



# MENTAL MODELS ON PRIVATE CONSERVATION: A CASE STUDY IN THE CHILEAN SOUTHERN PATAGONIA

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*Dedicatoria:*

*A mis abuelas, madre y hermanas por enseñarme a luchar, no rendirme  
y a hacer las cosas con amor.*

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## RESUMEN

Las áreas protegidas privadas (APP), tanto o más que las áreas protegidas estatales, se enfrentan a diversos grados de reticencia y desconfianza por parte de las comunidades en las que se insertan. Las razones de esta reticencia no siempre son las mismas y, por lo general, los propietarios y gestores de las AAP las desconocen. Aunque muchas opiniones sugieren que la falta de apoyo puede deberse a la escasa comprensión de la preocupación por la conservación, es posible que la falta de apoyo esté más relacionada con la percepción de la gobernanza de la APP. Basándonos en un estudio de caso en la Patagonia chilena, exploramos los modelos mentales de la comunidad tanto de la propia APP como de su gobernanza, para determinar si 1) existe una diferencia en el contenido entre los modelos mentales y 2) si esta diferencia influye en el apoyo a la APP. Recogimos modelos mentales de miembros de la comunidad local, sector turístico y representantes del gobierno. El resultado muestra que no había una diferencia clara en los modelos mentales entre los grupos, los modelos mentales que surgían dentro de los grupos eran coherentes en todos ellos. Estos modelos estaban en consonancia con el apoyo o rechazo al Santuario, mientras que el APP era vista por la mayoría como beneficiosa, no sólo para el ecosistema sino también para el bienestar humano, su gobernanza era controvertida ya que el carácter privado suscitaba modelos mentales opuestos entre los grupos de interés. Así pues, el Santuario Natural de Meullín-Puye se enfrenta al reto de disminuir las elevadas expectativas relacionadas con los beneficios del desarrollo turístico dentro de la zona, así como a la participación de los distintos grupos de interesados en la toma de decisiones con el fin de reducir futuros conflictos y garantizar la colaboración para la conservación del área.

Palabras clave: stakeholders, gobernanza, estrategias de conservación, áreas protegidas privadas (APPs).

## **ABSTRACT**

Private protected areas (PPAs), as much or more than state-protected areas, face varying degrees of reluctance and suspicion from the communities where they are inserted. People's reasons for this reluctance are not always the same and generally remain unknown to PPAs owners and managers. While many opinions suggest that the lack of support may be due to the limited understanding of the conservation concern, it is possible that lack of support be more related to the perceived governance of the PPA. Based on a case study in Chilean Patagonia, we explore people's mental models of both the PPA itself and its governance, to determine if 1) there is a difference in the content between mental models and 2) whether this difference influences the support of the PPA. We collected mental models from local community members, tourism entrepreneurs, and government representatives. The result shows there was no clear difference in mental models between groups, differing mental models emerged within groups were consistent across all groups. Mental models were in line with support or rejection of the Sanctuary, while the PPA was seen by the majority as beneficial, not only for the ecosystem but also for the human wellbeing, its governance was controversial as the private character raised opposing mental models among the stakeholders. Thus, the Meullín-Puye Nature Sanctuary faces the challenge of lowering the high expectations related to the benefits of tourism development within the area, as well as the involvement of different stakeholder groups in decision-making in order to reduce future conflicts and ensure collaboration for the conservation of the area.

Keywords: stakeholders, governance, conservation strategies, private protected areas (PPAs)

## I. INTRODUCTION

There is increasing recognition that the private sector can and should play a substantial role in conserving the world's biodiversity and ecosystem services (Stolton *et al.* 2014, UNEP-WCMC & IUCN 2016, Bingham *et al.* 2017, Hora *et al.* 2018, Clements *et al.* 2019). A variety of private actors including individuals, non-governmental organizations (NGOs) and business companies are increasingly purchasing and managing significant tracts of land for conservation. These areas are known as privately protected areas (PPAs) (Mitchell *et al.* 2018, Palfrey *et al.* 2021).

Although PPAs share common challenges with state protected areas, others are specific and especially complex. A recent systematic review (Gooden and 't Sas-Rolfes 2020) synthesizes these challenges into three large types. Firstly, implementation effectiveness, which comprises problems such as i) the uncertain permanence of the PPAs over time, ii) the effectiveness itself, including the uncertainty regarding the true costs and benefits of conservation and the effectiveness of conservation goals monitoring, and iii) financing and sustainability of the areas.

Secondly, value conflicts, which include issues such as i) cultural conflicts, given that foreign PPAs owners unaware of the territory can implement practices that oppose the traditional values of local communities, ii) inequality related conflicts, as owners are perceived by communities as wealthy, powerful and privileged (Serenari *et al.* 2016), iii) the generation of communities' dependency on the PPAs, and iv) elitism, as some PPAs are perceived as elite spaces where wealthy owners host wealthy tourists (Holmes 2011, Spierenburg & Wels 2011).

Thirdly, there is criticism from other sectors in relation to the economic inefficiency of keeping land in private conservation instead of putting it to productive uses. For all these reasons, PPAs

are often met with a degree of indifference and mistrust from affected stakeholders, and in some cases objection (Serenari *et al.* 2015, Zorondo-Rodríguez *et al.* 2019).

A mental model is an incomplete cognitive-based representation of the real world (Craik 1943; Johnson-Laird 1983) and is influenced by what people believe and value (Biggs *et al.* 2011). These internal models filter incoming information to create our perceptions and attitudes regarding the concept being modeled (Feldman-Barrett 2017). Specific concepts, such as a PPA or a public protected area, have distinct mental models within our cognition. The model is often described as having both content (all the concepts forming part of the model) and structure (the way those concepts interact) (van den Broek 2023). Mental models build over time, based on experiences and interactions with other ways of thinking (Biedenweg & Monroe 2013).

In the context of nature conservation, mental models have frequently been studied to understand differential interpretations and attitudes toward protected areas (Moon *et al.* 2019). Researchers have found that protected area users, such as fishers near marine protected areas, often have unique content and/or structure compared to managers (van den Broek 2023, Wade & Biedenweg 2019). These distinct mental models influence the preferences for specific conservation strategies, the way they communicate about protected areas, and their support for the protected areas. These analyses, however, have often incorporated content related to both what the protected area is and how it is or should be managed. Yet prior research has identified that people may have different conceptualizations of the system to be governed (e.g., the components of the protected area) compared to the governance system (e.g., the institutional dimensions of its management) (Jentoft *et al.* 2007, 2012). For example, components of a mental model around the system to be governed include one's understanding of the health of the system, conceptualization of how it contributes to human well-being, and the power structures associated with the place (Jentoft *et al.* 2012). In turn,

components of a governance system mental model include perceptions of the values, norms, and principles enacted through the protected area's governance. These two models interact and have outcomes on the perceived relevance of the governance structure to the system to be governed, perceived effectiveness of the governance system to protect the area's issues, and perceived equity because of the governance process in the area.

Considering that much dissatisfaction with protected area management is a result of perceived inequity (Bennett & Dearden 2014), it is possible that if actors hold a distinct governance system mental model from the protected area mental model, support for PPAs may be more influenced by the former than the latter. This would reflect on the outcomes that are the ideas that the stakeholders have around effectiveness, relevance, and equity. The fact that most conservation mental model research has focused on identifying mental models that encompasses both the system and the governance of the system may be due to the continuing persistence of the knowledge deficit approach among natural scientists. This approach assumes that ignorance is the cause for lack of support for science (Simis *et al.* 2016). It follows that researchers seeking to understand conservation dissatisfaction may have lacked nuance in mental model research, conflating the existence of components of the governance system and system to be governed as a single mental model rather than potentially separate mental models with their own influences on protected area support.

In multi-stakeholder contexts, the existence of multiple mental models can have both positive and negative effects on governance. If there is a genuine interest in understanding the different mental models, unique ideas for conservation strategies can be addressed to enhance the conservation effort (Jentoft *et al.* 2012, Chuenpagdee *et al.* 2020). If the differences are not explored, however, they can maintain a division between the diverse actors, and lead to misunderstood differences in

opinion. Therefore, investigating what these mental models are and how they are expressed in governance interactions are important research questions (Chuenpagdee *et al.* 2020).

We use the mental model approach to explore diverse understandings of PPAs, and whether these mental models provide insights into why PPAs are facing conflicts, particularly in developing countries. We conducted this research focusing on a private Nature Sanctuary in the Aysén region of Chile, Southern Patagonia. We expect our research contributes to the gaps identified in the PPAs literature (Gooden and 't Sas-Rolfes 2020), which include: i) assessment of the issues' specificity to private land conservation; ii) the need for broader geographic coverage that can be addressed through the creation of PPAs; and iii) evaluation of the extent to which concepts about the protected area versus the management of that protected area affects PPA support. The literature's strong emphasis on value conflict suggests that greater attention to governance effectiveness may steer private land conservation toward practices that are more just, equitable, and representative and lead to increased societal support. Regarding the gaps in the mental model's literature, we want to contribute to understanding the importance of separating mental models between the area itself and its governance system in order to avoid the knowledge deficit approach (Simis *et al.* 2016). In this context the aim of this research is to explore people' mental models of both the PPA itself and its governance, to determine if 1) there is a difference in the content between mental models among stakeholders and 2) whether this difference influences the support of the PPA applied to a case study in southern Patagonia.

## II. METHODS

### i. The Meullín-Puye Nature Sanctuary

The Meullín-Puye Nature Sanctuary is located in the municipality of Aysén, in the Aysén region in the Southern Patagonia of Chile (Figure 1). It has an area of near 29,542 ha and comprises adult native forest, snow, and glaciers, as well as riverbeds and numerous bodies of water. The area closest to the Sanctuary is located to the southeast in Río and Lago Los Palos, in Puerto Aysén. According to the Census carried out in 2017 (INE 2017), Los Palos Lake sector has a population of 25 people, and 21 homes, while the Los Palos River sector has a population of 96 inhabitants and 35 homes.

