The salt flat that protects itself. A case for the Rights of Nature

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Abstract

Through the case study of the Salar de Atacama, Chile, this work explores how environmental protection can go beyond conservation to become an opportunity and tool to resize the scale and presence of the extractive practices on the land.

The study proposes to define a model of 'protection' for this region that transcend the anthropocentric models of environmental protection born in the Western world. It designs the political space and a series of protocols that allow the shift from protection to environmental care, which is inclusive of ways of living of the indigenous population, expanded cross species kinship and extra human living beings united in life around the Salar de Atacama.

Keywords

Environmental protection, Rights of Nature, Salar de Atacama, Extractivism.

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This work is an excerpt of the individual research undertaken as the conclusion of the first of 4 years of both collective and individual research with Environmental Architecture at the Royal College of Art, on the case study of the Salar de Atacama. The principles of the research practice aim to address the question on what constitutes an environment redefining the understanding of landscape through multi-scalarism, multi-perspectivism and underrepresented world-views. The methodology combines proxy data analysis of the tensions in relation to lithium extraction in the Atacama Desert on global (macro) and local (micro) scales, as well as material evidence collected in the field.

Introduction

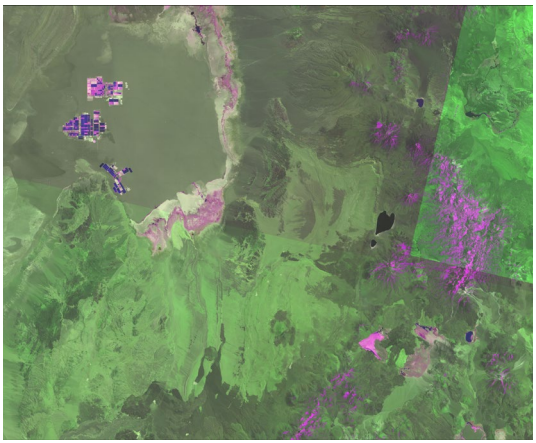
The Salar de Atacama is an area of peculiar climatic conditions and extreme fragility of eco-systems, where lithium mining exploitation driven by forces operating at global scales of abstraction collides with indigenous land claims and with an understanding of place which considers a broader, more inclusive perspective on living beings. In this complex constellation of human and extra-human forces, categorising such environment in its classic terminology recalling 'nature' and 'ecology' would be fundamentally reductive.

Copper and Lithium mining are the most substantial cause of environmental depletion related to mining waste and water scarcity; also, it is the cause of migration of workforces and services from town to small villages to mining camps[1].

In the last 20 years the increase of tourism[2] has revealed similar problems of uncontrolled urbanisation, necessity of services and commodification of nature and culture; effectively reproducing the same forms of exploitation of extraction. Despite the many benefits that it brings to the communities, it adds further pressure on the social and natural eco-systems, particularly water (fig. 1).

Mining and tourism are entities of global scale, that form a relation to the territory that occupies the land and shapes it to the needs of the industry, driving the transformations towards the dominant industrial idea of development. At the current pace of exploitation, these industries are not able to sustain their presence on the land and are unsuitable to fit within the land resilience potential and formative cycles.

Moreover, humans with plants, animals, waters, mountains and other more-than-human beings weave specific relationships that describe how to approach the Ancestors volcanos (fig. 2), the upperworld future and the underworld past[3]: the representation of society is in the territory.



In this complex landscape of reciprocity[4], the centre of this work is around the spatial embodiment of jurisdictions: overlapping and conflicting land and water rights, extraction concessions, indigenous territories and protected areas are the trigger and regulator of the longstanding struggles around the waters and the lands (fig. 3). Such political representation of the contrasting epistemologies is discussed in its spatial implications and effects on the eco-systems of the Salar de Atacama.

Such eco-systems have adapted to life in the extreme sun, heath, aridity, cold and salinity; many of them so specialised (endemic species) and at risk of disappearance, whether they are human, plant, or microbial. Their conservation determines the survival of all the entities living around the salt pan.

Environmental protection can reach also other types of ecologies: it is a tool and an opportunity to redefine the structures of power generated by the modes of operation of the exploitative practices, and subvert their control over their planned or unpredicted transformations on the environments of the Salar. However applying environmental protection in its current forms is problematic: it signifies the introduction of yet another layer of restrictions and exclusions, perpetrating the same forms of violence embodied in the environments of the Salar de Atacama through the disputes that are pressing with aggressive acts indiscriminately on the people, the land and the waters.

This work proposes to deal with such disputes surpassing the idea of environmental protection, to propose a new form of care for the environment through the design of a series of protocols that allow the entities in the territory of the Salar to defend themselves from the aggressiveness of global forces, tackle extraction, climate change and take care of the territory and society as one.

Ecologies of the Salar de Atacama

Extraction of lithium requires a very specific type of site: the salt pan which stores in its underbelly the mineral rich brines. Its exploitation in Atacama started in the mid 1980's and it is now expanding due to our demand for lithium battery powered devices and the necessary mass switch to 'green energy' (fig. 4). Lithium mining, alongside copper mining affects the ecologies of the Salar due to its extremely high demand of water and the extremely uneven distribution of water rights.

