




Albemarle Corporation

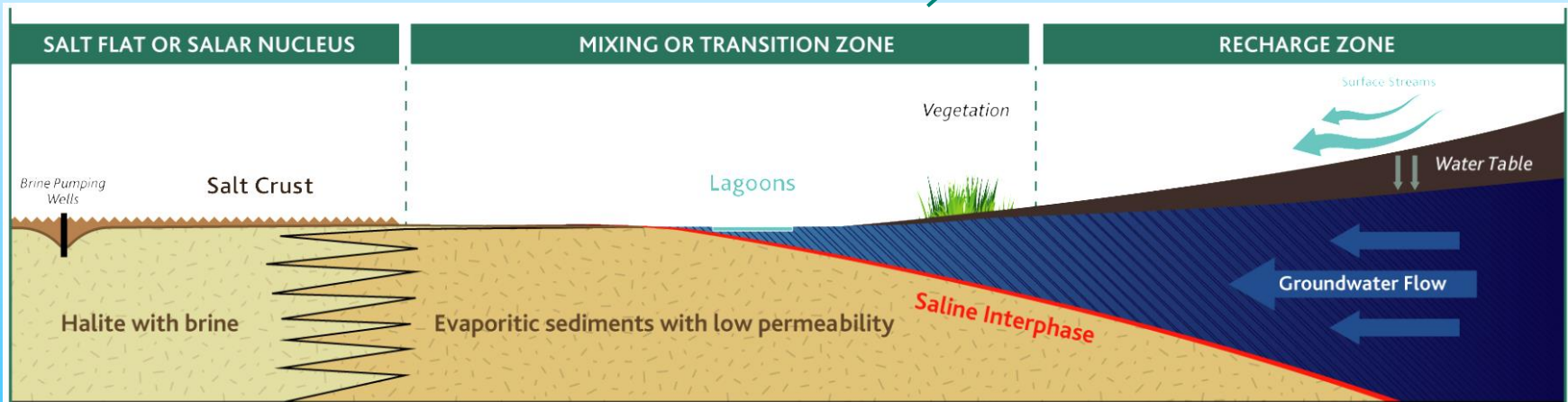
Making the World Safe & Sustainable by Powering the Potential of People
Lithium 2021



Hydrogeology Sustainability Update
February, 2021

The Atacama Basin: Saline Interphase

- In the Atacama basin, there are three primary zones: salt flat or **salar nucleus**, where the brine is located; **saline interphase**, the mixing or transition zone where the brine meets the fresh water; **recharge zone**, where surface or groundwater collects
- At the saline interphase, lower density groundwater meets higher density brine; the groundwater pools at the surface, forming lagoons
- Low permeability sediments around the saline interphase minimize the effects of brine extraction in the nucleus
- The size of the lagoons depends on the amount of groundwater that arrives at the saline interphase
- Our hydrogeological model and monitoring data demonstrates that brine pumping does not affect the upstream groundwater levels which feed the lagoons



Protecting Biodiversity and Ecosystems

Case Study: Peine-Punta La Brava Lagoon, Chile

Three types of flamingos inhabit the lagoons:



James



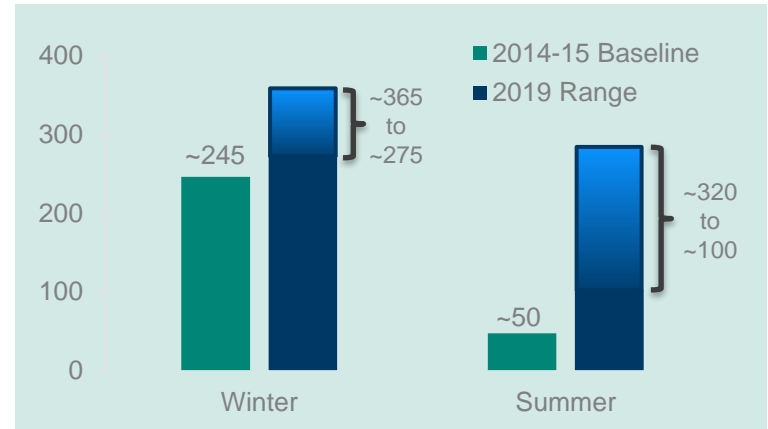
Andino



Chilean

Flamingo Monitoring Plan

- As part of a voluntary commitment, we monitor flamingos in the lagoons closest to our operations
- These migratory birds settle in the Peine-Punta La Negra lagoon system for portions of the year
- We have spent approximately \$1.1MM on these commitments since 2017
- Through our monitoring campaigns, we have documented an increase in flamingos¹