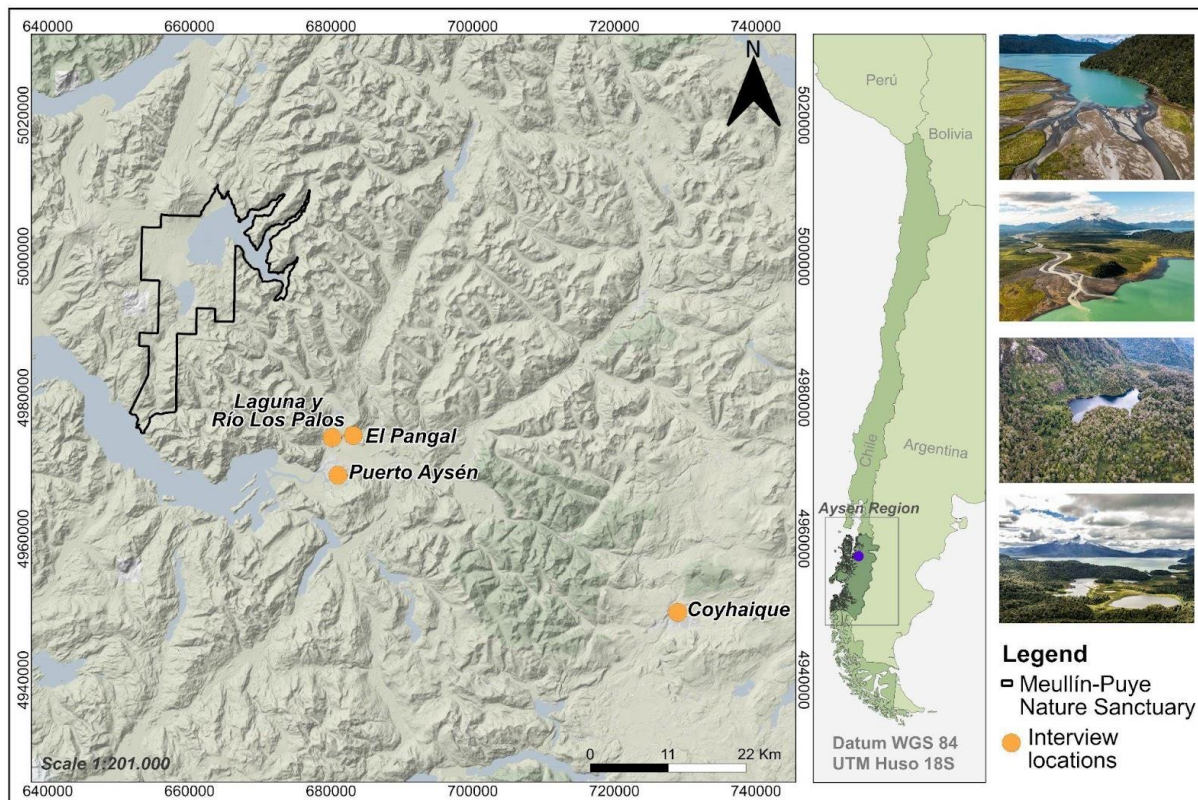


Figure 1. Location and natural setting of the Meullín-Puye Nature Sanctuary, in the Aysén Region, Chile (Photography by Kreen Foundation).

In the past, the area was used by settlers for livestock. Later, when the area was acquired by the Canadian company Noranda (during the 1990s), the remaining peasants were evicted to begin prospecting for the Alumysa project (for aluminum reduction), which was finally dismissed to the opposition from environmental organizations and the salmon farming industry. Subsequently, the area was acquired by Energía Austral SpA. for the installation of the Cuervo Hydroelectric Power Plant, which was never carried out (Fundación Kreen & Fotosíntesis 2019). In 2018, the area was acquired by its current owners under a Foundation figure and in 2021 was declared a Nature Sanctuary (Decreto 30 2022), which in Chile is an official protection of legal rank (Law of National Monuments n°17.228) overseen by the Ministry of the Environment. A Nature Sanctuary is defined by this law as “those terrestrial or marine sites that offer special possibilities for geological, paleontological, zoological, botanical or ecological studies and research, or that have natural formations whose conservation is of interest to science or to the State” (Law of National Monuments n°17.228). The Meullín-Puye Nature Sanctuary has nine conservation targets: i) Puye (*Galaxia platei*) and other native fish, ii) Darwin’s frog (*Rhinoderma darwinii*) and other native amphibians, iii) Huillín (*Lontra provocax*) which is a river otter, iv) wetlands and the hydric network, v) temperate rainforests, vi) geof ormations, vii) landscapes, viii) ecosystem services and ix) local patrimony and history (Decreto 30 2022).

## **ii. Overview of mental models**

Mental models can be studied through a variety of methods (Moon *et al.* 2019). We chose a semi-structured interview process that ensured the consideration of key components found in the literature on marine protected areas (Jentoft *et al.* 2012) (Figure 2). In this paper, the authors proposed that people have models for what a protected area is (including its health, contribution

to human well-being, and power relationships) and what its governance system is (including the values, norms, and principles that guide management). Moreover, these authors suggest interactions between these mental models, such as the relevance of the governance system to the PA system’s context, the perceived likelihood of effectiveness, and perceived equity in the process. The distinction between these systems suggests logical dimensions that should be considered in a mental model analysis across different stakeholders to protected areas.

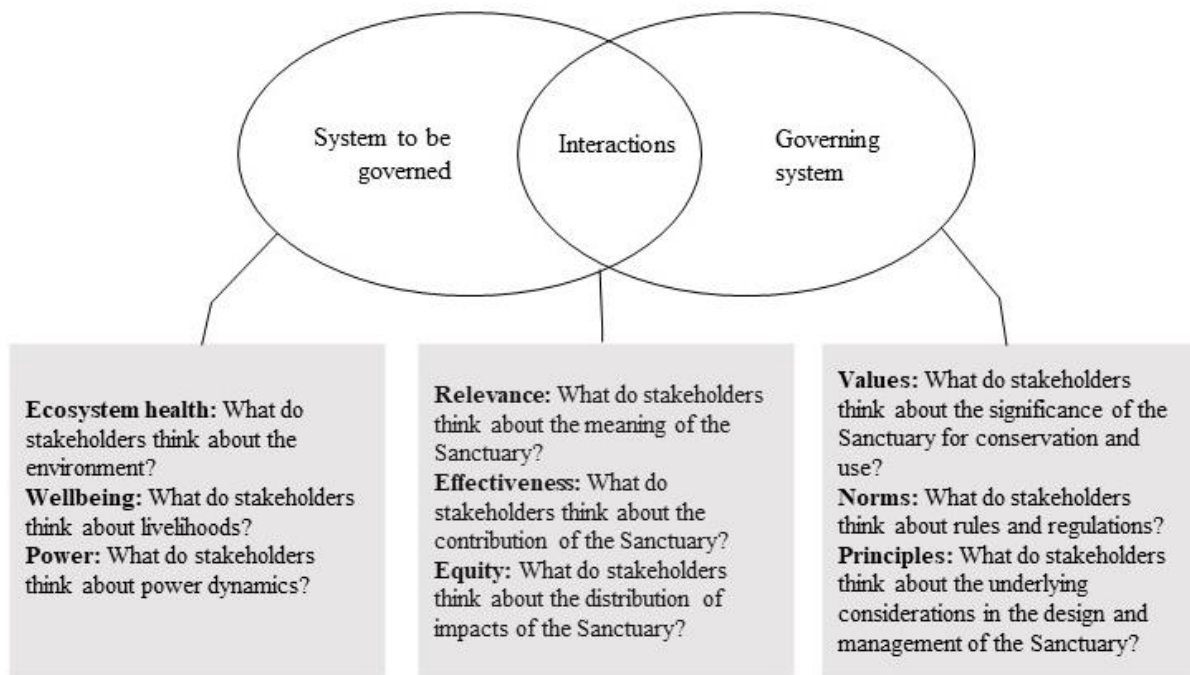


Figure 2. Dimensions of a mental model of an APP. Adapted from Jentoft *et al.* (2012).

### iii. Data collection

We chose a semi-structured approach to enable respondents to represent these mental models. This selection of questions allowed the researchers to confirm that participants were taking into consideration common components of these mental models that have been identified in prior literature. For example, because we were particularly interested in mental models around private

protected areas in this study, we wanted to assure that we asked about how ownership contributed to their understanding of the place. An entirely open assessment could have risked participants not discussing these issues because they did not immediately come to mind. The semi-structured aspect of the interview, however, also allowed participants to suggest that these components weren't important to their understanding of either the system to be governed or the governing system. As such, this approach allowed us to 1) ensure the respondents could easily access common ideas and 2) test our own assumptions that these ideas are important in forming two distinct mental models.

The instrument was pilot tested with ten people from three rural communities near a PPA in the Los Ríos Region of Chile during 2021. Based on the pilot test, questions were modified, eliminated and/or added to facilitate the understanding of the instrument. The final interview contained 26 open questions (Supplementary material 1) covering all the concepts in Figure 2 and was applied over four days during November 2021. Interviews lasted approximately one hour at the interviewees' houses or workplaces.

The sample was stratified across three groups of social actors from the municipality of Aysén, which we labeled as: a) Community Los Palos (Los Palos inhabitants), b) tourism sector (people related to tourism activities), and c) Government, comprising state representatives from seven agencies. The community group sample size of 42 was computed based on socio demographic information obtained from the 2017 population census (INE 2017) and from the data on workers by economic activity for the year 2020 (Biblioteca del Congreso Nacional, 2020) with a 95% confidence and 5% error. We contacted 42 people, and 39 interviewees responded. In the case of the tourism sector and government, we used targeted sampling reaching 13 and seven interviewees, respectively.

#### **iv. Data analysis**

We analyzed the data through qualitative thematic content analysis, which is a method of analyzing written, verbal, or visual messages (Cole 1988, Vaismoradi *et al.* 2016). Essentially, a qualitative perspective focuses on identifying the presence or absence of a particular topic in the content (Oliveira *et al.* 2014). Given the nature of our inquiry, we conducted our analysis manually assisted by Atlas.ti software (Version 9.1.3.0). When data is complex, automated methods might be unable to draw on the same logical thinking as human coders, therefore producing a systematic bias (Conway 2006). Computer-assisted methods assume that words have the same meaning in different contexts, whereas human coders working manually can discern between different meanings of the words depending on the context (Conway 2006).

