring of output and outcome indicators identified in the Project Results Framework (Appendix 1), AWP/B and M&E Plan. Each semester the National Project Coordinator (NPC) will prepare a draft PPR, and will collect and consolidate any comments from the FAO PTF. The NPC will submit the final PPRs to the FAO Representative in Mexico every six months, prior to 10 June (covering the period between January and June) and before 10 December (covering the period between July and December). The July-December report should be accompanied by the updated AWP/B for the following Project Year (PY) for review and no-objection by the FAO PTF. Once these comments have been incorporated, the LTO will give his/her technical clearance, the BH will approve and remit the final PPR to the Project Steering Committee (PSC) for final approval. The BH will upload the PPRs in FPMIS.

Annual Project Implementation Review (PIR): The PC, under the supervision of the LTO and BH, with the support of the PTM and in coordination with the national project partners, will prepare a draft annual PIR report<sup>49</sup> covering the period July (the previous year) through June (current year) no later than July 1<sup>st</sup> every year. The LTO will finalize the PIR and will submit it to the FAO-GEF Coordination Unit for review by July 10<sup>th</sup>. The FAO-GEF Coordination Unit, the LTO, and the BH will discuss the PIR and the ratings<sup>50</sup>. The LTO is responsible for conducting the final review and providing the technical clearance to the PIR(s). The LTO will submit the final version of the PIR to the FAO-GEF Coordination Unit for final approval. The FAO-GEF Coordination Unit will then submit the PIR(s) to the GEF Secretariat and the GEF Independent Evaluation Office as part of the Annual Monitoring Review of the FAO-GEF portfolio. The PIR will be uploaded to FPMIS by the FAO-GEF Coordination Unit.

Technical Reports: technical reports will be prepared as part of project outputs and to document and share lessons learned. The drafts of any technical reports must be submitted by the PMU to the Regional Steering Committee and to the FAO Representation in Chile who will share it with the LTO for review and clearance and with the FAO-GEF Coordination Unit for information and eventual comments, prior to finalization and publication. Copies of the technical reports will be distributed to the Regional Steering Committee, Technical Committee and other project stakeholders, as appropriate. The final reports will be uploaded to the FAO FPMIS by the OG.

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<sup>49</sup> Prior to the preparation of the PIR report, the FAO-GEF Coordination Unit will provide the updated format as every year some new requirements may come from the GEF.

<sup>50</sup> The NPC, the BH, the LTO and the FAO/GEF Coordination Unit should assign ratings to the PIR every year. The ratings can or cannot coincide among the project managers.

**Co-financing Reports:** the PMU will be responsible for collecting the required information on in-kind and cash co-financing provided by current and unforeseen project co-financiers. Each year, the PMU will submit these reports to the FAO Representation in Chile prior 10 July, covering the period July (the previous year) through June (current year).

**GEF Tracking Tools:** following the GEF policies and procedures, the tracking tools for the biodiversity focal area will be submitted to the GEF Secretariat in three opportunities: (i) with the project document for the GEF Executive Director endorsement; (ii) with the project’s mid-term evaluation; and (iii) with the project’s final evaluation.

**Final Report:** within two months prior the end date of the project, the PMU Coordinator will submit to the National Steering Committee and the FAO Representation in Chile a draft Final Report. The main purpose of the final report is to give guidance to authorities (ministerial or senior government level) on policy decisions required to track the project and to provide the donor with information on how the funds were utilized. Hence, the final report will be a concise account of the main outputs, outcomes, conclusions and recommendations of the Project, without unnecessary background information, narrative or technical details. The target readership consists of persons who are not necessarily technical specialists but who need to understand the policy implications of technical findings and needs for ensuring sustainability of project outcomes. The final report will provide an evaluation of the activities, a summary of lessons learned and recommendations in terms of their application to future mainstreaming of IAS management, development of conservation and management of biodiversity, in the context of the development priorities at national and regional levels, as well as in terms of practical execution. This report will specifically include the findings of the final evaluation as described in section 4.6. A final project review meeting should be held to discuss the draft final report with the Regional Steering Committee before it is finalized by PMU and approved by the LTO and the FAO-GEF Coordination Unit.

#### 4.5.4. Monitoring and evaluation plan summary

The table below provides a summary of the main monitoring and evaluation reports, responsible institutions and periodicity:

**Table 5. Monitoring**

<b>M&amp;E activity</b>	<b>Responsible institutions</b>	<b>Periodicity</b>	<b>Estimated costs</b>
Inception workshop	PMU; FAO (ETG with the support of the LTO, BH and the FAO-GEF Coordination Unit)	Three months as of project inception	2,150
Project inception report	PMU and ETG approved by the LTO, BH and the FAO-GEF Coordination Unit	15 days after project inception	3,000
Field-based impact monitoring	PMU; institutions and organizations participating in the project	Continuous	21,600
Project supervision and valuation visits in PIR	PMU; FAO (LTO, FAO-GEF Coordination Unit)	Annual, or as requested	3,600
Project Progress Report (PPR)	PMU, with inputs from the institutions participating in the project	Quarterly	14,400
Annual Project Execution Review Report (PIR)	FAO (LTO and ETG) with the support of the PMU. Approval and submission to the GEF by the FAO-GEF Coordination Unit	Annual	3,450
Evaluation of technical reports	PMU; FAO (LTO)	As appropriate	n.c.

<b>M&amp;E activity</b>	<b>Responsible institutions</b>	<b>Periodicity</b>	<b>Estimated costs</b>
Co-financing reports	PMU with inputs from other co-financing institutions	Annual	1,800
Mid-term Independent Evaluation (MTE)	External consultant, project team, including the GEF Coordination Unit and other stakeholders	Halfway through the project implementation	23,450
Final Independent Evaluation (FIE)	External consultant, FAO Independent Evaluation Unit in consultation with the project team, including the FAO-GEF Coordination Unit and other stakeholders	At the end of the project implementation	50,000
Final report	PMU; FAO (ETG, LTO, FAO-GEF Coordination Unit, the Report Unit TSCR)	Three months before the end date of the Execution Agreement	6,550
<b>TOTAL</b>			<b>130,000</b>

#### **4.6. EVALUATIONS**

After 15 months of project inception, the BH will organize a Mid-Term Evaluation (MTE), in consultation with the Steering Committee, the LTO and the FAO-GEF Coordination Unit. The aim of the MTE is to review the project progress and efficient implementation in terms of the achievement of objectives, outcomes and outputs. The MTE will allow the implementation of corrective measures, if needed. The MTE will provide a systematic analysis of the information included in the Monitoring Plan (see above), with emphasis on the achievement of expected goals and outcomes in terms of expenditures. The MTE will make reference to the project budget (see Appendix 3) and the AWP/B approved for years one and two. The MTE will enhance best practices to replicate and main problems faced during project execution and will suggest mitigation measures to be discussed by the PSC, the LTO and the FAO-GEF Coordination Unit.

An independent Final Evaluation (FE) will be carried out three months prior to the terminal report meeting. The FE will aim to identify the project impacts, sustainability of outcomes and the probability to achieve long-term outcomes. The FE will also indicate future actions needed to expand the project in subsequent phases, mainstream and up-scale its outputs and practices, and disseminate information to management authorities and institutions with responsibilities for IAS management, eradication, control and monitoring as well as the recovery of fragile ecosystems to ensure continuity of the processes initiated by the Project. Both, the MTE and the FE will pay special attention to outcome indicators and to the alignment with the GEF tracking tool (BD focal area).

#### **4.7. COMMUNICATION AND VISIBILITY**

A number of project activities will approach the visibility of the same and include the mechanisms to ensure that communications in support of the project's messages are effective.

These activities include: (i) publication of lessons learned and best project practices; (ii) publication of demonstration manuals and outreach material for different audiences; (iii) communication activities carried out by the project and partners, including dialogue with local and national media; (iv) local capacity building in education and awareness of the relevance of local biodiversity; (v) information and awareness activities for decision makers, including input from new analysis on beaver economic impact;

and (vi) proposals of policies and action plans to foster conservation and sustainable management of biodiversity, including IAS control.

Furthermore, the project will ensure the mechanisms for maximum outreach the documents produced by the project and, in particular, the Final Report, technical reports and the mid-term and final evaluation reports.

As identified in previous sections, this project can be found rejection from animal defenders' groups, who do not understand the reality of the beaver as introduced species, alien to the ecosystem in Patagonia and highly dangerous. So, the communication strategy of the project will be focused on raising public awareness about the beaver risk as an IAS.

## **SECTION 5 – SUSTAINABILITY OF OUTCOMES**

### **5.1. SOCIAL SUSTAINABILITY**

Generally speaking, the social sustainability of the project has structural bases in the participatory process and consensus reached during the design stage of the project. The workshops held in Punta Arenas with CONAF, MMA, SAG NGOs, academia, private sector and municipalities, have eased a broad interinstitutional participation, which is reflected in the project objectives and expected outcomes, that integrates inputs from participants and key stakeholders identified in the process.

At the civil society level, the Communication Strategy of output 1.3.1, which addresses the general public and stakeholders who work as multipliers of information and source of opinion, will support understanding at local level of the negative impact of the beaver in the productive sector and the ecosystem of the region. This level of awareness will result in supporting the continuation of the EECP when the project ends.

Another social sustainability factor will be the active participation of farmers in the pilots (private landowners), who will take ownership of techniques and methods and will disseminate them among peers in zones than will not be covered by the output.

Specifically, the project will support:

- the gender approach at every decision making stage and activities in the project, in special, the selection of staff for training and eradication activities. Given the nature of the project, the gender dimensions will be included by (i) ensuring participation of women in the capacity development and awareness raising activities and (ii) promoting participation of women in the eradications activities.
- the active participation and empowerment of local communities in the expansion and accreditation of best practices and its application;
- the active participation of the communities in the development process of beaver management plans. As stated on subsection 1.1, beaver activities affect producer because of streaming diversions harm livelihoods of the communities. Socioeconomic benefits will be delivered by reducing the constant threat to farmer's livelihoods.

The project, through output 1.1.3 will provide further information and analysis of the costs and impacts of the beaver invasion and thus the link between benefits for biodiversity and the local socio-economic conditions will be clearer. This information will strengthen decision makers' capacities, which will result in greater sustainability for the implementation of the IAS management and governance.

The effort undertaken in Chile and Argentina, contributes to the local effectiveness and prevents the spread on the mainland. The Binational Strategic Plan will continue beyond project completion. The binational joint work, that has already six years of implementation, is a strong stimulus to sustain the environmental benefits, in special, due to the implementation of a governance system that will endure the passing of time beyond project completion.

## **5.2. ENVIRONMENTAL SUSTAINABILITY**

As mentioned above (see sections 2.5 and 3.1), the project activities do not only have no negative environmental impact but it is expected that the benefits from the restoration of ecosystems affected by the beaver result in improvement of ecosystems in Patagonia and beyond, to avoid threats to globally significant ecosystems and increase resilience to climate change.

This project is designed to improve the environmental conditions of the Region of Magallanes, through the recovery of the ecosystems that are currently affected by beavers. Hence, these habitats will be in conditions to provide environmental goods and services previously disturbed by the presence of beavers. The generation of plans for the management of beaver as an invasive species (outputs 1.1.1 and 1.1.2) will help to devise policies and actions for prevention, prioritization and control, contributing to environmental sustainability. In turn, eradication pilots include actions in various sectors contributing to ensuring environmental sustainability, especially in that related to the monitoring of the restoration (output 2.1.1, 2.1.2 and 2.1.3).

Component 1 contributes to the interinstitutional coordination and mainstreaming technical and scientific knowledge in the decision-making process of national and regional government authorities. Building eradication and early warning capacities ensures a field intervention that contributes to environmental sustainability. Training the staff of the institutions involved in the management of the beaver (CONAF, SAG, MMA), including rangers, early detection techniques, immediate intervention, control and eradication, generates the capacities to face potential new invasions of beaver, in the absence of the project.

The implementation of the eradication and early warning pilots of component 2 will result in lessons learned that would help to replicate actions in other regions of Magallanes and contribute to environmental sustainability. During the execution of these pilots, the communication strategy is intended to provide information and raise awareness about the consequences of the beavers, so that target population becomes a key actor who indirectly contributes to management plans and environmental sustainability.

Environmental sustainability has direct implications on the continental Chile and Argentina. The objective of the project, concurrent with the Binational Agreement between Chile and Argentina, is the recovery of environments invaded by beaver.

## **5.3. FINANCIAL AND ECONOMIC SUSTAINABILITY**

The project devotes much of its efforts to support the implementation of phase two of four of the EECP, with input from participating institutions, thus ensuring that investments will be assumed by MMA, CONAF and SAG at the end of the project. Once operational capabilities and frameworks have been established, and thereby phase two of the EECP is completed, the group of implementing partners and their local base can move forward and implement phase three. The Strategic and financial plan for the management of beaver as an invasive species (output 1.1.1) will be the basis to determine the budget to be provided by the different institutions at the end of the project.

Financial sustainability will also be achieved by increasing national and regional authorities' support to eradication activities. The project will demonstrate the economic impact of beaver in the region of Magallanes (output 1.1.3), the costs of different beaver management interventions, critical funding gaps, link between impacts and socio-economic conditions in the country and the analysis of the economic

costs and benefits from the implementation of beaver management plans. All in all, the project will drive the political support for the eradication of beaver under the Invasive Alien Species Strategy developed at a national level (see section 1.1.1), which should bring additional funding to continue the implementation of early warning activities at the end of the project.

The integration of the private sector to the management plan design stage, to evaluate the benefits of prevention and early action, will help to create articulated mechanisms that contribute to long-term financial sustainability. The communication strategy aims at improving interinstitutional and civil society communication, reducing pressures on the ecosystem, while boosting social sectoral financing mechanisms (e.g. agriculture, forestry sector, etc.).

#### **5.4. SUSTAINABILITY OF CAPACITIES DEVELOPED**

A key element of the sustainability of the capacities developed with the support of the project is the involvement of partner organizations, which has remained stable from the design of the project profile. The objective of the institutional design, project implementation arrangements, as well as training activities, is to install capacities within public organizations, at the local and regional level, with clear mandates of continuity in the territory.

Thanks to improved capabilities of different institutions with responsibilities and competences in beaver management (CONAF, SAF, MMA), a true coordination of efforts will be achieved to consolidate a coherent and functional IAS management system in the Region of Magallanes, which in turn, will lead to institutional sustainability. In addition, prevention, control, eradication and early warning measures directed towards responsible ministries services and the private sector (landowners), will be strengthened through technical training, new equipment and development and implementation of new protocols, standards and beaver management practices.