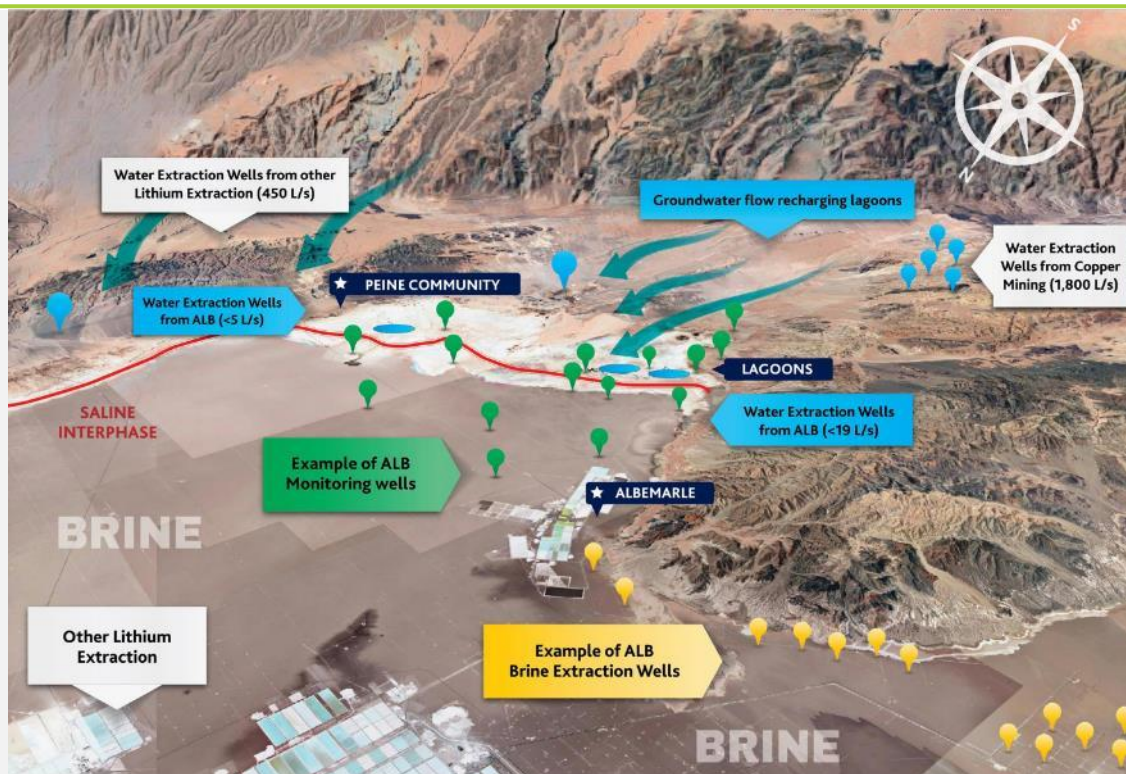


Hydrogeological Conceptual Model of the Southern Margin of Salar de Atacama

Hydrogeological Conceptual Model

Albemarle was granted a new **environmental permit (2016)** after developing a new hydrogeological model of the Salar de Atacama to support the sustainability and equilibrium of that ecosystem

- This study was conducted for **eight years** and cost **more than US\$20 million**
- With this new hydrogeological model, Albemarle established the highest standard for the sustainable extraction of brine in the Salar de Atacama
- This model is the most up-to-date tool available and serves as the basis for authorities, communities and other companies with operations in the area



Continually Improving Our Model to Allow for the Sustainability and Equilibrium of the Ecosystem

Environmental monitoring network

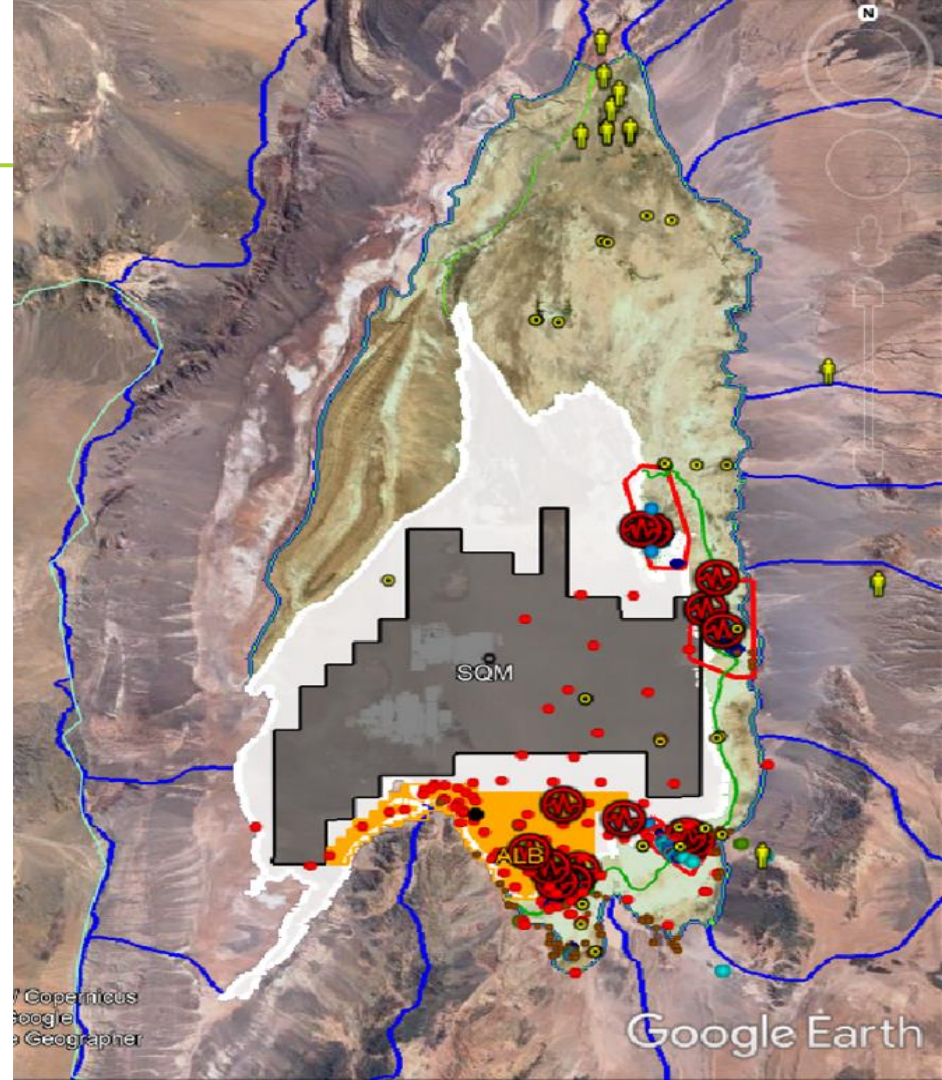
SdA is the most studied in the world.
Albemarle monitors:

- Terrestrial Ecosystems
- Aquatic Ecosystems
- Brine and Groundwater Levels
- Evaporation
- Atmospheric Conditions



Albemarle's Early Warning Monitoring Points

If the levels of some wells go below certain thresholds, measures must be taken (conduct more studies, reduce pumping of fresh water and/or brine).



Early Warning Plant (EWP), North Sector

The northern lagoon systems are supplied by the San Pedro and Vilama rivers. Water stress comes from the upper part of the basin with possible origin in climate change and agriculture (not lithium production) ^(A).