Copper[5] and lithium corporations (Minera Escondida, Zaldivar, Albemarle, SQM) hold the majority of rights to water extraction from the aquifer below the salt flat crust; such rates overtake the recharge potential of the aquifer itself, without including the rights to brine extraction[6].

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Fig. 1 – False colour image of the Salar de Atacama for environmental analysis to study the presence of water – in magenta. Landsat processed in GIS. Detail. 2018. Author.

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Fig. 2 – The *ayllu* of Camar from the Salar, with its tutelar mountain in the background. 2018. Environmental Architecture Archives 2017|2018.

The established Atacameños communities circumscribing the Salar have no rights over the aquifer, and hold instead an amount of surface water rights[7] barely sufficient for their survival. Their water does not come from stable sources: small rivers and streams seasonally fed by snowmelt.

The incessant pumping steadily causes the reduction of the water mirror of the salty and fresh water lagoons on the eastern edge on the salt pan. The lagoons receded between 50% and 30% from 1970 to 2010 (fig. 5) (Jorge Vergara Castro, direct conversation). The lagoons that are drawn where brine emerges from the underground represent a critical source of life for the communities of aquatic birds, fauna and Atacameños people. The lagoons, Salar, the underground aquifer and brine reserves, and the Andean streams are all part of the same single complex hydrological system (fig. 6).

The issue of water rights is mirrored in the matter of land rights, distinct between above and below ground, operating on different levels of the land and across scales[8]; from the national boundary to recognised indigenous lands; from mining concessions to areas of protected eco-systems, from underground aquifers to astronomical skies (fig. 3).

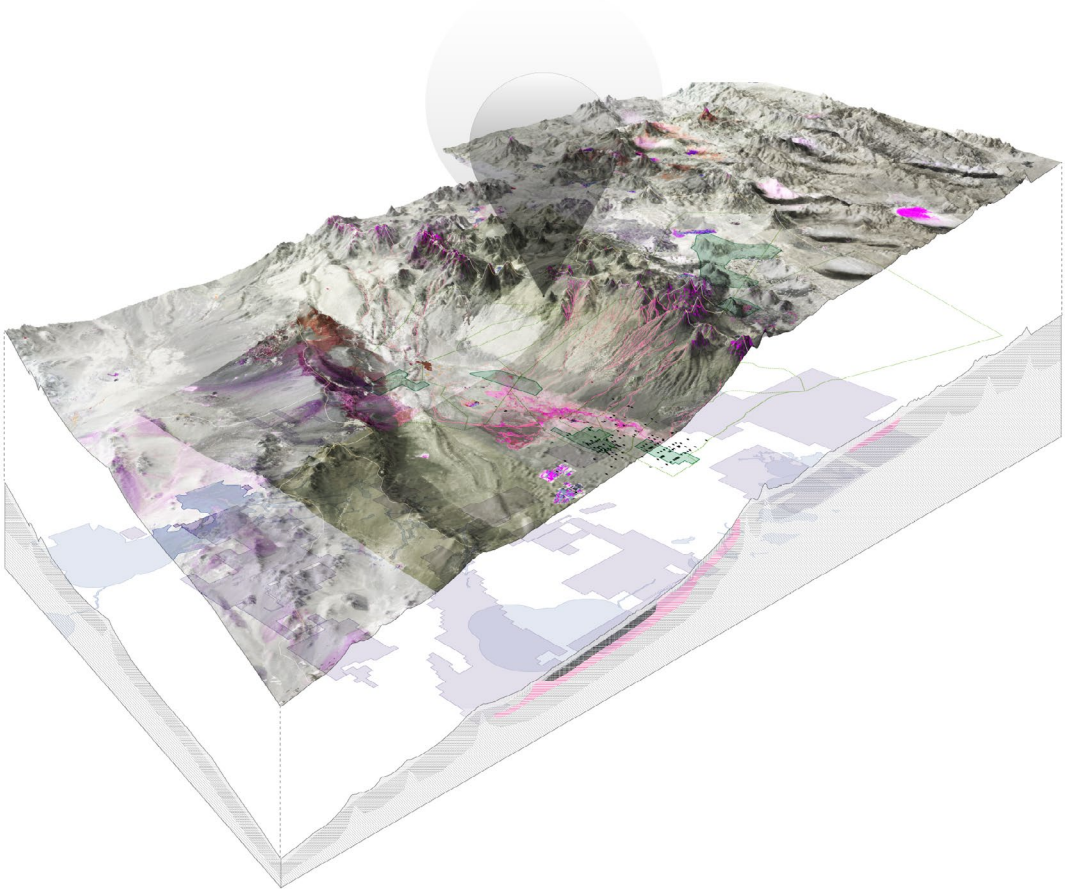
In maintaining this division, the Chilean state retains the inalienable and exclusive right over the lease of mining concessions, regardless the ownership or other forms of regulation on surface land. Overlaps of different rights of property and use are perfectly coherent; also in the case of evidently conflicting overlaps of exploitation concession over protected areas[9].