The project will develop at the local level capacities to replicate the pilot experiences and continue with Phase 3 of the EECF. To do this, it is essential to monitor and systematize the work developed in the pilots of Component 2, which should demonstrate the feasibility and replicability of approaches and techniques to be used.

The decision-making process at the local level will be strengthened thanks to the constant flow of information created by the CMWS (output 1.2.1), zoning (output 1.1.2) and the set of recovery indicators (output 1.2. 3), which will improve prioritization, institutional planning and performance to eradicate and prevent reinvasion or new invasions in the Region of Magallanes.

#### **5.5. PERTINENCE OF TECHNOLOGIES INTRODUCED**

Outcomes and outputs that require technology transfer include control, management, early warning and restoration protocols which will be validated during project implementation. The strategy has been developed in consultation with relevant partners in the project. The intervention of pilot areas aims to restore and recover ecosystems. In this sense, training activities implemented in the project, respond to the specific public needs, ensuring that the institutional staff have basic information about the impact of invasive species on ecosystems; that management, control, early warning and restoration brigades team have technical information to optimize the capture in a humane manner, disposal of specimens hunted and restoration control, to provide a meeting point for science and practice in different ecosystems, and different forms of land tenure.

The project will support the use of some technologies for monitoring, containment and/or eradication of beaver as IAS. In the selection of the same, experiences of other countries and own experiences will be taken into account. One of the objectives of the pilots is to prove what are the most efficient and cost-effective technologies in Chile's ecosystems and environments. **Only techniques that meet the standards of humane trapping (AIHTS standard) will be used**, which ensure immediate death of the beaver without causing suffering (see Hunting Law, Title IV about hunting methods <http://www.leychile.cl/Navegar?idNorma=128106&idParte=8782460&idVersion>)

Similarly, it is ensured that the disposal of dead animals will not cause water pollution problems, or threat to human health. Personnel will be trained to guarantee that dead animals will be removed from roads, access path, and no closer than 30 meters from the body or watercourse and out of sight of carrion birds, either in the forest or under bushes that limit their visual detection. The large extension of Tierra del Fuego, the geographical and the climatic conditions existing in the area guarantee that there is no risk on public health by leaving the carcasses in the place where they have been captured. According to the existing experience, the geographic and climatic difficulties to access to beaver affected areas make more efficient to leave animals in place and allow natural decomposition cycle. The existing experiences documented in Argentina 5-7 individuals are captured by wild land sites and leaving the animals in place will not have negative impact in nature. In private land, hunting/capture will be done individually. In private areas there is sufficient knowledge on appropriate disposals of dead animal and skin utilization, as it has been a practice already implemented in the area.

## **5.6. REPLICABILITY AND SCALING UP**

The project seeks to replicate and expand existing scattered and poorly organized experiences and initiatives in the area through better systematization and institutionalization of best practices and approaches, and through access to the best technology available worldwide to run spread models of the species, identify vulnerable sites and early warning. Similarly, other global experiences eradicate invasive mammals, developed by the Global Invasive Species Programme may be inputs to improve the efficiency of management, control and eradication practices. The beaver eradication activities in the pilots are designed to be scaled up and replicated in other demonstration units in the Region of Magallanes. The project will provide field tested eradication approaches and methodologies, so government institutions, NGOs and others may apply them domestically and internationally. These lessons learned will be systematized under Component 3 and distributed as part of the communication strategy, to make them public.

## APPENDICES

## APPENDIX 1: RESULTS FRAMEWORK

Outcomes chain	Indicators	Baseline	Mid-term target	Final goal	Means of verification	Assumptions
<p><b>Global environmental objective:</b> improve sub-national institutional frameworks to effectively control, prevent and manage IAS in highly valuable ecosystems for biodiversity in the Region of Magallanes.</p> <p><b>Development objective:</b> incorporate biodiversity conservation into the management of productive landscapes, through the development of skills that allow for adequate risk management of biological invasions.</p> <p><b>Component 1: Management and governance framework, information, monitoring, early warning, participation and communication in the Region of Magallanes</b></p>						
<p><u>Outcome 1.1</u> Management and governance framework to ensure effective management and control of the invasion in the Magallanes Archipelago and the Brunswick Peninsula.</p>	<p>a) Score on the GEF tracking tool (section VI on IAS, questions 1,2,3)</p> <p>b) Presence of mechanism for the control and eradication of beaver in the Region of Magallanes, designed and validated with the participation of all stakeholders<sup>51</sup></p> <p>c) Number of hectares (Region of Magallanes excluding the Antarctic territory) vulnerable to beaver invasion, under effective management and control of beaver invasion</p>	<p>a) 1/13</p> <p>b) Absence of institutional mechanisms</p> <p>c) 0 hectares</p>	<p>a) 3/13</p>	<p>a) 6/13</p> <p>b) Control and eradication mechanism in place</p> <p>c) 13,229,700 ha covered by the beaver management framework.</p>	<p>GEF tracking tool completed during mid-term and final evaluation</p> <p>Summary report of beaver management mechanisms and governance arrangements</p> <p>Validation meeting minutes</p> <p>Field monitoring reports.</p> <p>PIR</p> <p>M&amp;E reports</p>	<p>National and regional authorities consider the introduction of IAS management, including beaver, in its institutional priorities in a coordinated manner</p> <p>Awareness of the value of biodiversity and threats posed by beaver, ensure that communities and key government stakeholders adopt beaver management mechanisms.</p> <p>The binational agreement with the Republic of Argentina is maintained and strengthened with parallel projects in both countries.</p>

<sup>51</sup>The plan includes budget and financing methods, regulatory and normative aspects, governance mechanism and procedure protocols. Lead by the MMA, CONAF, SAG, Regional Government, with the participation of WCS, civil society. The plan is designed within the framework *Strategic Plan of Beaver Eradication Project in Southern Patagonia* (EECP)

Outcomes chain	Indicators	Baseline	Mid-term target	Final goal	Means of verification	Assumptions
						Coordinated binational actions and goals are implemented.
Output 1.1.1. Strategic and financial plan for the management of beaver as an invasive species	Designed and validated strategic and financial plan	Incipient approach and few probatory evidence of management cost-efficiency	1 (draft)	1 (final version)	Plan document published and disseminated  Validation meeting minutes	
Output 1.1.2. Coordination and governance plan of beaver management as an invasive species	A designed and implemented coordination and governance plan and procedures protocol for national and binational coordination	There is a Binational Strategic Plan for the Eradication of Beaver in Southern Patagonia (EECP), but it does not have the necessary elements for effective implementation	1 (draft)	1 (final version)	Plan document published and disseminated  Validation meeting minutes	
Output 1.1.3. Evaluation of current and potential economic impact of beaver in Chilean Patagonia	Economic impact study including analysis of sectors (forestry, farming and cattle, protected areas and tourism, water resources and infrastructure) and submitted to decision makers	Little and out of date information on the economic value of the impact of beaver on ecosystems and biodiversity. Only estimates of productive forestry in Isla Grande de Tierra del Fuego are available		1	Study document published and disseminated	
Output 1.1.4. Validated regulatory framework for beaver management at municipal and regional level	Municipal and regional regulatory framework ready for approval	There is no local regulatory framework that includes beaver threat.		1	Documents with normative proposals  Validation meeting minutes	

Outcomes chain	Indicators	Baseline	Mid-term target	Final goal	Means of verification	Assumptions
<b>Outcome 1.2.</b> Decision makers have updated, systematized and available information about beaver management in Magallanes, including data on operational zoning, spread, monitoring, early detection, recovery-restoration and research.	a) Score on the GEF tracking tool (section VI on IAS, questions 4,5,6);  b) Coordinated Information, Monitoring and Early Warning System (CMWS), designed and under implementation.	a) 3/16  b) There is no systematic and permanent monitoring and early warning system to ensure timely detection of beaver invasion.	a) 8/16	a) 13/16  b) 1	GEF tracking tool completed during mid-term and final evaluation  CMWS platform  PIR  M&E reports	National and regional authorities include information on beaver presence and spread to their institutional action plans
Output 1.2.1. Coordinated Information, Monitoring and Early Warning System (CMWS)	(i) Platform (geomatics, workflows, telematics) (ii) Early Warning System (EWS) already developed and an action protocol already developed and implemented, (iii) 150 people from 12 institutions/organizations trained in EWS, (iv) Four pilot areas monitored	Monitoring is carried out according to budgetary and operational capacity. There is no systematic monitoring. SAG (in agriculture areas) and CONAF (protected areas) do some monitoring but the information is not shared	(i) Designed platform structure (ii) Designed EWS (iii) 75 people trained	(i) Approved and operational platform (ii) Operational EWS (iii) 150 people trained (iv) Four pilot areas monitored	Platform design protocol  Monitoring protocol  Participants minutes  Monitoring report	
Output 1.2.2. Spread and adaptive zoning model per management unit	A designed potential distribution and spread model of species	There is no operational zoning for beaver management	1 proposal	1 validated final version	Beaver distribution map. Document of spread trends	
Output 1.2.3. Sub Antarctic ecosystems recovery indicators applied in control and eradication pilot sites	A matrix of recovery indicators	There is no reference framework to measure the recovery of ecosystems after eradication	1 proposal	1 validated final version	Document of criteria	

Outcomes chain	Indicators	Baseline	Mid-term target	Final goal	Means of verification	Assumptions
Output 1.2.4. Information exchange protocols between Chile and Argentina at the regional, national and binational level	Protocol and procedures protocol to be formalized via administrative decision.	Binational information exchange is not systematic	1 proposal	1 approved and validated final version	Official records of binational agreements  Administrative decisions	
<b>Outcome 1.3</b> Regional institutions and civil society recognize the importance of beaver eradication practices and restoration in the Region of Magallanes, including the recovery of riparian forests with endemic species.	a) MMA, SAG and CONAF staff recognize the importance of the eradication of invasive species to biodiversity and productive areas of the Region;  b) Staff of the MMA, SAG and CONAF assigned to control, management and eradication of beaver, implement best practices;  c) Number of members of civil society with improved knowledge and attitude on the impact of beaver as an invasive species in agricultural systems and vulnerable ecosystems.	Little knowledge and insufficient institutional and citizens' capacities to control invasion. Lack of communication and awareness of beaver problem	a) 50% staff aware of the problem (20% are women)  b) 100% implementing and validating best practices  c) 2,000 people have improved their knowledge and attitude on the impact of beaver (20% are women)	a) 75% staff aware of the problem (30% are women)          c) 3,000 people have improved their knowledge and attitude on the impact of beaver (30% are women)	Design and sampling of Knowledge, Attitude and Practices (KAP) surveys  Report of surveys results  PIR  M&E reports	Willingness of key stakeholders (CONAF, SAG, MMA) to train their staff in beaver management and early warning techniques  Civil society is receptive to project activities
Output 1.3.1.	(i) Comprehensive communication and	Scatter efforts of communication and	1 initial version	1 final version complemented	Document of the strategy	

Outcomes chain	Indicators	Baseline	Mid-term target	Final goal	Means of verification	Assumptions
Communication and awareness raising programmes for different target audiences	sensitivity/education strategy, including the elaboration and distribution of educational material	public awareness. Incipient analysis of stakeholders interests		with pilot experiences (component 2)	Lists of material disseminated Website  Meeting minutes	
Output 1.3.2. Capacity building programme for key stakeholders <sup>52</sup> for the management and eradication of beaver	(i) 150 people trained in management and operational aspects (operational zoning, control and eradication, monitoring, recovery-restoration and research), (ii) 140 people trained in early warning	Personnel in charge of planning and beaver management activities (professionals, technicians and workers) lack the necessary training	i) 75  ii) 70	i) 150  ii) 140	Training material  Participants minutes	
<b>Component 2: Demonstration activities of control, management and restoration in pilot areas</b>						
<b>Outcome 2.1</b> Beaver invasion is under effective control in selected areas of native forest and peatlands ecosystem in the Region of Magallanes and in the recovery process of riparian forests with endemic species. <sup>53</sup>	a) Number of hectares and kilometres free of beaver and under basic restoration (i. process of recovery of watercourses; ii. quantity of organic matter in basins)  b) Number of hectares and kilometres under proven	a) 1. Beaver control in Karukinka and Laguna Parrillar National Reserves according to budget and operational availability  a) 2. Watercourses affected (baseline to be defined in year 1 through satellite images, as part of a cooperation agreement between FAO and Google Earth)	a) 34,271 hectares/278 km free of beaver and 34,271 hectares/278 km in process to be free of beaver	a) 68,543 ha/574km of channels free of beaver  (i. watercourses freed from beaver recovered to similar conditions as those watercourses	Verification reports of areas free of beaver  PIR  M&E reports  Satellite images (agreement FAO – Google Earth)	Support from public and private agencies involved in control and eradication activities

<sup>52</sup>Key regional actors are officials from the MMA, CONAF, SAG, WCS, including technical staff at the office and field activities.

<sup>53</sup>Indicators of biodiversity recovery in terrestrial environments are applied to periods longer than those of the project (10-20 years).