- From 1940 to 2014 (with no relevant Li production), river flows have decreased from 1,127 L/s to 620 L/s and from 332 L/s to 77 L/s respectively (45% and 77%).
- Consequently, in that period the agricultural area has decreased from 1,210 ha to 709 ha (41.4%).

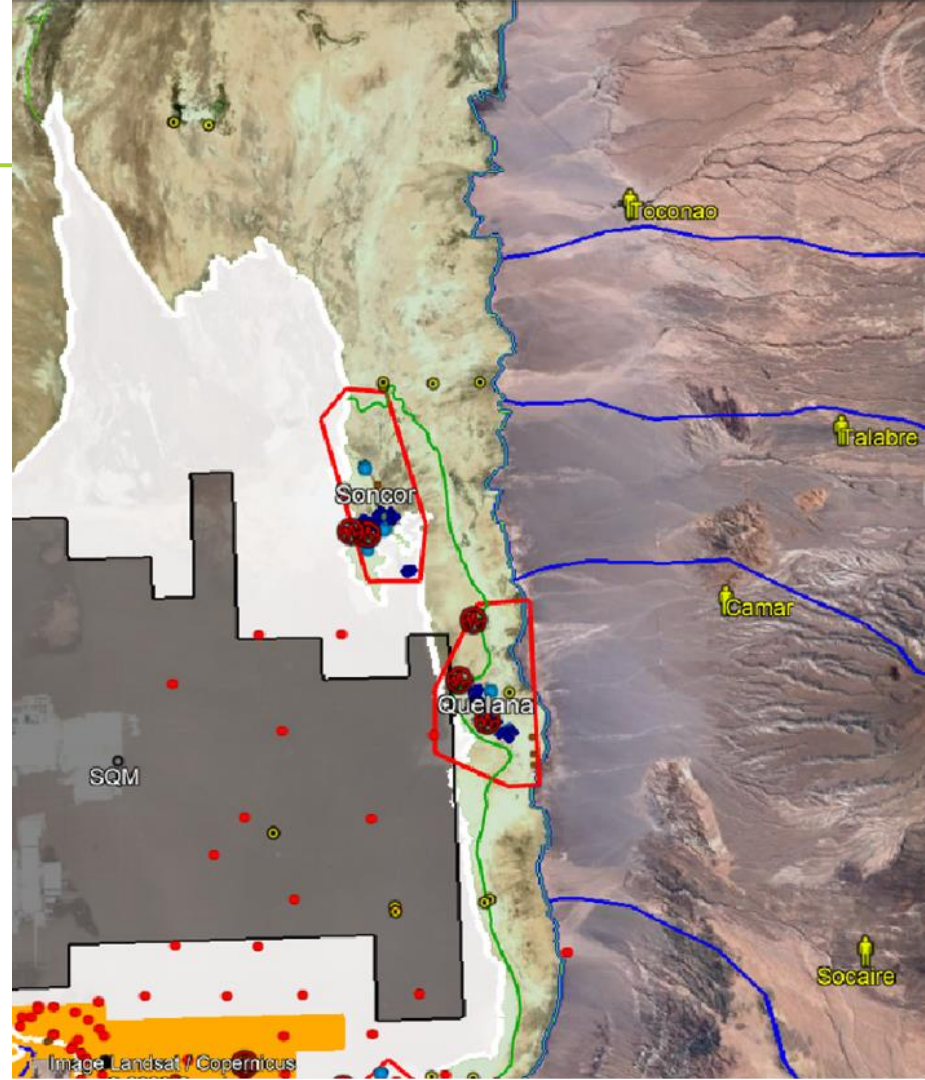
Studies of both SQM and Albemarle^(B) show that 90% of the impact generated by lithium would be generated by SQM (its operation is in the north).

SQM must reduce its extraction if levels are below thresholds and, if they continue to fall, Albemarle would reduce its pumping.

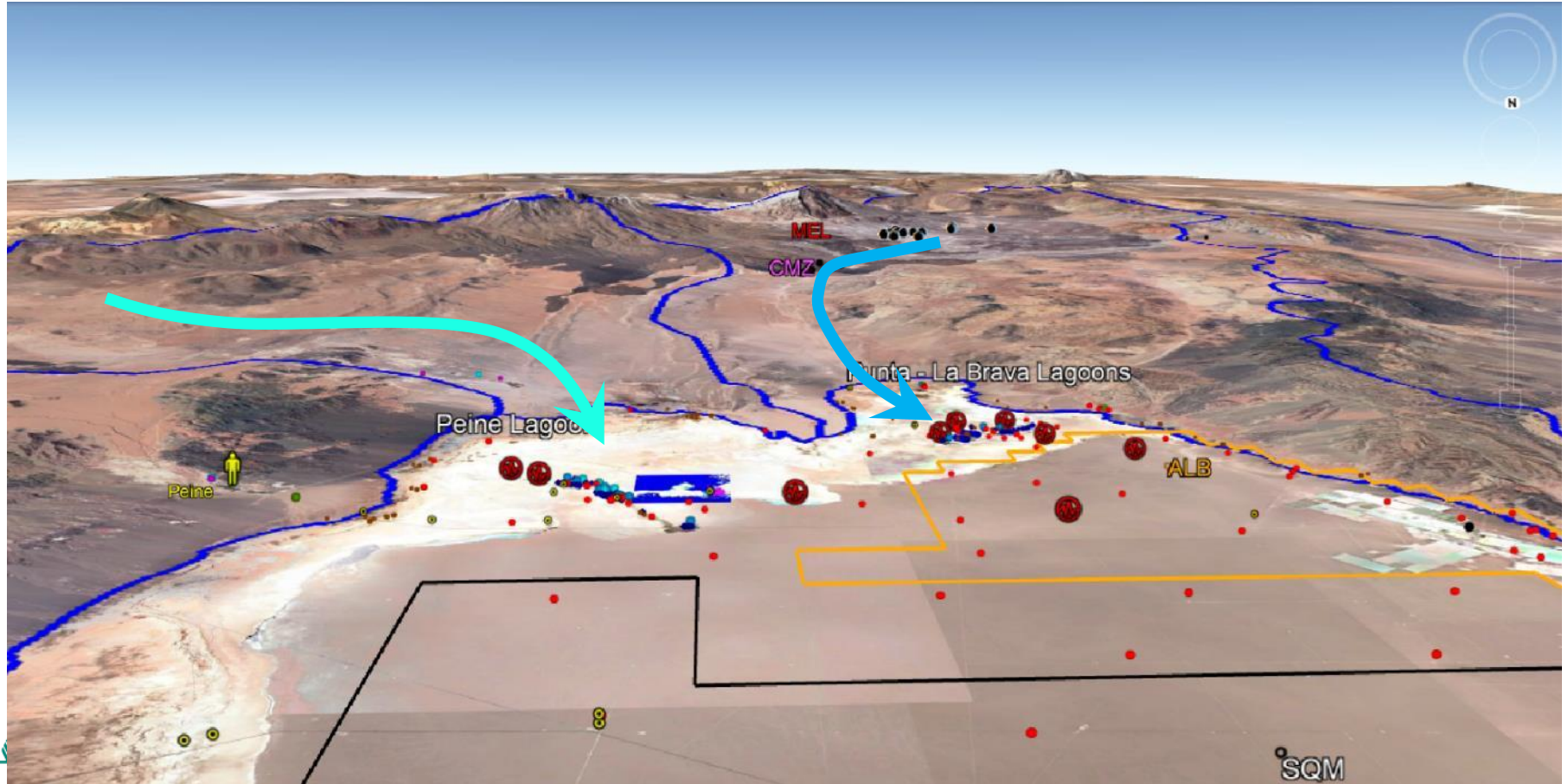
Only SQM has reduced its pumping as the levels have recovered in months, without the need for Albemarle to reduce its pumping.