Identifying the characteristics of mental models regarding PPAs from interview transcripts required a level of abstraction and interpretation on the part of the coder. We followed three steps in the analysis (Oliveira *et al.* 2014): 1) pre-analysis, 2) exploration, and 3) treatment and interpretation. Pre-analysis involved refining the objectives of the content analysis, selecting the material (e.g. transcripts) according to its relevance in relation to the goal, reading the material to be analyzed, and organizing the material for analysis (e.g. annotated transcriptions). It is important to remark that the dimensions in Figure 2 provided a first categorization of mental model components and acted as a first layer for code selection (Table 1). Here we define coding as ‘a way of indexing or categorizing the text in order to establish a structure of thematic ideas in relation to it’ (Gibbs 2009). The exploration stage involved defining the smallest unit of analysis (i.e., the portion of text to which the code is associated) which in our case were paragraphs. Finally, in the treatment and interpretation step, inferences were drawn.

Table 1. Mental models, components, and code groups and codes used in the qualitative content analysis.

Mental model	Component	Definition	Code
System to be governed	Ecosystem health	Capacity of the system to maintain its structure organization) and function (vigor) over time in the face of external stress (resilience) or threats (Constanza 2012).	Impact of the Sanctuary on the health of ecosystem components
	Well-being	General state of each individual, a sum or result of a person's various life experiences, and which is relatively stable, unaffected by emotional fluctuations or momentary events (Kahn & Juster 2002). Human well-being has multiple components, including the basic material for a good life, freedom of choice, health, good social relationships, and security (MEA 2005).	Impact of the Sanctuary on human well-being
			Permitted activities within the Sanctuary
			Limitations the Sanctuary can impose to the local community's enjoyment and use of nature
	Power	Capacity or ability to determine or control how things work in the Sanctuary or which rules apply (Hodder & Lucas 2017, Jentoft <i>et al.</i> 2012).	How the Sanctuary owners are seen by the community
			How decision-making in the Sanctuary is made

The governance system	Values	Values express the regard that something is held to deserve; the importance, worth, or usefulness of something. In this case values are what people consider important, and what they therefore would like to see happen with the Sanctuary, the ecosystems within it, and their own community or group (Jentoft <i>et al.</i> 2012)	Significance of the Sanctuary for nature conservation, culture and identity
	Norms	Norms are what people believe to be obligatory, something they must abide by or avoid, which may be encoded in law or institutionalized in terms of local social practice and knowledge (Jentoft <i>et al.</i> 2012)	Rules and regulation of access and activities
	Principles	Principles are the codes of conduct for those who govern the system and guide how the protected area is to be implemented (Jentoft <i>et al.</i> 2012)	Principles underlying the creation of the Sanctuary: participation, access, transparency, conflict resolution, others
Interactions between mental models	Relevance	Quality or state of being closely connected or appropriate. In this case it refers to the alignment of the Sanctuary with the reality of people’s needs (Jentoft <i>et al.</i> 2012)	Relevance of the creation of the Sanctuary
			Importance of the Sanctuary for the conservation in Patagonia
	Effectiveness	The degree to which something is successful in producing a desired result. In this case it refers to the extent to which the Sanctuary fulfills its promises and goals (Jentoft <i>et al.</i> 2012).	Effectiveness of Sanctuary as a protection figure  Threats

	Equity	Equity in conservation is a matter of governance and includes recognition and respect for actors and their human and resource rights, equity in procedure (e.g., participation, accountability) and equitable cost/benefit distribution (Boillat <i>et al.</i> 2018).	Inclusion of the visions of the community regarding nature conservation, in the management of the Sanctuary
			Distribution of benefits attributed to the Sanctuary
			Inclusion of stakeholder's participation in the Sanctuary
			Actors who benefit from the creation of the Sanctuary

Given the experience in other Sanctuaries, we anticipated that interviewees would have a difficult time conceptualizing principle. For this reason, we provided a list of possible principles, based on Chuenpagdee *et al.* (2020), that we showed to the interviewees.

- a. Ensure access for all sectors of society regardless of their physical, educational, or economic condition.
- b. Guarantee equity in the distribution of benefits.
- c. Promote stakeholder participation in decision-making.
- d. Making decisions at the local level.
- e. Provide information (transparency).
- f. Consider future generations.
- g. Prioritize nature conservation.

h. Guarantee that regulations consider cultural uses.

### III. RESULTS

#### i. Mental model content for what the system to be governed

##### *The Sanctuary and ecosystem health*

The ideas expressed about ecosystem health by the interviewees were relatively homogeneous, although we also found some divergences.

Within the Sanctuary mental model, the component shared by most of the interviewees was the positive role of the Sanctuary on the health of the ecosystems it is meant to protect. The health was linked to both biological (e.g. flora and fauna) and landscape (e.g. water) elements. Some interviewees from the community identified specific biological conservation objects that the Sanctuary would help to protect, as illustrated by this testimony: “[the Sanctuary] will continue protecting species and conserving nature, because there are places with species such as the Puye, which is under risk of being lost” (Los Palos Community). A smaller proportion of the community group indicated that the Sanctuary will not generate additional changes in the health of the ecosystems either within it or in the surroundings of the area. Given the Sanctuary’s current pristine nature and difficult access, its protection would only maintain ecosystem balance without significant changes from the current conservation status.

The interviewees from the tourism sector agreed with the community group that the Sanctuary will protect species (e.g. foxes) and habitats (e.g. wetlands), and will improve the provision of ecosystem services such as climate regulation, water supply and air quality. However, some interviewees from this group pointed out that there could be negative impacts for flora, fauna and the landscape due to the possible establishment of tourism infrastructure within the Sanctuary, as

evidenced by this testimony: “what would be most disadvantageous is if someone wants to implement some kind of tourism that requires infrastructure” (tourism sector).

Finally, the government group considered that the creation of the Sanctuary will allow the maintenance of life and biodiversity of the near pristine ecosystems that it comprises, by limiting future interventions that could be planned in the area, generating protection of the ecosystems in the short and long term. The interviewees in this group also pointed out that scientific research in the Sanctuary will contribute to ecosystem health by generating knowledge about ecosystems’ structure and functioning, as well as by generating awareness in the population about nature’s care. This group highlighted the key role of the Sanctuary on endangered and vulnerable species, as well as on wetlands and bodies of water and the control of invasive species, as illustrated by this testimony: “the Sanctuary is going to preserve a system of wetlands with unique species such as the Puye, which contribute a lot to the health of the ecosystem and the basin” (Government).

### ***The Sanctuary and well-being***

The results in this component show contrasting mental models while most interviewees of all groups acknowledge the Sanctuary as a human wellbeing provider, others do not recognize possible benefits for their wellbeing or even think that it will decrease it.

A large part of the interviewees in all the groups asserted that the Sanctuary could enhance material well-being by preserving the natural resources that make life possible, promoting tourism and associated activities, such as commerce, rentals, and sports activities, and increasing the value of land near the Sanctuary. Expectations of benefits were high and associated with the adventure tourism that the area could promote (horseback riding, hiking, trekking and cycling, as well as

water sports such as kayaking and sport fishing) and ecotourism (bird watching, nature photography), both assisted by the development of camping and picnic infrastructure.

Yet, some interviewees from the community stated that the Sanctuary could adversely affect the well-being of some community inhabitants by restricting productive activities, especially the extraction of firewood and construction, as illustrated by this testimony: “If they [the owners] close this place [the Sanctuary] where I used to go to look for firewood, there will be a clash” (Community Los Palos). An interviewee from the tourism sector argued that the Sanctuary could limit the tourist activity that could take place in the area since access will be legally restricted to preserve nature. In turn, one Government interviewee stated that there could be negative implications for farmers currently using the area.

Regarding the contribution to intangible well-being, the community group highlighted education and research. Education was associated with the possibility of the community, especially young people and students, to learn about flora and fauna as explained by a resident of Community Los Palos: “What interests me most is that they do research, and that our community be benefited with knowledge; that they let our children learn”. Participants from the tourism sector mentioned the generation of awareness for the conservation of nature, leading to the creation of other PPAs, the generation of education on conservation, the preservation of nature for future generations, and the satisfaction of having a nearby space protected from human intervention to enjoy nature. The government group highlighted environmental education opportunities as well as research.

Finally, there were also interviewees who believed that the Sanctuary will not affect them positively or negatively, since this depends on several factors beyond their control, such as the objectives of the Sanctuary, access, or the activities that the owners will allow in the area. The access restriction was the well-being barrier most frequently mentioned in the community and

tourism sector groups and was associated both with the distance and with the lack of routes to and within the Sanctuary and the prohibition of entry. This testimony illustrates this view: “I don’t think it influences me much because from what we learned they are not going to allow people to enter there” (Community Los Palos).

### *The Sanctuary and power dynamics*

Power dynamic’s mental models are constructed under the premise of the private character of the Sanctuary therefore the results show how the opinion on the owners shape the different mental models of the interviewees.

#### *Ownership*

The interviewees from the community group clearly acknowledged the private ownership of the area and their ideas in this regard were divided. Expressions of mistrust arose around the owners and their intentions. Although the community interviewees did not know who the owners were, the general perception was that the owners were philanthropists, wealthy, with altruistic values towards nature, and willing to reach agreements. This testimony illustrates this point: “These [the owners] are people who must have a lot of money and an interest in nature; for them it is likely more important to preserve nature than to make a profit” (Community Los Palos). Mistrust testimonies were mainly linked to the previous ownership of the area and their intended development projects (e.g. Alumysa and Central Cuervo projects), as the following testimony shows: “[we face the creation of the Sanctuary] with fear, because every time something private or corporate is presented, the experiences in general in the region are not very good.” (Community Los Palos). A minority of the community interviewees did not express ideas of the owners because they did not know them or the conservation project.

The interviewees from the tourism sector held contrasting ideas regarding the owners and their intentions. Some interviewees expressed mistrust because the Sanctuary could monopolize tourism and natural resources, as this narrative shows: “The Sanctuary is an external territorial intervention which does not preserve the spiritual, development or scenic rights of the Aysén community, and neither future tourism ventures; it can also forbid access to resources such as water” (tourism sector). Yet another part of these interviewees saw the owners as philanthropists and therefore as no threat to the community and the region.

Most government interviewees said to ignore who the owners were; they added that most people in the community and the region do not know the owners or the managers, because they do not live in the municipality of Aysén where the Sanctuary is located.