Outcomes chain	Indicators	Baseline	Mid-term target	Final goal	Means of verification	Assumptions
	early detection of beaver invasion.	b) 0		not affected by beaver; ii. organic matter in sediments diminishes in the basins freed from beavers)		
				b) Early detection in 1,499,100 ha/13,660 km of channels hectares		
Output 2.1.1. Beaver eradication and basic restoration method designed and implemented in Karukinka Park	(i) A demonstration pilot activity of beaver eradication in La Paciencia sub-basin (132 km of channels, 18,481 ha), that includes the disappearance of new ditches monitored during six months after the end of the pilot;	0	(i) Inception of pilot activity  (ii) Vulnerable spread sites identified  (iii) Design a basic	(i) Pilot activity is executed  (ii) Vulnerable spread sites are identified  (iii) Basic monitoring	Verification of positive eradication in pilot areas  Sites maps  Monitoring protocol,	

Outcomes chain	Indicators	Baseline	Mid-term target	Final goal	Means of verification	Assumptions
	(ii) Protecting and monitoring vulnerable spread sites; (iii) A basic restoration monitoring system		monitoring system	system is established	monitoring reports, systematization document	
Output 2.1.2. Beaver eradication and basic restoration method designed and implemented in Laguna Parrillar National Reserve and downstream private lands	(i) A demonstration pilot activity for beaver eradication from Laguna Parrillar National Reserve (442 km of channels, 50,062 ha), including the elimination of new ditches monitored during six months after the pilot is finished; (ii) Public-private cooperation strategies	0	(i) Inception of pilot activity  (ii) Design and validate public-private cooperation strategies	(i) Pilot activity is executed  (ii) Public-private cooperation strategies are assessed	Verification of positive eradication in pilot areas  Summary document of strategies, agreement minutes  Systematization document	
Output 2.1.3. Early Warning System (EWS) Method to be implemented in the Southeast area of Ultima Esperanza province, including the Torres del Paine National Park	(i) An EWS in the southeast area of the Última Esperanza Province (13,660 km of channels, 1,499,100 ha); (ii) A set of assessed early detection strategies; (iii) A set of assessed public-private cooperation strategies;	0	(i) Inception of an EWS (ii) A set of early detection strategies identified (iii) A set of public-private cooperation strategies identified	(i) EWS is executed (ii) A set of early detection strategies under implementation (iii) A set of public-private cooperation strategies under implementation	EWS platform (within CMWS framework)  Minutes of agreements on strategies  Systematization document	

Outcomes chain	Indicators	Baseline	Mid-term target	Final goal	Means of verification	Assumptions
Output 2.1.4. Systematization of best practices for beaver eradication, invasion monitoring and early warning	Four beaver management manuals: (i) detection, (ii) control and eradication in public property, (iii) monitoring, (iv) restoration, control and eradication in multifunctional private property.	0	4 proposals of beaver manuals in the validation phase	4 validated	Published manuals	
<b>Outcome 2.2.</b> Beaver invasion is under effective control in multifunctional private property in the Region of Magallanes.	a) number ha/ number km of channels in multifunctional private property free of beaver and under restoration; b) number ha of forests in process of recovery (recovery of lenga trees <i>Nothofagus pumilio</i> and Antarctic beeches <i>Nothofagus Antarctica</i> in progress in affected areas)	Private landowners perform occasional incipient eradication activities  Significant impact on farming systems	a) 22.621 ha /225km free of beaver and in process to be free of beaver	a) 45,243ha/ 450km hectares free of beaver  b) 1000ha forest in process of recovery	Verification reports of areas free of beavers  PIR  M&E reports	Commitment of rural landowners to achieve local eradication objectives is maintained
Output 2.2.1. Sustained control and restoration methodologies for multiple-use private property.	(i) A pilot of species eradication in the main bed of Marazzi river (453 km of beds, 45,243 ha), monitored according to the number of empty ditches six months after the end of the pilot; (ii) A designed and implemented data model on spread and reinvasion;	0	i) Inception of pilot (ii) A data model on spread and reinvasion in process of validation (iii) A set of public-private cooperation strategies in	i) Pilot is executed (ii) A data model on spread and reinvasion is implemented (iii) A set of public-private cooperation strategies is implemented and assessed	Verification of positive eradication in pilot areas Spread map Minutes of agreements on strategies  Monitoring protocol, monitoring report	

Outcomes chain	Indicators	Baseline	Mid-term target	Final goal	Means of verification	Assumptions
	(iii) A set of implemented and assessed public-private cooperation strategies; (iv) An established basic restoration monitoring system		process of validation (iv) A basic restoration monitoring system in process of validation	(iv) A basic restoration monitoring system is established	Systematization document	
Output 2.2.2. Systematization of a 'best practices' model for multifunctional private property	A public-private cooperation strategies manual for the management of beaver in multifunctional property	0		1	Manual Published	
<b>Component 3: Results based management, monitoring, evaluation and dissemination</b>						
<b>Outcome 3.1.</b> Project implementation based on a results-based management approach and application of project findings and lessons learned in future operations facilitated.	Achievable and sustainable project outcomes	Project Outcomes Framework with indicators, baseline and goals of outcomes and outputs validated with key actors	30-40% progress in the achievement project outcomes	Project outcomes are achieved and show sustainability	Mid-term and final evaluations  PIRs	Key actors adopt management and governance framework for the eradication of beaver and implement the CMWS
Output 3.1.1 Project progress assessment and monitoring system	6 Biannual Project Progress Reports (PPR).		3 biannual PPRs	3 biannual PPRs	PPR document	
Output 3.1.2 Mid-Term Independent Review (MTR) and Final Independent Evaluation (FIE)	a) mid-term review report, b) final evaluation report		1 Mid-term review	1 final evaluation	Evaluations report	

<b>Outcomes chain</b>	<b>Indicators</b>	<b>Baseline</b>	<b>Mid-term target</b>	<b>Final goal</b>	<b>Means of verification</b>	<b>Assumptions</b>
Output 3.1.3 Publication and dissemination of best practices and lessons learned	Manuals of standardized information on invasive species for project partners' staff. Best early warning, control, management, eradication and restoration practices manuals for field staff		Systematization of experiences	Publication of manuals	Published texts	

**APPENDIX 2: WORK PLAN (results-based)**

Output	Activities	Responsible Institution	Year 1				Year 2				Year 3			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Component 1: Management and governance framework, information, monitoring, early warning, participation and communication in the Region of Magallanes</b>														
<b>Output 1.1.1</b> Strategic and financial plan for the management of beaver as an invasive species	Revision of current eradication plan, adjustment and new proposal	PMU MMA	■	■	■	■								
	Plan implementation in pilots of component 2						■	■	■	■				
	Plan adjustment based on lessons learned										■	■	■	■
<b>Output 1.1.2</b> Coordination and governance plan of beaver management as an invasive species	Revision of current eradication plan, adjustment and new proposal	PMU MMA SAG CONAF	■	■	■	■								
	Plan implementation in pilots of component 2						■	■	■	■				
	Plan adjustment based on lessons learned										■	■	■	■
<b>Output 1.1.3.</b> Evaluation of current and potential economic impact of beaver in Patagonia	Information gathering	PMU	■											
	Systematization			■										
	Submission and validation				■									
	Publication					■								
<b>Output 1.1.4.</b> Validated regulatory framework for beaver management at municipal and regional level	Proposal of regional and municipal regulations	PMU	■	■	■	■								
	Mass outreach of proposed regulations						■	■	■	■				
	Validation of the regulatory framework to be submitted for approval and adoption										■	■	■	■

Output	Activities	Responsible Institution	Year 1				Year 2				Year 3			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Output 1.2.1.</b> Coordinated Information, Monitoring and Early Warning System (CMWS)	Design of the virtual platform virtual	PMU MMA WCS												
	Data collection from pilots													
	Staff training on the use of the platform													
	Implementation of protocols and monitoring of four pilot areas													
<b>Output 1.2.2.</b> Spread and adaptive zoning model per management unit	Operational zoning of the Region of Magallanes	PMU MMA												
	Data collection on spread of species and upload to the platform (1.2.1)													
	Identification of early warning points and high vulnerable sites													
	Systematization of information													
<b>Output 1.2.3.</b> Sub Antarctic ecosystems recovery indicators applied in control and eradication pilot sites	Development of a matrix of environmental recovery criteria	PMU MMA WCS												
	Definition of data monitoring, collection and storage													
	Record of information from pilots													
<b>Output 1.2.4.</b> Information exchange protocols at regional, national and binational level between Chile and Argentina	Design of an information exchange protocol	PMU MMA												
	Run tests and validation of protocol													
	Adjustment of protocol and adoption by binational institutions													
<b>Output 1.3.1.</b> Communication and awareness raising programmes for different target audiences	Adjustment and implementation of a communication strategy for general public	PMU												

Output	Activities	Responsible Institution	Year 1				Year 2				Year 3			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	Elaboration and distribution of graphic, audio-visual and electronic material, interactive games, etc.	Communication specialist												
	Website design													
	Adjustment and implementation of a communication strategy for government officials													
<b>Output 1.3.2.</b> Capacity building programme for key stakeholders <sup>54</sup> for the management and eradication of beaver	Training for trappers, hunters and supervisors	PMU MMA SAG CONAF												
	Training of conservation agents, including rangers, in beaver control and monitoring techniques and activities related to ecosystems restoration, composition and resilience													
<b>Component 2. Demonstration activities of control, management and restoration in pilot areas</b>														
<b>Output 2.1.1.</b> Beaver eradication and basic restoration method designed and implemented in Karukinka Park	Systematic trapping and removal	PMU WCS												
	Verification of the eradication and monitoring for possible reinvasion													
	Partial removal of dams to restore water flow													
	Restoration monitoring													
<b>Output 2.1.2.</b> Beaver eradication and basic restoration method designed and implemented in Laguna Parrillar	Information gathering and definition of the estimated number of beavers	PMU CONAF Private landowners												
	Systematic trapping and removal													

<sup>54</sup>Key regional actors are officials from the MMA, CONAF, SAG, WCS, including technical staff at the office and field activities.

Output	Activities	Responsible Institution	Year 1				Year 2				Year 3			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
National Reserve and downstream private lands	Verification of the eradication and monitoring for possible reinvasion													
	Partial removal of dams to restore water flow													
	Restoration monitoring													
<b>Output 2.1.3.</b> Early Warning System (EWS) Method to be implemented in Torres del Paine	Design of the system within CMWS framework (1.2.1.)	PMU SAG												
	System implementation													
	Permanent control, monitoring and prevention of reinvasion													
<b>Output 2.1.4.</b> Systematization of best practices for the eradication of beaver, invasion monitoring and early warning	Workshop for exchanging experience from the three pilots	PMU												
	Compilation of lessons learned and draft manuals													
	Validation and publication													
<b>Output 2.2.1.</b> Sustained control and restoration methodologies for multiple-use private property	Systematic trapping and removal	PMU WCS Private landowners												
	Verification of the eradication and monitoring for possible reinvasion													
	Partial removal of dams to restore water flow													
	Restoration monitoring													
<b>Output 2.2.2.</b> Systematization of a 'best practices' model for multifunctional private property	Compilation of lessons learned	PMU												
	Publication													
<b>Component 3: Results based management, monitoring, evaluation and dissemination</b>														
	Project inception workshop	PMU												

Output	Activities	Responsible Institution	Year 1				Year 2				Year 3			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Output 3.1.1.</b> Project progress assessment and monitoring system	Submission of PPR biannual reports	FAO												
	PIR													
<b>Output 3.1.2.</b> Mid-Term Independent Evaluation (MTE) and Final Independent Evaluation (FE)	Design of Terms of Reference and experts' selection	FAO												
	Evaluation mission and monitoring tools update (TT)													
	Submission of reports													
<b>Output 3.1.3.</b> Publication and dissemination of best practices and lessons learned	Coordination of former outputs publications	PMU												
	Project systematization and compilation of best dissemination practices	FAO												

**APPENDIX 3: RESULTS BASED BUDGET**

Oracle code and description	Unit	No of Units	Unit cost	Component 1 Management and governance framework	Component 2 Demonstration activities	Component 3: M&E	PM	GEF	Year 1	Year 2	Year 3
				Total	Total	Total					
<b>5300 Salaries professionals</b>											
Operations Officer	month	36	2.849	0	0	0	102.566	102.566	34.189	34.189	34.189
<b>5300 Sub-total salaries professionals</b>				0	0	0	102.566	102.566	34.189	34.189	34.189
<b>5570 International Consultants</b>											
Sub-total international Consultants				0	0	0		0	0	0	0
<b>National consultants</b>											
Project Coordinator (PMU)	month	36	5.000	121.000	30.909	28.091		180.000	60.000	60.000	60.000
Technical Assistant (PMU)	month	36	2.000	62.188	9.812	0		72.000	24.000	24.000	24.000
Administrative Assistant (PMU)	month	36	1.100	20.840	12.505	6.255		39.600	13.200	13.200	13.200
4 Consultants for regional and local regulation	month	24	2.000	48.000	0	0		48.000	24.000	24.000	
CMWS Consultant (implementation)	lump sum	1	33.200	33.200	0	0		33.200	16.600	16.600	0
Zoning Consultant	lump sum	1	18.000	18.000	0	0		18.000	18.000	0	0
EWS pilot professionals	lump sum	1	28.400	0	28.400	0		28.400	7.100	14.200	7.100
Pilots systematization consultants	lump sum	1	49.000	0	49.000	0		49.000	0	19.000	30.000
Sub-total national Consultants				303.228	130.626	34.346		468.200	162.900	171.000	134.300
<b>5570 Sub-total consultants</b>				303.228	130.626	34.346		468.200	162.900	171.000	134.300
<b>5650 Contracts</b>											

Public bidding economic study	contract	1	110.000	110.000	0	0		110.000	74.000	18.000	18.000
CMWS design consultancy	contract	1	56.000	56.000	0	0		56.000	37.333	18.667	0
Mid-term review	contract	1	23.450	0		23.450		23.450	0	0	23.450
Final evaluation	contract	1	50.000	0		50.000		50.000	0	0	50.000
LOA WCS	contract	1	306.154	36.548	269.606	0		306.154	102.051	102.051	102.051
Design communication strategy	contract	1	84.000	84.000	0	0		84.000	28.000	28.000	28.000
Website	contract	1	12.000	12.000	0	0		12.000	12.000	0	0
Terminal report	contract	1	6.650	0	0	6.650		6.650	0	0	6.650
<b>5650 Sub-total Contracts</b>				298.548	269.606	80.100		648.254	253.385	166.718	228.151
<b>5900 Travel</b>											
Pilots technical consultants travel	global	1	216.493	51.450	155.020	10.023		216.493	72.164	72.164	72.164
PMU and consultants travel	global	1	144.328	34.300	103.346	6.682		144.328	48.109	48.109	48.109
Final evaluation international travel	global	1	37.485	23.200	0	14.285		37.485	12.495	12.495	12.495
<b>5900 Sub-total travel</b>				108.950	258.366	30.990		398.306	132.769	132.769	132.769
<b>5023 Training and workshops</b>											
Management plan definition meetings and workshops	event	36	1.389	54.300	0	0		54.300	18.100	18.100	18.100
Governance mechanism meetings	event	6	1.720	17.200	0	0		17.200	5.733	5.733	5.733
Economic impact study workshops	workshop	6	1.290	12.900	0	0		12.900	4.300	4.300	4.300
Regulations proposal workshops	workshop	10	1.720	17.200	0	0		17.200	5.733	5.733	5.733
CMWS training	event	20	1.387	27.740	0	0		27.740	9.247	9.247	9.247
Binational workshops per protocol	workshop	20	1.750	35.000	0	0		35.000	11.667	11.667	11.667
Inception workshop, quarterly meetings, steering committee, presentation audit results	event	19	1.018	0	0	19.350		19.350	6.450	6.450	6.450
Relevant partners training	event	36	1.389	50.000	43.000	0		93.000	31.000	31.000	31.000
Civil society training	event	36	1.389	50.000	0	0		50.000	16.667	16.667	16.667