(A): Sepúlveda et al. (2015) https://scielo.conicyt.cl/scielo.php?pid=S0718-10432015000200012&script=sci_arttext

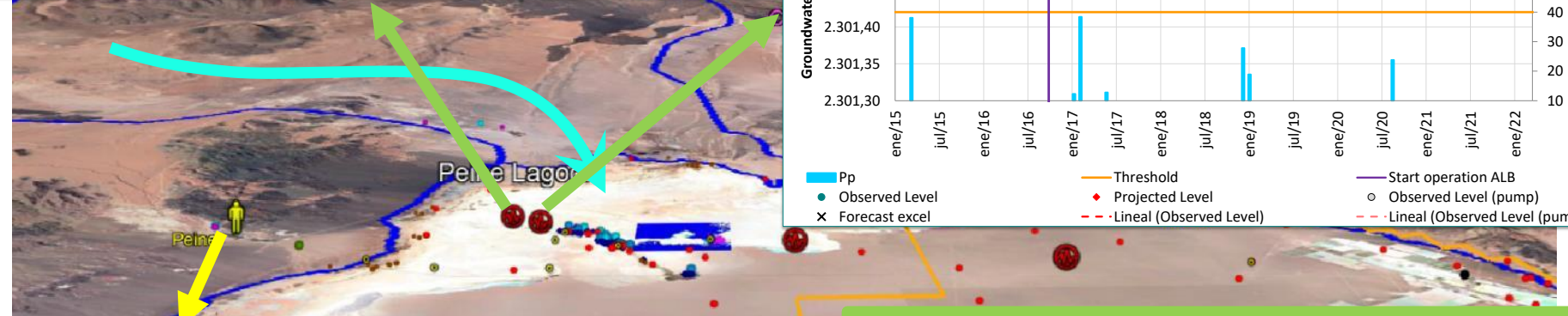
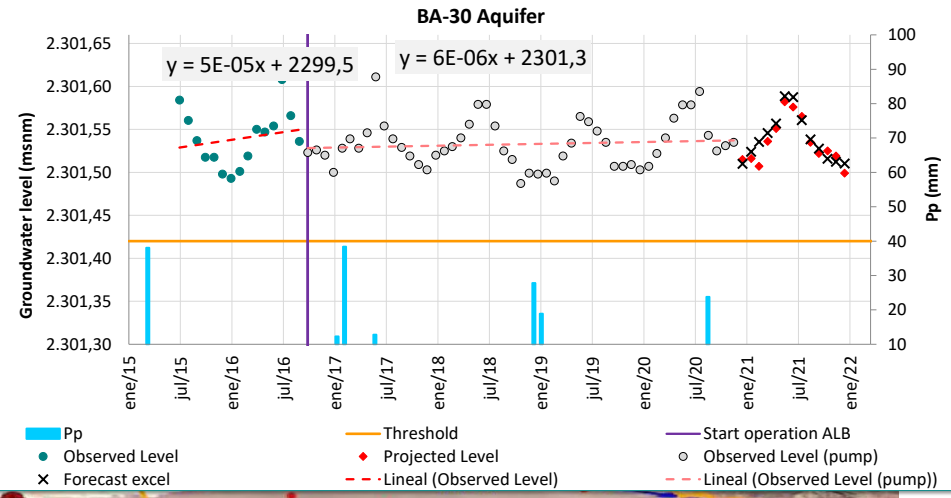
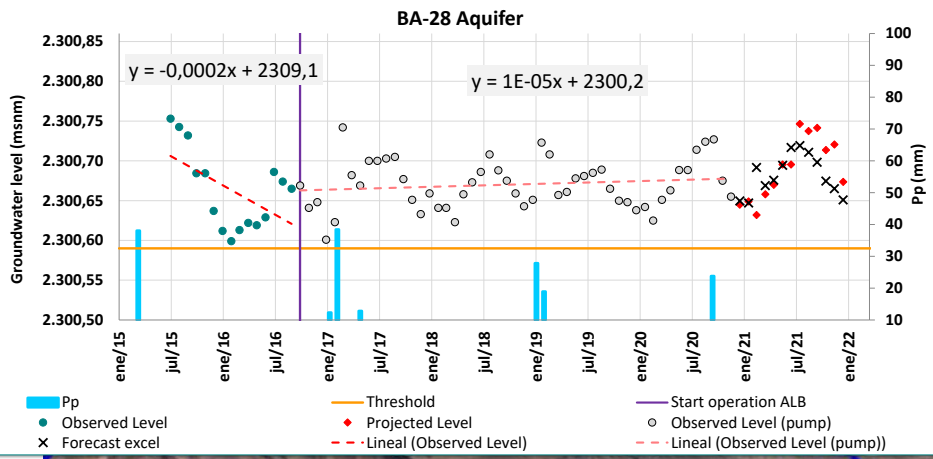
(B): SQM&ALB's reports to environmental authority