Within this framework, the communities witness not only the depletion of their eco-system, but also the erosion of rights over the part of the territories which had been officially recognised[10] as indigenous lands in the '90's, rendering the official forms of recognition and protection in practice ineffective. In terms of preservation of diversity and environment tenure, the recognition of land to indigenous people can be likened to protection (Tauli-Corpuz et al., 2018): autonomy becomes a powerful factor in the process of redefining conservation.

The mountains around the salt pan accommodate 18 communities, homogeneous in practices and modes of living[11]. Each village has a 'field of action': the lands where the village activities materialise. It is recognised according to ancestral uses, such as agriculture and grazing, now clashing with mining concessions.

The ancestral demarcations today partly registered are traced with the agreement and collaboration of the elders; however to draw a boundary here is a stretch of colonial mentality in a space not suited for accommodating boundaries.

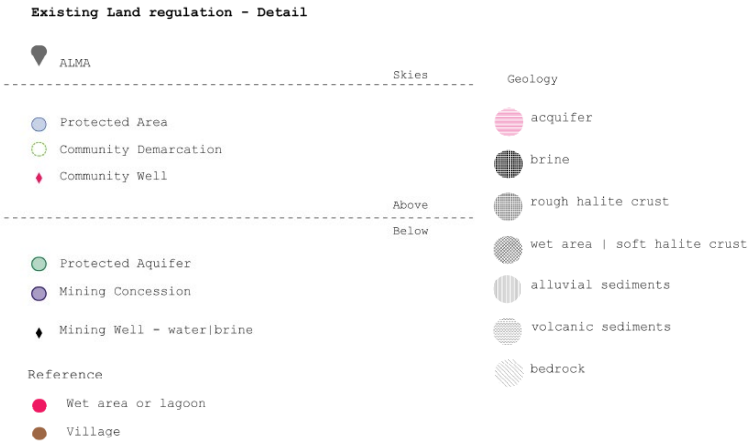
Fig. 3 – Visualisation of stratified land, water and airspace rights. Surface water in magenta. Detail. 2018. Author.



The Atacameños revolve their traditional lives in a disperse portion of territory which goes form the Andean peaks to the Salar core. It is the expanded territory of the *ayllu*[12] – the community and the oasis. A diverse type of engagement with the richness of the 'resources' available corresponds to each level of the landscape. The engagement is in the level of commonality, sharing and collaboration between communities in the exploitation of the resources-beings. The threshold of commonality and interdependency varies according to elevation, seasonality and occupation (fig. 7).

The expanded field of the community includes the relation with the ancestors, the collaboration with other beings and other *ayllus*, the navigating traces and spaces of shrublands, grazing fields and water features above and below ground shifting through the seasons and the years. To make use of the resources available might require movement over tens of kilometres.

It is an open and indivisible field that finds its inextricable representation in the land, the people and the spiritual forces. Interdependency is both with the environment and with other communities.



Exclusive and Anthropocentric.
A critique to existing models of protection

Of the varied existing models of environmental protection, the National Park and the Cultural Landscape are the most adaptable to the complexities of the watershed of the Salar de Atacama, and partly already utilised (Reserva Nacional de Los Flamencos). Both models, whether centred on the maintenance of ecological relations, or whether centred on the maintenance of the relations between the environment and its human beings, perpetuate some limitations that, if applied to the region of the Salar de Atacama, would distort the re-production of land and society.
The National Park concept bears aspects of reduced freedom of movements and restricted agency discriminatory of the populations living in the surroundings of the park, or living on the resources within reach of the park protection. Conservation in these terms is exclusively centred on the protection of ecological biodiversity from whichever human beings and their practices. It is particularly discriminatory to indigenous people, whose lands largely fall under the limitations of the protected areas.
Between 1960's and 1980's in Latin America the 'fortress conservation' approach enforced and extremised the restrictions related to biological protection, as a retaliation to balance what was legitimated in often adjacent areas (extraction). Indigenous people have been more or less forcibly displaced from their territories, where they fell under the new planned conservation. Many are the cases[13] where they have been directly evicted and forced to reservations; or been moved at the margins of the park or at the margins of towns. National Parks have been used as tool to attracts international funding for conservation to very remote and little known regions of the world, and such funding helped to normalise[14] the territories (Tauli-Corpuz et al., 2018).
In a mentality that perpetuates the idea that humans are separated from nature, indigenous people are excluded from the conservation of it. The exclusion from what we read as 'nature', the exclusion from the protected area, is a violent separation toward peoples who identify socially and physically with the territory.
South America has been inhabited and dwelt in from ancestral times; and ancestral human actions accomplished transformations and left effects, in some cases clear marks (Tavarez, 2017, p. 125), however with very different epistemologies and modes from the European.
The concept of Cultural Landscape for the case of the Salar de Atacama is undoubtedly worth consideration. However the formulation (World Herit-

Fig. 4 – Lithium mining operations in the Salar de Atacama. 2018. Environmental Architecture Archives 2017|2018.

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Fig. 5 – Visual analysis of the reduction of the water mirror in the lagoons of the South-Eastern edge of the Salar. 2004 and 2016. Image:Landsat. Environmental Architecture Archives 2017|2018.