<b>5023 Sub-total training</b>				264.340	43.000	19.350		326.690	108.897	108.897	108.897
<b>6000 Expendable procurement</b>											
CMWS expendable	lump sum	1	250	5.250	0	0		5.250	5.250	0	0
Communication expendable	lump sum	1	20.800	20.800	0	0		20.800	0	10.400	10.400
Pilots expendable	lump sum	1	33.696	0	33.696	0		33.696	25.272	8.424	0
Edition and printing	lump sum	1	54.000	0	24.000	30.000		54.000	0	0	54.000
Expendable PMU	lump sum	1	7.396	0	0	7.396		7.396	2.958	1.479	2.958
<b>6000 Sub-total expendable procurement</b>				26.050	57.696	37.396		121.142	33.480	20.303	67.358
<b>6100 Non-expendable procurement</b>											
PMU equipment	lump sum	1	27.450	27.450	0	0		27.450	27.450	0	0
CMWS equipment	lump sum	1	15.250	15.250	0	0		15.250	15.250	0	0
Pilots equipment	lump sum	1	32.794	0	32.794	0		32.794	32.794	0	0
<b>6100 Sub-total non-expendable procurement</b>				42.700	32.794	0		75.494	75.494	0	0
<b>6300 GOE budget</b>											
Miscellaneous including contingencies	lump sum	1	13.330	4.000	4.500	4.830		13.330	4.443	4.443	4.443
<b>6300 Sub-total GOE budget</b>				4.000	4.500	4.830		13.330	4.443	4.443	4.443
<b>TOTAL</b>				1.047.816	796.588	207.012	102.566	2.153.982	805.557	638.318	710.107

<b>SUBTOTAL Comp 1</b>	<b>1.047.816,00</b>	49%
<b>SUBTOTAL Comp 2</b>	<b>796.588,00</b>	37%
<b>SUBTOTAL Comp 3</b>	<b>207.012,00</b>	10%
<b>SUBTOTAL Manejo Proyecto</b>	<b>102.566,00</b>	5%
<b>TOTAL GEF</b>	<b>2.153.982,00</b>	100%



budget final English

#### APPENDIX 4: RISK MANAGEMENT MATRIX

Risk	Level	Mitigation measures
National and subnational authorities do not include IAS management measures, including beaver, in their institutional priorities.	Low	The NBSAP, developed through a participatory process, identifies the impact of IAS and establishes the need for IAS management. The project deals specifically with the barriers that impede the implementation of management measures by regional institutions of Magallanes. Specifically, the project mitigates the risk through awareness-raising and specific training for target audiences, including officials and decision makers of the institutions involved in the eradication of the beaver. The consultation processes carried out during the design stage, allowed the regional authorities of Magallanes to work in planning activities during project implementation, and agree on field activities related to staff training needs (according to their responsibilities, as mentioned above), the identification of pilot sites, recognition of the ecological diversity of the territory, land tenure and social conditions to classify the different realities that exist in Magallanes. Consultation and awareness raising programmes with municipalities will facilitate the implementation of local practices. Awareness, information and outreach programmes for the civil society will also help to position the need for IAS control in the territory. Coordination with the GEF 4330 project in Chile and GEF 4768 project in Argentina will allow a better positioning at the local, national and international policy level.
Potential funding gaps in the next EECF phase	Low	The project will consider the necessary steps to agree on a participatory design of the action plan which includes a financial component in terms of costs as well as funding sources. Furthermore, the economic impact study of the beaver will provide the elements to negotiate additional resources. The participation of the private sector (breeders, forest and tourism) is an additional source of funding. The adoption of practices on private lands, based on the interest of eradicate IAS, will lead to the restoration of the same. Once these groups are trained in best practices implementation, they may apply them to their own territories with the assistance of government agencies.

Risk	Level	Mitigation measures
Climate change could increase the rate of invasion or lead to another beaver-related threat	Moderate	IAS's threat to vulnerable ecosystems increases when they adapt to new conditions posing a risk of introduction or re-invasion, augmented by an increase in the number of extreme events (floods, droughts, etc.) or higher stress on native species which increases vulnerability. The Second National Communication to the UNFCCC (MMA, 2011) provides good detailed prospective models for the whole country, including the region of Magallanes, reporting on the prioritization of activities in the future management system. The project develops capacities for proactive and adaptive management enabling a more robust response to less favourable conditions as the ones projected in future climate scenarios. Climate change variables are monitored over relatively longer periods of time, beyond the PPG implementation, making difficult, during the design phase, to draw conclusions for the implementation phase. However, some conditions were identified that will help to develop strategies, namely, the role of tides and currents in the spread of the beaver, which enables to identify spread models and vulnerable sites, and hence, propose actions for beaver invasion control, management and early warning.
Local communities and/or key stakeholders are not fully committed or do not adopt the practices proposed	Low	The project supports and coordinates efforts to ensure that the plan integrates key stakeholders and understands their motivation and interests (Outcome 1.3). On the other hand, increasing institutional capacities and a thorough review of the institutional framework should reduce the number of practices against the objective of the project. Communication activities during the project aim at raising stakeholders' awareness of the IAS problem. Stakeholders of local communities, private sector, civil society, academia, were invited to participate in the design phase of this project. Workshops, site visits and landowners' visits were made to define training needs to address the problem recognized by these groups. At the local level, no stakeholders opposed to the project implementation were identified. There may be some resistance from animal defenders' groups, mainly based in the Metropolitan Region. During the implementation of the project, all internationally agreed standards in terms of humanitarian measures will be observed, because of conviction of the staff involved and to reduce the negative connotation that such intervention may have on people.

Risk	Level	Mitigation measures
There is no access to private properties.	Low	Consultations during the PPG phase and those foreseen in the project, suggest that the incorporation of farmers, as partners of the institutions participating in the project, would help to mitigate risks. By way of example, two private landowners have committed their participation in pilot activities. Agreements with private landowners were achieved during the PPG (including project endorsement letters), but given the nature of the property, their interest may lessen or the property may change ownership what would end up in new negotiations.
Restoration of ecosystems does not occur spontaneously or cannot be carried out after successful control and eradication operations	Low	There are enough pristine ecosystems in Patagonia that can provide genetic material within proximities, including the same watersheds, for the reproduction of the main plant species. The project includes restoration activities to demonstrate the most appropriate and cost-effective methods. The scientific evidence compiled during the design phase of the project provides the basis to estimate this risk as minimal. The workshop 'Designing pilots to manage beaver invasion in Patagonia' was held in Punta Arenas, March 2015, during the PPG phase. Reference states for ecological restoration of ecosystems and management practices were analysed. During the session, input was received from the experience of forest restoration in Torres del Paine after the fire in 2010, the restoration plan of Cohiue forest in Magallanes, the work experience of SEREMIS of the Ministry of Agriculture and the MMA with seeds and the experience of the Centre for Agricultural and Environmental Studies of Magallanes. However, it is worth noting that restoration of temperate forests takes time before showing any changes, which may not be in line with the time framework of this project. Nevertheless, if there is no negative impact caused by flooding, the ecosystem will tend to restore itself. If there is an intervention, the process may be speeded up, but the forest will not be fully recovered within three years, which is the time framework of the project.

**APPENDIX 5: PROCUREMENT PLAN**

Reference	Item description	Unit	Estimated amount	Estimated cost	Unit price	Request method <sup>55</sup>	Purchase method <sup>56</sup>	Buyer <sup>57</sup>	Estimated call for tender date	Estimated contract date	Estimated delivery date	Final destination and delivery terms	State <sup>58</sup>	Other considerations

<sup>55</sup>Request quotation, request proposals, invitation to tender.

<sup>56</sup>Direct purchase, reutilization of tender products, United Nations framewok, etc.

<sup>57</sup>CSAP, Out the headquarters, Procurement mission.

<sup>58</sup>This column will be updated in the phase of implementation and follow up.

## APPENDIX 6: TERMS OF REFERENCE

<b>Name</b>			
<b>Title</b>	<b>Project Coordinator</b>		
<b>Division/Department</b>			
<b>Programme/Project Number</b>	STRENGTHENING AND DEVELOPMENT OF INSTRUMENTS FOR THE MANAGEMENT, PREVENTION AND CONTROL OF BEAVER ( <i>CASTOR CANADENSIS</i> ), AN INVASIVE ALIEN SPECIES IN THE CHILEAN PATAGONIA		
<b>Location</b>	Punta Arenas, Chile		
<b>Estimated starting date</b>		<b>Duration</b>	
<b>Report to</b>		<b>Title</b>	National Project Manager
<b>GENERAL DESCRIPTION OF TAKS AND OBJECTIVES</b>			
<b>BACKGROUND INFORMATION</b>			
<p>In XXX the GEF (Global Environment Facility) approved the project ‘Strengthening and development of instruments for the management, prevention and control of beaver (<i>Castor canadensis</i>), and invasive alien species in the Chilean Patagonia’. This project was submitted by the Ministerio del Medio Ambiente, Corporación Nacional Forestal (CONAF), NGO Wildlife Conservation Society (WCS) and Servicio Agrícola y Ganadero (SAG), with FAO as implementing agency. The project has three components: 1) Management and governance framework, information, monitoring, early warning, participation and communication in the Region of Magallanes, 2) Demonstration activities; and 3) Project progress and information dissemination monitoring.</p>			
<b>ACTIVITIES</b>			
<ul style="list-style-type: none"> <li>• Organize and participate in the inception workshop, revision and planning the annual work plan and budget (AWP/B) and annual progress and monitoring workshops with local stakeholders and other organizations involved in the project implementation.</li> <li>• Provide technical supervision and guidance to partners in the execution and implementation of project activities, regular field visits.</li> <li>• Conduct permanent field supervision and provide permanent orientation to the field technical staff and project executing partners.</li> <li>• Coordinate daily communication between the Project Management Unit and project partners. SEREMI de Medio Ambiente.</li> <li>• Conduct the project, the Management Unit and execute the AOP (Annual Operational Plan) and the project according to the PRODOC.</li> <li>• Perform ongoing monitoring with project staff and partners about the risks of the Project, taking into account the Risk Matrix and ensure that mitigation measures proposed in the PRODOC are implemented and propose alternatives, if appropriate. Prepare biannual progress reports (SEPR), in coordination with Project specialists.</li> <li>• Support FAO/LTO in the preparation of the Project Implementation Report (PIR).</li> <li>• Prepare reports on cash/in-kind co-financing from co-financiers and other partners not considered in the Project Document.</li> <li>• Help out with the organization of the mid-term and final evaluation of the project, in close collaboration with the Executing Partners of the Project, the FAO Evaluation Office, the FAO Technical Unit and FAO-GEF Coordination Unit.</li> <li>• Coordinate and perform M &amp; E activities, including: i) regular field visits to M &amp; E sites; ii) monthly monitoring, output progress and outcome indicators; iii) provide technical and operational guidance to the staff of participating institutions, and iv) propose any changes to the Project execution strategies, if the project is not working as expected.</li> <li>• Coordinate the revision and approval of the Terms of Reference and technical specifications of the corresponding contracts.</li> <li>• Coordinate the work of other specialists and consultants hired for the execution of the project.</li> </ul>			

<b>KEY PERFORMANCE INDICATORS</b>	
<ol style="list-style-type: none"> <li>1. Submission of the AWP/B, and approval</li> <li>2. Submission of the IPP, and approval</li> <li>3. Submission of the PIR, and approval</li> </ol>	
<b>REQUIRED COMPETENCES</b>	
<ul style="list-style-type: none"> <li>• Professional with a Bachelor’s degree in natural resources, namely Biologist, Agronomist, Veterinarian, Forest Engineer, etc. A Postgraduate Degree in natural resources management would be desirable.</li> <li>• Accredited work experience in national public management, project management and leadership of professional teams, multi-sectoral environmental management projects; development of management tools and institutional issues in natural resources, environmental science and natural resources management.</li> <li>• Experience working with public and private sectors, NGOs and multicultural environments in coordination, negotiation and leadership tasks and with international and/or national technical experts and scientists.</li> <li>• Knowledge and experience with environmental regulations in Chile and managerial work with the public sector.</li> <li>• Experience in mid-term and long-term project management with funds from various sources (public-private-international). Experience with the public sector, project management and experience in management, control and administration of financial instruments and resources (bidding funds, regional funds and others) will be highly valued.</li> <li>• Competences, abilities and skills in oral and written communication, coordination and teamwork, leadership, conflict resolution and negotiation, work under pressure within deadlines and consultation processes in the public-private sector.</li> <li>• Availability for frequent field trips.</li> </ul>	

<b>Name</b>			
<b>Title</b>	<b>Technical assistant</b>		
<b>Division/Department</b>			
<b>Programme/Project Number</b>	STRENGTHENING AND DEVELOPMENT OF INSTRUMENTS FOR THE MANAGEMENT, PREVENTION AND CONTROL OF BEAVER ( <i>CASTOR CANADENSIS</i> ), AN INVASIVE ALIEN SPECIES IN THE CHILEAN PATAGONIA		
<b>Location</b>	Punta Arenas, Chile		
<b>Estimated starting date</b>		<b>Duration</b>	
<b>Report to</b>		<b>Title</b>	Project Coordinator

<b>GENERAL DESCRIPTION OF TAKS AND OBJECTIVES</b>			
<b>BACKGROUND INFORMATION</b>			
<p>In XXX the GEF (Global Environment Facility) approved the project ‘Strengthening and development of instruments for the management, prevention and control of beaver (<i>Castor canadensis</i>), and invasive alien species in the Chilean Patagonia’. This project was submitted by the Ministerio del Medio Ambiente, Corporación Nacional Forestal (CONAF), NGO Wildlife Conservation Society (WCS) and Servicio Agrícola y Ganadero (SAG), with FAO as implementing agency. The project has three components: 1) Management and governance framework, information, monitoring, early warning, participation and communication in the Region of Magallanes; 2) Demonstration activities; and 3) Project progress and information dissemination monitoring.</p>			
<b>ACTIVITIES</b>			
<ol style="list-style-type: none"> <li>1. Assistance to the project coordinator in monitoring the activities of the project, in especial, restoration activities.</li> <li>2. Facilitate the participation of stakeholders involved in the project.</li> <li>3. Organize project outreach activities (e.g., documents, calls, presentations).</li> </ol>			

<b>KEY PERFORMANCE INDICATORS</b>	
<ul style="list-style-type: none"> <li>• Submission of the AWP/B, and approval</li> <li>• Submission of the IPP, and approval</li> <li>• Submission of the PIR, and approval</li> </ul>	

<b>REQUIRED COMPETENCES</b>	
<ul style="list-style-type: none"> <li>• Biologist, natural resources or alike.</li> <li>• 5 years of work experience in the region of Magallanes.</li> <li>• Knowledge and previous experience working with project developers and executing partners.</li> </ul>	

<b>Name</b>			
<b>Title</b>	<b>Logistics Assistant</b>		
<b>Division/Department</b>			
<b>Programme/Project Number</b>	STRENGTHENING AND DEVELOPMENT OF INSTRUMENTS FOR THE MANAGEMENT, PREVENTION AND CONTROL OF BEAVER (CASTOR CANADENSIS), AN INVASIVE ALIEN SPECIES IN THE CHILEAN PATAGONIA		
<b>Location</b>	Punta Arenas, Chile		
<b>Estimated starting date</b>		<b>Duration</b>	
<b>Report to</b>		<b>Title</b>	

#### **GENERAL DESCRIPTION OF TAKS AND OBJECTIVES**

##### **BACKGROUND INFORMATION**

In XXX the GEF (Global Environment Facility) approved the project 'Strengthening and development of instruments for the management, prevention and control of beaver (*Castor canadensis*), and invasive alien species in the Chilean Patagonia'. This project was submitted by the Ministerio del Medio Ambiente, Corporación Nacional Forestal (CONAF), NGO Wildlife Conservation Society (WCS) and Servicio Agrícola y Ganadero (SAG), with FAO as implementing agency. The project has three components: 1) Management and governance framework, information, monitoring, early warning, participation and communication in the Region of Magallanes; 2) Demonstration activities; and 3) Project progress and information dissemination monitoring.

