Appendix 1. Examples of domains, attributes, and common sources of data for the construction of indicators. The list is not exhaustive as there are many others that could be relevant to a protected area.

Domain	Attribute	Indicator data sources
• Physical health	• Outdoor activity	• Direct observations • Questionnaire to gather information about people's outdoor activity habits. • GPS Data to track the movement of people in outdoor spaces (using smartphones or fitness trackers) • Aerial Imagery to track the number of people using outdoor spaces (using drones or satellite imagery) • Social Media Activity (the number of posts on Instagram or Twitter about a hiking trail can indicate how many people are using that trail).
	• Drinking water quality	• Questionnaire to gather information about the availability of drinking water. • Ministry of Health in Chile (MINSAL) provides data on water quality parameters such as turbidity, pH, and chlorine levels. • National Sanitation and Drinking Water Service (SNSA) provide data on the coverage and quality of these services. • Chilean Superintendence of Sanitary Services (SISS) provide data on the quality of drinking water the different water companies provide. • Dirección General de Aguas, Atlas de calidad de agua 2020.
	• Air quality	• The Ministry of Environment in Chile operates a network of air quality monitoring stations and provides real-time air quality data (MMA, Sistema de Información Nacional de Calidad del Aire).

		• National Air Quality Information System (SINCA) is an online platform providing real-time air quality data from over 80 monitoring stations across Chile. • The Center for Climate and Resilience Research (CR2) University Research provides daily averages of PM10 and PM2.5 in Santiago from 1988 to 2015.
	• Availability of local healthy foods	• The National Institute of Statistics (INE) provides data on food production, consumption, and availability at the national level. • Ministry of Agriculture publishes data on agricultural production and food availability in Chile that can be used to assess the availability of local healthy foods. • Ministry of Health provides information on the consumption of healthy foods, as well as on the prevalence of diet-related diseases such as obesity and diabetes. • Census of local food markets on the availability of healthy foods in different regions of Chile. • Surveys can be used to collect data on the availability of local healthy foods in Chile.
• Economic well-being	• Number of jobs per natural resource industry	• The National Institute of Statistics (INE) - (Encuesta Nacional de Empleo, ENE) provides information on the number of jobs by industry sector, including mining, forestry, and agriculture. • The Ministry of Energy in Chile provides data on the number of jobs in the energy sector, which includes the natural resource industries of oil and gas, mining, and renewables. • The Ministry of Mining provides data on the number of jobs in mining and related industries. • The Central Bank of Chile provides data on the number of jobs by industry sector, including natural resource industries.

	• Net regional income from natural resource activities	• A portion of Chile's GDP is allocated to natural resource activities. • Natural resource production data • Employment data from natural resource activities in a particular region. • Local tax revenue data, such as property taxes and mining royalties. • Foreign investment data in natural resource activities. • Export data • The national accounts of Chile, such as the System of National Accounts (SNA), can be used to estimate the income generated from natural resource activities in the country.	
	• Access to natural resources for income	• The percentage of land that is used for agriculture can be an indicator of access to natural resources for income. The Chilean National Institute of Statistics (INE) provides data on land use and agricultural production. • The Forestry National Corporation (CONAF) provides data on forest cover, timber production, and other forestry-related indicators. • The Chilean Copper Commission (COCHILCO) provides data on mining production and exports. • The Ministry of Agriculture provides data on water use and irrigation, while the National Water Directorate (DGA) provides information on water resources and management. • The National Fisheries and Aquaculture Service (SERNAPESCA) provides data on fishing production and exports. • Fishing license sales	
	• Access to firewood and building materials	• Percentage of households using firewood for heating and cooking obtained from the National Socioeconomic Characterization Survey (CASEN) conducted by	

		the Chilean government's Ministry of Social Development. • Average distance to the nearest source of firewood - obtained through local surveys conducted in regions where firewood is commonly used. • Number of hectares of forest cover per capita – that can be obtained from national statistics agencies such as the CONAF land cover map. • Number of households without access to electricity or gas - this information can be obtained from national surveys such as CASEN. • Price of firewood and building materials - this information can be obtained from local markets and suppliers. • Availability of subsidies for firewood and building materials - this information can be obtained from government agencies such as the Ministry of Housing and Urbanism.
	• Equitable distribution of economic benefits	• Income inequality (Gini coefficient) can be obtained from the National Statistics Institute (INE) of Chile. • The percentage of the population living below the poverty line can be obtained from INE or the Ministry of Social Development and Family. • The National Employment Survey, conducted by INE, provides data on unemployment rates by region and sector. • The Ministry of Education provides data on enrollment and completion rates at different levels of education, including primary, secondary, and tertiary. • The Ministry of Health provides data on health indicators such as life expectancy, infant mortality rates, and access to healthcare services.