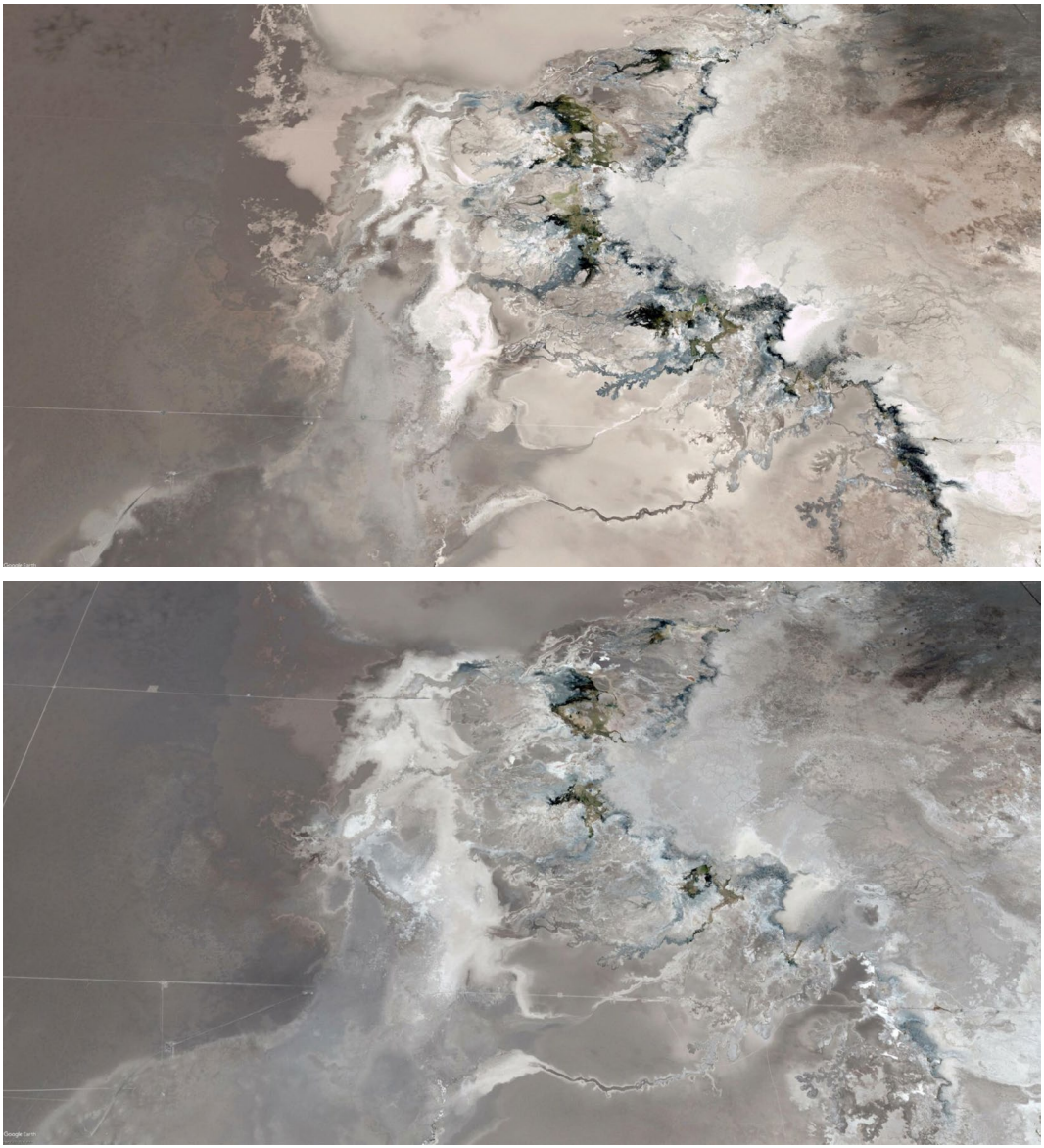
age Committee, 1992-1993) of cultural landscape reflects a certain approach which draws from European and Western culture.

In European conception, the the dichotomy nature-culture sits at the base of the principal structures of thoughts: Nature is a threatening step-mother, and as such it can and must be modified to tame it. It is human beings who do so, transforming and constructing 'nature' to make it suitable for their needs. Its value resides in the types of benefits it can offer. 'Landscape' is purely artificial and is a cultural modification of 'nature': the people shape the lands. Such concept has an anthropocentric foundation; and applying such foundation to this region would render only a partial, if not incorrect way to frame its landscape.

Diversity, biological and cultural

In the Salar de Atacama the rights and role of indigenous people are formally recognised through the ADI, but effectively their power and field of action are limited by the influence of extractive practices or top down protection restrictions. Protection is not a consumptive land practice, yet there is a lot at stake when indigenous lands overlap with protected areas.

