



Briefing on lithium mining in the Andes of South America

No to water mega-mining

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Background

In the context of climate change, there is a growing urgency to substitute fossil fuels for cleaner alternative energy sources. Over recent years there has been a significant increase in lithium extraction, due to the use of lithium in rechargeable batteries for computers, mobile phones and other portable devices. However, the largest demand is for its use in electric cars batteries and renewable energy accumulators, which has converted lithium into a key mineral for the energy transition.

This growing demand has resulted in an exponential growth in lithium exploration and exploitation in the High Andes of South America during the last few years –especially in the area known as the “lithium triangle”–. Spanning parts of Argentina, Bolivia, and Chile, and at more than 3,000 meters above sea level, approximately 67% of global proven lithium reserves are concentrated in this area¹.

The High Andean wetlands located in and around the lithium triangle includes lakes, lagoons, marshes, bogs and salt flats. These are extremely fragile ecosystems that reflect their complex and unique hydrological systems. They are highly productive, veritable oases of vital importance for biodiversity and the wellbeing of local communities. These ecosystems harbour distinctive and valuable fauna, which includes Andean Flamingos and other threatened endemic bird species. Furthermore, the High Andean wetlands are allies in the fight against climate change, as they capture and have fixed large quantities of carbon² for the past centuries.



¹ U.S. Geological Service. 2018. Mineral commodity summaries 2018: U.S. Geological Survey.

Lithium Triangle in South America. Source: Apex in *The Economist* (2017).



The biggest threat posed by lithium mining today is related to the fact that exploitation is mostly carried out via lithium brine extraction and deposition in evaporation pools. The resulting concentrate is then removed for processing into lithium carbonate. Each **ton of lithium requires around 2 million litres of lithium rich water** to be evaporated, resulting in enormous quantities of water being lost every year and putting underground freshwater reserves in danger of salinisation by getting in contact with brine. In addition to the impact on freshwater reserves caused by lithium brine extraction, freshwater for purifying the lithium product is consumed during the process. The consequences of this, “water mega-mining” are demonstrated by a fall in the water table, the salinisation of freshwater and a reduction in underground water available ^{3,4}. This results in the drying up of surface water bodies and the damage to wetland ecosystems, with **direct impacts on biodiversity** ⁵ and **climate**, as vast quantities of securely stored carbon are released to the atmosphere as CO₂.

Given the extreme drought affecting the High Andean region, the loss of water resulting from lithium brine extraction has deeply negative implications for wetland ecosystems and local communities that depend upon them for their survival.

Our Position

Wetlands International agrees with the need to accelerate the transition towards cleaner, renewable, and sustainable energy sources to avoid the emission of greenhouse gases –mostly carbon dioxide (CO₂), but also methane (CH₄)– that are generated in the production, operations, and combustion of fossil fuels.

We are not against the use of lithium as a key mineral for the energy transition.

However, **evaporation-based lithium brine mining methods are not sustainable**. Energy generation involving the use of lithium derived from this process **should not be categorised as “renewable” nor “sustainable”**, given the impact on water resources and on High Andean wetlands, and the consequent GHG emissions generated by the disturbance and degradation of these ecosystems, which balances out any apparent gains in terms of CO₂ and reduces their resilience –making local communities and Andean countries more vulnerable to the adverse effects of climate change–. Furthermore, lithium brine mining should not take place in protected areas or sites that have been recognised for their international conservation value, such as Ramsar Sites and Biosphere Reserves, nor other high value wetlands in terms of climate, biodiversity and social wellbeing.

² Amaya, N. E., D.E. Blanco, A. F. Chamorro Cuestas, J. M. Gonnet, C. Hegoburu y H. J. Sosa. 2019. Conservación y manejo de vegas altoandinas en Argentina y Perú. Dos estudios de caso. Fundación Humedales / Wetlands International. Buenos Aires.

³ Sticco, M., G. Guerra, V. Kwaterka y S. Valdés. 2021. Impactos ambientales de la explotación de litio en los humedales y recursos hídricos del Altiplano. Programa Conservando los Humedales Altoandinos. Fundación Humedales / Wetlands International. Buenos Aires.

⁴ Conservación de humedales altoandinos y una minería de litio ajustada a estándares sociales y ambientales. Programa Conservando los Humedales Altoandinos. Wetlands International, FARN, YUCHAN. Abril 2021.

⁵ Petavratzi, E., D. Sanchez Lopez, A. Hughes, J. Stacey, J. Ford and A. Butcher. 2022. The impacts of environmental, social and governance (ESG) issues in achieving sustainable lithium supply in the Lithium Triangle. Mineral Economics: <https://doi.org/10.1007/s13563-022-00332-4>.



Impacts on biodiversity (Petavratzi et al. 2022)

There are a number of features of lithium production that affect biodiversity:

- ▶ Salinisation of freshwater and a reduction in underground water available, drying up of surface water bodies and the damage to wetland ecosystems.
- ▶ The evaporation ponds create a significant area of open water which has the possibility to attract wildlife and confuse migrating birds.
- ▶ The supply of power and raw materials as well as transport of the product requires the development of linear features such as electrical transmission lines and roads. These have the ability to cause harm to migrating birds through line-collision hazards, linear road features disrupting surface waterflow and to disrupt habitats and migration routes for terrestrial animals.
- ▶ The operation of the facilities themselves can result in indirect impacts such as poor food waste management resulting in increased scavenger populations leading to increased predation impacts.