##### **ACTIVITIES**

- Assistance to the project team and partners in the workshops logistics: send invitations, participants follow-up, find the venue, outsource services, etc.
- Assistance to the project team and partners in travel procedures: authorizations, clearance, etc.
- Carry out the necessary and timely procedures about all operational requirements for issues related to staff, equipment, material and disbursements, in coordination with the FAO Operations Office in Santiago de Chile.

#### **KEY PERFORMANCE INDICATORS**

Activities report

#### **REQUIRED COMPETENCES**

- Management, Secretary studies
- At least three years of experience in development projects management
- Knowledge of the administrative process of donation funds
- Fluency in English

<b>Name</b>			
<b>Title</b>	<b>OPERATIONS OFFICER</b>		
<b>Division/Department</b>			
<b>Programme/Project Number</b>	STRENGTHENING AND DEVELOPMENT OF INSTRUMENTS FOR THE MANAGEMENT, PREVENTION AND CONTROL OF BEAVER (CASTOR CANADENSIS), AN INVASIVE ALIEN SPECIES IN THE CHILEAN PATAGONIA		
<b>Location</b>	Punta Arenas, Chile		
<b>Estimated starting date</b>		<b>Duration</b>	

<b>Report to</b>		<b>Title</b>	FAOR Chile
<b>GENERAL DESCRIPTION OF TASKS AND OBJECTIVES</b>			
<b>BACKGROUND INFORMATION</b>			
<p>In XXX the GEF (Global Environment Facility) approved the project ‘Strengthening and development of instruments for the management, prevention and control of beaver (<i>Castor canadensis</i>), and invasive alien species in the Chilean Patagonia’. This project was submitted by the Ministerio del Medio Ambiente, Corporación Nacional Forestal (CONAF), NGO Wildlife Conservation Society (WCS) and Servicio Agrícola y Ganadero (SAG), with FAO as implementing agency. The project has three components: 1) Management and governance framework, information, monitoring, early warning, participation and communication in the Region of Magallanes; 2) Demonstration activities; and 3) Project progress and information dissemination monitoring.</p>			
<b>ACTIVITIES</b>			
<p>Under the general supervision of the FAO Representative in Chile (Budget Holder) and in close collaboration with the PMU and the executing project partners, the Operations Officer will have the operational responsibility for timely delivery of the project outcomes. In particular, it will carry out the following tasks:</p>			
<ol style="list-style-type: none"> <li>1. Ensure timely implementation of project activities in support of the outcomes-based plan, through operational and administrative procedures according to FAO rules and regulations.</li> <li>2. Coordinate the operational arrangements of the project through contractual agreements with key project partners.</li> <li>3. Make the necessary arrangements for the signing and execution of the Letters of Agreement (LOA) and the Government Cooperation Programme (GCP) with relevant project partners.</li> <li>4. Maintain the links between FAO departments and donors, finance, human resources and other units as needed.</li> <li>5. Manage the project budget on a day to day basis, including monitoring of the availability of cash, budget preparation and budget revisions that must be performed by the Technical Manager and the National Project Manager.</li> <li>6. Ensure the accurate record of all relevant data for the operational, financial and outcomes-based supervision.</li> <li>7. Ensure that the relevant expenditures, forecasts and progress reports against work plans and project closure, are prepared and submitted in accordance with the FAO and the GEF procedures and reporting formats, schedules and communication, as necessary.</li> <li>8. Participate and represent the project in collaborative meetings with project partners and the Project Steering Committee, as needed.</li> <li>9. Undertake missions to monitor the outcomes-based budget and to resolve outstanding operational issues, as appropriate.</li> <li>10. Be responsible for outcomes obtained within the area of work and ensure that issues affecting the project implementation and success are brought to the attention of the highest authorities through the Budget Holder in a timely manner.</li> <li>11. In consultation with the FAO Evaluation Office, LTO and FAO-GEF Coordination Unit, support the organization of the mid-term and final evaluations and provide input to the project budget.</li> <li>12. Other tasks required.</li> </ol>			
<b>KEY PERFORMANCE INDICATORS</b>			
<ul style="list-style-type: none"> <li>• Biannual financial reports</li> <li>• PIR financial portion</li> </ul>			
<b>REQUIRED COMPETENCES</b>			
<ol style="list-style-type: none"> <li>a) Bachelor’s degree in Economics, Business Administration or alike.</li> <li>b) Five years of experience in project management and operation of natural resources, including field experience in developing countries.</li> <li>c) Proven working capacity and ability to establish working relationships with government and non-governmental representatives.</li> <li>d) Knowledge of the FAO project management systems.</li> </ol>			

<b>Name</b>	
<b>Title</b>	<b>Consultancy on Communication and Participation</b>
<b>Division/Department</b>	

<b>Programme/Project Number</b>	STRENGTHENING AND DEVELOPMENT OF INSTRUMENTS FOR THE MANAGEMENT, PREVENTION AND CONTROL OF BEAVER (CASTOR CANADENSIS), AN INVASIVE ALIEN SPECIES IN THE CHILEAN PATAGONIA		
<b>Location</b>	Punta Arenas, Chile		
<b>Estimated starting date</b>		<b>Duration</b>	
<b>Report to</b>		<b>Title</b>	
<b>GENERAL DESCRIPTION OF TASKS AND OBJECTIVES</b>			
<b>BACKGROUND INFORMATION</b>			
<p>In XXX the GEF (Global Environment Facility) approved the project ‘Strengthening and development of instruments for the management, prevention and control of beaver (<i>Castor canadensis</i>), and invasive alien species in the Chilean Patagonia’. This project was submitted by the Ministerio del Medio Ambiente, Corporación Nacional Forestal (CONAF), NGO Wildlife Conservation Society (WCS) and Servicio Agrícola y Ganadero (SAG), with FAO as implementing agency. The project has three components: 1) Management and governance framework, information, monitoring, early warning, participation and communication in the Region of Magallanes; 2) Demonstration activities; and 3) Project progress and information dissemination monitoring.</p>			
<b>ACTIVITIES</b>			
<p>This consultancy be responsible for Output 1.3.1. Communication and awareness programmes will contribute to the success of the project, incorporating communication criteria with the primary objective of achieving stakeholders support, namely: local, regional and national public opinion; authorities and NGOs, among others. The Programme will be carried out during the project execution to support a cost-efficient and sustainable implementation of beaver management and control pilots and then, the whole eradication programme. This Programme should include different strategies for different stakeholders, a communication platform, a specific strategy to facilitate the effective participation in prevention, monitoring and control activities for farmers, rural workers, tourists and tour operators, staff from public and private institutions, fishermen, armed forces and local politicians (stakeholders).</p>			
<ol style="list-style-type: none"> <li>1. Adjust and implement an overall communications strategy for the project, aimed at raising awareness among stakeholders, particularly local people and sectors affected by the beaver, on its impact and control and eradication measures.</li> <li>2. Outline the communication variables to the project management team which should be considered in taking decisions and activities.</li> <li>3. Mapping stakeholders from the communication standpoint.</li> <li>4. Design specific strategies and an action plan for each stakeholder.</li> <li>5. Develop detailed accounts for each stakeholder, aligned with the strategy.</li> <li>6. Develop appropriate contents for each account.</li> <li>7. Lead the relationship with the media, including free campaigns, if appropriate.</li> <li>8. Provide the necessary communication and relational skills to the persons participating in the project, to perform their functions accordingly. Hence, bidders shall submit proposals of a training programme, considering that the cost of it should not be included in the cost of the proposal.</li> <li>9. Propose goals and indicators to monitor the impacts of the communication and awareness activities to support the continuous improvement of the programmes.</li> </ol>			
<b>KEY PERFORMANCE INDICATORS</b>			
<ul style="list-style-type: none"> <li>• Adjusted strategy</li> <li>• Strategy implementation</li> <li>• Design of communication material</li> <li>• Workshop facilitation</li> <li>• Systematization of the experience</li> </ul>			
<b>REQUIRED COMPETENCES</b>			
<ul style="list-style-type: none"> <li>• Professional in the field of communications with five years of experience in qualitative communication diagnosis.</li> <li>• Experience in training courses on themes related to social and soft skills.</li> </ul>			

- Preferably knowledge and previous work with stakeholders and sectors of Patagonia.
- Availability to travel to Magallanes.
- Proven ability to write.

<b>Name</b>			
<b>Title</b>	<b>Study of the economic, social and cultural impact of the beaver invasion in Tierra del Fuego and over of the Magellan region.</b>		
<b>Division/Department</b>			
<b>Programme/Project Number</b>	STRENGTHENING AND DEVELOPMENT OF INSTRUMENTS FOR THE MANAGEMENT, PREVENTION AND CONTROL OF BEAVER (CASTOR CANADENSIS), AN INVASIVE ALIEN SPECIES IN THE CHILEAN PATAGONIA		
<b>Location</b>	Punta Arenas, Chile		
<b>Estimated starting date</b>		<b>Duration</b>	
<b>Report to</b>		<b>Title</b>	
<b>GENERAL DESCRIPTION OF TAKS AND OBJECTIVES</b>			
<b>BACKGROUND INFORMATION</b>			
<p>In XXX the GEF (Global Environment Facility) approved the project ‘Strengthening and development of instruments for the management, prevention and control of beaver (<i>Castor canadensis</i>), and invasive alien species in the Chilean Patagonia’. This project was submitted by the Ministerio del Medio Ambiente, Corporación Nacional Forestal (CONAF), NGO Wildlife Conservation Society (WCS) and Servicio Agrícola y Ganadero (SAG), with FAO as implementing agency. The project has three components: 1) Management and governance framework, information, monitoring, early warning, participation and communication in the Region of Magallanes; 2) Demonstration activities; and 3) Project progress and information dissemination monitoring.</p>			
<b>ACTIVITIES</b>			
<p>The main objective of the study is to have detailed information to make the most appropriate policy decisions to address the beaver invasion in Magellan territory (output 1.1.3). Specifically, it shall provide evidence to explain and detail the consequences, advantages and disadvantages of the following alternatives of action: 1) not to carry out actions to mitigate and/or control of the beaver in the territory; 2) implement one or more programmes of harm reduction and control of invasion of Magallanes; 3) implement one or more beaver containment programmes in a specific territory (e.g., Tierra del Fuego island or region of Magallanes); 4) Implement the total eradication of the species <i>C. canadensis</i> in the region.</p>			
<b>Specific objectives</b>			
The specific objectives of the Study are:			
<ol style="list-style-type: none"> <li>1. The current estimated extent of the damage and ecological impact of the <i>C. canadensis</i> on local ecosystems have been refined and specified.</li> <li>2. There is a conceptual framework to identify (at least qualitatively) not only the economic but also social, cultural and political impacts.</li> <li>3. There is an economic and financial estimation of damages and impacts.</li> <li>4. There is socioeconomic impact projection for each of the alternatives specified in paragraph (general objective)</li> <li>5. There is a clear map of the advantages and disadvantages of implementing the various alternatives to address the beaver invasion.</li> <li>6. Financing and co-financing alternatives have been identified.</li> </ol>			
<b>Methodology</b>			
<p>Considering that, the general methodological orientation of the action plans to deal with this invasive species is the damage and/or socio-economic impacts on current and future ecosystems, the methodological analysis should consider at least two key aspects:</p> <ol style="list-style-type: none"> <li>1) Identification and quantification of current and future (potential) damages and impacts applying the criterion of the best possible value of use/non-use of damaged ecosystems;</li> </ol>			

- 2) Specify the costs associated with the restoration of damages and impacts (if possible and, if not, justify why restoration is not feasible).

It should be noted that in both cases, the traditional cost-benefit analysis is not adequate to properly quantify the amount of ecosystem damage. The current monetary estimates of the damage caused by *C. canadensis* are those made Skewes *et. al* in 1999<sup>59</sup>, who calculated the loss with reference to the timber lost due to the invasive species.

The calculation methodology of the study should also model the damage and impact using conventional cost-benefit methodologies for comparative purposes and consolidate more suitable criteria to deal with damage to the natural heritage or ecosystems. It is important to have both types of evaluation to facilitate the funds for restoration (if any) of the true extent of the damage caused by the *C. canadensis*, as well as to refine the most suitable lines of action for its control.

The specific methodology to be used in the study may be that of the Total Economic Value (TEV), to calculate the highest possible values of use/non-use, or similar methodological applications, to ensure that these higher values of use/non-use are effectively identified in the study.

In addition, the methodology must reconcile its content with the methodological framework being used in similar processes at the Ministry of Environment. Likewise, the methodological framework should include the socialization of the methodology and results with all relevant social actors at the national, regional and local level.

As part of the required components of the study, at least the following field activities should be considered:

- 1) Interviews to the population directly affected by the presence of beaver, especially in Tierra del Fuego. This target population should include a reasonably robust sample of livestock farms and forest land in Tierra del Fuego and the villages of Porvenir, Cameron and Cerro Sombrero.
- 2) Field exploration of the damage caused by the *C. canadensis* and compare such damages to those reported in previous studies.
- 3) Carry out at least two information/participatory workshops on the results of the study (one in Porvenir and the other in Punta Arenas).