EWP, South Aquifer Peine - La Punta/La Brava Sector



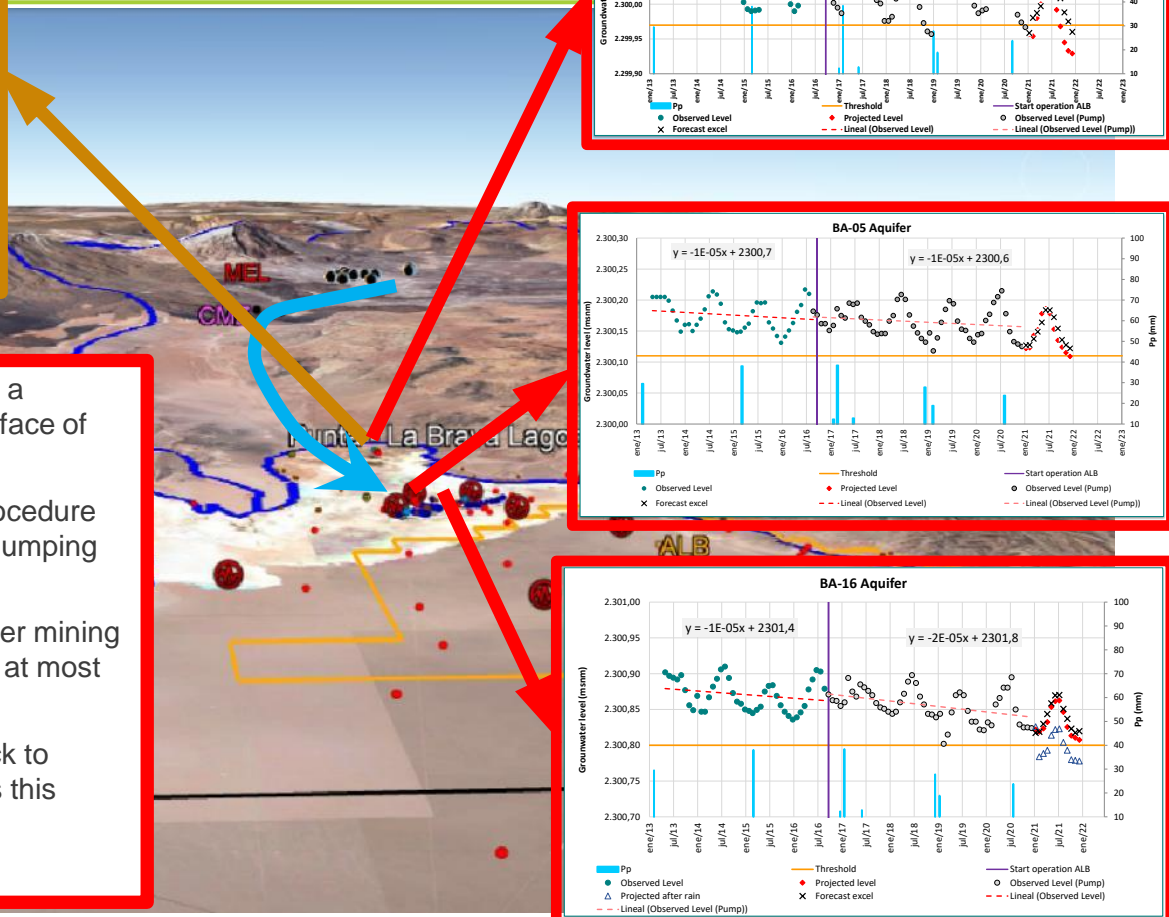
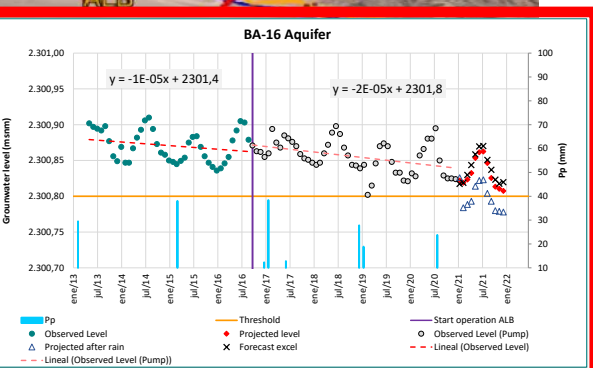
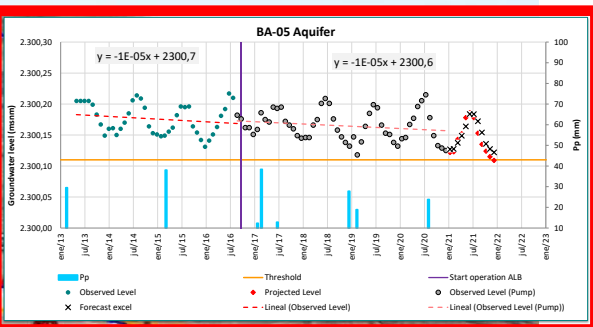
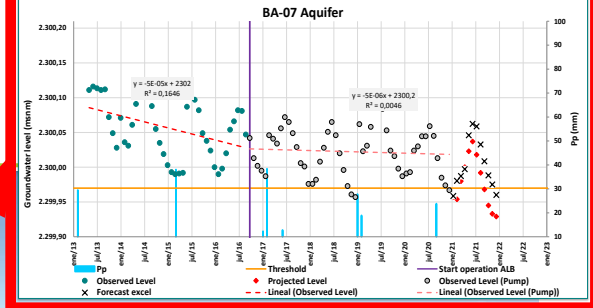
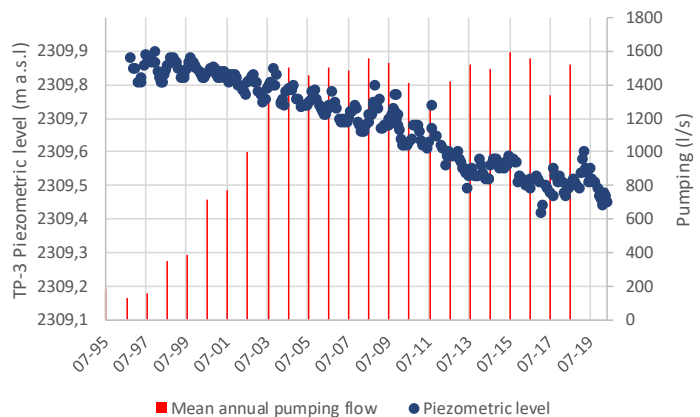
EWP, South Aquifer Peine