On the global scale, the overlap between indigenous communities' lands and protected areas is estimated ranging between 50% to 80% (Tauli-Corpuz et al., 2018), ultimately creating a state of constant dispute. Although only an estimate, this ratio is a consistent and relevant number that problematises a direct causality: indigenous lands are the richest in



ecological diversity and best preserved for the variety of animals and plant species.
This condition is to a great extent the produce of indigenous practices on agriculture, grazing and foraging, systems of land tenure, cycles and rituality in the maintenance of trees, irrigation structures, crops variation, fertilisation and more, all of which participate in the re-production of the 'eco-system services' or the extra human resources proper to each ecology. It is a produce so intermingled with its context, that its signs of civilisation might be difficult to accommodate into Western perspective.
In the territory of the Salar de Atacama, such territorial structures are expressed wholly through an extended system of collectively managed water canals (fig. 8), which is the thread for a complex set

of relations that encompasses all the values of water, all its timescales and cycles, and all its embodiments in the performance of the water rituals[15]. Such system of spiritual, social and ecological interrelation can be scaled up to the extent of the salt flat watershed.

The structures, which also model the structures of society, are the spatialisation of a conception of 'nature' that is rather distant from the European: there is no opposition with culture. On the contrary, culture is constructed in and through the landscape. Culture and knowledge are embodied in the land.

The practices collaborate not only in the maintenance, but also in the intensification of vegetational and animal biodiversity (Tauli-Corpuz et al., 2018). Indigenous modes of land tenure and of living have proven to be highly effective in the conservation of nature and in the rejection of illegal activities such as poaching or logging or mining.

The discourse is proven to be valid in recognised indigenous lands, whether they are protected or not[16]; on the contrary, the power of such actions weakens where the communities' lands are not secured. Indigenous modes of land management are most effective in guarding the eco-system, if ancestral rights are recognised and people continue to operate with their practices for the reciprocal re-production of land and culture. Biological diversity and cultural diversity are interdependent on each other.

Compared to the European relation to the landscape, the shift of perspective resides in the fact that the territory of the Salar

> is the product of spatial arrangements that are sustained by – and by themselves sustain – the life. The extermination of the former is conducive to the destruction of the latter, inasmuch as biological and social diversity, nature and culture, are structurally interdependent. (Tavarez, 2017, p. 147)

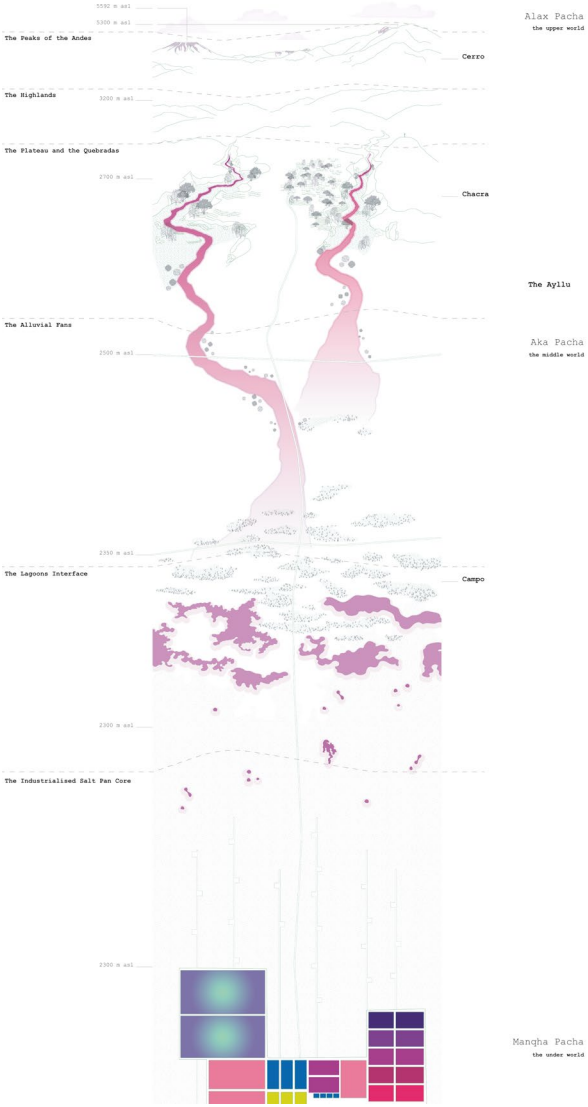


Fig. 7 – Typical elevation of the community 'field of action'. On the left hand side the categorisation of the landscape levels, confronted with basics of indigenous cosmology on the right hand side. 2018. Author.

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Fig. 6 – A protected lagoon on the North-Eastern edge of the Salar. 2018. Environmental Architecture Archives 2017|2018.

The consideration on the work of indigenous people in collaborating with the 'eco-system services' are of greater importance in the proposal of a protected area: where culture and knowledge embodied in the land, their protection must come from within the land.

The watershed as autonomous entity

The question of autonomy is relevant in allowing to set the foundation for a space that reconcile the distance between the contrasting of epistemologies on the land. Reconciling this distance demands an approach to and between nature and human beings which is built upon indigenous world views. In the specificity of the Salar the territorial manifestation of such space is its water basin[17].