#### *Decision making*

The ideas around who is responsible for decision-making were diverse. Some interviewees recognized that decision-making will be a matter of the owner Foundation that acquired the area. Likewise, they identified certain environmental authorities as decision-makers in the Sanctuary, such as the Ministry of the Environment and the National Forestry Corporation. Few recognized the participation of the community but expressed the expectation of joint decision-making between different actors. For example, the government group mentioned that the decisions on the operation of the Sanctuary should be made jointly between the Foundation, the educational community, the tourism sector, public services and civil society organizations (e.g. neighborhood associations), as shown in the following narrative: “According to the procedures and depending on how we are working regionally here, it is the users who have to define, that is, the community, the public service, the private system, it is an issue that has to incorporate the largest number of participants” (Government).

*A synthesis of the distinct mental models of the system to be governed*

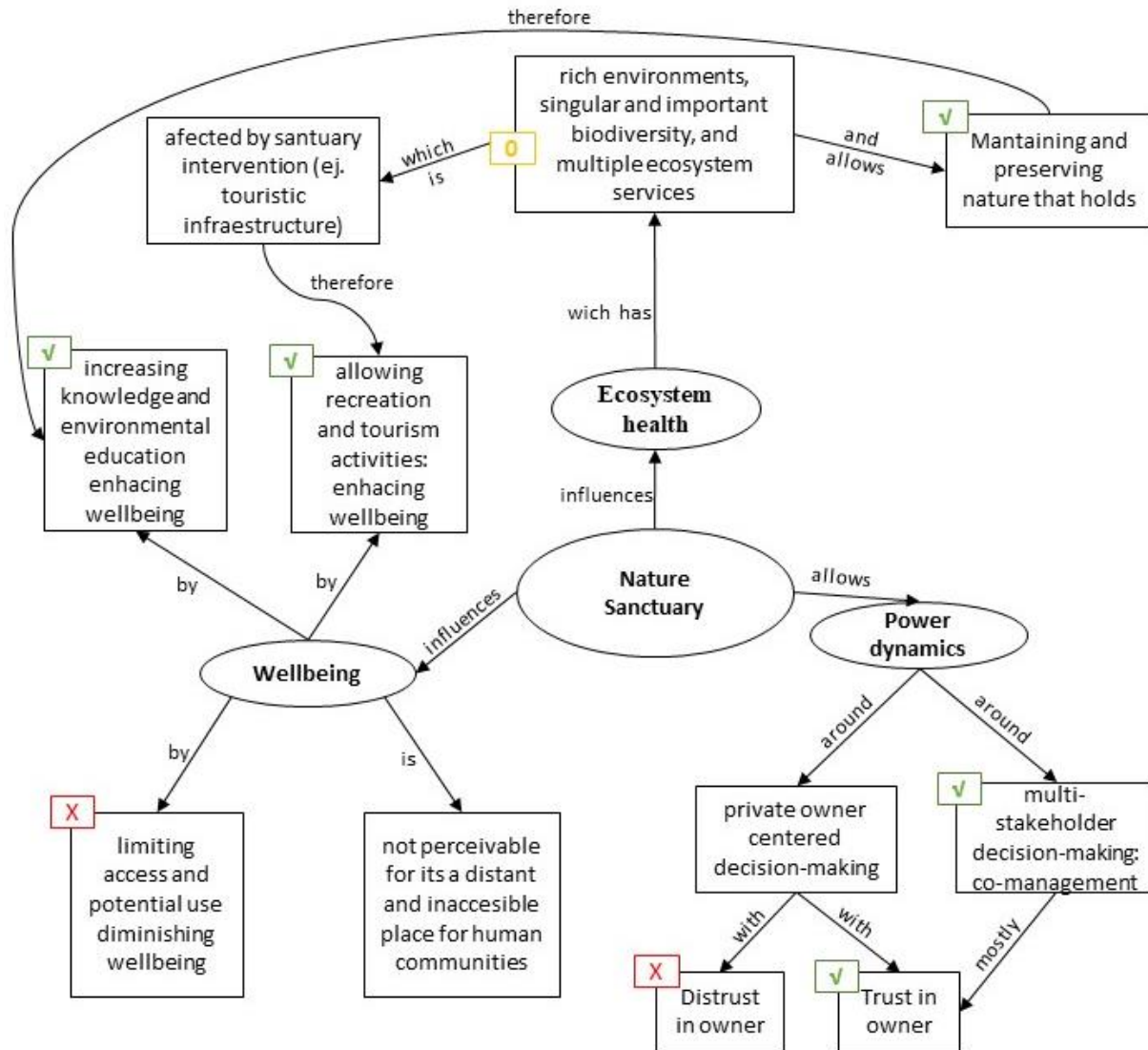


Figure 3. Mental model synthesis for the system to be governed. In square boxes are the differing mental models in relation to the components (in circles). Red boxes express rejection to the PPA; green boxes support the PPA; and the yellow box represent a consensus image among the interviewees independent of support or rejection. No color box in a model shows no clear relation with support or rejection.

Next, the differing mental models shown in Figure 3 are developed in relation to the system components:

*Models that differ for the impact of the Sanctuary on ecosystem health and well-being*

**Mental model 1:**

The Sanctuary will maintain a pristine area, with amazing nature and biodiversity that generates well-being to people through water provision, climate regulation, and economic benefits through tourism. Most people who held this mental model supported the Sanctuary.

**Mental model 2:**

The Sanctuary is a biodiversity spot, but the Sanctuary interventions, mainly touristic, will alter the ecosystem health. The people who held this mental model neither supported nor rejected the Sanctuary because they hoped the damage to the ecosystem will be minimal but enhanced the community wellbeing and allow the recreational use.

**Mental model 3:**

The Sanctuary is a place rich in biodiversity and ecosystems but is inaccessible and distant for the surrounding human communities, therefore it delivers none or little benefits.

*Models that differ in terms of power dynamics of the sanctuary*

**Mental model 1:** The Sanctuary is in the hands of a private owner that people do not know but that they think intends to protect nature, so they expect the Sanctuary to maintain the ecosystem and abundant nature and to keep providing wellbeing to the community and region. Most people who held this mental model supported the Sanctuary.

**Mental model 2:** The Sanctuary is in the hands of a private owner who they distrust and who will use the area for its own benefit in the future and will limit the benefits for the community. Most people who held this mental model rejected the Sanctuary.

**Mental model 3:** A Sanctuary where decision-making is made only by the owners. Support is conditional to the ownership perception and conservation outcomes in this model.

**Mental model 4:** A Sanctuary where joint decision-making between different actors is going to take place. Support was more likely in people with this model.

## **ii. Mental model content for the governance system**

### *Values*

All types of nature values were mentioned by the interviewees resulting in mental models differentiated by the type of value that the interviewees recognized as important.

#### *Intrinsic values*

The interviewees of all the groups indicated the protection of nature as an important value to be preserved by the Sanctuary. The community group related this value to the well-being that the proximity to the Sanctuary would grant the local inhabitants. Most of them stated the importance of living in harmony with the ecosystems, aware of the care of the environment because it brought them peace and tranquility. This testimony illustrates the importance of nature to people as embodied by the Sanctuary: “It is something sacred (the Sanctuary) in which we cannot kill or violate the rights of animals, both those that fly and those that walk on the ground” (Community Los Palos).

#### *Instrumental values*

The interviewees from the tourism sector group highlighted instrumental values associated with the conservation of natural resources such as water, as this testimony illustrates: “If we don’t take care for nature, what’s the use of being here?; we have to take care of the water because everyone is running out of water there”. Also, some interviewees from the tourism sector remarked the importance of caring for the environment because of the jobs it sustains and because of the need to create awareness of what they want to leave to future generations (intergenerational values). The government group pointed out that the Sanctuary has emerged as a necessity in the face of the current situation of climate change and depletion of resources and therefore its vision is associated with instrumental values linked to its professional field. The following testimony illustrates the above: “In this world, with what we are living today, such as climate change, you have to have natural reserves” (Government).

### *Relational values*

Interviewees from all groups raised the idea that the Sanctuary is part of their identity and of the local community since it protects nature, which is part of their lifestyle and with which their predecessors have been related, as stated by the testimony given by a interviewee of Community Los Palos: “Our ecosystems, our ecology, our nature are part of our heritage and a person has nothing without heritage; we do not exist without heritage and one of the things that represents us worldwide is nature”. But there was also a part of the interviewees that did not see the Sanctuary as part of their identity since it is a distant place with which they are not directly related.

### *The norms*

This was a complex component of the interview, among other things because most of the community interviewees were not familiar with the institutional context of conservation nor with

the Sanctuary's conservation proposal, because of the previous the interviewees mainly had mental models around which norms they imagined should apply and didn't have mental models around norms applying at the moment. Below we summarize the main ideas associated with the area.

#### *Regulate access to the area*

The interviewees expressed the need for the Sanctuary to regulate the entrance through guided tours (tourist guide or park ranger) in order to inform what can and cannot be done within the area. The community group also pointed out that entry with domestic animals such as dogs and cats should be prohibited. The community and tourism group raised the need for an entrance fee, however, the community group stated that the entrance should be free for people from the local community. The tourism sector group also mentioned putting a limit to the number of people entering the area. The interviewees from the government group added that the entry of people should be exclusively pedestrian (no vehicles of any kind). The community and tourism groups provided a condition to access the PPA: those who want to visit the area or run tours in the area must be educated about the area, as expressed by the following Tourism interviewee: "If there is going to be a tour operator that is going to do hikes, this operator must comply with certain standards and practices, such as ethics and education, to be able to work there" (tourism sector).

#### *Regulate the activities allowed*

Most of the interviewees from the community and tourism group agreed that only low-impact research, recreational and sports activities should be allowed. They also agreed that extractive activities, such as entry of motorized boats and the use of bonfires, should be prohibited. The tourism group added that fishing should also be prohibited, while the government group added the

need to establish a formal regulation that regulates the activities and the duties and rights of visitors, and that establishes prohibitions and sanctioning measures.

### *Principles*

The results in this section emerge from the principles presented to the interviewees; however, not all the principles presented were discussed or considered.

For the three groups, one of the most important principles was to “prioritize nature”; interviewees argued that since this is the stated objective of the creation of the Sanctuary, care for the environment should always be placed before other needs and interests. In addition, nature is essential for the development of life and therefore if this principle is not respected, it conflicts with the other principles.

The local community also recognized that a priority principle for the Sanctuary must be to “ensure access for all sectors of society”, that is, to facilitate access for those who do not have the opportunity to enjoy nature on a regular basis. This testimony by a resident of Community Los Palos illustrates this point: “Because I believe that since the Sanctuary is nature and the largest number of people are locked up in the cities, access should be facilitated for those who do not have that possibility.”