Moreover, the role of High Andean wetlands in providing key resources for Andean communities as well as contributing to climate change adaptation and mitigation and biodiversity targets, must be more widely considered and valued by the authorities that are responsible for decision-making relating to land-use planning and conservation and sustainable use of natural resources.

Recommendations for action

Considering the above, we call on:

Countries spearheading the energy transition and demanding or sourcing lithium to take the following actions to minimise harm to environment and society:

- Transparently disclose how and where lithium is exploited for electric vehicle batteries and other products being sold or manufactured domestically, in particular when sourced from the Andes of South America.
- Support more research into and innovation for the application and deployment of new technologies that will consume less water and have a lower environmental impact.
- Promote operations and supply chains free of wetland degradation and ecosystem conversion –giving this equal importance to zero deforestation commitments– including via the development of robust certification and/or accreditation schemes for EVs and/or lithium.
- Energy storage involving the use of lithium derived from evaporation-based lithium brine mining methods should not be categorised as “renewable” nor “sustainable”, given the impact on water resources and on wetlands.
- Adopt policies for responsible and informed consumption, that is conscious of the impacts of the goods and services being consumed.
- Evaluate pathways to shift to a circular economy which will reduce the demand for minerals necessary for the energy transition and the pressure that this places on ecosystems.
- Adopt policies that increase the reuse and recycling of minerals required in battery production, taking into account the life cycle of the products.
- Include an explicit focus on lithium and wetlands as part of the work programme of the Sustainable Critical Minerals Alliance and related initiatives.





National and subnational authorities in the Andean countries to implement land-use regulations and policies that guarantee the conservation of the High Andean wetlands in the lithium triangle region:

- Where regulations exist, they must be updated and enhanced. These environmental land-use regulations must be taken forward, including the identification of key wetland sites for preservation.
- Regulations must as well update the environmental assessment procedures –Strategic Environmental Evaluation and Environmental Impact Evaluation (EIA)–.
- Environmental impact assessment should be adapted to each particular wetland type and should consider an integral assessment of the basin, tailoring the definition of the project’s zone of influence on its spatial and temporary hydrogeological dynamic –connectivity between basins, and modern and fossil water–.

International financial institutions and development banks to play a stronger role in addressing the threats to the High Andean wetlands from lithium mining in order to meet climate and biodiversity goals:

- Review and strengthen standards, policies, and conditions for clients to take fully into account the harmful impacts on people and nature of lithium mining, especially in the High Andes region, including via IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources (2012) and associated guidance.
- Incorporate a focus on lithium mining and environmental impacts as part of Multilateral Development Bank activity on the implementation of the Global Biodiversity Framework via policies, analysis, assessments, advice, investments, and operations –and in line with the MDB Joint Statement on Nature, People and Planet (2022)–.

Private sector and business and finance organizations to give greater consideration to lithium mining and the impacts on people and nature:

- Ensure the impacts of lithium mining on wetland ecosystems are prioritized as part of the implementation of Global Biodiversity Framework, especially Target 15 on the disclosure of risks, impacts and dependencies on nature, and via the Taskforce for Nature-Related Financial Disclosures.
- Work with partners to develop nature-positive pathways and business models for electric vehicles and energy storage sectors.
- Ensure representation of local communities and consideration of impacts of lithium on wetlands in initiatives such as the Global Battery Alliance Battery Passport Proof of Concept and as part of a greater focus on biodiversity and ecosystems in line with the GBF.

How we work

As a science-based organisation with expertise on wetlands, Wetlands International works with many different partners, including the mining sector, to improve environmental practices and to promote more responsible mining. We work to limit the impact on wetlands by improving the understanding and consideration of ecosystem functions such as carbon sequestration and storage, water flow, habitats and biodiversity and their values, and by ensuring this is better reflected in planning decisions, including mine development and closure.

We promote wetland conservation through the application of wise use principles based on the ecosystem approach⁶. We support the Ramsar Convention on Wetlands hierarchy for operations in wetlands, with a preference for avoiding, otherwise minimising impacts; then to mitigate those impacts and compensate for any resultant impacts.

We work to support:

- A net positive impact policy for avoiding, mitigating and compensating the impacts of operations on biodiversity.
- A risk-based approach to operational planning that includes the cost of lost ecosystem services in its decision-making.
- Opportunities to avoid, minimise, mitigate, compensate and restore impacts through the use of zoning and spatial planning; strategic environment assessments; improved impact assessment standards which include cumulative impacts; ecosystem-based operational standards that monitor the ecological baseline and impacts as a basis for adaptive management.
- Increased awareness of stakeholders, including regulators (local and national governments) and international finance institutions, of the benefits provided by the safeguarding and restoration of wetlands, and in order to better compensate for loss of ecosystem functions.
- Planning approaches (including protected areas for critical habitat) that maintain the integrity of key ecosystem services and avoid compromising irreplaceable or difficult to remediate areas such as those with complex hydrology, high carbon stocks or those important to indigenous livelihoods or species at risk.
- Better regulations to minimise the impacts of mining operations, and ensure that ecosystem-based restoration is better reflected in laws, policies and practices.

⁶ A clear elaboration of this approach and these principles has been developed and adopted by the Ramsar Convention on Wetlands.

About Wetlands International

Wetlands International is the only global not-for-profit organisation solely dedicated to the conservation and wise use of wetlands. Our vision is of a world where wetlands are treasured and nurtured for their beauty, the life they support and the resources they provide.



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