#### **Expected outputs/outcomes from the study**

As an extension of the methodological framework, the consulting company responsible for the study shall explicitly record the expected outcomes of the study, to be determined by the company, in close connection with the objectives (general and specific) of the same. These outcomes should include quantitative performance indicators (exceptionally, only qualitative indicators) and the corresponding means of verification.

These are considered essential components of the proposal, to ensure that suitable means of outcomes monitoring, reporting and verification are established.

#### **Responsibilities**

The consulting company responsible for the study, shall appoint a professional team in charge of carrying out the work, which should include, at least, an environmental engineer, an economist, or a professional with expertise in environment and development problems.

Notwithstanding the number of people making up the professional team, a project manager shall be designated, who will responsible to the relevant authorities of MMA, FAO, and other government officials at the national, regional and local level.

The project manager will be the spoke person of the consulting company and responsible to counterparties designated by the MMA, FAO or other government officials at the national, regional and local level.

#### **KEY PERFORMANCE INDICATORS**

- Information gathering
- Presentation of the report during a workshop with the Government
- Adjustment of the report based on the workshop results

#### **REQUIRED COMPETENCES**

- A consulting company with at least five years of experience in socioeconomic impact analysis, ecosystem services and different schemes of natural resources management.
- Minimum five years of experience in the design of socioeconomic impact study methodologies in strategic sectors, depending on the sustainable management of natural resources and ecosystem services (preferably, ecosystems in Patagonia).

<sup>59</sup> SKEWES, O., F. GONZALEZ, L. RUBILAR, M. QUEZADA, R. OLAVE, V. VARGAS & A. AVILA. Research, utilization and Control of the Beaver (*Castor canadensis*) in Tierra del Fuego and Navarino islands. Final Report, Servicio Agrícola y Ganadero (SAG) XII Regional, Magallanes and the Chilean Antartica, 1999.

## Appendices

### Gantt Chart of the study

ACTIVITY	MONTH	1	2	3	4	5	6	7	8	9	10	11	12
1.1 Surveys' preparation, conducting and processing			■	■	■								
1.2 Field trips SCL-PUQ			■										
1.3 Land damage prospecting		■	■	■									
1.4 First progress report: updated damage, survey results, methodological proposal and harmonization				■	■								
1.5 Evaluation and calculation of current damage (dual methodology)					■	■	■	■					
1.6 Evaluation and calculation of potential damage (dual methodology)						■	■	■	■				
1.7 Modelling and appraisal of alternative actions (three scenarios)							■	■	■	■	■		
1.8 Field trips SCL-PUQ:							■	■					
1.9 Methodology socialization, inclusion of key stakeholders, adjustment and final harmonization							■	■					
1.10 Second progress report: preliminary evaluation of damage and modelling scenarios										■	■		
1.11 Field trips SCL-PUQ											■	■	■
1.12 Outreach workshops (2)												■	■
1.13 Final report: Reception and approval													■

### Activities

1.1 Survey preparation, conducting and processing
1.2 Field trip SCL-PUQ
1.3 Field damage survey
1.4 First progress report: updated damage, survey results, methodological proposal and harmonization
1.5 Evaluation and calculation of current damage (dual methodology)
1.6 Evaluation and calculation of potential damage (dual methodology)
1.7 Modelling and appraisal of alternative actions (three scenarios)
1.8 Field trip SCL-PUQ:
1.9 Methodology socialization, inclusion of key stakeholders, adjustment and final harmonization
1.10 Second progress report: preliminary evaluation of damage and scenarios modelling
1.11 Field trip SCL-PUQ
1.12 Outreach workshops (2)
1.13 Final report: Reception and approval

## APPENDIX 7: GEF TRACKING TOOL



BD TT

## APPENDIX 8: SOCIAL AND ENVIRONMENTAL REVIEW

Would the project, if implemented?	Not Applicable	No	Yes	Unknown
<b>I. FAO VISION/STRATEGIC OBJECTIVES</b>				
Be in line with FAO's vision?			X	
Be supportive of FAO's strategic objectives?			X	
<b>II. FAO KEY PRINCIPLES FOR SUSTAINABILITY IN FOOD AND AGRICULTURE</b>				
Improve efficiency in the use of resources?			X	
Conserve, protect and enhance natural resources?			X	
Protect and improve rural livelihoods and social well-being?			X	
Enhance resilience of people, communities and ecosystems?			X	
Include responsible and effective governance mechanisms?			X	
<b>ESS 1 NATURAL RESOURCES MANAGEMENT</b>				
<b>❖ Management of water resources and small dams</b>				
Include an irrigation scheme that is more than 20 hectares or withdraws more than 1000 m <sup>3</sup> /day of water?	X			
Include an irrigation scheme that is more than 100 hectares or withdraws more than 5000 m <sup>3</sup> /day of water?	X			
Include an existing irrigation scheme?	X			
Include an area known or expected to have water quality problems?			X	
Include usage of non-conventional sources of water (i.e. wastewater)?	X			
Include a dam that is more than 5 m. in height?	X			
Include a dam that is more than 15 m. in height?	X			
Include measures that build resilience to climate change?	X			
<b>❖ Tenure</b>				
Negatively affect the legitimate tenure rights of individuals, communities or others <sup>1</sup> ?	X			
<b>ESS 2 BIODIVERSITY, ECOSYSTEMS AND NATURAL HABITATS</b>				
Make reasonable and feasible effort to avoid practices that could have a negative impact on biodiversity, including agricultural biodiversity and genetic resources?			X	
Have biosafety provisions in place?			X	
Respect access and benefit-sharing measures in force?			X	
Safeguard the relationships between biological and cultural diversity?	X			
<b>❖ Protected areas, buffer zones and natural habitats</b>				
Be located such that it poses no risk or impact to protected areas, critical habitats and ecosystem functions?			X	
<b>ESS 3 PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE</b>				
<b>❖ Planted forests</b>				
Have a credible forest certification scheme, national forest programmes or equivalent or use the Voluntary Guidelines on Planted Forests (or an equivalent for indigenous forests)?	X			
<b>ESS 4 ANIMAL - LIVESTOCK AND AQUATIC- GENETIC RESOURCES FOR FOOD AND AGRICULTURE</b>				
Involve the procurement or provision of pesticides?	X			
<b>❖ Aquatic genetic resources</b>				
Adhere (Aligned) to the FAO Code of Conduct for Responsible Fisheries (CCRF) and its related negotiated instruments?	X			

<sup>1</sup> In accordance with Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security (VGGT )  
<http://www.fao.org/docrep/016/i2801e/i2801e.pdf>

Be aligned, where applicable, with FAO's strategic policies established in the FAO Technical Guidelines for Responsible Fisheries (including aquaculture)?	X			
<b>❖ Livestock genetic resources</b>				
Be aligned with the Livestock Sector Strategy including the animal disease, public health and land degradation provisions?	X			
<b>ESS 5 PEST AND PESTICIDES MANAGEMENT</b>				
Involve the procurement or provision of pesticides?	X			
Result in increased use of pesticides through expansion or intensification of production systems?	X			
Require the disposal of pesticides or pesticide contaminated materials?	X			
<b>ESS 6 INVOLUNTARY RESETTLEMENT AND DISPLACEMENT</b>				
Avoid the physical and economic displacement of people?	X			
<b>ESS 7 DECENT WORK</b>				
Adhere to FAO's guidance on decent rural employment, promoting more and better employment opportunities and working conditions in rural areas and avoiding practices that could increase workers' vulnerability?	X			
Respect the fundamental principles and rights at work and support the effective implementation of other international labour standards, in particular those that are relevant to the agri-food sector?			X	
<b>ESS 8 GENDER EQUALITY</b>				
Have the needs, priorities and constraints of both women and men been taken into consideration?			X	
Promote women's and men's equitable access to and control over productive resources and services?			X	
Foster their equal participation in institutions and decision-making processes?			X	
<b>ESS 9 INDIGENOUS PEOPLES AND CULTURAL HERITAGE</b>				
Are there any indigenous communities in the project area?		X		
Are project activities likely to have adverse effects on indigenous peoples' rights, lands, natural resources, territories, livelihoods, knowledge, social fabric, traditions, governance systems, and culture or heritage (tangible and intangible)?	X			
Are indigenous communities outside the project area likely to be affected by the project?		X		
Designed to be sensitive to cultural heritage issues?	X			



Risk classification  
certificate signed

## Risk classification certificate

After completing the Social and Environmental Control Matrix, the LTO completes and certifies:

Project Symbolo: GCP/CHI/034

Project Title: STRENGTHENING AND DEVELOPMENT OF INSTRUMENTS FOR THE MANAGEMENT, PREVENTION AND CONTROL OF BEAVER (CASTOR CANADENSIS), AN INVASIVE ALIEN SPECIES IN THE CHILEAN PATAGONIA

### A. Risk classification

Low

Moderate

High

1. Record the risks identified in the Social and Environmental control matrix

The project will be carried out in areas where there is no presence of indigenous population.

2. Has the project site and the surrounding area been visited by the undersigned?

Yes

No

### B. Consultation with stakeholders

Partner identification	Date	Participants	Location
Private landowners	July/2014	12	Punta Arenas
Project regional partners (CONAF, MMA, SAG)	July/2014	10	Punta Arenas
Field staff at Karukinka	July/2014	8	Tierra del Fuego

1. Sum up the risks identified during the consultation process

A. Neither social nor environmental risks were identified in the region. The groups consulted mentioned the environmentalist groups of the Metropolitan Region as potential opponents of the project only.

2. Have other stakeholders expressed concern about the project?

No. It is believed that animal defenders groups in the Metropolitan Region of Chile, may identify the beaver control actions as not 'humanitarian'. However, in the region of Magallanes, due to the negative impact of the species on ecosystems and private lands, people are aware of the species control activities. The project mitigates the risk by providing support to raising awareness and training to specific target audiences, including officials and decision-makers of the institutions involved in the Project.

The LTO endorses the previous information

Date \_\_\_\_\_

Signature \_\_\_\_\_

## APPENDIX 9 DRAFT LETTER OF AGREEMENT FAO – WCS

This text will be reviewed and completed during the project inception phase.

### ANNOTATED SUMMARY OF THE DRAFTING OF THE UNIFIED APPENDIX 1 OF THE LETTER OF AGREEMENT

#### 1. Background information

In November 2013 the GEF (Global Environment Facility) Council approved the Project Identification Form (PIF) *Strengthening and development of instruments for the management, prevention and control of beaver (Castor canadensis), an invasive alien species in the Chilean Patagonia*. This project was submitted by the Ministerio del Medio Ambiente (MMA), Corporación Nacional Forestal (CONAF), Chilean NGO Wildlife Conservation Society (WCS) and Servicio Agrícola y Ganadero (SAG). The PIF has three components (1) Project management and governance framework, information, monitoring, early warning system, communication and participation; (2) Demonstration activities; and (3) Project progress monitoring and dissemination of the information.

The project identifies FAO as the executing agency for the GEF project, due to the experience of FAO in themes related to biodiversity conservation and ecosystems management, including Invasive Alien Species (IAS) and protection of plants, trees, forest landscapes, aquatic species, wildlife and livestock. WCS has staff and offices at the Region of Magallanes and the Chilean Antartica and years of experience managing the threat posed by the beaver in the region and the land managed by it, Karukinka Park, located in Tierra del Fuego, what eases the demonstration work, systematization and dissemination of experiences related to the beaver eradication process. *In order that the Service Provider could render the Services, FAO will pay partial amounts based on the activities carried out and delivery of outputs as specified below.*

#### 2. Mandate

##### 2.1 Definition of activities, services provided and outputs

##### 1. Participation in the activity 1.2.4 Strengthening an Early Warning System (EWS).

Description of the activity: The existing design (SAG) will be reviewed and improved and an agreed alerts protocol will be developed for all the participating institutions. At least 150 people of 12 institutions/organizations will be trained for its implementation.

Description of WCS services: A diagnosis will be made from the review of what has been previously done by the SAG to develop a protocol of action and design and implement training for the staff involved in it.

Verifiable output(s): Flow chart of EWS operations between public and private actors, to expand and enhance the system of the Ministry of Agriculture.

##### 2. Participation in the activity 1.2.5 Sub Antarctic ecosystems recovery indicators applied in control and eradication pilot sites. Description of the activity: A matrix of environmental recovery criteria will be developed for sites affected by the presence of the beaver, from the best available evidence. This matrix will be applied at least to the pilot sites.

Description of WCS services: According to the experience compiled during the implementation of the pilots and based on experts' consultation, the applicability of theoretical restoration criteria will be evaluated on the basis of the experience available in Chile and Argentina, and the foundations will be laid down to guide passive and active actions to facilitate the restoration of affected ecosystems.

Verifiable output(s): A matrix of environmental recovery criteria will be developed for sites affected by the presence of the beaver, from the best available evidence.

##### 3. Participation in the activity 2.1.1 Beaver management pilot at La Paciencia basin, Karukinka Park.

Description of the activity: A pilot of beaver management practices (including a decision making design and control, eradication, monitoring and restoration activities) at La Paciencia basin of Karukinka Park in the southern area of Isla Grande de Tierra del Fuego. The expected outcomes of the pilot include: local eradication, data gathering on spread and reinvasion, basic restoration activities, monitored and systematized activities.

Description of WCS services: Prepare a diagnosis of the distribution of beavers and impact on the basin, to subsequently design the eradication strategy considering the logistic factor and the most viable and efficient methods. The information will be systematized and analysed in parallel to the eradication success monitoring. At the same time, necessary data will be gathered to evaluate water flows restoration methods

and facilitate the restoration of channels. The activities will be represented in a work programme which will be monitored, and along with the outcomes and associated costs will be an essential part of an eradication guideline for this type of ecosystem.

Verifiable output(s): Basin baseline, database, eradication activity report, monitoring and eradication activity report, basic restoration activity reports.

4. Participation in the activity 2.1.2. Beaver management pilot practices in its baseline component at Laguna Parrillar National Reserve.

Description of the activity: Beaver management pilot baseline (including a decision making design and control, eradication, monitoring and restoration activities) at the basin of Laguna Parrillar National Reserve. Description of WCS services: The WCS activity will be focused on supporting CONAF and SAG in the determination of the beavers' distribution in the basin of this protected area.

Verifiable output(s): database, baseline report, photographic record of the beavers' habitat, sites description in terms of vegetation and watercourse flow.

5. Participation in the activity 2.2.1 Development of sustained control methodologies and restoration of multiple-use private property at Marazzi river basin in Tierra del Fuego.

Description of the activity: A pilot will be developed with private landowners at Marazzi river basin (mid zone of Isla Grande de Tierra del Fuego, steppe ecosystem), to propose sustained control methodologies and restoration in multiple-use private property. The expected outcomes of the pilot include: local eradication, data gathering on spread and reinvasion, public-private cooperation strategies, basic restoration activities, monitored and systematized activities.