The tourism group interviewees also considered highly relevant the principle of “making decisions at the local level”, for the conservation project of the Sanctuary to be sustainable over time, as supported by the following testimony: “Including decision-making at the local level is going to be very important for this to take place. The most important thing is that they listen to people, consider their decisions and what they want for this sector.” (Tourism sector).

Within the government group there were differences regarding this principle. While some considered “making decisions at the local level” relevant, others argued that because it is a private area this cannot be assured and that therefore “promote stakeholder participation in decision-making” should be a priority. However, all stakeholders’ groups were uncertain if participation in the Sanctuary could be included. Among the Community Los Palos some believed that it would be possible, while others stated that the opposition to the Sanctuary would limit participation or were simply uncertain because effective participation would depend on multiple issues. In the three groups there was agreement that getting the different social actors involved will depend on the owners and the will of the other parties involved, as well as the quality of information that is delivered, the call that the meeting instances have with the parties, the ability to generate dissemination of information associated with the management of the area and work with local authorities.

One interviewee from the government group stated that the principle “regulations should consider cultural uses” was a very important one, that was not incorporated in other private conservation initiatives, which could generate greater acceptance in the community and will diminish future conflicts. Nevertheless, nobody considered this principle a priority.

On the other hand, the local community and tourism group interviewees considered “guaranteeing equity in the distribution of benefits” not an important principle. Furthermore, the idea of benefit generation created suspicion for some interviewees, as a tourism sector interviewee pointed out: “If there are benefits, things will change. For example, if they find gold, it will no longer be a Sanctuary because the owner of the gold would be the State, not the foundation, so things can change”. The government group did not delve into the less important principles.



Next, the differing mental models shown in Figure 4 are developed in relation to the system components:

*Models that differ in terms of the values important to the interviewees and the principles that should guide Sanctuary management*

**Mental model 1:** The sanctuary is a place that should be conserved because of its rich nature and therefore has a scientific and educational role. In this model, intrinsic and relational values take precedence and the principle that should guide its management is to prioritize nature because the environment should always be placed before other needs and interests. The people who held this mental model mostly support the Sanctuary.

**Mental model 2:** The Sanctuary is a place that sustains livelihoods and provides ecosystem services that maintain human well-being associated with the area. In this model, instrumental values take precedence. Support for the Sanctuary will depend on whether or not they will be able to access the benefits provided by the Sanctuary. A priority principle for this mental model is the principle of local decision and to ensure access to all sectors of society.

*Models based on Sanctuary norms*

**Mental model 1:** The sanctuary will establish restrictions to access that will affect local well-being because it will exclude locals from participating in livelihood and recreational activities. The people who held this mental model mostly rejected the Sanctuary.

**Mental model 2:** The sanctuary is a place with visitor access that is regulated by the presence of park rangers and rules of use aimed at protecting the ecosystems, flora, and fauna within it. This sanctuary is a place that integrates local community participation and allows them access to learn

about it, educate their children, and will generate infrastructure and the possibility of generating tourism. Those with this mental model support the idea of a nature sanctuary in the area.

#### *Model based on the principle of prioritizing nature conservation*

The prevailing principle of the Sanctuary is to prioritize nature, which determines regulated access. What the sanctuary does is preserve a part of Patagonia and the region that has virgin or pristine areas so that future generations can enjoy it. This area will serve to generate education in the local and regional community about the care of nature and therefore improve their wellbeing. On the other hand, it is not the sanctuary's duty to guarantee equity in the distribution of benefits because this generates incentives that are detrimental to the Sanctuary conservation. Those with this mental model support the creation of a nature sanctuary in the area and it's the majority in all groups.

### **iii. Outcomes for the governance (interaction between systems)**

#### *Relevance of the Sanctuary*

The results show that the ideas regarding the relevance of the Sanctuary are in line with the ideas of what the Sanctuary is (section 3.1), a rich area with multiple ecosystems and biosiversity.

Most of the interviewees of all groups viewed the creation of the Meullín-Puye Sanctuary as positive, stating that the creation of the private protected area is promoting the care of nature and protecting the flora and fauna present in the area as this testimony shows: “I am glad that it is a place that seemed unprotected and from now on is a nature sanctuary” (Community Los Palos).

The government group affirmed that the Sanctuary will grant security to the area since it is regulated by a decree that in turn allows diversifying the responsibility of nature conservation, traditionally attributed to the State, as the following testimony shows: “The figure of Sanctuary also allows decentralized conservation by the state, so that the private sector is in charge of its own

conservation. Furthermore, the good thing about having a protection figure, whatever it is, is that it cannot be changed from one moment to the next” (Government).

On the other hand, a minority of the community and the tourism sector groups viewed the figure of the Nature Sanctuary as a prohibitive measure, as it is incompatible with activities carried out by members of the local community, such as cattle ranching and wood extraction, as this testimony illustrates: “I don’t like sanctuaries because they prohibit you from doing many things, for example, they don’t like having cattle in the place” (Community Los Palos).

The interviewees from the three groups also saw the Sanctuary as important for the conservation of Patagonia, because the area encompasses ecosystems and important features such as forests, volcanoes and wetlands that are home to endemic species and that present a great diversity of resources that would be protected, among them the water and hydrobiological components with a low anthropogenic intervention. The community and tourism groups suggested that the Sanctuary may be useful for research and studies that facilitate the protection of other areas that harbor similar species and landscape characteristics, as a member of Community Los Palos affirmed: “It will be useful to preserve and also to investigate, the same investigation will help to protect, to prevent, to learn”. The tourism group added that the above will allow the generation of knowledge and awareness for the care of nature: “the type of research that can be carried out there gives an extra scope of knowledge of what the nature of the locality is and how to care for it” (Tourism sector). The government group stated that the Sanctuary will help to compensate for the multiple “sacrificial zones” currently existing in the region and that the declaration of a Nature Sanctuary in the area would represent an exemplary case of nature care for Patagonia. This testimony supports part of what was previously said: “the region has many sacrifice zones, therefore this sector would be a rest area, for protection” (Government).

### *Effectiveness of the Sanctuary*

Given that at the time of the interview the Sanctuary was not yet in operation, the interviewees stated their expectations of the possibility of the Sanctuary on “delivering its promises”.

In general, the interviewees from the different groups agreed on the potential effectiveness of the Nature Sanctuary protection figure, since it will be a space with controlled access, with an approach directed towards conservation and the development of science. These strategies will benefit communities and universities by providing greater restrictions as the following narrative shows: “Being a Nature Sanctuary has more restrictions than any other type of protection, and being so restrictive protects” (Community Los Palos). Along with the above, the community indicated that the word “sanctuary” evokes respect and care for nature. The tourism group added that the Sanctuary will legally protect the area from future anthropic interventions, as a tourism sector interviewee mentioned: “I think there will be laws that protect it [the Sanctuary] so it won’t be intervened”.

In the three groups, a second set of ideas arose about other more effective protection figures, such as the National Park administered by the State or CONAF. This testimony is illustrative “I understand that national parks have the greatest capacity to protect nature” (Community Los Palos). Also in all groups, a small number of interviewees mentioned that they ignored other forms of nature protection so they could not affirm that the Sanctuary was more or less effective than other protection figures. Finally, a small part of the community and tourism group added that the Sanctuary would not be effective as long as it is private property, because it would be a closed area that will not allow entry, and will limit the possibilities of the community to participate, as this response details, “by declaring it a sanctuary, they are declaring it definitively private, with all the private regulations and benefits that it will bring to the owners” (Tourism sector).

The interviewees mentioned some threats that could compromise the Sanctuary's ability to fulfill conservation targets. The community group mentioned both natural and anthropogenic threats. Among the former, they identified volcanic eruptions, due to the proximity of the Macá and Cay volcanoes, floods, and the occurrence of geological events such as earthquakes and tsunamis that could affect the vegetation and fauna present in the area. Within the latter, they primarily identified deforestation due to the extraction of firewood for heating and construction (which would become illegal extractions), since this is the main source of fuel used in the community of Los Palos. Other anthropic threats identified were water contamination due to salmon farming, flooding of the area for hydroelectric production, parceling out of land due to population growth, invasive species (e.g., *Neovison vison*) and the plague of Didymo microalgae (*Didymosphenia geminata*).

The tourism sector group identified only anthropogenic threats, such as population growth and the growth of tourism due to the entry of people to the place, which can also generate extraction of species or modification of the habitat: "the arrival of visitors is the biggest threat the area can have (tourism sector). On the other hand, the flooding of the area for the generation of hydroelectric power was also identified as a threat, as it had occurred in the past. In addition, this group pointed out as a threat the privatization of the area, since the owners can do whatever they want in the place. For its part, the government group identified threats of anthropogenic and natural origin. Within the former, cattle raising, salmon farming, forest exploitation, mining exploitation and the generation of hydroelectric energy were indicated. Among the latter, climate change and its effects on the variation of the precipitation regime were pointed out, since this could modify the functioning of the ecosystem and the balance of its elements as a Government representative stated: "threats associated with climate change are also present". On the other hand, some interviewees stated that they were unaware of threats.

### *Equity outcome of the Sanctuary implementation*

The mental models associated with equity are in line with the ideas of what the Sanctuary does (section 3.2) regarding the fact that interviewees were not familiar with the institutional context of conservation nor with the Sanctuary's conservation proposal. Resulting models centered in what they imagined would ensure equity.

### *Inclusion*

The interviewees expressed that equity would be possible only if the owners and administrators consider the points of view of the local community, working together, delivering clear and timely information, and integrating the ideas of the different interest groups. The government group added that the extent of participation had to be clearly communicated, dialoguing about the vision of the Sanctuary and of local inhabitants regarding conservation, informing and educating about the objectives of its creation and the impacts of the activities that are agreed to be carried out and prohibited in the area: “dissemination is key, the clear identification of the objectives, meeting people's expectations well, many times the expectations are very high or very restrictive, so there it is key to inform the community” (Government).

Some of the ways mentioned by the interviewees to incorporate the views of local communities on conservation planning in the Sanctuary were: a) holding meetings in which the administrators work with the Río Los Palos community (e.g. neighborhood council meetings), b) generating informative activities with the communities (e.g. brochures or stands in local fairs or events) and c) hold talks in the educational communities (e.g. environmental education workshops in local schools).