Its recognition as a right-bearing entity responds to the longstanding struggles for sovereignty over ancestral lands of the indigenous people united around the Salar de Atacama. It gives to the communities the capacity of independent decision making regarding the transformation occurring in the basin. It affirms and empowers the official recognition of the indigenous lands, acknowledging the position of Atacameños and their ancestral presence in the space, and the centrality of their practices as organic and most essential actions to tackle the depletion of the environment and the changing climate. It calls their presence and their existence to an ample, global audience: the recognition of the salt flat watershed as an entity is the organ and the occasion to compete with the tentacular organs of mining corporations, and in lighter proportion tourism.

> It is part of what it means to be indigenous today and create the few occasions on which indigenous peoples can protect themselves from the incursions of nation-states and business interests within territories on which they are recognised as 'occurring or living naturally', 'not introduced', 'native'. (Geslin et al., 2005, p. 571)

It is acknowledging the basin as a stratified vertical entity that goes from the upper world airspace to the underworld aquifer. It is a singular indivisible entity comprised of human and extra-human communities, physical and spiritual elements united in life around the flows and cycles of waters of the Atacama Salt Flat watershed (fig. 9).

The constitution of the basin as a right-bearing unified entity is the constitution of the space that allows for leverage of the situation and overturn the vantage point that corporations have in this regard. Recognising the Rights of Nature[18] affords the basin-entity to operate within the Andean principles of reciprocity, resiliency, ecological and cultural diversity and interdependency.

The watershed entity is an experiment of indigenous autonomy, where protocols for managing the land are re-written through indigenous practices, to ultimately redistributing the pressure of extraction at large and mining and tourism in particular. It is a localised action with possible resonance on the global scale, which is the scale of operation of such entities.

Beyond conservation. Outlines of new model

In this frame, protection is a concept that needs to be surpassed, as it retains a patronising view of living systems as fragile, endangered possessions; whereas 'protection' is a process that must come from the land.

The environment rather than being maintained and dependant from human beings, weaves a relation of collaboration and interdependency that is mutually rewarding.

Human presence is crucial only when it is able to establish a compatible engagement with the environment itself. The space of action of Atacameños people, in modelling, proposing, halting and driving the transformation of exploitation around the Salar is a primary resource for this model.

The core of the model is based on the performing of a series protocols of engagement with the land. Protocols that are based on the capacity of the eco-system, on its exceptionally rich and varied environments comprising of distinctive forms of land aggregation, and equally specific forms of life, vegetational and animal. Scaling across spatial frames

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Fig. 8 –An example of the extended water canal network of the communities (Peine). Still from film. Environmental Architecture Archives 2017|2018 .

and time frames, such protocols engage on the land with the intention of taking care.

In the specificity of the Salar, environmental care means to avoid feeding a system of exploitation of resources that favour extractivisms, in order to slow down the expansion and catastrophic consequences of its processes of industrialisation. Thus, environmental care must be prescriptive towards the exploitative practices on the land. Mining and tourism are now conceived as temporary visitors: guests, and as in the best habit of guests they offer something back.

This might sound simplistic, but it entails a shift of paradigm and mentality to subvert the current structures of power: extraction is not a much needed incentive to development, but rather a reality unable to operate anywhere else in the absence of its much needed strategic lithium resources.

On the other hand, the proposed model must be adaptable and flexible towards the practices of the Atacameños that are the human representative of the territory and contribute to the cultural and physical re-production of it: building upon the existing grades of interdependency of the commons, the basin-entity is organised through a nested community management with the priority to enable environmental care practices[19] in the spaces that describe the territory between two or more communities.

Environmental Care: methodology

> Taking responsibility for what and whom we care for doesn't mean being in charge. Adequate care requires knowledge and curiosity regarding the needs of an 'other' – human or not – and these become possible through relating, through refusing objectification. Such a process inevitably transforms the entangled beings. (Puig de la Bellacasa, 2010, p. 98)

The proposed model is based on the understanding of the elements that compose the environment, whether they are extra human, animal or human, and it studies action for their regeneration.

The constitutive element of the Salar de Atacama is water, in all its different states and significances (fig. 10). Water, as much as the others, is an element affected by morphing and changing conditions of climate, seasons and the influence of other living systems.

Regenerative actions, in order to be defined, require specific and recurrent research: how to take care of a living dynamic system is both an open and situated question. However, building upon the existing tradition of the water practices, one of the first acts that the basin-entity activates is the collection and arrest of surface water. The collection and arrest of water runoff is a corollary action that contrasts the expansion of exploitative practices: when the water is underground, it becomes the domain of mining rights, but as long as it stays