Description of WCS services: Prepare a diagnosis of the distribution of beavers and impact on the basin, to subsequently design the eradication strategy considering the logistic factor and the most viable and efficient methods. The information will be systematized and analysed in parallel to the eradication success monitoring. At the same time, necessary data will be gathered to evaluate water flows restoration methods and facilitate the restoration of channels. The activities will be represented in a work programme which will be monitored, and along with the outcomes and associated costs will be an essential part of an eradication guideline for this type of ecosystem.

Verifiable output(s): Basin baseline, database, eradication activity report, monitoring and eradication activity report, basic restoration activity reports.

Verifiable output(s): database, eradication activity report, monitoring and eradication activity report, basic restoration activity reports. Pre and post intervention workshops with relevant institutions and local breeders

## 2.2 Work plan and calendar (duration)

The Agreement shall be valid during 30 months and organized and executed according to the work plan attached.

## 2.3 Supervision mechanisms and notification requirements

The FAO's Regional Office for Latin America and the Caribbean, through the Forestry Officer, together with officers of the Forestry Department of FAO, Rome, specifically the Forestry Assessment Management and Conservation Division established a 'task force' that will revise draft documents to ensure clarity, coherence and provide technical assistance and recommendations to the same. The documents will be submitted in Spanish via email (electronic format). The suggested date to submit the reports and outputs is specified in the work plan attached.

## **3. Inputs supplied as co-financing by the Service Provider**

### 3.1 Inputs list

Inputs from WCS as project co-financing have been reported to FAO in letter dated 28 April 2015.

## **4. In kind inputs from FAO**

The Forestry Officer of FAO-RLC will act as liaison officer with the task force of FAO Headquarter in Rome. Other staff at FAO-Rome and RLC will provide assistance in terms of GEF goals compliance, project objectives and others.

FAO-RLC will facilitate space to meet with team members, partners and consultants and FAO staff. Likewise, it will also facilitate the use of communication systems (video-conferences) to ensure more effective communication with FAO-Rome. Inputs will be supplied from the signing of the Letter of Agreement.

## **5. Detailed budget**

The Agreement will have a maximum budget of USD 306,154 (three hundred six thousand one hundred fifty-four US dollars), as attached.

**6. Responsible official**

The official mentioned in the Agreement, Mrs. Hivy Ortiz Chour, will act as the responsible Technical Officer and Mrs. María Mercedes Proaño, GEF Project Task Manager have been designated by the Budget Holder to manage and supervise the correct application of the Agreement on behalf of FAO and to certify that the conditions of the Agreement have been met satisfactorily and that the corresponding payment can be made. Mrs. Hivy Ortiz Chour will give the technical certification of reports and outputs.

**7. Reimbursement**

Reimbursement shall be made by the Service Provider for payment in excess of surplus that may be available after completion of Services.

## APPENDIX 10 DEMONSTRATIVE ERADICATION ACTIVITIES (PILOTS)

<b>Name</b>	Pilot at La Paciencia basin		
<b>Location</b>	La Paciencia basin (Karukinka, Isla Grande de Tierra del Fuego)		
<b>Estimated starting date</b>		<b>Duration</b>	30 months
<b>Reported to</b>		<b>Title</b>	Project coordinator
<b>GENERAL DESCRIPTION OF TAKS AND OBJECTIVES</b>			
<b>BACKGROUND INFORMATION</b>			
<p>In XXX the GEF (Global Environment Facility) approved the project ‘Strengthening and development of instruments for the management, prevention and control of beaver (<i>Castor canadensis</i>), and invasive alien species in the Chilean Patagonia’. This project was submitted by the Ministerio del Medio Ambiente, Corporación Nacional Forestal (CONAF), NGO Wildlife Conservation Society (WCS) and Servicio Agrícola y Ganadero (SAG), with FAO as implementing agency. The project has three components: 1) Management and governance framework, information, monitoring, early warning, participation and communication in the Region of Magallanes; 2) Demonstration activities; and 3) Project progress and information dissemination monitoring.</p>			
<b>CONTEXT</b>			
<p>One objective of the project is the implementation of demonstration or pilot actions in different areas, in order to assess local capacities and build them where the existing ones are not adequate. The execution of various pilots in this project, will eventually allow the development of a roadmap to articulate and channel the participation of all agencies and organizations involved in the project. Karukinka Park has many of the ecologic, social, administrative, logistic and scientific characteristics required to design and implement one of the pilots.</p>			
<b>OBJECTIVES</b>			
<p>The following objectives of the pilot are part of a consistent set of objectives for all of the pilots of the project:</p> <ul style="list-style-type: none"> <li>- Local eradication of beavers in the area and prevent reinvasion.</li> <li>- Compile data on current beaver distribution.</li> <li>- Perform a basic restoration (removal of dams and others) and assess restoration strategies: <ul style="list-style-type: none"> <li>o monitor the series of temporary changes in management units (ecologic efficacy).</li> <li>o Identify landscape features where it would be desirable to accelerate restoration (economic efficiency).</li> </ul> </li> <li>- Monitoring and systematization: <ul style="list-style-type: none"> <li>o Collect data to assess the ecologic efficacy and economic efficiency of all actions.</li> <li>o Assess the reasons to perform pilot activities in Argentina.</li> <li>o When costs permit it, gather visual information on muskrat and other IAS.</li> </ul> </li> </ul>			
<b>KEY TASKS TO ACHIEVE THE OBJECTIVE</b>			
<ul style="list-style-type: none"> <li>- Procurement of material and the necessary equipment to execute the pilot.</li> <li>- Hire trained staff with different techniques, logistic, safety standards and health, monitoring techniques and data entry and ethics.</li> <li>- Field work: logistics, diagnosis, beaver capture and restoration of affected ecosystems.</li> <li>- Beaver reinvasion monitoring.</li> <li>- Ecologic and restoration variables monitoring.</li> </ul>			
<b>KEY PERFORMANCE INDICATORS</b>			
1. Sustained control work.		months 10-15	
2. Post-capture monitoring to evaluate the presence or reinvasion and the restoration status of channels.		months 22-24	
3. Drafting of the sustained control and ecological restoration report.		months 28-30	
<b>WORK METHODOLOGY</b>			
<p>The main ecosystem in this pilot is a matrix of peatlands and mixed and pure lenga beech forests. In sites of high altitude there is the Andean desert with shrubs of ñirre and meadows. The procedures to be implemented in this demonstration unit will allowed to use the necessary capture and logistic tools to eradicate the species in a basin and replicate the experience in other areas of similar ecological characteristics. On the basis of sustained trapping, data will be taken on the characteristics of the site, number and position of traps, positioning of rounds with GPS, registered</p>			

dens and dams, and a photographic record of the activities. The activities of restoration consider the partial or total destruction of dams to restore flows and water level in peatlands. Similarly, criteria for the ecological restoration of coastal systems will be established to compare the trajectory of the recovery of sites affected by beaver.

Two technical teams with experience in different methods of capture, supported by the necessary logistics which could include the use of 4WD vehicles, carriers and helicopters, as emergency supplies for the staff, among others. An adequate traps stock should be available, according to the previous experience in Tierra del Fuego trying to maximize trapping and men hours. The work starts from the Despreciado lake, moving westward, along the main riverbed of river Sanchez and tributaries of the same. It is expected to work with two teams simultaneously, starting from a central point of the basin and from its eastern end, what could facilitate the logistic support.

The next stage involves the inspection of the basin to verify remaining beavers and additional capture, if required. This is done running through of all channels, georeferencing signs of beaver activity after removal. The information will be added to the information system (output 1.2.1 of the project) linked to the management unit or sub-basin.

With regard to the ecological restoration, it is advisable to remove dams to restore the water flow. The information of ecological references historically established in a base line of other streams, will be analysed and compared to the situation in brooks with beaver capture.

**REQUIRED COMPETENCES**

- Field staff with experience/capacity in beaver capture with different techniques, logistic, safety and health, monitoring techniques, data collection, ethics.
- Professionals with experience/capacity in managing alien species an ecologic restoration.

**COSTS AND SUPERVISION**

- Technical supervisor and scientific supervisor
- Trapping and logistics staff
- Inputs and logistics.

**APPENDIX A: Detailed work plan**

ACTIVITY	TRIMESTER									
	1	2	3	4	5	6	7	8	9	10

**COORDINATION**

Planning	■									
Field work	■	■		■	■			■	■	
Partial reports		■				■				■
Drafting of work manuals									■	■
Outputs delivery (Pilot final report and manuals)										■

**SPECIFIC ACTIONS SCHEDULE**

Procurements	■									
Diagnosis of beaver distribution	■	■								
Local eradication and reinvasion prevention				■	■			■		
Basic ecologic rehabilitation					■					
Monitoring of success indicators and change in management units					■	■			■	
Identification of criteria and sites for other restoration activities								■	■	
Data systematization and analysis				■		■			■	
Monitoring of the execution				■		■			■	■

<b>Name</b>	Pilot at Laguna Parrillar National Reserve		
<b>Location</b>	Water system Laguna Parrillar, Turba river, Desaguadero river, Chorrillo Hermoso and San Juan river (Brunswick Peninsula)		
<b>Estimated starting date</b>		<b>Duration</b>	30 months

Reported to		Title	Project coordinator
<b>GENERAL DESCRIPTION OF TAKS AND OBJECTIVES</b>			
<p><b>BACKGROUND INFORMATION</b></p> <p>In XXX the GEF (Global Environment Facility) approved the project ‘Strengthening and development of instruments for the management, prevention and control of beaver (<i>Castor canadensis</i>), and invasive alien species in the Chilean Patagonia’. This project was submitted by the Ministerio del Medio Ambiente, Corporación Nacional Forestal (CONAF), NGO Wildlife Conservation Society (WCS) and Servicio Agrícola y Ganadero (SAG), with FAO as implementing agency. The project has three components: 1) Management and governance framework, information, monitoring, early warning, participation and communication in the Region of Magallanes; 2) Demonstration activities; and 3) Project progress and information dissemination monitoring.</p> <p><b>CONTEXT</b></p> <p>Beaver invasion represents the greatest threat to the sub-Antarctic terrestrial ecosystems. The impact of beavers is shown at different levels, affecting structural and functional components of the Patagonian biodiversity, not only forest and aquatic ecosystems, but also scrub, grasslands, bogs, marine, as well as agricultural production systems, resulting in economic and social impacts.</p> <p>As regards Wild Protected Areas, beavers have been found at Laguna Parrillar National Reserve, Alberto D’ Agostini National Park and zones next to the Natural Monument Laguna de los Cisnes.</p> <p>One objective of the project is the implementation of demonstration units or pilots for beaver control. The execution of one or various pilots in this project, will eventually allow the development of a roadmap to articulate and channel the participation of all agencies and organizations involved in the project.</p> <p>One of the pilots corresponds to an area that is part of the National System of State Protected Areas (SNASPE), Laguna Parrillar National Reserve (RNLN), that is managed by the Corporación Nacional Forestal (CONAF), and which objective is the protection of an important source of drinkable water for Punta Arenas city.</p> <p>The presence of this species was identified during the nineties and it is estimated that the most probable colonization up to the Reserve, is through San Juan river with presence in different sectors, and it is likely that the species may come from the Dawson island to mainland; however, further studies are required con confirm it. The presence of this species in the continental area shows other conditions different from the ones observed in Tierra del Fuego island, what characterizes this pilot as a control area for early or low density colonization.</p> <p><b>OBJECTIVES</b></p> <p>The following objectives of the pilot are part of a consistent set of objectives for all of the pilots of the project:</p> <ul style="list-style-type: none"> <li>• Elaboration of a baseline of potential beaver habitat in the interior of Laguna Parrillar National Reserve and mapping of direct and indirect records of the species in the area.</li> <li>• Local eradication of beavers in the area and prevent reinvasion. <ul style="list-style-type: none"> <li><u>Monitoring and systematization</u> <ul style="list-style-type: none"> <li>- Implement a beaver capture model in the area.</li> <li>- Assess and develop restoration measures in affected areas.</li> <li>- Monitoring and assessment of control and restoration activities</li> <li>- Collect data to assess the ecologic efficacy and economic efficiency of all of the activities.</li> <li>- When costs permit it, gather information on mink, muskrat and other IAS.</li> </ul> </li> </ul> </li> <li>• Perform basic restoration (removal of dams and others) and assess restoration strategies depending on the affected surface and vegetation <ul style="list-style-type: none"> <li>○ Monitor the series of temporary changes in management units (ecologic efficacy).</li> <li>○ Identify landscape features where it would be desirable to accelerate restoration (economic efficiency).</li> </ul> </li> </ul> <p><b>KEY TASKS TO ACHIEVE THE OBJECTIVE</b></p> <ul style="list-style-type: none"> <li>- Bidding for the baseline of potential beaver habitat areas and mapping of direct and indirect records of the species.</li> <li>- Hiring of professionals (for two years)</li> <li>- Procurement of material and equipment for the execution of the pilot.</li> <li>- Recruitment of staff and training</li> <li>- Field work – logistics and capture</li> <li>- Beaver reinvasion monitoring</li> <li>- Ecologic variables and restoration monitoring</li> </ul> <p><b>KEY PERFORMANCE INDICATORS</b></p>			

1. Mapping of areas with beaver in the reserve and adjacent areas, identifying plant communities.	3-4 months
2. Sustained capture control.	
3. Post-capture monitoring that will show the presence-recolonization and channels restoration.	22-24 months 28-30 months
4. Drafting of the sustained control and ecologic restoration report.	28-30 months

### WORK METHODOLOGY

The pilot of Laguna Parrillar National Reserve is located in an ecosystem composed by a matrix of *Nothofagus pumilio*, *Nothofagus betuloides* and *Nothofagus antarctica*. It is possible to find peatlands dominated by *Sphagnum magellanicum*, *Marsippospermum grandiflorum*, *Rostkovia magellanica*, *Polytrichum* sp, among others, corresponding to Ombrotrophic peatlands or peatlands with sedge family among Minerotrophic peatlands.

The first stage to be implemented in this demonstration unit consists of gathering information and prepare the baseline of the presence and absence of the species. This activity will be put out to tender and executed during the first three months of the project. This will serve to evaluate and determine the capture plan, in order to distribute the capture and monitoring efforts on the sub-basin and tributaries.