		• The Gender Equality Index, which measures gender gaps in education, employment, and political participation, can be obtained from the National Women's Service (SERNAM). • Data on regional disparities in economic development can be obtained from the Regional Development Corporation (CORFO).
• Cultural well-being	• Ability to practice cultural knowledge and activities depending on or related to natural environment	• GIS data on heritage sites (UNESCO, MMA and Ministerio de las Culturas, las Artes y el Patrimonio[b]) • Cultural Space Map[c] • Data on the indigenous population in Chile can be found from the National Institute of Statistics (INE). • Data on land ownership and use patterns can be obtained from the Ministry of Agriculture or the National Forestry Corporation (CONAF). • Data on efforts to document and preserve traditional knowledge can be found in the National Indigenous Development Corporation (CONADI). • Data on conservation efforts • Data on language proficiency in indigenous languages can be obtained from the Ministry of Education or the National Institute of Indigenous Languages (INALI). • Data on cultural tourism activities and their economic impact can be obtained from the National Tourism Service (SERNATUR).
	• Ability to engage in important spiritual practices related to the natural environment	• A questionnaire focusing on the availability and accessibility of natural spaces that are important for spiritual practices. • Data on any policies or programs designed to support these practices. • Surveys can be conducted to assess public opinions and attitudes toward spiritual practices

		related to the natural environment in Chile. These sources may provide data on the perceived importance of these practices, as well as any perceived barriers or challenges to engaging in them.
• Psychological health	• Stress reduction when outdoors	• Self-report surveys can be used to gather data on a person's perceived stress levels before and after engaging in outdoor activities. Including questions about mood, relaxation, and perceived stress levels. • GPS and activity trackers can be used to track a person's movement and activity levels during outdoor activities. By comparing data from before and after engaging in outdoor activities, it may be possible to identify changes in activity patterns that indicate reduced stress. • Weather and environmental data, such as temperature, humidity, and air quality, can also be useful in measuring stress reduction when outdoors.
	• Cognitive restoration	• Standardized cognitive function tests can be administered before and after spending time outdoors to assess any changes in cognitive function. • Spending time in nature has been shown to increase HRV, which can be used as an indicator of cognitive restoration. • Spending time in nature can decrease cortisol levels, indicating a reduction in stress and potentially contributing to cognitive restoration. • Questionnaire of self-reported measures of cognitive restoration, such as the Perceived Restorativeness Scale (PRS) or the Attention Restoration Scale (ARS). • Environmental Measures such as noise levels, air quality, and visual complexity, can also be used to

			assess the restorative potential of the environment.
		• Depression and anxiety reduction	• A questionnaire of self-reported measures focusing on the effects of spending time outdoors on mental health (e.g. depression and anxiety symptoms before and after spending time outdoors). • A questionnaire of self-reported measures focusing on physiological measures, such as reducing cortisol levels and increasing heart rate variability. • Environmental data, such as air quality, temperature, and noise levels, can also be used.
		• Awe from wildlife viewing	• A questionnaire to gather information about people's experiences with wildlife viewing in Chile (e.g. level of awe they experienced, how long they watched the wildlife, and what specific wildlife they saw). • Observing people's behaviors during wildlife viewing can provide insight into their level of awe. • Measuring physiological responses, such as heart rate or skin conductance, can provide an indication of the intensity of the emotional response to wildlife viewing. • Analyzing social media posts related to wildlife viewing • Density of wildlife watching events — From geotagged pictures in social media (e.g. Flickr or inaturalist) • Ecotourism industry data focusing on experiences related to wildlife viewing.
		• Personal identity derived from relationships with the natural place	• Surveys can be conducted to gather self-reported data on people's attitudes, beliefs, and behaviors regarding their relationship with the natural environment (the importance of natural places in people's lives, the frequency of visits to natural areas,