A proportion of the interviewees in the three groups stated that they did not believe that an effective inclusion of the vision of the communities will be achieved since it will be difficult to reconcile contrary points of view regarding the conservation of nature. The interviewees from the tourism group and government stated that it will be complicated since the local community develops activities such as the extraction of firewood and fishing, which are incompatible with the concept of conservation. This testimony illustrates these visions: "I think it will be a debate topic, for example wood extraction, fishing and trekking that are available now will be regulated" (tourism sector).

#### *Distribution of benefits*

In relation to the distribution of the benefits attributed to the Sanctuary, the three groups were divided in their ideas. A part of them raised the idea that everyone would benefit equally from caring for nature, as well as from the generation of new knowledge and learning about ecosystems, as the following testimony stated: "taking care of the ecosystem is beneficial for the human race, I feel that this is for everyone" (Community Los Palos). As a conflicting idea, it emerged that there will be sectors that will benefit more, such as the tourism sector, the local community and educational and research institutions. The community and tourism group also mentioned that the main beneficiaries will be the owners themselves. The tourism group added that there are economic sectors that will be affected because their interests conflict with the conservation of nature, as is the case of private companies dedicated to the development of extractive activities.

#### *Participation*

Regarding the stakeholder's participation in the Sanctuary, the interviewees of the community expressed the expectation that both informative instances and joint decision-making be carried out.

However, some pointed out that this will depend on the will of the owners. Therefore, they mentioned the relevance of being informed and giving their opinion as a community regarding the creation and administration of the area. They also pointed out as relevant the inclusion of the neighborhood council, which fulfills an organizational and informative role within the local community.

The tourism sector mentioned that a possibility of participation would be hiring of people belonging to the local community to fill the jobs associated with the operation of the Sanctuary and integrate them in the management of the area, as the following mentions “if someday they need guides, don’t bring them from elsewhere. Try us” (*tourism sector*).

The government group shared that their specific knowledge and skills should be considered to determine their participation in the Sanctuary’s decision-making. The interviewees from the National Institute for Agricultural Development (INDAP) indicated that the institute would be involved in the management only if there was agricultural development in the area. The representatives of the Agricultural and Livestock Service (SAG) indicated that they are called upon to participate in the governance of the area as long as the maintenance of forestry and agricultural lands is involved. The representatives of the National Fisheries and Aquaculture Service (SERNAPESCA) of the Aysén region stated that they could be considered part of the governance in case the fishing law or the recreational fishing law were involved. The representative of the Undersecretariat of Fisheries and Aquaculture (SUBPESCA) indicated that SUBPESCA would be linked to decision-making in the Sanctuary only when related to issues associated with recreational fishing. Finally, the interviewees from the National Tourism Service (SERNATUR) of the Aysén Region, indicated their willingness to participate in the governance model of the Sanctuary from the perspective of sustainable tourism development.

*A synthesis of the distinct mental models of the outcome between systems*

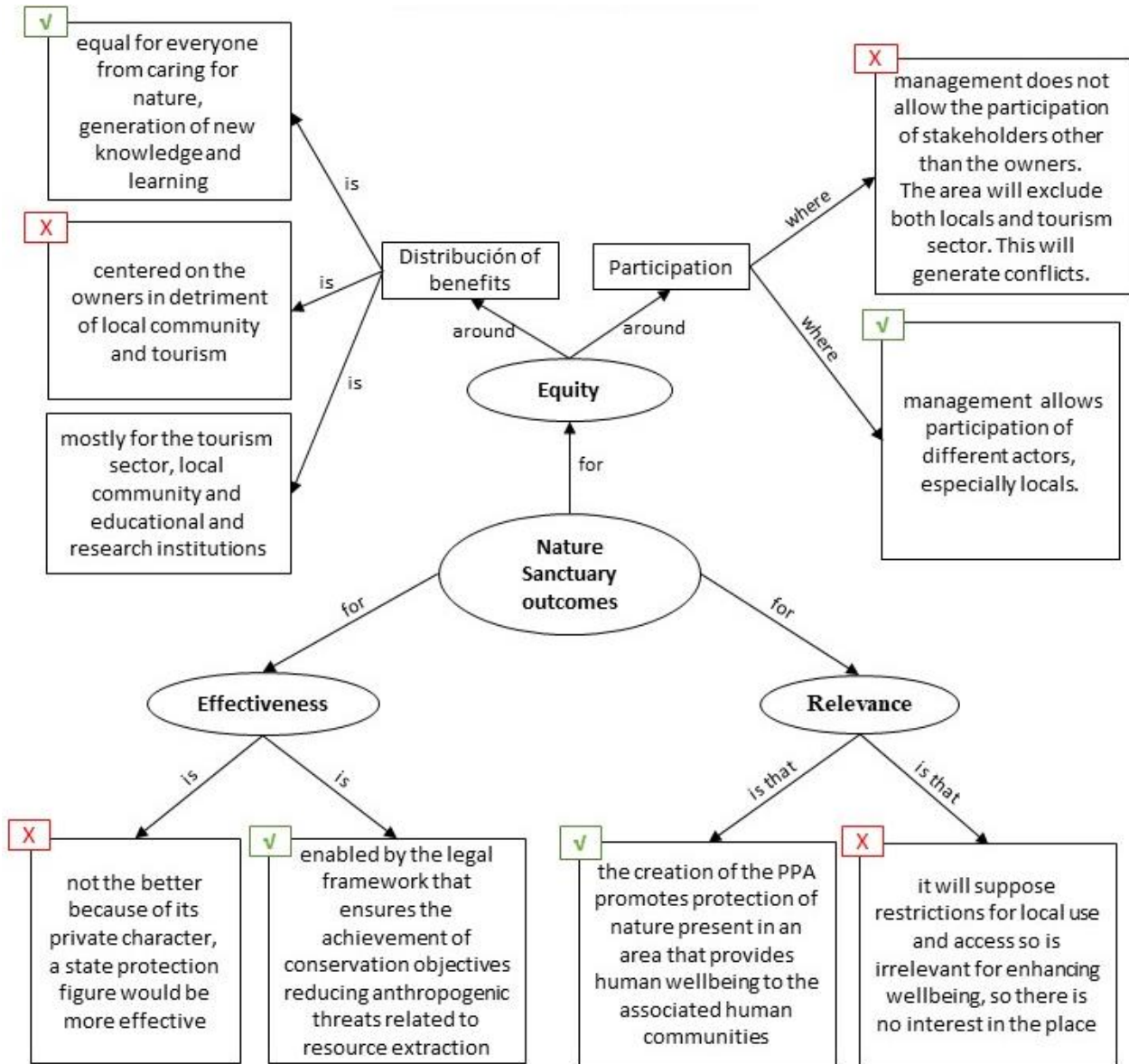


Figure 5. Mental model synthesis for the system to be governed. In square boxes are the differing mental models in relation to the components (in circles). Red boxes express rejection to the PPA; green boxes support the PPA. No color box in a model shows no clear relation with support or rejection.

Next, the differing mental models shown in Figure 5 are developed in relation to the system components:

*Models that differ in relevance and effectiveness as an outcome between systems*

**Mental model 1:** The creation of the PPA promotes the care of nature and protects the flora and fauna present in an area that provides human wellbeing to the associated human communities. The legal framework will ensure achievement of conservation objectives effectively as a space with controlled access, with an approach directed towards conservation and the development of science. Anthropogenic threats related to extractive activities won't be able to operate in the area. People who hold this mental model support the Sanctuary. An important part of the interviewees had this mental model.

**Mental model 2:** The figure of nature sanctuary is not relevant, it won't allow human wellbeing outcomes because it will suppose restrictions for local use and access. Effectiveness of this conservation figure is not seen as the better because of its private character, a state protection figure would be more effective. The people who held this mental model were a minority and rejected the Sanctuary.

*Mental models for equity outcomes regarding the Sanctuary*

**Mental model 1:** The sanctuary and its management allow different actors, especially locals, to participate in decision making. In this model, the sanctuary improves well-being and reduces conflicts. The sanctuary will implement tourism infrastructure that can be used for economic and recreational activities that have a low impact on biodiversity and will benefit mainly the tourism sector, the local community, and students who visit the sanctuary. This model is consistent with a favorable opinion of the sanctuary as a protected area and was expressed by the majority.

**Mental model 2:** The Sanctuary and its management will not allow the participation of actors other than the owners themselves because they are not obligated to generate a participatory model. The area will exclude both locals, who have been using the place, and potential users of the tourist sector. This will generate conflicts because the main beneficiaries will be the owners and will limit access and use by other stakeholders, especially the local community. This model, expressed by a smaller proportion of those interviewed, coincides with an unfavorable opinion of the sanctuary as a protected area.

## IV. DISCUSSION

The results show both convergences and divergences in relation to what is the system to be governed (Nature Sanctuary). The greatest convergence is in relation to the system to be governed being a "pristine" (or low intervention) system whose objective is to conserve the rich nature it harbors, similar to the results obtained by Jentoft *et al.* (2012) in which despite the criticisms stakeholders have, a large majority acknowledge the need for conservation that PPA promises. This condition is, for some interviewees, a guarantee for species and habitat conservation while for others being now a protected area will require the implementation of infrastructure that could affect this system with low intervention, which is not necessarily related to a rejection of the Sanctuary in the area.

The above can be explained in part by the findings in the wellbeing component, in which, as part of the model in line with support, the sanctuary is conceived as a space that will benefit them particularly through tourism, education, and research. It is interesting to note that the model associated with increased wellbeing as a result of using the sanctuary for tourism coexists with the image of preservation, which are generally opposed in practice. Globally, it is estimated that the richer the areas are in biodiversity the greater the benefits associated with nature-based tourism (Chung *et al.* 2018), which could be related to this model. Another explanation may be in line with the culture of public use of protected areas in Chile for tourism where this activity coexists with nature conservation (Subsecretaría de Turismo 2017). Serenari *et al.* (2016) found that PPAs are seen as tools that support not only species and habitat protection needs but also human development. On the other hand, the increase in tourism pressure globally (Frost *et al.* 2014, Tribe 2016) and in the Aysén region (Blair *et al.* 2018, Rovira *et al.* 2020) is also a factor to consider when explaining this mental model.

In the case of local wellbeing, although all stakeholders recognize that the Sanctuary provides benefits related to the nature it harbors (Jentoft *et al.* 2012), there are opposing models. On the one hand, there is the mental model that associates the Sanctuary with an increase in wellbeing, while a smaller part of the interviewees sees the Sanctuary as a constraint that threatens local livelihoods based on resource extraction or the potential use of the area for tourism development and therefore the local economy.