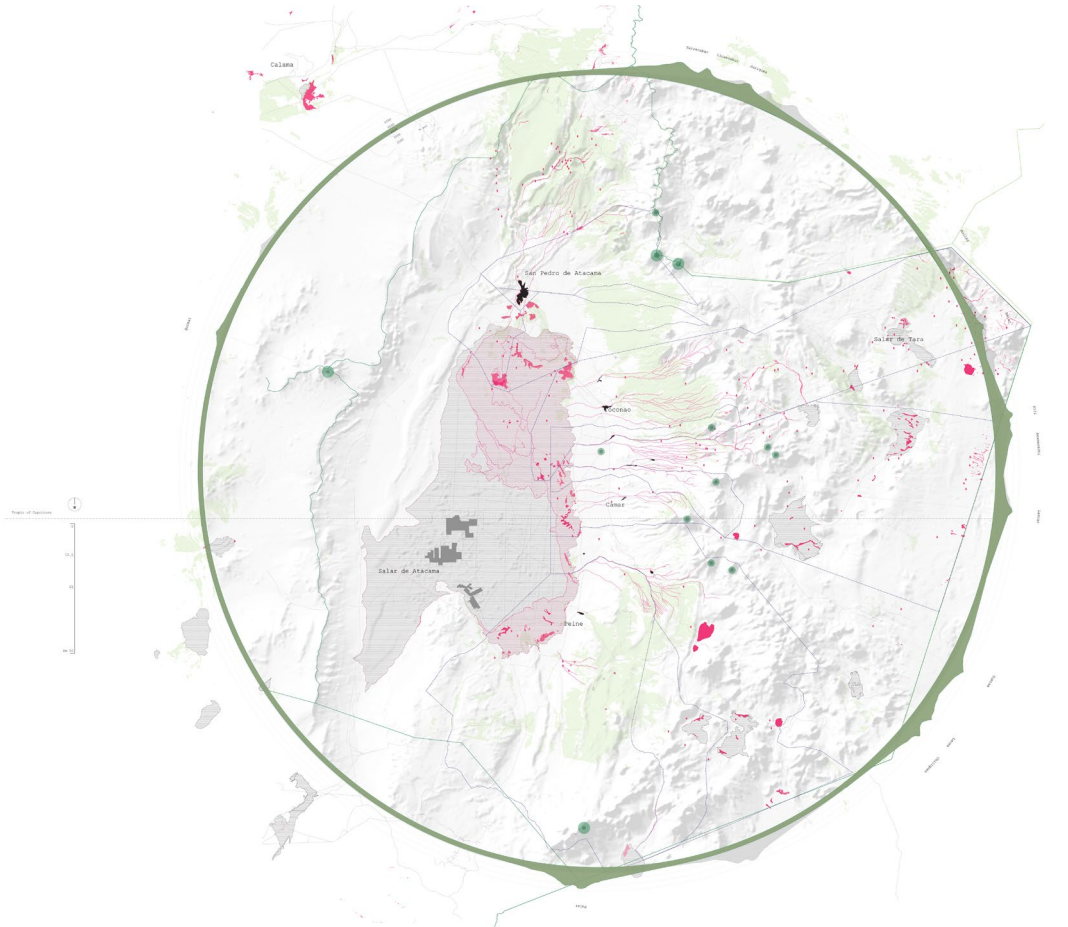
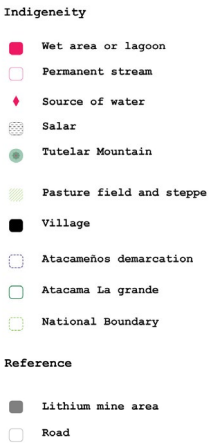


Fig. 9 – Space and time orientation. The tutelar mountains in relation to the villages and the basin: Atacameños know quite well that the Salar is at the centre not only for a matter of geometry of the landscape: historically resources for their trades were coming from the salt flat. Surface water in magenta. 2018. Author.

on the ground it is the community responsibility. In environmental care ecological reciprocity is achieved through continuous every-day actions and attentions; it emphasises the process of identification to the land, keeping bonds with all its entities. Environmental care is about continuous repairing and maintaining the main elements that compose the territory, allowing their interconnected contexts to transform and regenerate within its capacity of resilience. It is grounded to the land and its forms of life. Locals are the representative of such ecologies: as part of the ecology themselves, they are the ones able to engage with it in the least destructive way.

Environmental care moves away from the exclusivity of conservation as something that only experts are able to carry on and control. Contrary to conservation, environmental care is a practice that includes natives and their ordinary procedures; it needs the hands and the minds of all entities of the watershed in order to be performed and prolonged through the different timescales of the multiple ecologies of the water basin. It is a tradition and a heritage as much as a process that entails exchange and transformation, both personal and embedded in the community.



Note

[1] The history of mining exploitation and related issues is long-standing in the salt pan and the Atacama Desert at large. A full overview is in Environmental Architecture Studio Portfolio 2017|2018, currently unpublished. Some materials are available here <https://spark.adobe.com/page/2p5i35hRouV4u/>.

[2] The Atacama Desert, Patagonia and Rapa Nui are the most visited places of Chile.

[3] As in Atacameños world-view.

[4] Reciprocity is *Ayni*, the core principle of the Andean world-view which entails the exchange and interchange between humans, nature and the universe. It is the principle of give and take (and thus of help and thank) among all things.

[5] Copper extraction is the principal support of Chilean economy and its stakeholders are a powerful lobby in the country. Copper processing is highly water demanding, twice as much as lithium processing.

[6] According to Jorge Vergara Castro the recharge of the Salt flat aquifer is estimated in 800 l/s, whilst underground water rights both for copper and lithium mining currently amount to 2000 l/s. The rights to brine extraction amount to circa 1200 l/s in 2016. The data is however an estimate, as there is no publicly available hydrological model of the Salar de Atacama. The study models produced are property of the mining companies. SQM plans to increase the production of lithium crystals from 48'000 Million Tonnes in 2018 to 180'000 MT in 2021, which entails aggressive extraction.