		and the emotional connection people feel to specific landscapes).
		• Geographic Information Systems (GIS) data: can be used to measure people's physical proximity to natural places and the frequency of their visits (satellite imagery, GPS data, and social media check-ins).
		• Environmental quality data, such as air and water quality, can be used to measure the impact of natural places on people's health and well-being.
		• Social media data, such as the number of posts or hashtags related to specific landscapes.
		• Ethnographic data can provide in-depth insights into how people's relationships with the natural environment are shaped by cultural, social, and historical factors.
	• Sense of Place: attachment to place that cannot be substituted with another place	• Places that have a rich cultural or historical significance can also inspire a sense of attachment in people.
		• Census data can provide information on length of residency, homeownership rates, and other demographic factors that may be associated with attachment to a place.
		• Questionnaires to gather information on community participation, cultural and historical significance, and sense of identity.
		• Social media platforms can provide insights into how people talk about and engage with a particular place and may offer clues about the level of attachment they feel.
		• Historical records and archives can provide information about the cultural and historical significance of a place.
		• Assessments of the physical environment, such as the quality of parks and public spaces, can

			provide information about the level of care for a particular place.
	• Viewshed value	•	Elevation data of the terrain, which can be obtained from digital elevation models (DEMs) or LiDAR data.
		•	GIS software to create a viewshed analysis that considers factors such as elevation, vegetation, and distance from the viewer to the landscape.
		•	Satellite imagery to assess the visibility of a particular landscape.
		•	User surveys to gather data on people's perceptions of the view and its value.
		•	Economic data, such as tourism revenue or property values, can also be used to measure the value of a particular viewshed.
		•	Visual simulations to assess the potential impact of development on the viewshed value of a particular landscape.
	• Perception of scenic beauty	•	Questionnaires on people's perceptions of scenic beauty.
		•	Social media platforms such as Instagram and Flickr. By analyzing the number of likes, shares, and comments on photos of different landscapes or landmarks, researchers can gain insights into people's perceptions of beauty.
		•	Satellite imagery can be used to analyze the physical characteristics of landscapes, such as vegetation cover and water features. These data can be used to identify areas that are likely to be perceived as beautiful by humans.
		•	GIS data can be used to map and analyze the physical and cultural characteristics of landscapes. By analyzing data on factors such as topography, land use, and proximity to amenities, researchers can gain insights into people's perceptions of scenic beauty.

		• Behavioral data such as visitation to natural areas can be analyzed to understand patterns of usage and popularity, which can be indicative of perceptions of beauty.
	• Sense of freedom to pursue your valued activities	• Questionnaires that ask people about their experiences in nature, such as whether they feel free to pursue their valued activities or if they feel restricted in any way. • Behavioral observations to observe people in natural settings and look for signs of whether they are engaging in activities freely or if they are constrained by external factors. • Certain environmental factors such as the accessibility of natural areas, the presence or absence of certain types of infrastructure or amenities, or the extent to which natural areas are protected from development or other types of human activity.
• Governance	• Respect for and/or inclusion of customary/local governance systems	• Data on the percentage of indigenous peoples in government positions could be collected from official government sources. • Data on the implementation of laws and policies related to indigenous rights, as well as the outcomes of legal cases related to indigenous rights, could be collected from a policy review of official government sources. • Data on the number of consultations of indigenous peoples on matters that affect them, and the outcomes of those consultations could be collected from official government sources. • Data on the availability of traditional practices, the recognition of traditional knowledge in land and sea use and conservation policies, and the incorporation of indigenous practices in government