This impact on wellbeing is related to the results in power dynamics associated with the vision of a private area with a distrustful owner who makes decisions without considering other stakeholders. This model is in line with the results found by other studies conducted in Chile (Holmes 2015, Di Giminiani & Fonk 2018) as well as globally (Gooden and 't Sas-Rolfes 2020), in which local communities see the owners of these areas as powerful who hoard natural resources for their own benefit or as islands for the elite of which they are not part (Langholz & Krug 2004, Meza 2009).

It is noteworthy that most of the interviewees have the mental model that this area will be managed through joint decision-making, where local actors, local or regional government representatives and other stakeholders can participate in what happens in the PPA. Even the Government group imagines power dynamics that include joint decision-making. These results are in line with more general considerations about the role of inhabitants in the distribution of power and their presence in political and policy decision-making, as well as the transition from government leadership to more inclusive governance involving diverse stakeholders (Blair *et al.* 2019, Pahl-Wostl 2019, Delgado *et al.* 2021). However, this area is a protected area administered by a Foundation that, while desiring multi-stakeholder participation, does so while maintaining the right to decide on the management of the area with the aim of fulfilling the proposed objective for the area, which is its

preservation (Kreen Foundation undated). This contrasts with the results regarding the nature of private property, which plays an important role in the mental models and the predisposition of the interviewees to reject or not completely trust the outcomes that a protected area of these characteristics may have, as shown by other authors (Serenari *et al.* 2017, Iñiguez-Gallardo 2021). The results show divergences in all the components in relation to the governance system, and some of these divergences conflict with each other. Values show what is important individually, while some identified more with intrinsic and relational values with nature the other mental model was in line with instrumental view of nature. These differences can lead to conflicts between people with these mental models and the Sanctuary administration, generating problems of governance or legitimization of the PPA, as shown by Bieleng *et al.* (2020) in which the difference in the values that guided different actors played a relevant role in reaching agreements that allowed the implementation of necessary conservation measures. Mental models for regulations around access conflict with the principles and values pretended by the stakeholders for the area. While restricted access for locals and tourism is seen by a majority as a bad measure coupled with diminish support to the APP, prioritizing nature above other principles is a consensus among most of the interviewees. It is important to recognize the diversity of values, principles, and norms because they may lead to diverging arguments, priorities, goals, and pathways. Moreover, communication and an inclusive and participatory approach are crucial for fostering commitment to a long-term good that is widely agreed upon by the affected people (Bieleng *et al.* 2020; Chuengpagdee *et al.* 2020).

The resulting models for outcomes, are directly related with the mental models of both systems and their interaction. The interaction between systems show that people expect both conservation of nature and social benefits. Support or rejection of the Sanctuary is directly related to the

interaction of wellbeing models and power dynamics with the values, norms, and principles they envision for the Sanctuary (Jentoft *et al.* 2012). For the equity component, the distribution of benefits has three models. First, the model that sees the Sanctuary as an area that will only benefit the owners, diminishing the benefits for the community and tourism sector, is related to the mental model of the power dynamic that views the owners with distrust and imagines them as hoarders of this nature for their own benefit (Langholz & Krug 2004, Meza 2009, Holmes 2015, Di Giminiani & Fonk 2018), this group is related to the value system in line with an instrumental view of nature. The previous model contrasts with the second benefit-sharing model that believes that the Sanctuary will benefit everyone equally due to its predominantly educational and research role and that is in line with intrinsic or relational values system of people with nature. Kreen Foundation (undated) has also manifested a value system that is primarily aligned with the intrinsic value of nature and states as one of its main objectives "to promote scientific research, and knowledge of this pristine Patagonian" for the area, which is in line with the latter mental model. Third model relates with an unbalance of benefits over certain groups such as local community, researchers, and tourism sector. An unequal distribution of benefits and responsibilities tends to generate conflicts among the parties involved which is the case documented in the marine protected areas by Jentoft *et al.* (2012) resulting in an unfavorable outcome for some parties, even if ecosystem health and social welfare are improved. Further research about costs and benefits of the PPAs should be addressed during the establishment process or management as it gives an accurate assessment of the attitudes of people in relation to the establishment of a new PPA (Zorondo-Rodriguez *et al.* 2019). Serenari *et al.* (2017) argues that, in the case of PPAs, in addition, they generate vulnerability in the communities since having the owners the decision-making power they can change the deal with the communities and therefore the benefits they obtain from the PPAs.

In the case of effectiveness, outcome mental models were influenced by the power component as a better effectiveness was thought to be achieved by a protection figure managed by the state instead of a private owner, although a majority believed that the Sanctuary will be effective because it will regulate and diminish anthropic threats. Although these results show support for the sanctuary figure, other studies argue that the perception of the effectiveness of a protected area is more related to the social impacts and benefits perceived by the stakeholders involved in the governance system (Odelkop *et al.* 2016, Bennett *et al.* 2019). This relates with the third mental model of this component that relates low effectiveness with diminished access to benefits from the Sanctuary.

#### *Implications of mental models*

In multi-stakeholder contexts, the existence of multiple mental models can have both positive and negative effects on governance. The satisfaction with what the PPA provides would then depend on their expectations, the higher they are, the more likely that the PPA will lead to disappointment, as also indicated by Jentoft *et al.* (2012). If there is a genuine interest in understanding the different mental models, unique ideas for conservation strategies can be addressed to enhance the conservation effort (Jentoft *et al.* 2012, (Biedenweg *et al.* 2020, Chuenpagdee *et al.* 2020). If the differences are not explored, however, they can maintain a division between the diverse actors, and lead to misunderstood differences in opinion. Therefore, investigating what these mental models are and how they are expressed in governance interactions are important research questions (Biedenweg *et al.* 2020, Chuenpagdee *et al.* 2020).

It is commonly assumed that conflicts surrounding protected areas are caused by a lack of knowledge regarding these areas, however, research on mental models demonstrates that people possess different levels of knowledge about protected areas. Therefore, conflicts are not due to a

lack of knowledge but rather a lack of mutual understanding between individuals (Simis *et al.* 2016). Additionally, there are differing mental models regarding the governance process and how citizens assess management of protected areas. These mental models may be crucial for understanding conservation outcomes. The interactions between these mental models create distinct psychological foundations that influence attitudinal assessments of protected areas (Jones *et al.* 2011, Biedenweg *et al.* 2020). Governability depends on the diversity and compatibility of these mental models. It is not necessary for stakeholders to agree on the same mental models, but they should be aware of their presence and understand their origins and prospects. To enhance governability, an interactive process must be implemented where stakeholders exchange ideas and learn from one another. This strengthens protected areas and prepares them for situations where outcomes are questioned by stakeholders. It is imperative to integrate mental models and investigate their direct and indirect impact on governing orders from the very beginning, as outlined in works by Kooiman in 2003 and Kooiman and Jentoft in 2009.

In this case, where the mental models that exist across stakeholder-stakeholder and stakeholder-owner are in conflict, the search for valid trade-offs is important. While the win-win discourse may be seen as a more powerful approach to achieving support for conservation projects, it is difficult to reach this outcome. Even more so if the expectations of the different stakeholders are not in line, a trade-offs approach would be beneficial in reducing conflict and improving governance around PPAs (MacShane *et al.* 2011, Loveridge *et al.* 2023). According to MacShane *et al.* 2011, the greatest strength of the trade-off concept lies in its ability to unite various parties under the recognition that difficult decisions must be made. This consensus is not reached when the issues are presented as a win-win situation for all involved. The reason for this recognition is that there are multiple options, each with various potential consequences for human well-being as well as

for health and ecosystem services. To reach consensus collaboration is determinant, Biggs et al. (2011) presents the main barriers for collaboration in conservation and natural resource management, which includes, poor communication, difficulties incorporating different types of knowledge, and a lack of shared ownership of the plan, which were issues that appeared throughout the interviews. By addressing these issues and improving social assessments and trade-offs evaluation, coupled with this study of mental model's findings could play a crucial role in enhancing the collaboration process and ultimately leading to better conservation outcomes in the Meullín-Puye Sanctuary.

## V. CONCLUSIONS

Conflicts surrounding protected areas are not caused solely by a lack of knowledge, but rather a lack of mutual understanding between individuals who possess differing mental models. Mental models regarding governance and management play a crucial role in conservation outcomes and governability. Stakeholders must exchange ideas and understand mental models to enhance governability and prepare for potential conflicts.

Our results indicate that, even though mental models are not stakeholder specific in this case, across stakeholders we can find similar mental models. Mental models of the interviewees are loaded with high expectations of the benefits, some expect benefits related to increased knowledge and education, others the benefit of continuing to have a pristine wilderness area nearby, while others expect benefits linked to the development of the local economy (mainly tourism). resulting from the creation of the PPA even if they distrust the private character of the Sanctuary.

For the system to be governed, stakeholders agree on the ecosystems importance and rich biodiversity it safeguard. In relation with wellbeing component most recognize that the area provides benefits, although some don't see benefits provides by the Sanctuary due its farness and difficult access. This system also holds models of power dynamics with mental models of multi stakeholders' decision-making included in planning and future management of the area that contrast with ownership distrust present in some of the people with this mental model.

In relation to de governing system, the type of benefit they expect depends on the values that the different stakeholders have of nature, on one hand a mental model guided by intrinsic and relational values of nature with preservation of nature with little intervention and a contrasting model guided

by instrumental value of nature expecting economic or material benefits because of the Sanctuary implementation.

The interaction between systems show that people expect both conservation of nature and social benefits. The perceived effectiveness of the PPA is mediated by power dynamics given that, a priori, the Sanctuary possesses important ecosystem and biodiversity richness that may or may not be effectively conserved by the private owner, therefore a mental model that assumes better effectiveness if the state guards it appears. Relevance on the other hand has more consensus as all the participants in the study consider this a relevant site for the conservation of Patagonia.

Conflicting mental models in all the systems pose the task for searching for valid trade-offs between nature conservation and benefits expected from de Sanctuary. Additionally, Meullín-Puye Nature Sanctuary faces the challenge of lowering the high expectations related to the benefits of tourism development within the area, as well as the involvement of different stakeholder groups in decision-making in order to reduce future conflicts and ensure collaboration for the conservation of the area.