In Peine the water levels have increased, illustrating extraction by the community and Albemarle is sustainable

Water levels have not decreased since we increased brine pumping in 2016.

EWP, South Aquifer La Punta-La Brava



The extraction of water by copper mining has generated a permanent decrease in the aquifer levels (and in the surface of the wetlands).

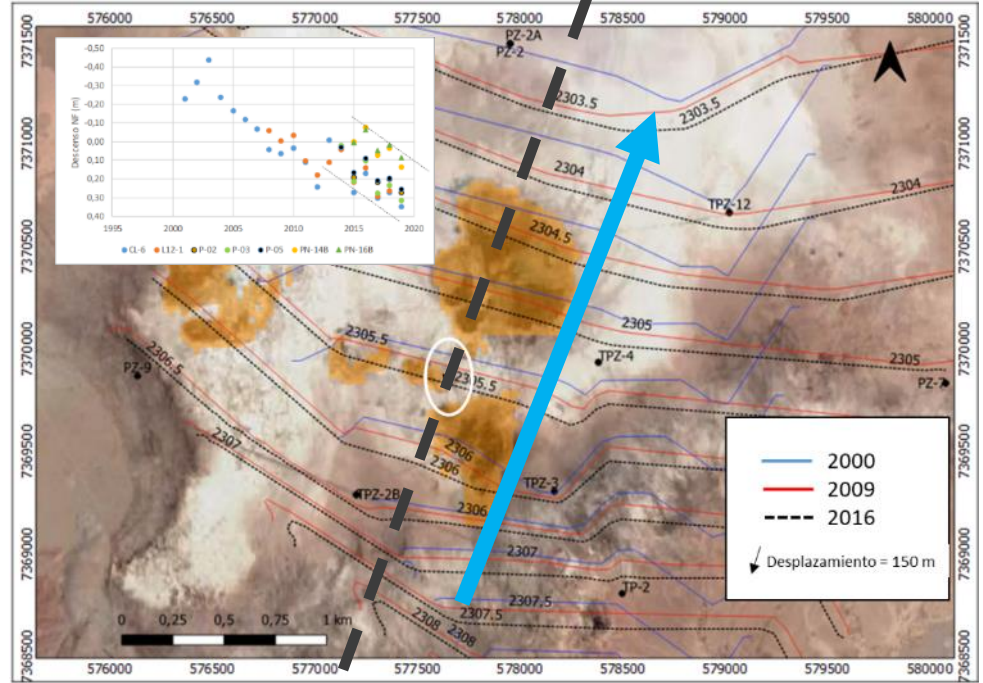
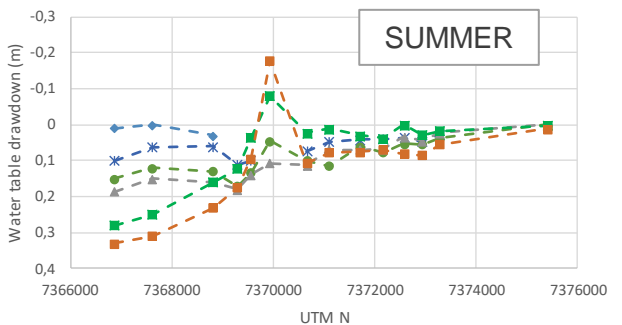
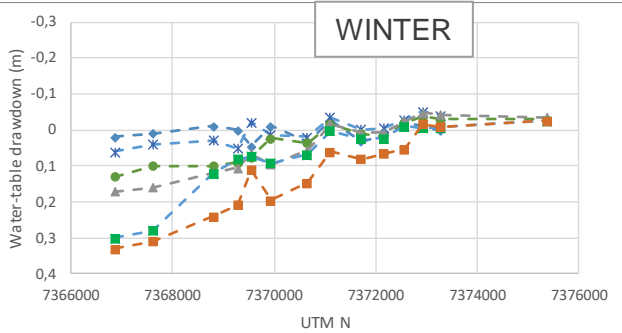
Environmental authorities have started a sanctioning procedure against Minera Escondida for not reducing fresh water pumping between 2005-2019.

In its defense, Minera Escondida blamed the other copper mining company (Zaldívar) and confirmed that Albemarle could at most only have a local effect around the monitoring well.

The downward trend in the three control wells dates back to before the implementation of the Albemarle project, thus this descent is attributable to the copper industry.

Southern Zone Research - Groundwater levels

A - A



A

On the left is the cross-sectional profile of the water table. It shows how the decreases in the upper part of the basin impact the lower part.