[7] Water in Chile was fully privatised under Pinochet's regime in 1981 (*Codigo de Agua*). Its rights of use can be bought and sold as any other goods without specific limitations. This juridical frame inevitably favours corporations.

[8] Surface mining rights, underground mining rights, strategic resources rights, underground water rights, surface water rights, protected areas, protected aquifers, indigenous lands, ALMA research enclosure. The extensive research that Environmental Architecture conducted in 2017|2018 is unpublished. However some of our sources are available in the bibliography for this article.

[9] To cite as an example, the SQM site over the Los Pantanos protected lagoons; or the Mineral de Pacifico exploration right over the Salar de Tara, part of the Reserva National de Los Flamencos.

[10] The ADI (Area Desarollo Indigena) comprises of all the communities' lands.

[11] Today mining is the first form of income, followed by traditional agriculture and jobs in the tourism industry. The panorama of opinions about mining within and among the communities is extremely fragmented.

[12] *Ayllu* translates both as community and oasis. It is a territory-based, extended family that forms the basis of productive relations even today and was conceived in terms of common descent from oppositional but complementary mythological ancestors. This landscape level is composed of disperse parts within short distances, and interpreted as a unit.

[13] To cite one: Parque Nacional del Manu in Madre de Dios, Peru.

[14] The process of territorial and social control that denies or erases indigenous people's modes of living.

[15] The *Talatur*: the ritual maintenance of the water canals through communal labour.

[16] Indigenous Lands 'perform better' than protected areas in the maintenance of the balance of the ecosystem, whatever the form of protection.

[17] This is thoroughly discussed in the complete work. Please see <https://spark.adobe.com/page/2p5i35hRouV4u/> for more details.

[18] Rights of Nature: Laws acknowledging the rights of nature change the status of natural communities and ecosystems to being recognised as *rights-bearing entities* with rights that can be enforced by people, governments, and communities.

[19] The practices suitable for the watershed of the Salar de Atacama are discussed in this complete work. It also designs the space in which mining, tourism and scientific research are able to set their practices within the basin-entity and what is their form of 'giving back' to it. Such practices are limited by the principles of foundation.

Fig. 10 – Two ways of telling the same territory: administrative (partial – green) and natural boundaries (basin – magenta). 2018. Author.

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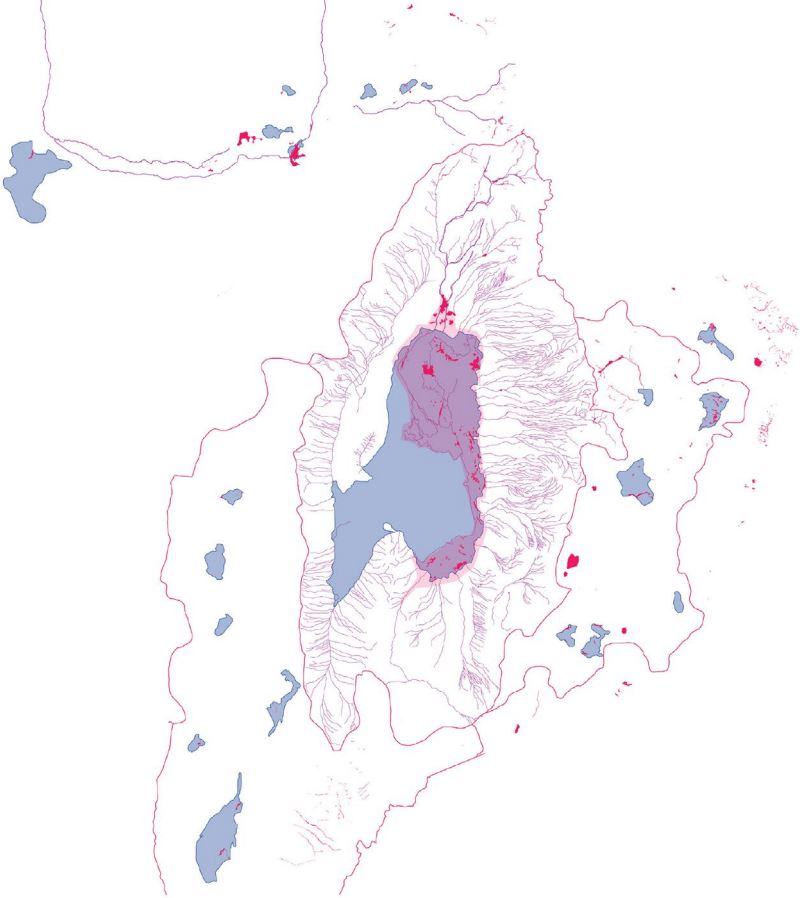

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Phosphor Tailings Pond #4, Near Lakeland, Florida, USA 2012. photo(s) © Edward Burtynsky, courtesy Admira Photography, Milan / Nicholas Metivier Gallery, Toronto.
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