#### Capture plan execution

There will be a team of six people with expertise in different capture techniques (given the administrative system of this corporation and access to the interior of the National Reserve) who will work according to a roles system. They will be supported with field logistic elements consisting of a 4WD vehicle, an ATV and maybe horses. A stock of conibear traps shall be available, in a number that will be determined according to the information gathered in the first phase.

The work will be carried out in three sectors: Chorrillo Hermoso, Turba river and Desaguadero river. A base camp for the staff should be installed during the control activities. In addition, and prior to capture, the native fauna should be recognized, to determine the capture methodology and reduce the risk of capturing native species. This activity would be complemented with cameras in the traps, in order to see the use of the area by native species (huillin and nutria) and beaver, since according to the records of this unit, they share common areas.

The baseline and the capture plan aim at identifying and determining the capture and logistic tools to be implemented according to the ecologic characteristics, which may be subsequently applied to similar areas.

The ecological records of control sites, number and location of traps, rounds positioning with GPS, dens and dams and photographic record should be available. The destruction of dams to restore the flow of brooks and the water level in peatlands will be considered once confirmed the absence of individuals in the area. The observation period after capture will be assessed since rangers use it to verify the absence or presence of this species. Likewise, the ecological reference of riparian systems will be defined to compare the recovery of sites affected by beaver.

The post-capture monitoring involves inspection to the basin to look for beavers and supplementary trapping, if any. At this stage, all the channels should be gone through, georeferencing any indications of the presence of beavers after the implementation of control and capture.

#### Ecologic restoration

Information from ecological references and control sites is analysed in this activity. A monitoring and ecological restoration procedures manual of the pilot area will be produced. Restoration activities will be assessed depending on the affected area and plant surface.

### REQUIRED COMPETENCES

Field staff with experience/capacity in trapping with different techniques, logistic, safety and health, compatible with the land.

Professionals with experience and capacity in managing alien species an ecologic restoration.

### COSTS AND SUPERVISION

- Technical supervisor and scientific supervisor
- Trapping and logistics staff
- Inputs and logistics (fuel, horses, equipment, traps, transportation)

<b>Name</b>	Pilot at Última Esperanza Province		
<b>Location</b>	Última Esperanza Province (Magallanes)		
<b>Estimated starting date</b>		<b>Duration</b>	30 months
<b>Reported to</b>		<b>Title</b>	Project coordinator
<b>GENERAL DESCRIPTION OF TAKS AND OBJECTIVES</b>			
<b>BACKGROUND INFORMATION</b>			

In XXX the GEF (Global Environment Facility) approved the project ‘Strengthening and development of instruments for the management, prevention and control of beaver (*Castor canadensis*), and invasive alien species in the Chilean Patagonia’. This project was submitted by the Ministerio del Medio Ambiente, Corporación Nacional Forestal (CONAF), NGO Wildlife Conservation Society (WCS) and Servicio Agrícola y Ganadero (SAG), with FAO as implementing agency. The project has three components: 1) Management and governance framework, information, monitoring, early warning, participation and communication in the Region of Magallanes; 2) Demonstration activities; and 3) Project progress and information dissemination monitoring. The activity defined below is part of Component 2 of the project.

**CONTEXT**

Beaver invasion represents the greatest threat to the sub-Antarctic terrestrial ecosystems. The impact of beavers is shown at different levels, affecting structural and functional components of the Patagonian biodiversity, not only forest and aquatic ecosystems, but also scrub, grasslands, bogs, marine, as well as agricultural production systems, resulting in economic and social impacts. One objective of the project is the implementation of demonstration or pilot actions in different areas, in order to build capacities and improve actions taken to date. The execution of various pilots in this project, will eventually allow the development of a roadmap to articulate and channel the participation of all agencies and organizations involved in the project.

In this context, it has been considered to implement a demonstrative Early Warning System (EWS) for the early detection and removal of beavers in the area of the Última Esperanza Province, south of Torres del Paine National Park, including also this one.

Demonstration actions will be based on the working document proposed by the Livestock and Agricultural Service ‘Contingency Plan for new points of beaver invasion in Magallanes’ (2009). The EWS, which has been designed but not implemented, is a set of detection mechanisms and communication chain from the sighting of this species until the inspection of the land and capture or individuals. The EWS, as it has been proposed, includes the opportunistic record (passive surveillance), the periodic monitoring record (active surveillance) and detection in Environmental Impact Declarations (EID). Active surveillance has not been carried out except for the work done by CONAF in some sectors at the interior of the Brunswick Peninsula and the coastline of protected areas.

On the other hand, the movement of beavers in mainland goes back to '70s. The latest information indicates that the arrival of beavers is not massive in the continent, but has occurred at least 23 years before the estimated through interviews. During 2013 the specimen was found in the Hollemborg river, Province of Última Esperanza, which results in the northernmost record to date. This point is located 65 km south of Torres del Paine National Park, in a coastline area, in a transition zone between continental forests and the archipelagic zone.

**OBJECTIVES**

The following objectives of the pilot are part of a consistent set of objectives for all of the pilots of the project:

- Compile data on current beaver distribution.
- Try and assess early detection strategies
- Assess public-private cooperation strategies
- Monitoring and systematization:
  - o Collect data to assess the ecologic efficacy and economic efficiency of all actions.
  - o Assess the reasons to perform pilot activities in Argentina.
  - o When costs permit it, gather information on mink, muskrat and other IAS.

**KEY TASKS TO ACHIEVE THE OBJECTIVE**

- Procurement of material and equipment.
- Training of CONAF staff in species biology, beaver capture with different techniques, monitoring techniques and data collection.
- Definition of critical zones at Última Esperanza Province.
- Identification of key actors and outreach workshops.
- Implementation of protocols.
- Field work: surveys, interviews.
- Research work: analysis of Environmental Impact Declarations (EID), systematization
- Field work; logistics, monitoring and capture.
- Beaver reinvasion monitoring.
- Identification and description of the landscape intervened.

**KEY PERFORMANCE INDICATORS**

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• Implementation of protocols</li> <li>• Field and research execution work</li> </ul> | <p>Months 1 al 6<br/>months 4 al 30</p> |
|--|---|

• Report drafting	months 25 al 30
<b>WORK METHODOLOGY</b>	
<p>a. Geographical framework The current knowledge about centres with the highest presence of beavers is limited to the centre-south area of Tierra del Fuego. However, there are information gaps in areas where the presence of beavers is known but have not been surveyed enough to determine the actual distribution and, much less, the abundance of the same. Sectors such as the Brunswick Peninsula, the northern area of Tierra del Fuego, Riesco Island and mainland areas such as Rio Verde, Rio Pinto and Seno Obstrucción, among others, are places where it is necessary to determine the presence and permanence of the species. The zoning proposed by the SAG Contingency Plan should be updated in the light of records about beavers in recent years that locate them in the area of Holleberg river. The proposal is to run the pilot in the continental area of the Última Esperanza Province, with the provincial border on the South, the international border on the East, the outer coastal border of Las Montañas fiord on the West, and a strip on the south border of Torres del Paine National Park on the North.</p> <p>b. Public and private participation The delivery of information is one of the most important factors for the operation of the early warning plan and, therefore, the active participation of field staff from public institutions should be considered. Likewise, the whole community and private associations of the farming, tourism, forestry, mining, and aquaculture sectors as trade associations, fishing and hunting clubs, hiking groups, tour guides and fishermen, among others, are important actors who can populate the database and trigger the early warning procedure. There is no doubt that the SAG Programme on private lands together with CONAF staff in protected areas of the State, will be key stakeholders. However, the entire community should also be involved and for this, the project can be supported by communication and outreach activities through talks and training. This information system corresponds to the passive detection of the SAG contingency plan Another source of information is the Environmental Impact Declarations where wildlife specialists provide reports on fauna, that in the case of beaver, it should include georeferenced observations subsequently managed by the coordinating unit of the early warning plan.</p> <p>c. GIS Platform The early warning plan is a tool that should populate the database of beavers' distribution that will be distributed over a GIS platform to model the spread and current and potential distribution of the beaver. In that regard, the information gathered by the SAG is essential as a basis for future analysis.</p> <p>d. Communication channels The early warning system should expedite timely information on the presence of beavers to the coordinating unit, either from natural persons or trained staff who are performing field surveying tasks. It should periodically report project partners on database updates.</p> <p>e. Response procedure The logic response to the evidence of a new spot of beavers, either previously unknown or a recolonization of the environment, should be the lethal capture all individuals. After verifying the evidence, the coordinating unit shall notify through official channels. This is achieved with a permanent crew of trappers or 'operating units'. Under the framework of the new control program of SAG in livestock farms, this could work by mobilizing the nearest crew. However, the coordinating unit shall verify the total eradication of beavers. In line with this project, the protocol proposed by the SAG Contingency Plan, should be analysed and leveraged to make it operational.</p> <p>f.- Manual of operations A manual of operations and procedures should be a product that organizes the way to present records, specifies recipients and how search and eradication is generated. It should be noted that there is the possibility of records in remote locations without immediate possibility to verify the information, for example fishing zone or hatcheries.</p>	
<b>REQUIRED COMPETENCES</b>	
<ul style="list-style-type: none"> <li>- Hired and assigned (CONAF) professional and field staff with experience/capacity in biology of the species, beavers capture with different techniques, logistics, safety and health, technical monitoring, data collection, ethics, customer service, GIS.</li> </ul>	
<b>COSTS AND SUPERVISION</b>	
<ul style="list-style-type: none"> <li>- Technical coordinator</li> <li>- Hired and assigned (CONAF) professional and field staff</li> <li>- Inputs and logistics (fuel, horses, equipment, traps, transportation and helicopter)</li> </ul>	

#### Appendix A: Detailed work plan

ACTIVITY	TRIMESTER									
	1	2	3	4	5	6	7	8	9	10
GENERAL COORDINATION										



species in forest ecosystems, both in terms of ecologic aspects and the application of control and eradication techniques.

At the north central area of Tierra del Fuego, small streams associated with the Marazzi River extend into the Patagonian steppe ecosystem, with presence of rangelands, meadows and scrubs, mainly. The presence of beavers has been reported in the area by breeders and some fauna specialists. The existing internal road network, together with the potential support of the landowners affected, make it feasible to implement a pilot to control this species considered harmful for these ecosystems. The comparative advantage of a pilot developed in this area, is that it will be possible to assess impacts from the presence of the species and control aspects in a management system different from the private or public conservation systems which are addressed in other pilots of this project. It will allow to provide information on the abundance of beavers in a little known area, despite its accessibility.

**OBJECTIVES**

The following objectives of the pilot are part of a consistent set of objectives for all of the pilots of the project:

- Eradicate the local beaver population and prevent reinvasion.
- Compile data on current beaver distribution.
- Assess public-private cooperation strategies.
- Perform a basic restoration (removal of dams and others) and assess restoration strategies:
  - o monitor the series of temporary changes in management units (ecologic efficacy).
  - o Identify landscape features where it would be desirable to accelerate restoration (economic efficiency).
- Monitoring and systematization:
  - o Collect data to assess the ecologic efficacy and economic efficiency of all actions.
  - o Assess the reasons to perform pilot activities in Argentina.
  - o When costs permit it, gather information on mink, muskrat and other invasive alien species (IAS).

**KEY TASKS TO ACHIEVE THE OBJECTIVE**

- Procurement of material and the necessary equipment to execute the pilot.
- Hire trained staff with different techniques, logistic, safety standards and health, monitoring techniques and data entry and ethics.
- Field work: logistics, diagnosis, beaver capture and restoration of affected ecosystems.
- Beaver reinvasion monitoring.
- Ecologic and restoration variables monitoring.

**KEY PERFORMANCE INDICATORS**

1. Sustained control work.	Months 4-6 and 10-12
2. Post-capture monitoring to evaluate the presence or reinvasion and the restoration status of channels.	Months 4-15
3. Drafting of the sustained control and ecological restoration report.	Month 27

**WORK METHODOLOGY**

The basin formed by Marazzi river and tributaries was selected as pilot area. The topography is undulating, with low enclosed valleys in the upper part of the area and plains toward the river mouth at Inútil Bay. The vegetation is mainly a semiarid matrix of coiron and rosemary shrub, with meadows in the low plains and murtillar or small peatlands in the highest windy areas.

An essential criterion to select this area as pilot is that the breeders have expressed interest in controlling beavers and could serve as a contrast to the beaver control programme implemented, in parallel, by SAG in cattle farms.

Two teams of experienced trappers with capacity in capture techniques, supported with vehicle and horses will be available. This means that at least four people will work with logistic support to mobilize as many traps as possible to the capture sites. The waypoints of sustained trapping will be defined with reference of the network of internal roads in each farm. Once there is zero captures in specific sites, data on the characteristics of the site, number and location of traps, logistical support, workdays, rounds with GPS positioning, burrows and dams, and photographic record of the site will be analysed. The partial destruction of dams will be considered to restore the brooks flow. Data on the landscape intervened will be taken to establish the criteria for ecological restoration of vegetation and its long term applicability. The next stage involves monitoring the basin for the presence of beavers and the action of supplementary trapping. Data should be entered to the information system (project activity 1.2.1) linked to the management unit or sub-basin. The manual of procedures will be used to monitor the ecological restoration (project activity 2.1.4).

**REQUIRED COMPETENCES**

<ul style="list-style-type: none"> <li>- Field staff with experience/capacity in beaver capture with different techniques, logistic, safety and health, monitoring techniques, data collection, ethics.</li> <li>- Professionals with experience/capacity in managing alien species an ecologic restoration.</li> </ul>
<b>COSTS AND SUPERVISION</b>
<ul style="list-style-type: none"> <li>- Field technical supervisor and scientific supervisor</li> <li>- Trapping and logistics staff</li> <li>- Inputs and logistics (fuel, horses, equipment, traps, transportation)</li> </ul>

**Appendix A: Detailed Work Plan**

ACTIVITY	TRIMESTER										
	1	2	3	4	5	6	7	8	9	10	
<b>COORDINATION</b>											
Planning with landowners and executing partners	■										
Field work	■	■		■	■			■			
Partial reports			■				■			■	
Drafting of management manuals									■	■	
Outputs delivery (Pilot final report and manuals)										■	
<b>SCHEDULE OF SPECIFIC ACTIONS</b>											
Procurements	■										
Diagnosis of beaver distribution	■	■									
Local eradication and reinvasion prevention		■		■							
Basic ecologic restoration				■	■						
Change monitoring in management units						■	■	■			
Identification of sites for other restoration activities				■		■	■	■			
Data systematization and analysis		■	■			■	■	■	■		
Monitoring of the execution		■				■				■	

**APPENDIX 11 OFFICIAL NOTE FROM THE MMA REQUESTING FAO ADMINISTRATION OF GEF FUNDS**



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Document