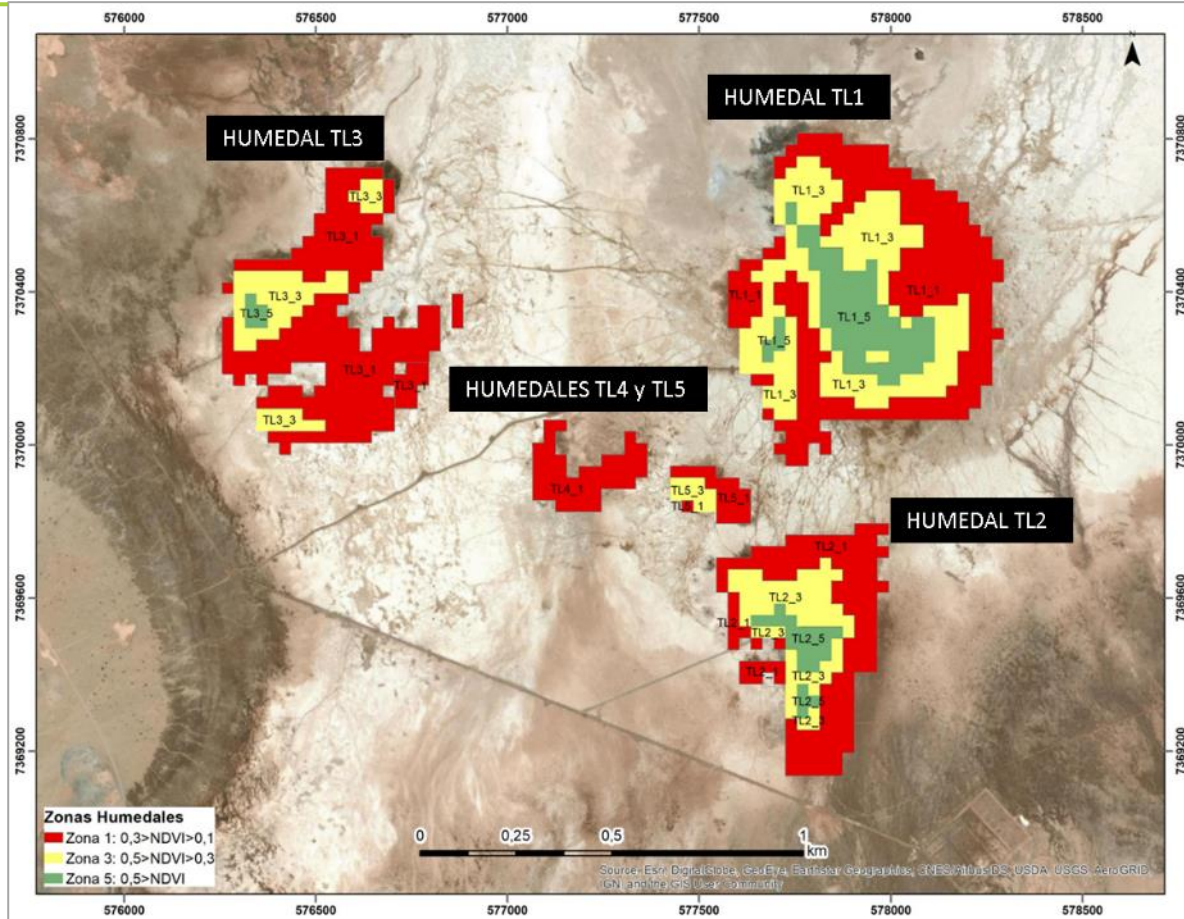
The background is a composite image. The top portion shows a night cityscape with buildings and light trails in shades of blue and cyan. The bottom portion shows a road at night with light trails in orange, yellow, and blue, and white road markings. The word "Annex" is centered in the middle of the image.

Annex

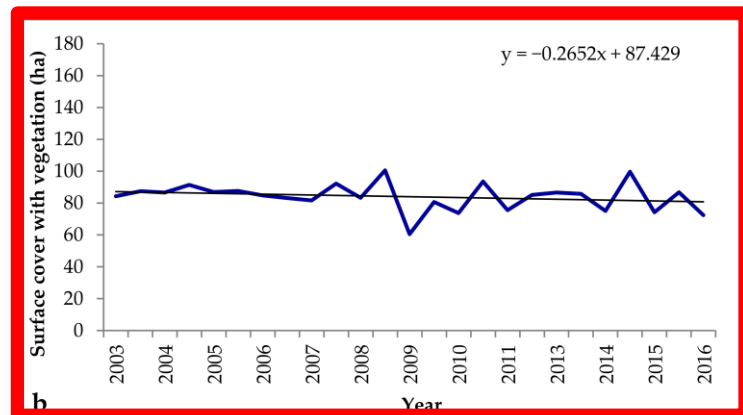
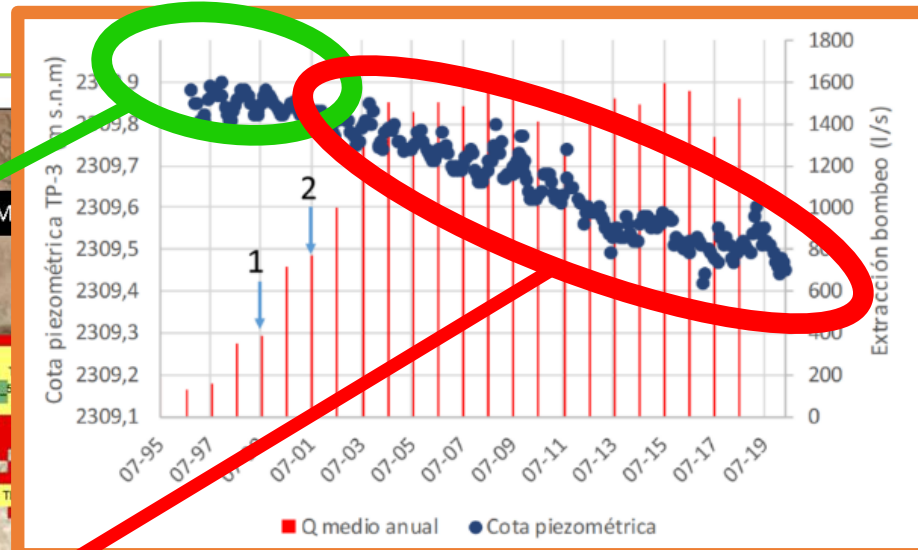
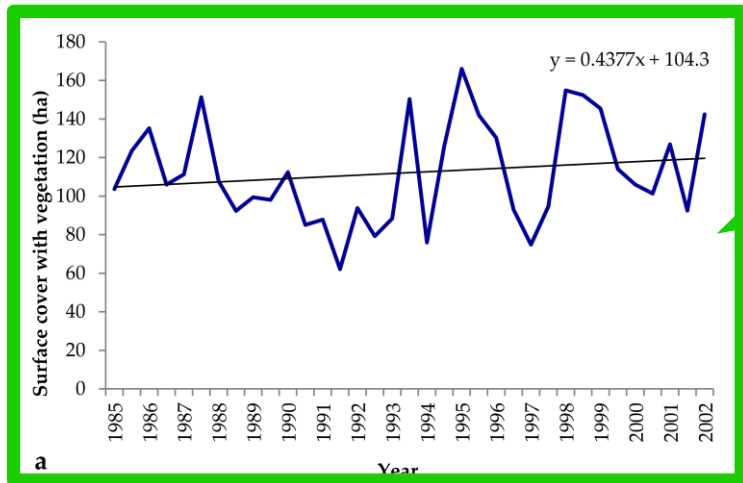
Southern Zone Research – Wetland Surface