		ceremonies could be collected from official government sources.
		• Questionnaires to indigenous communities to ask them about the inclusion of customary/local governance systems.
	• Customary practices allowed	• Indigenous community questionnaires ask about specific practices that are considered customary and allowed in nature. Income, employment, and poverty rates could provide insights into the economic significance of customary practices.
		• Review of government regulations and policies aimed at protecting the country's natural resources and ensuring that customary practices are allowed.
		• GIS data on the Indigenous Marine Areas policy (Subpesca[d])
		• Biodiversity surveys to identify areas where customary practices are occurring and the impact they are having on local ecosystems.
	• Clear rules for natural resource management	• Available protected area management plans review (can also include private protected areas, natural sanctuaries and ECMPOs[f]).
		• A review of the environmental impact assessment studies can provide valuable information on the clarity of rules and regulations in this sector.
		• Questionnaires focusing on natural resource management and the clarity of rules in Chile.
	• Opportunities for participation in decision making	• The Citizen Participation Index is a tool developed by the Ministry General Secretariat of the Presidency to measure the level of citizen participation in decision-making processes at the local level in Chile (e.g. existence of citizen councils, public consultations, and citizen oversight mechanisms).
		• The National Statistics Institute (INE) collects and publishes data on indicators related to citizen

		participation, such as voter turnout in elections and the percentage of citizens who feel that their voices are heard in decision-making processes. • Questionnaires focus on opportunities for participation in decision-making. • Civil society organizations work closely with local communities and can provide first-hand accounts of the challenges and opportunities for citizen participation in decision-making processes.
	• Justice in the application of policies	• Questionnaires to assess whether different groups, including Indigenous peoples and local communities, are adequately represented in decision-making processes related to conservation policies. • Data on enforcement and compliance rates can be obtained from government agencies responsible for implementing conservation policies, such as CONAF or the National Fisheries Service (SERNAPESCA). • Environmental Justice Complaints. The number and type of complaints related to environmental justice issues, including those related to the application of conservation policies. Data on complaints can be obtained from the National Human Rights Institute or from environmental justice organizations
	• Permanent access to resource rights	• Questionnaires on access to Benefits to assess whether different groups, including Indigenous peoples and local communities, have natural resources rights. • Land Ownership Data to track changes in access to natural resources over time.

		• The quality of natural resources such as water, air, and soil can impact the ability of individuals and communities to access and use these resources. • Indigenous Peoples' Rights, and the degree to which they are able to maintain access to these resources (CONADI registry).
	• Confidence in the future	• Questionnaires focus on the level of support and confidence that the public has in protected areas in Chile. These surveys can be conducted by government agencies or independent organizations.
• Social well-being	• Conflict within the community	• Human Rights National Institute database for socio-environmental conflicts (INDH, 2020[g]) • Questionnaire to gauge the level of tension within a community, as well as the attitudes and beliefs of residents towards various social and political issues. • Social media can provide valuable information on conflicts within a community, including posts and messages related to social and political issues. • Local news outlets can provide information on conflicts and tensions within a community, as well as the underlying causes and potential solutions. • The number and types of protests and demonstrations in a community can provide an indication of the level of conflict and social unrest.
	• Trust in others to protect and manage natural environment	• A questionnaire that asks Chilean citizens about their attitudes and beliefs towards environmental issues and their trust in different actors, such as government agencies, NGOs, and corporations, to manage and protect the environment. • Media analysis can be used to evaluate public discourse on

		environmental issues in Chile, including discussions around trust in different actors.
	• Feeling appreciated and needed by others in the community	• Questionnaires that measure community participation can provide insight into the extent to which individuals feel appreciated and needed in their community. Questions can be asked about participation in community events, groups, and activities, as well as perceptions of the value of community involvement. • By analyzing social media posts and interactions, researchers can gain an understanding of the language and sentiment used to describe community involvement and connectedness. • In-depth qualitative interviews with members of the community can provide rich data on individuals' experiences of feeling appreciated and needed within their community.

[a]: https://globalfishingwatch.org/press-release/chile-vessel-tracking-data/

[b]:https://www.ide.cl/index.php/noticias/item/2036-disponible-nueva-cartografia-digital-del-ministerio-del-medio-ambiente-y-el-ministerio-de-las-culturas-las-artes-y-el-patrimonio

[c]:http://observatorio.cultura.gob.cl/index.php/mapa-de-espacios-culturales/

[d]:https://www.ide.cl/index.php/oceanos-y-costa/item/1492-espacios-costeros-marinos-para-pueblos-originarios-ecmpo

[e]: Territorial User Rights for Fishing

[f]: Espacio Marino Costero para Pueblos Originarios

[e]: INDH, Instituto Nacional de Derechos Humanos (Human Rights National Institute)

Mapa De Conflictos Socioambientales En Chilehttps://mapaconflictos.indh.cl/#/