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## VII. SUPPLEMENTARY MATERIAL

### **Consentimiento informado para realización de entrevista**

Yo, \_\_\_\_\_, he sido informado/a por la investigadora \_\_\_\_\_ sobre las condiciones de realización de entrevista para el estudio Percepciones del SN Meullín-Puye.

La presente entrevista busca conocer las opiniones de los servicios públicos de la región, empresas que operan en el área, ONGs y vecinos y vecinas de las localidades cercanas al área protegida privada (APP) denominada Meullín-Puye respecto de esta.

La participación en esta entrevista es absolutamente voluntaria y no significa riesgo alguno para quienes acepten participar de ella, así como tampoco recibirá remuneración por ésta. Se le solicitará autorización para grabar en audio la conversación, pudiendo usted solicitar posteriormente la transcripción del audio.

La información obtenida estará sujeta a confidencialidad, por lo que únicamente el equipo de investigación tendrá acceso a las grabaciones de audio, las cuales sólo serán utilizadas para los propósitos de este proceso, y para efectos de las transcripciones e informes no se utilizarán los nombres propios de los informantes. La información permanecerá en manos del equipo de investigación, conformado por Photosíntesis Consultores y Universidad de Valparaíso.

He comprendido los propósitos y naturaleza del trabajo de investigación expuesta en la carta de consentimiento. Entiendo que puedo negarme o terminar mi colaboración en cualquier momento, sin necesidad de expresar la causa. Bajo estas condiciones, acepto colaborar con la investigación libre y voluntariamente. El presente formulario de consentimiento será firmado en dos copias una de las cuales quedará en manos de quien consienta ser entrevistado/a, otra en manos del equipo de investigación.

Fecha y lugar:

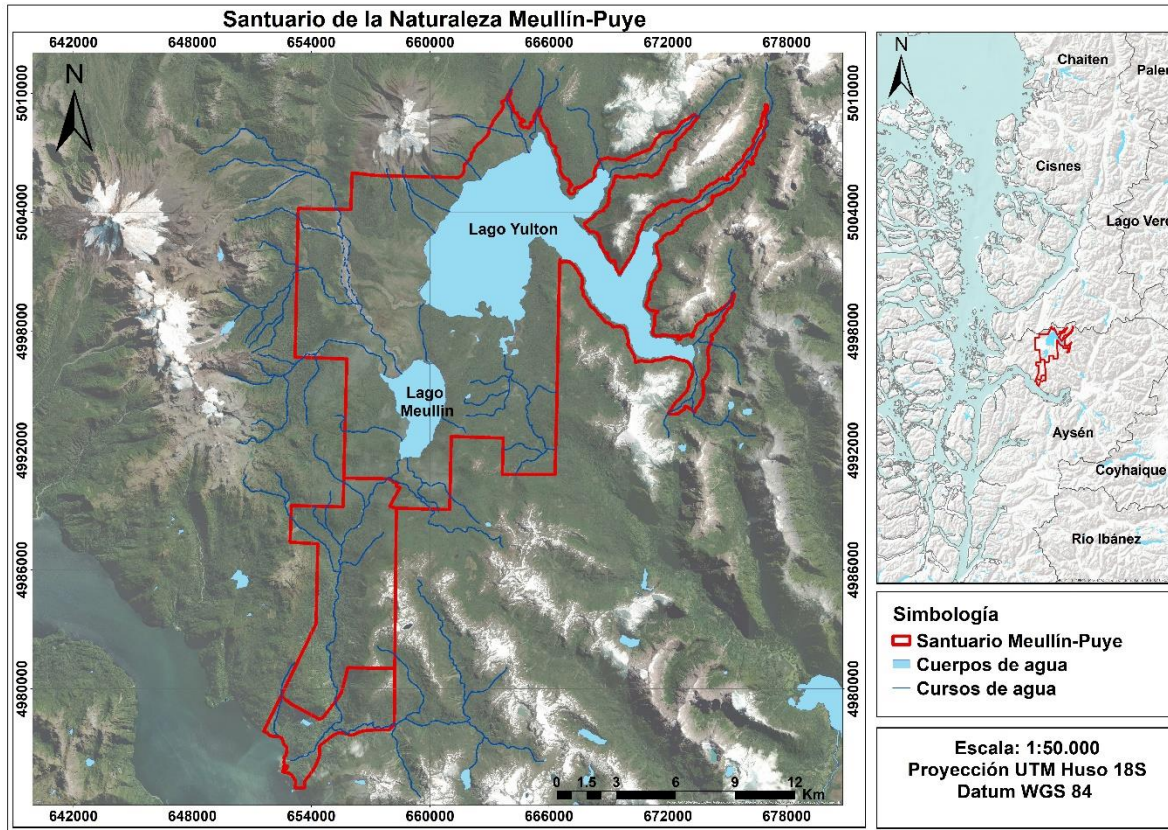
\_\_\_\_\_  
Rut y firma de entrevistado/a

\_\_\_\_\_  
Rut y firma de entrevistador/a

Este documento se firma en duplicado, quedando la persona invitada con un ejemplar y el equipo de investigación con el otro. Ante cualquier duda usted puede ponerse en contacto con Beatriz Brito carrasco al teléfono +56988695782 o al correo [beatriz@photosintesis.cl](mailto:beatriz@photosintesis.cl)

### Presentación del Área Protegida Privada

El APP sobre el que se realizará el estudio se encuentra ubicada en la Región de Aysén del General Carlos Ibáñez del Campo, provincia de Aysén y comuna del mismo nombre (Figura 1). Este abarca el área terrestre en torno al lago Yulton, Meullín y Río Cuervo, cercano a la comunidad de Los Palos. Actualmente se encuentra en tramitación para ser declarado ‘santuario de la naturaleza’ (SN). Un Santuario de la naturaleza están establecidos en la Ley N° 17.288, de 1970, sobre Monumentos Nacionales, por lo que, esta categoría de protección tiene una consagración jurídica formal, de rango legal. Desde la Ley N° 20.417 (2010), dependen del Ministerio de Medio Ambiente. se define como *“Sitios terrestres o marinos que ofrecen posibilidades especiales para estudios e investigaciones geológicas, paleontológicas, zoológicas, botánicas o de ecología, o que posean formaciones naturales, cuya conservación sea de interés para la ciencia o para el Estado”* (MMA, 2020).



**Figura 1. Localización del SN Meullín-Puye.**

Es respecto a este lugar y a su relación con este, es que le realizaré una serie de preguntas abiertas, para las cuales no hay respuestas correctas o incorrectas.

1. Teniendo en cuenta que un ecosistema es sano si es estable y sustentable, eso es que, está activo y es capaz de mantener su organización y autonomía frente al estrés o amenazas externas, por lo que es resiliente.

Cuénteme, ¿Como cree que el Santuario de la Naturaleza Meullín-Puye influye en la salud de sus ecosistemas? ¿Y de su entorno?

2. ¿Qué elementos (ambientes, animales, plantas, paisajes, etc) de la naturaleza cree que se verán favorecidos y desfavorecidos por el hecho de que ahora sea un Area Protegida Privada?

---

3. ¿Qué amenazas cree que tiene el APP y los componentes de la naturaleza dentro del área?

---

4. ¿Cómo cree que influirá en su bienestar material o inmaterial la presencia del Santuario de la Naturaleza Meullín-Puye en esta zona?

---

5. ¿Qué actividades cree Ud. que deberían poder realizar las personas y comunidades locales en este Santuario de la Naturaleza? ¿Realiza usted alguna de estas?

---

6. ¿Qué limitaciones cree que tiene el APP que podrían afectar los beneficios para usted/la comunidad local?

---

7. ¿Quiénes cree usted que se beneficiarán más con la creación del Santuario?

---

8. ¿Quién o quiénes cree usted que definirán la forma en la que funcionará el Santuario?

---

9. ¿De qué manera cree que usted o su organización podrían vincularse o influir en la toma de decisiones del Santuario?

---

10. ¿Cómo percibe usted a los dueños del Santuario?

---

11. ¿Y cómo cree que percibe su comunidad a los dueños del Santuario?

---

12. ¿La conservación de la naturaleza es parte de sus valores en la vida?

---

13. ¿Cree que podría haber conflictos entre cómo entienden la conservación de la naturaleza la comunidad v/s los dueños o administradores del Santuario de la Naturaleza?

---

14. ¿Qué significa para su identidad y su cultura el Santuario de la Naturaleza Meullín-Puye?

---

15. ¿Cuáles reglas o normas cree usted que deberían existir para regular el acceso al Santuario?  
¿Y para controlar las actividades en el Santuario?

---

16. ¿Qué cree usted que se busca conseguir con la creación del Santuario?

---

17. Los principios que orientan la creación e implementación de un APP pueden ser: Acceso universal, Equidad, Participación universal, Inclusión de la comunidad local, Transparencia, Conservar para las generaciones futuras, priorizar la naturaleza, Tener en cuenta la cultura local, entre otros. ¿Con relación a estos principios en relación con la implementación del APP, ¿Cuál es el nivel de importancia que usted les otorga?

---

18. ¿Qué opina de que esta área protegida privada sea reconocida como Santuario de la Naturaleza?

---

19. ¿Es importante este lugar (el SN Meullín-Puye) para la conservación de la Patagonia? ¿Por qué?

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20. Y, ¿Qué características particulares del santuario de la Naturaleza Meullín-Puye hace que sea relevante para la conservación de la Patagonia?

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21. ¿Cree que declarar este lugar como un Santuario de la Naturaleza sea más efectivo que otras formas de protección? ¿Por qué? ¿Cuál cree que sería más efectiva

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22. Cuénteme, en su opinión ¿Cuáles son los elementos más relevantes o emblemáticos que conserva este Santuario?/ Alternativa: ¿Qué cosas importantes protege el Santuario de la Naturaleza Meullín-Puye?

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23. En su opinión ¿Además de los objetivos ecológicos, (conservar la ecología) cree que el Santuario de la Naturaleza Meullín Puye ayuda a conservar otros componentes culturales o patrimoniales por ejemplo?

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24. ¿Considera usted que la creación del Santuario de la Naturaleza beneficia a todas las personas y grupos humanos relacionados al área por igual? Explique

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25. ¿Cree que en el manejo del Santuario de la Naturaleza se reconocerán los distintos puntos de vista que tienen las comunidades sobre la conservación de la naturaleza? ¿De qué manera?

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26. ¿Podrá el Santuario de la Naturaleza asegurar la participación de los distintos actores sociales? ¿Por qué?

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