- There are wetlands in the southern part of the Salar.
- The critical environmental variable in these ecosystems is the depth to groundwater.
- Soto *et al* (2019)^A show that the wetland surface showed signs of decreasing ten years after Copper miner *Escondida* started pumping groundwater from the upper part of the basin.
- Studies conducted by authorities, independent researchers and Albemarle show a direct relationship between groundwater declines and smaller wetland areas.

^A: A model for estimating the vegetation cover in the high-altitude Wetlands of the Andes (HAWA) <http://repositorio.uchile.cl/handle/2250/171580>



Southern Zone Research – Wetland Surface



The impact of water extraction by copper mining takes years to impact downstream. These graphs show that wetland areas increased initially after copper industry began pumping water and when the impact of such pumping reached the Tilopozo monitoring area, the surface area of the wetlands begins to decrease.

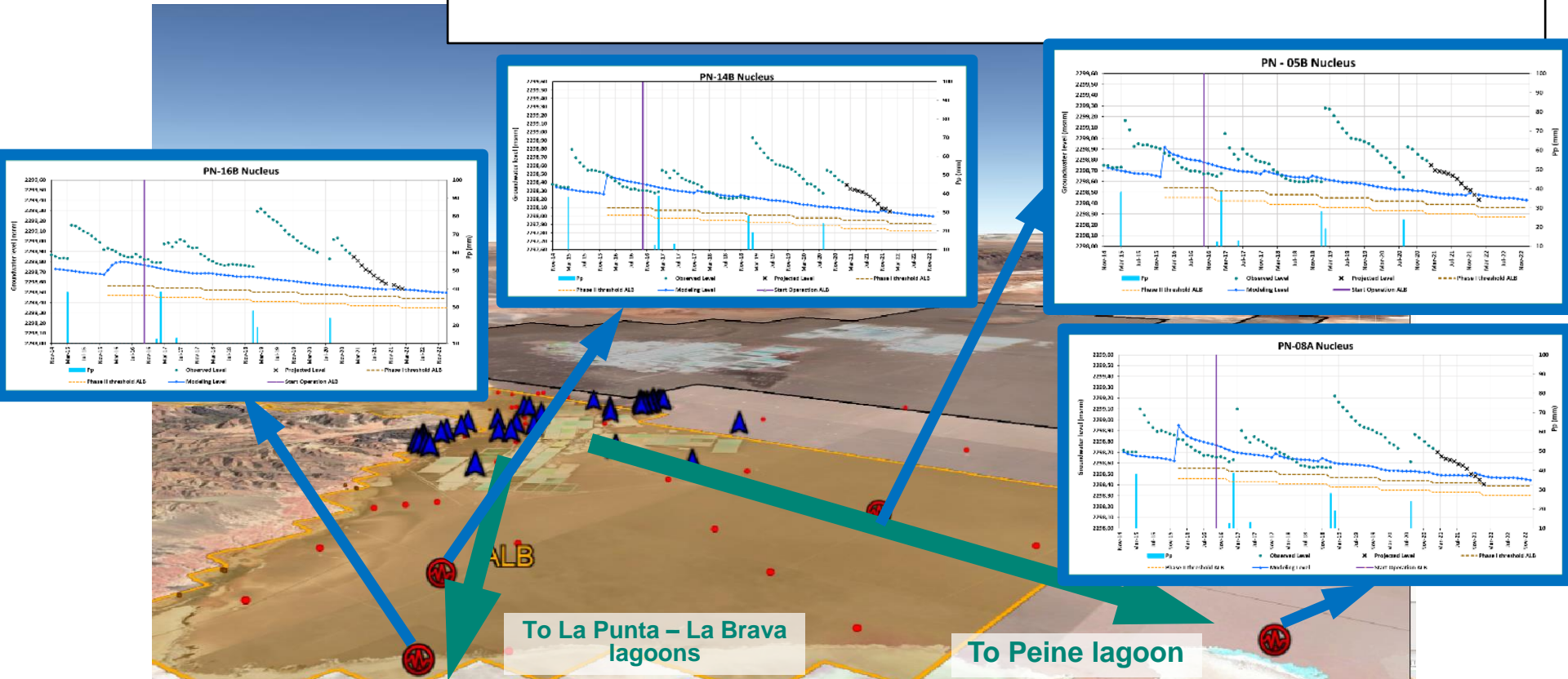
Zonas Humedales

- Zona 1: 0,3>NDVI>0,1
- Zona 3: 0,5>NDVI>0,3
- Zona 5: 0,5>NDVI

EWP, Nucleus

The brine levels in the nucleus are intended to verify that the model used in the environmental assessment adequately represents the observed reality. The thresholds descend because the enviro authority recognizes that our impact in the nucleus does not affect the ecosystems.

To date, the model has accurately predicted the descent of the brine levels as a result of our brine extraction.





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